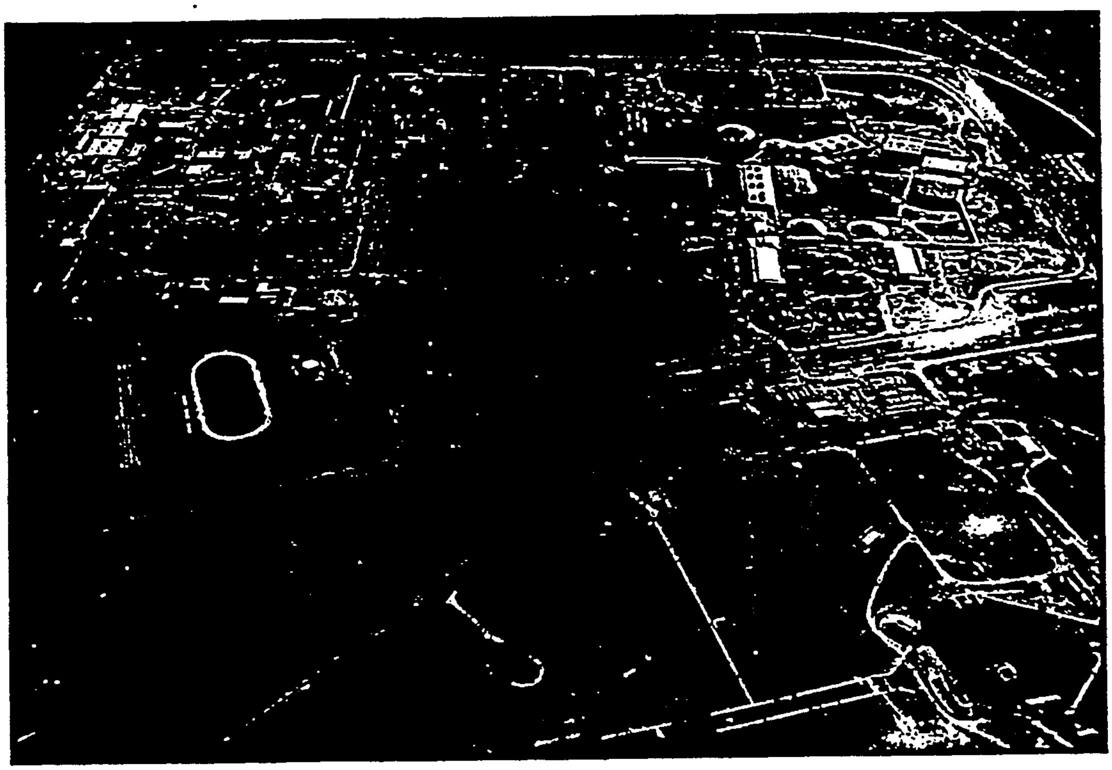
DOE/EIS-0225 -Vol. I

Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components

Volume I–Main Report



U.S. Department of Energy
1000 Independence Avenue
Washington, DC 20585

November 1996

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COVER SHEET

RESPONSIBLE AGENCIES:

Lead Federal Agency: U.S. Department of Energy (DOE)
Cooperating Federal Agency: U.S. Department of the Air Force

TITLE:

Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, located in Carson County, Texas (DOE/EIS–0225)

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ABSTRACT:

This document assesses the potential environmental impacts over approximately 10 years of continued operation of Pantex Plant, including foreseeable projects and activities. For Pantex Plant, this document assesses the alternatives of No Action, Relocation of the storage of plutonium components (pits) resulting from nuclear weapon disassembly activities at Pantex Plant to another site, and the Proposed Action (Preferred Alternative) of continuing operations and increasing the quantity of pits in interim storage at Pantex Plant. For the Pit Storage Relocation Alternative, this document also assesses the potential environmental impacts to three DOE candidate sites and one Department of Defense candidate site that could be selected for the relocation of the nuclear component storage activities from Pantex Plant. Evaluations of site infrastructure, land resources, geology and soils, water resources, air quality, acoustics, biotic resources, cultural resources, socioeconomic resources, intrasite transportation, waste management, human health, aircraft accidents, and environmental justice for Pantex Plant and the candidate sites are included in the assessment. The intersite transportation of nuclear and hazardous materials is also assessed.

PUBLIC COMMENTS:

In preparing the Final EIS, DOE considered comments received by mail, fax, e-mail, handed in at hearings, or transcribed from telephone messages. In addition, interactive public hearings were held in April, May, and June 1996 at the following locations where comments and concerns identified during discussions were transcribed: Amarillo, Texas; North Las Vegas, Nevada; North Augusta, South Carolina; Albuquerque, New Mexico; and Richland, Washington.

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ACRONYMS AND ABBREVIATIONS

AAO	Amarillo Area Office
ADROIT	Analysis of Dispersal Risk Occurring in Transportation
AEDC	Amarillo Economic Development Corporation
AFB	Air Force Base
AGV	Automated Guided Vehicle
AL	Albuquerque Operations Office
ALARA	As Low as Reasonably Achievable
AOC	Area of Concern
AQCR	Air Quality Control Region
ASER	Annual Site Environmental Report
BA	Biological Assessment
BACT	Best Available Control Technology
BG	Burning Ground
BGU	Burning Ground Upgrade
BNA	Block Numbering Area
BNSF RR	Burlington Northern and Santa Fe Railroad
BRAC	Base Realignment and Closure
BRL	Ballistic Research Laboratory
CAA	Clean Air Act
CAMS	Continuous Air Monitoring Systems
CDP	Census Designated Place
CDR	Conceptual Design Report
CEDE	Committed Effective Dose Equivalent
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant(s) of Concern
COD	Chemical Oxygen Demand
COE	U.S. Army Corps of Engineers
CONUS	Continental U.S.
COPC	Contaminant(s) of Potential Concern
CRM	Cultural Resource Management
CRMP	Cultural Resource Management Plan
CRP	Conservation Reserve Program
CSA	Canned Subassembly

CWA	Clean Water Act
CY	Calendar Year
DAF	Device Assembly Facility
DCG	Derived Concentration Guidelines
D&D	Decontamination and Decommissioning
DEIS	Draft Environmental Impact Statement
DNA	Defense Nuclear Agency
DNL	Day-Night Average Sound Level
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
DOT	Department of Transportation
DPTRA	Defense Programs Transportation Risk Analysis
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ER	Environmental Restoration
ERAD	Explosive Release Atmospheric Dispersion
ERPG	Emergency Response Planning Guidelines
ES&H	Environment, Safety, and Health
ESL	Effects Screening Level
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS	Final Environmental Impact Statement
FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Act
FFTF	Fast Flux Test Facility
FICA	Federal Insurance Contributions Act
FM	Farm-to-Market Road
FMEF	Fuels and Materials Examination Facility
FPPA	Farmland Protection Policy Act
FWS	Fish and Wildlife Service
FY	Fiscal Year
GAd	Gross Alpha—dissolved
GAs	Gross Alpha—suspended

GBd	Gross Beta—dissolved
GBs	Gross-Beta—suspended
GPS	Global Positioning System
HAP	Hazardous Air Pollutant
HE	High Explosive(s)
HEPA	High Efficiency Particulate Air
H-Gear	Weapons-Specific Handling Gear
HHS	Health and Human Services
HVAC	Heating, ventilation, and air conditioning
HLW	High-Level Waste
HPCAF	Health Physics Calibration and Acceptance Facility
HW	Hazardous Waste
HWTPF	Hazardous Waste Treatment and Processing Facility
ICM	Interim Corrective Measure
ICRP	International Commission on Radiological Protection
IHE	Insensitive High Explosive
ILS	Instrument Landing System
IO	Isolated Occurrence
ISC	Industrial Source Complex
ISCLT2	Industrial Source Complex Long Term, Version 2
ISCST2	Industrial Source Complex Short Term, Version 2
IST	In-Service Training
JCO	Justification for Continued Operation
JTA	Joint Test Assembly
KAFB	Kirtland Air Force Base
LANL	Los Alamos National Laboratory
LCF	Latent Cancer Fatality
LDR	Land Disposal Restrictions
L_{eq}	Equivalent Sound Level
LLNL	Lawrence Livermore National Laboratory
LLMW	Low-Level Mixed Waste
LLW	Low-Level Radioactive Waste
LWR	Light Water Reactor
MACCS	Melcor Accident Consequence Code System
MACT	Maximum Achievable Control Technology
MCAF	Materials Compatibility Assurance Facility
MCL	Maximum Contaminant Level

MDL	Method Detection Limit
MELTER	Model of the Thermal Response of Cargos Transported in the Safe-Secure Trailer Subject to Fire Environments for Risk Assessment Applications
MEOI	Maximally Exposed Offsite Individual
MOBILE 5a	Mobile Source Emission Factor Model, Version 5a
MOU	Memorandum of Understanding
MR	Modified Richmond
MSA	Metropolitan Statistical Area
MTU	Mobile Treatment Unit
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
ND	No Damage
NDEF	Nondestructive Evaluation Facility
NDRC	National Defense Research Committee
NE	Northeast
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFA	No Further Action
NHPA	National Historic Preservation Act
NHW	Nonhazardous Waste
NIOSH	National Institute for Occupational Safety and Health
NLR	Noise Level Reduction
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NTS	Nevada Test Site
OB/OD	Open Burning/Open Detonation
O&I	Operations & Inspection
OMB	Office of Management and Budget
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
OSTP	Old Sewage Treatment Plant
OU	Operable Unit
PA	Programmatic Agreement

PBX	Plastic Bonded Explosives
PEIS	Progammatic Environmental Impact Statement
PIDAS	Perimeter Intrusion Detection and Alarm System
PL	Public Law
PPOA	Pollution Prevention Opportunity Assessment
PP/WM	Pollution Prevention/Waste Minimization
PRG	Preliminary Remediation Goal
PRA	Probabilistic Risk Assessment
PSD	Prevention of Significant Deterioration
QA/QC	Quality Assurance/Quality Control
RAMS	Radar Airspace Monitoring System
R&D	Research and Development
RBC	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RHWSF	RCRA Hazardous Waste Staging Facility
RIMS II	Regional Input-Output Modeling System
RMMA	Radioactive Materials Management Areas
ROD	Record of Decision
ROI	Region of Influence
RRS	Risk Reduction Standard
RTG	Radioisotopic Thermoelectric Generator
S&D	Storage and Disposition
SAC	Steel Arch Construction
SAR	Safety Analysis Report
SARA	Superfund Amendments and Reauthorization Act
SARP	Safety Analysis Report for Packaging
SCDHEC	South Carolina Department of Health and Environmental Control
SDWA	Safe Drinking Water Act
SF	Slope Factor
SHPO	State Historic Preservation Office
SNL	Sandia National Laboratories
SNM	Special Nuclear Material
SPF	Standard Project Flood
SRS	Savannah River Site
SSM	Stockpile Stewardship and Management
SST	Safe Secure Tractor Trailer

STAR	Stability Array
START II	Strategic Arms Reduction Treaty
STP	Site Treatment Plan
SVOC	Semivolatile Organic Compound
SWDA	Solid Waste Disposal Act
SWEIS	Site Wide Environmental Impact Statement
SWMU	Solid Waste Management Unit
T&E	Threatened and Endangered
TAC	Texas Administrative Code
TACB	Texas Air Control Board
TBEG	Texas Bureau of Economic Geology
TCP	Traditional Cultural Property
TDCJ	Texas Department of Criminal Justice
TDH	Texas Department of Health
TDS	Total Dissolved Solids
TNRCC	Texas Natural Resources Conservation Commission
TOX	Total Organic Halogen
TPWD	Texas Parks and Wildlife Department
TRU	Transuranic
TSCA	Toxic Substances Control Act
TSD	Transportation Safeguards Division
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TTU	Texas Tech University
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank
U.S.	United States
U.S.C.	United States Code
UTL	Upper Tolerance Limit
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
VOR	Very High Frequency Omni-Directional Radio Range
VORTAC	Very High Frequency Omni-Directional Radio Range with Tactical Air Navigation
VSI	Visual Site Inspection
WAC	Waste Acceptance Criteria
WM PEIS	Waste Management Programmatic Environmental Impact Statement
WSA	Weapons Storage Area

WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant
XTX	Extrudable Explosive

CHEMICALS AND UNITS OF MEASURE

Be	beryllium
BGY	billion gallons per year
BOD	Biological Oxygen Demand
°C	degrees Celsius
Ca	calcium
Ci	Curie
CCl_4	carbon tetrachloride
CO	carbon monoxide
CFC	chlorofluorocarbons
CFC-12	dichlorodifluoromethane
CFC-113	trichlorotrifluoroethane
cm	centimeter
Cs	cesium
D	deuterium
d	day
dB	decibel
dBA	decibel A-weighted scale
dBC	decibel C-weighted scale
DCE	1, 2-dichloroethylene
DDT	dichlorodiphenyltrichloroethane
DU	depleted uranium
°F	degrees Fahrenheit
ft	feet
ft^2	square feet
ft^3	cubic feet
ft^3/s	cubic feet per second
g	gram
gal	gallon
gpd	gallons per day
g/sec	gram per second
H	hydrogen
H^3	tritium
ha	hectare

HCFC-22	chlorodifluoromethane
HCl	hydrochloric acid
HEU	highly enriched uranium
HF	hydrogen fluoride
HMX	high melt explosive
hr	hour
Hz	Hertz
in	inch
K	kelvin
kg	kilogram
km	kilometer
km^2	square kilometers
km/hr	kilometers per hour
kV	kilovolt
kVA	kilovoltampere
kW	kilowatt
kWh	kilowatt hour
lb	pound
lb/hr	pounds per hour
lb/yr	pounds per year
L	Liter
Li	lithium
LX	press-moldable HMX
M	million
m	meter
m^2	square meters
m^3	cubic meters
mCi	millicurie (one-thousandth of a Curie)
mCi/g	millicurie per gram
mCi/ml	millicurie per milliliter
mg	milligram (one-thousandth of a gram)
mg/L	milligram per liter
MGD	million gallons per day
MGY	million gallons per year
mi	miles
ml	milliliter
MOX	mixed oxide

mph	miles per hour
mrem	millirem (one-thousandth of a rem)
mrem/yr	millirem per year
m/sec	meters per second
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatthour
MWt	megawatt thermal
N	nitrogen
nCi	nanocurie (one-billionth of a Curie)
nCi/g	nanocuries per gram
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
O_3	ozone
P	phosphorous
Pa	pascal
Pb	lead
PBX	plastic-bonded explosives
PCB	polychlorinated biphenyl
pCi	picocurie (one-trillionth of a Curie)
pCi/g	picocuries per gram
pCi/L	picocuries per liter
PETN	pentaerythritoltetranitrate
pH	hydrogen-ion concentration
PM_{10}	particulate matter of aerodynamic diameter less than 10 micrometers
ppb	parts per billion
ppbv	parts per billion by volume
ppm	parts per million
psi	pounds per square inch
Pu	plutonium
qt	quart
qtr	quarter
RBC	risk based concentrations
RDX	research development explosive
rem	roentgen equivalent man
sec	second

SO_2	sulfur dioxide
SO_x	sulfur oxides
sq	square
Sr	strontium
T	tritium
TATB	triaminotrinitrobenzene
TCA	1, 1, 1-trichloroethane
TCE	trichloroethene
Th	thorium
TNB	trinitrobenzene
TNT	trinitrotoluene
TOC	total organic compounds
TOX	total organic halogen
U	uranium
UL	Underwriter's Laboratory
yd	yard
yd^3	cubic yards
yr	year
μCi	microcurie (one-millionth of a Curie)
μCi/g	microcuries per gram
μg	microgram (one-millionth of a gram)
μg/kg	micrograms per kilogram
μg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
μm	micron or micrometer (one-millionth of a meter)
μohms/cm	micromhos per centimeter

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METRIC CONVERSION CHART

TO CONVERT INTO METRIC			TO CONVERT OUT OF METRIC		
IF YOU KNOW	MULTIPLY BY	TO GET	IF YOU KNOW	MULTIPLY BY	TO GET
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.40469	hectares	hectares	2.471	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45385	kilograms	kilograms	2.2034	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32, then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

METRIC PREFIXES

PREFIX	SYMBOL	MULTIPLICATION FACTOR	PREFIX	SYMBOL	MULTIPLICATION FACTOR
exa-	E	$1\,000\,000\,000\,000\,000\,000 = 10^{18}$	deci-	d	$0.1 = 10^{-1}$
peta-	P	$1\,000\,000\,000\,000\,000 = 10^{15}$	centi-	c	$0.01 = 10^{-2}$
tera-	T	$1\,000\,000\,000\,000 = 10^{12}$	milli-	m	$0.001 = 10^{-3}$
giga-	G	$1\,000\,000\,000 = 10^{9}$	micro-	µ	$0.000\,001 = 10^{-6}$
mega-	M	$1\,000\,000 = 10^{6}$	nano-	n	$0.000\,000\,001 = 10^{-9}$
kilo-	k	$1\,000 = 10^{3}$	pico-	p	$0.000\,000\,000\,001 = 10^{-12}$
hecto-	h	$100 = 10^{2}$	femto-	f	$0.000\,000\,000\,000\,001 = 10^{-15}$
deka-	da	$10 = 10^{1}$	atto-	a	$0.000\,000\,000\,000\,000\,001 = 10^{-18}$

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CHAPTER 1

Introduction

CHAPTER 1 INTRODUCTION

This chapter provides background information to facilitate a general understanding of operations conducted at Pantex Plant, the circumstances that resulted in the preparation of this Environmental Impact Statement (EIS), and the types of analyses that are presented in subsequent chapters. Chapter 1 begins with an overview of Pantex Plant, including a brief history and description of its current mission. Following this overview is a discussion of the evolution of this EIS, the decision making process, significant issues addressed in the EIS, related environmental studies, interagency cooperation, and agency consultations for implementing the alternatives. The chapter concludes with a summary of the subjects covered in other chapters of this EIS.

1.1 INTRODUCTION

The Department of Energy (DOE) (the Department) is the Federal agency responsible for ensuring the safety, reliability, and effectiveness of the Nation's nuclear deterrent. The Department's Stockpile Stewardship and Management Program integrates the expertise and capabilities of three national laboratories, four plant sites, and a field testing site to accomplish this mission. Pantex Plant is an essential element in the program and its continued operation and associated storage of nuclear components are the subjects of this Environmental Impact Statement (EIS). A major aspect of this EIS is to assess the environmental impacts of increasing the number of plutonium components (called "pits") that are to be placed in interim storage as a result of ongoing weapons dismantlement operations.

This chapter provides the foundation for understanding the nature of Pantex Plant and its specific missions, the decisions that the Department faces, and the facts that bear upon these decisions. The chapter begins with a site description and a discussion of the history and mission of Pantex Plant. This is followed by a summary of the origin of this study and changes that have occurred as the EIS has evolved. Subsequent sections address the decision making process and decisions that are to be made, public involvement in identification of issues through the scoping process, the interagency cooperation in the development of this EIS, and agency consultations for implementing the alternatives.

1.2 PANTEX PLANT OVERVIEW

Pantex Plant is located in the Texas Panhandle, approximately 27 kilometers (17 miles) northeast of Amarillo, Texas (Figure 1.2–1). Pantex Plant is bounded on the north by Texas Farm-to-Market Road (FM) 293, on the east by FM 2373, and on the west by FM 683. To the south, DOE-owned property extends to within 1.6 kilometers (1 mile) of United States (U.S.) Highway 60 (Figure 1.2–2).

Pantex Plant Site consists of land owned and leased by DOE. DOE owns approximately 3,683 hectares (9,100 acres) at Pantex Plant proper and 436 hectares (1,077 acres) of detached property, called Pantex Lake, approximately 4 kilometers (2.5 miles) northeast of the main plant site. Pantex Plant operations near its southern boundary require DOE to lease approximately 2,347 hectares (5,800 acres) of land between the plant and U.S. Highway 60 from Texas Tech University (TTU), primarily for safety and security buffer areas. DOE also leases a small facility at the Amarillo International Airport for its own

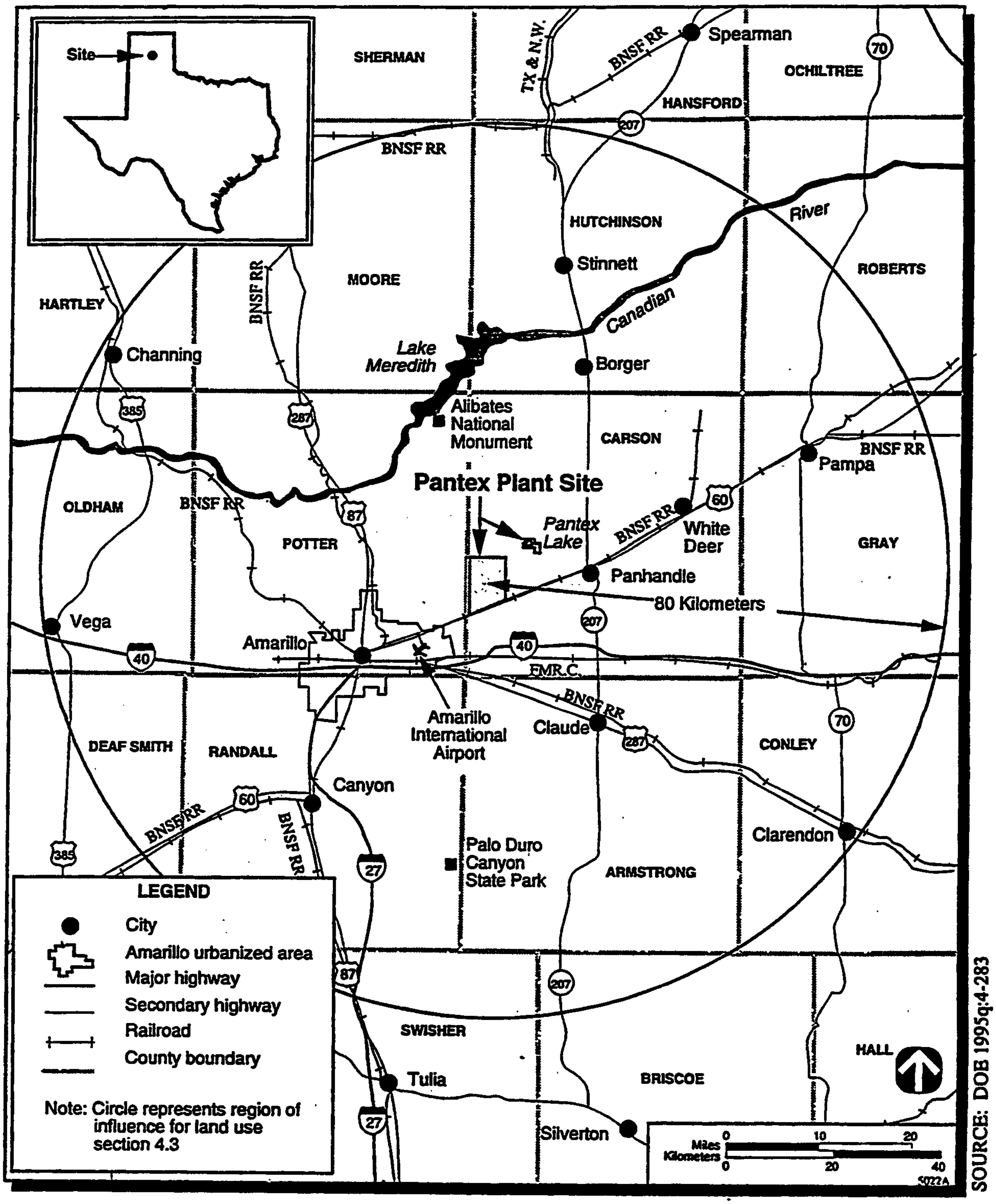


FIGURE 1.2–1.—*Location of Pantex Plant Site in the Texas Panhandle.*

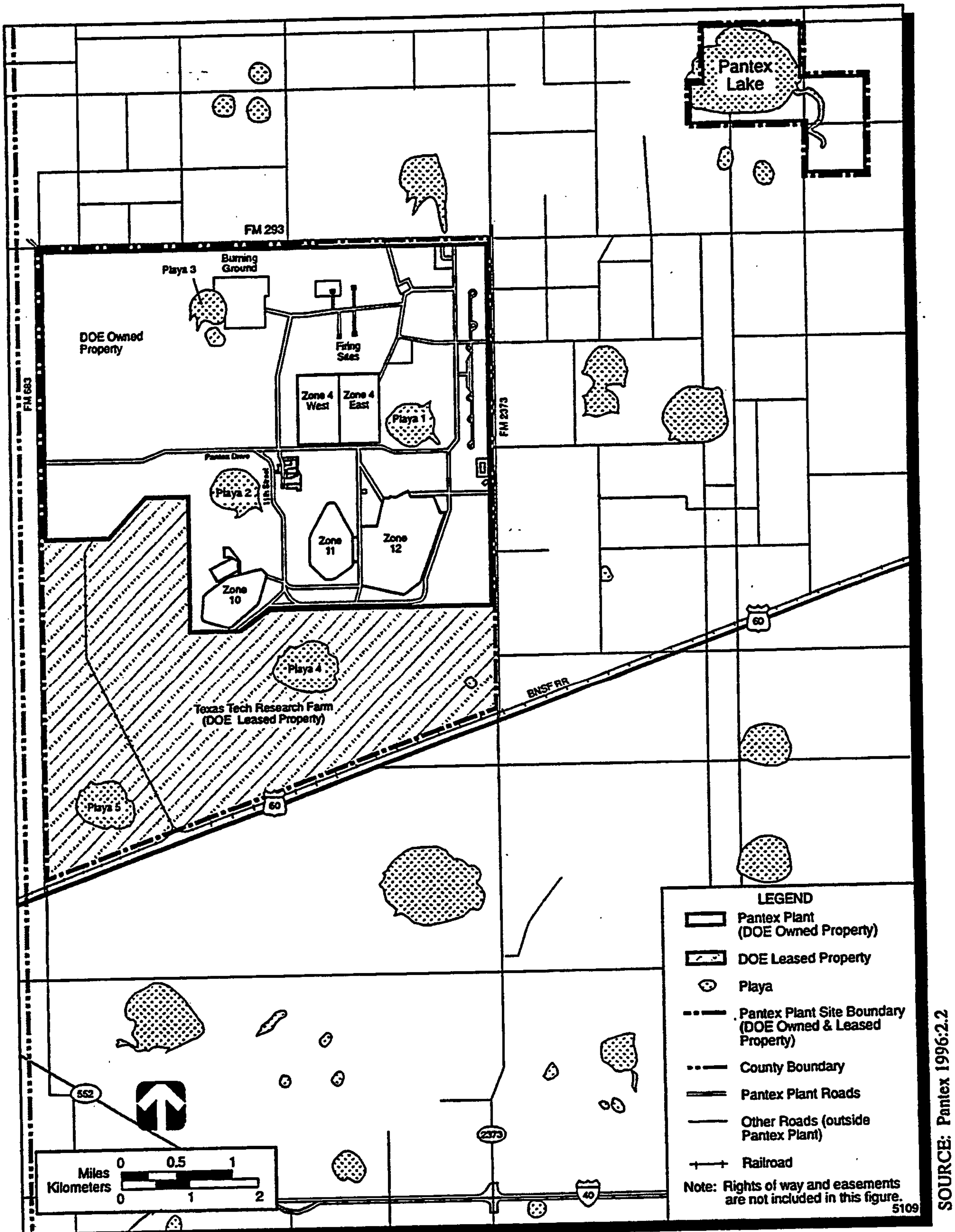


FIGURE 1.2–2.—*Location of Key Areas at Pantex Plant Site.*

transportation use. Approximately 809 hectares (2,000 acres) of Pantex Plant proper are used for industrial operations, the Burning Ground, and firing sites. Some land not actively used for plant operations is provided to TTU for agricultural purposes through a service agreement. The amount of land used for agricultural purposes is variable and subject to periodic change. Approximately 2,596 hectares (6,421 acres) of land were included in the service agreement as of April 1995.

Approximately 476 buildings containing 230,674 square meters (2,483,020 square feet) are located on DOE-owned property. An additional 144 structures, containing 39,928 square meters (429,780 square feet), support the principal operations. The operations that take place in these buildings and structures can generally be divided into four broad categories; production, storage, administration, and support. The production category includes assembly/disassembly and applied technology buildings, representing approximately 33 percent of the site's total building floor area. Storage buildings range from weapons and component staging magazines to portable waste storage dwellings, accounting for approximately 24 percent of the site's total building floor area. The administrative and support categories account for 30 and 13 percent of the total building floor area on the site, respectively.

Pantex Plant currently employs about 3,800 people. In fiscal year 1995, the operating budget was $268 million.

1.2.1 History of Pantex Plant

Pantex Plant was originally built for the U.S. Army during the early days of World War II with the mission of producing conventional munitions—bombs and artillery projectiles. After the war, the plant was deactivated and lay vacant until 1949, when Texas Technological College (now TTU) purchased the site for $1.00.

PANTEX PLANT PROGRAMMATIC MISSION STATEMENT

- *Fabricate chemical high explosive components for nuclear weapons.*
- *Assemble nuclear weapons for the Nation's stockpile.*
- *Maintain and evaluate nuclear weapons in the stockpile.*
- *Disassemble nuclear weapons being retired from the stockpile.*
- *Store plutonium pits from dismantled weapons on an interim basis.*

In 1951, the Atomic Energy Commission (predecessor of DOE) asked the Army to reclaim the main plant and surrounding land under the recapture clause of the sale agreement. Upon transfer to the Atomic Energy Commission, Pantex Plant was used to assemble nuclear weapons. Originally, there were four plants performing the weapons assembly and modification missions. However, between 1965 and 1975, the plants at Clarksville, Tennessee; Medina, Texas; and Burlington, Iowa were shut down. Since then, all nuclear weapons assembly and disassembly operations have occurred at Pantex Plant.

1.2.2 Current Mission of Pantex Plant

Pantex Plant is where DOE fulfills its responsibilities regarding the assembly and disassembly of nuclear weapons, certain maintenance and modification activities regarding the nuclear weapons stockpile, stockpile evaluation, quality assurance testing of weapon components, and research and production of high explosive(s) (HE) components for nuclear weapons. Related activities at Pantex Plant include certain quality assurance evaluations of weapons; research and development activities supporting nuclear weapons; demilitarization and sanitization of weapon parts, equipment, and related materials; waste management; environmental restoration; and onsite transportation, as required. While most of the work currently taking place at Pantex Plant relates to the disassembly of nuclear weapons, the plant must be capable of responding to any mix of assembly, disassembly, modification, or quality assurance operations that may be necessary to maintain the stockpile in the future.

Figure 1.2.2–1 describes the design elements of a typical nuclear weapon and how they interact to create a nuclear explosion. The nonnuclear components, weapon parts, equipment, and related materials resulting from weapons disassembly are demilitarized and sanitized. Activities at Pantex Plant include recycling, salvaging, and disposal, including through commercial firms. Examples of these nonnuclear components include HE, electronics, and structural parts.

The nuclear components resulting from weapons disassembly include pits, highly enriched uranium (HEU) assemblies, radioisotopic thermoelectric generators (RTGs) (encapsulated plutonium heat sources), and classified components made of or containing depleted uranium and tritium. The pit is composed of a plutonium metal core surrounded by a hermetically sealed, nonradioactive outer case. The pits are currently placed in interim storage at Pantex Plant in Modified Richmond and Steel Arch Construction (SAC) magazines.

1.2.2.1 . *Pantex Plant Operations*

A brief description of current operations and other related activities at Pantex Plant is provided in the following sections. More detailed explanations of operations, activities, and facilities may be found in the Pantex Plant *Programmatic Information Document* (Pantex 1996b).

Assembly of Nuclear Weapons

The assembly, modification, and repair of nuclear weapons have occurred at Pantex Plant since the early 1950's. These operations are performed in the bays and cells of Zone 12, and include HE components prepared in Zone 11. Locations of these zones are shown in Figure 1.2–2.

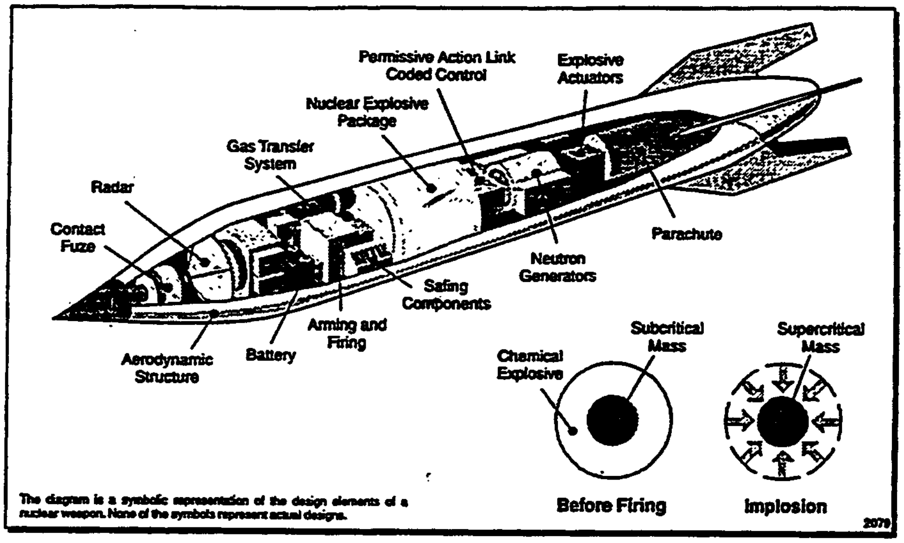
Weapons assembly requires written, prescribed steps to combine separate parts or subassemblies to form a new weapon. Complete weapons assembly is accomplished in the following stages:

- Physics Package assembly.
- Mechanical and Electronic Components assembly.
- Final Package or Ultimate User Package assembly.

The physics package is a subassembly combining HE components (produced at Pantex Plant) and nuclear components (manufactured at other sites) within a protective shell. Physics package assembly entails bonding or mating the main charge subassemblies to a nuclear pit and then inserting this subassembly into a case along with other components. Mechanical and electronic components assembly entails placing the physics package in a warhead case and then installing the components for the arming, fusing, and firing systems; the neutron generator; and the gas transfer system. The final package assembly involves installing additional components and packaging the weapon for shipment.

Currently, the only weapons assembly activities in progress at Pantex Plant are modifications (retrofits and rebuilds) for weapons remaining in the stockpile and the assembly of Joint Test Assemblies (JTAs). JTAs are assemblies of

Nuclear explosions are produced by initiating and sustaining nuclear chain reactions in highly compressed material that can undergo both fission and fusion reactions. Most modern nuclear weapons use a nuclear package with two assemblies: the primary assembly, which is used as the initial source of energy; and the secondary assembly, which provides additional explosive energy release. The primary assembly contains a central core, called the "pit", which is surrounded by a layer of high explosive. The "pit" is typically composed of plutonium-239 and other materials.



Primary Detonation

The primary nuclear explosion is initiated by detonating the layer of chemical high explosive that surrounds the pit which in turn drives the pit material into a compressed mass at the center of the primary assembly. This implosion process is illustrated in the inset of the diagram.

Boosting

In order to achieve higher explosive yields from primaries with relatively small quantities of pit material, a technique called "boosting" is used. Boosting is accomplished by injecting a mixture of tritium (T) and deuterium (D) gas into the pit. The deuterium and tritium are stored in high-pressure reservoirs until the gas transfer system is initiated. The implosion of the pit and the onset of the fissioning process heat the D–T mixture to the point that the D–T atoms undergo fusion. The fusion reaction produces large quantities of very high energy neutrons which flow through the compressed pit material and produce additional fission reactions.

Secondary Activation

The energy released by the primary explosion activates the secondary assembly. The secondary assembly is composed of lithium deuteride and other materials. As the secondary assembly implodes, lithium in the isotopic form lithium-6 is converted to tritium by neutron interactions. The tritium product in turn undergoes fusion with the deuterium to create the thermonuclear explosion.

Nonnuclear Components

Nonnuclear components include contact fuzes, radar components, aerodynamic structures, arming and firing systems, gas transfer systems, permissive action link coded controls, neutron generators, explosive actuators, safing components, batteries, and parachutes.

FIGURE 1.2.2–1.—*Nuclear Weapons Design.*

components in weapon-like configurations that are delivered to the Department of Defense (DOD) for flight testing under field conditions. In these JTAs, the physics package, consisting of the cased HE and nuclear materials components of the nuclear weapon, is replaced with electronic equipment that monitors the desired test functions and simulates the unit mass.

As previously mentioned, Pantex Plant would continue to maintain the capabilities necessary to assemble new nuclear weapons in the future.

Disassembly of Nuclear Weapons

Weapons returned to Pantex Plant for disassembly are received, inspected, and staged in magazines at Zone 4 West preparatory to beginning the actual disassembly process. The disassembly of nuclear weapons is performed within the bays and cells of Zone 12. Disassembly includes the following activities:

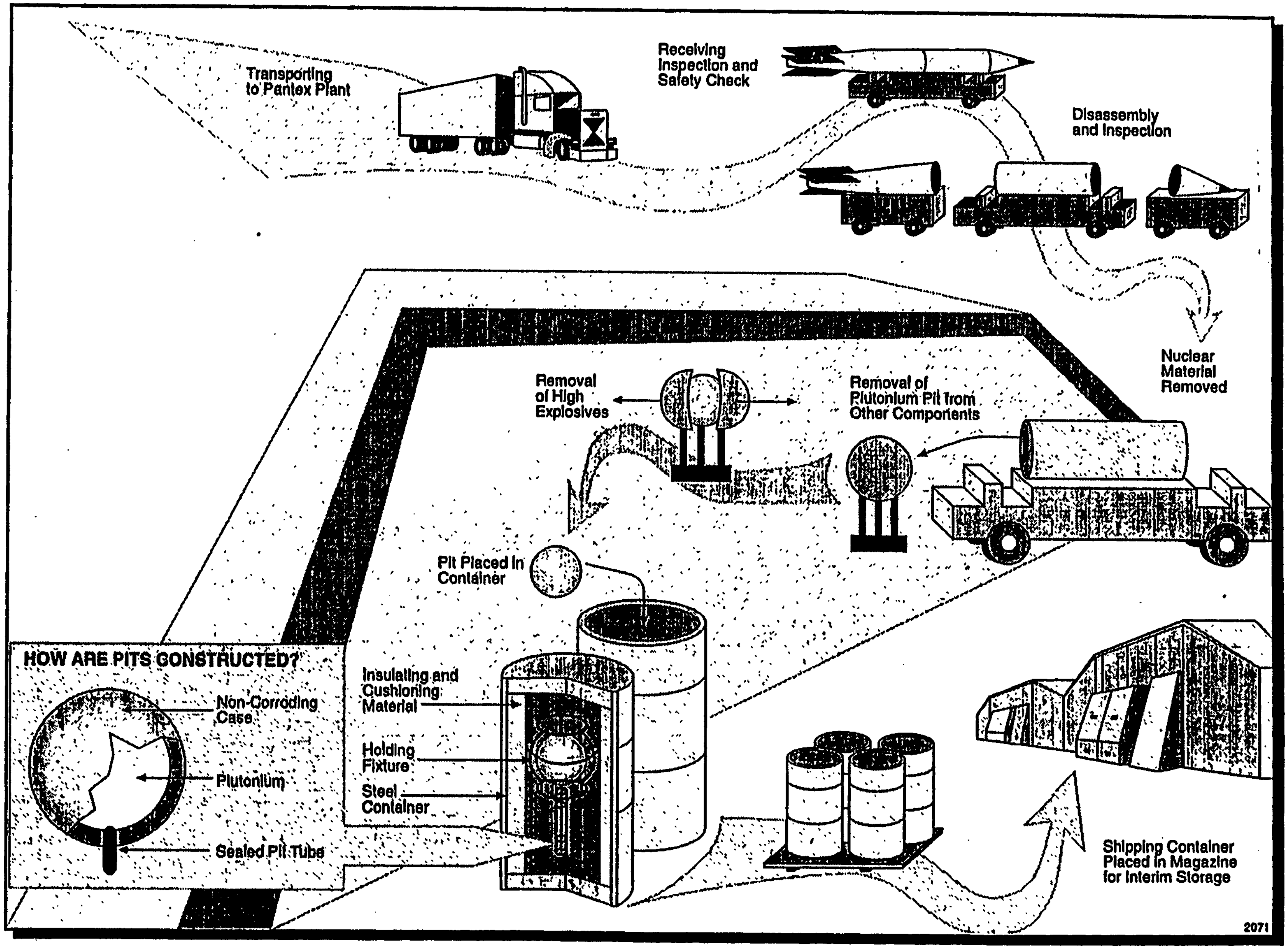
- Weapons staging in Zone 4, which includes inspection and verification after receipt from DOE.
- A variety of specialty operations (e.g., X-ray examinations, leak testing, coding, packaging, painting, verification, etc.) in special purpose bays.
- Mechanical disassembly operations in bays.
- Nuclear disassembly operations in cells.
- Demilitarization and sanitization of weapon components, which includes grinding, crushing, and open-air burning.
- Packaging and shipping HEU and tritium components to Oak Ridge Reservation (ORR) and Savannah River Site (SRS).
- Interim storage of pits at Pantex Plant.
- Segregation of waste products into non-hazardous, hazardous, low-level radioactive, and low-level mixed waste categories.

Final package dismantlement begins in an assembly/disassembly bay by performing a series of verification steps to ensure that the weapon is in a safe condition and internal components are intact. The steps include tritium monitoring, electrical system test, gamma spectrometry safeguards verification, and a radiographic verification of the weapon status system.

Next, warheads are removed from the final package container and the mechanical assembly is separated. The mechanical weapon disassembly entails removing the components for arming, fusing, and firing systems; the neutron generators; the gas transfer system; and the outer weapon case.

Finally, the physics package dismantlement is accomplished in an assembly/disassembly cell by opening the case, removing the HE/pit subassembly and other components, and separating the HE main charge from the nuclear pit. The physics package may require a radiographic inspection for an evaluation before disassembly. The balance of the weapon dismantlement function involves managing the various weapon parts such as mechanical, gas transfer, and electrical components. These parts may be recertified and staged for reuse, shipped to the originating vendor site for evaluation or disposition, or demilitarized and sanitized at Pantex Plant. A diagrammatic representation of the weapons dismantlement process is shown in Figure 1.2.2.1–1.

Many nuclear weapon components and items cannot be considered for discard or disposal until demilitarization and sanitization activities are performed. Demilitarization and sanitization are manufacturing activities used to remove classified and other nuclear proliferation-sensitive information. These activities include thermal shock, thermal treating, machining, granulation, melting, mechanical crushing, fluid jet machining, chemical dissolution, grinding, cutting, or chipping and actuation.



SOURCE: Pantex 1994c

FIGURE 1.2.2.1–1.—*Weapons Dismantlement and Pit Storage at Pantex Plant.*

Modification and Maintenance of Nuclear Weapons

Weapons remaining in the stockpile that require maintenance or modification are returned to Pantex Plant. Modification and maintenance activities can range from replacement of limited life components to almost total rebuilds for the purpose of retrofitting or upgrading the weapons (e.g., for improved safety or enhanced security features).

Stockpile Evaluation

Stockpile evaluation involves the disassembly and evaluation of pre-selected weapons returned from DOD. The main purpose of stockpile evaluation is to determine the reliability of the weapon system based on the test results of a representative sample of each weapon system in the stockpile. The weapons returned for evaluation are divided into two categories, laboratory tests and flight tests. Following evaluation, some of the weapons are rebuilt and returned to the stockpile. As part of the laboratory tests, select weapon systems are exposed to variable temperatures for prolonged time periods to simulate environmental conditions that the weapons could be subject to during their lifetimes. This type of test is referred to as aging studies. Aging studies are conducted in environmental chambers located in Buildings 12–94 and 12–104A. Currently, these environmental chambers are not in use. Prior to use, these environmental chambers will be subject to review under NEPA and site safety management systems.

Quality Assurance Testing of Weapons Components

To maintain the reliability of the Nation's nuclear weapons stockpile, a certain number of preselected weapons from each type of weapon are returned to Pantex Plant each year for component surveillance testing and evaluation. Weapons are evaluated in a selective dismantlement process whereby certain components are physically removed from the weapon, assembled into specified test configurations, and subjected to electrical and/ or explosives testing.

Research and Production of High Explosives and Weapons Components

Pantex Plant researches the physical and chemical characteristics of the used parts in nuclear weapons. Highly specialized explosive main charges and initiation systems are required for a weapon to produce a nuclear explosion. Research at Pantex Plant includes the use of insensitive HE for increased safety as well as refinement of HE manufacturing methods and safety procedures. Pantex Plant performs HE synthesis, formulation, machining, extrusion, testing, process development, and analytical operations in performing its HE research and development and production missions. These operations are performed in Zone 11 or Zone 12 using HE materials stored in Zone 4 East.

The products of manufacturing operations are explosive main charges, small explosive components, and other highly specialized explosive materials. Main charge subassemblies are emplaced in the physics package of a nuclear explosive during the weapon assembly process. Various small explosive subassemblies and pellets are produced from explosives, metal or plastic components, electrical components, hardware, assembly materials, and small explosive components that are manufactured offsite. Punch and die pressing, laser welding, explosive extrusion loading, and mechanical assembly of HE are some of the functions carried out at Pantex Plant. Currently, most explosives components are made for modification, random testing, and maintenance of stockpile weapons.

In March 1994, a formal literature search was conducted to investigate treatment/processing methods for HE other than OB/OD. The review identified processes currently in use (e.g., OB/

OD and chemical treatment), as well as those in various stages of development. A Best Available Control Technology (BACT) analysis for air emissions from explosives treatment at Pantex Plant Burning Ground was conducted and documented in a DOE letter to the Texas Natural Resources Conservation Commission (TNRCC) dated October 15, 1993. The BACT review concluded that controlled open thermal treatment with existing administrative controls constituted BACT.

In a subsequent study, the alternatives were determined to be either technically infeasible for Pantex Plant explosives or economically infeasible on a cost-per-unit mass of air pollutants that could be controlled (Radian 1994:1). The alternative emerging explosive treatment technologies were identified as: advanced thermal treatment methods (i.e., molten salt destruction, supercritical water oxidation, and advanced plasma incineration), chemical/biological treatment methods (e.g., base hydrolysis, chemical/electrochemical oxidation, and biological oxidation), and explosives recovery/reuse technologies (e.g., critical fluid extraction, explosives as supplemental fuels, and solvent recovery).

Since 1994, the development of refined procedures for HE chemical treatment has warranted the further investigation of a base hydrolysis treatability study program to be housed in Building 11–36. Though the most commonly generated HEs resulting from dismantlement processes are HMX based, this treatability study can accommodate other types of HE (e.g., RDX, TNT, HNS, TATB, and some of their respective formulations).

Alternative methods to open burning-open detonation of HE are summarized in appendix G. Recycling and commercial use of Pantex Plant explosives are currently utilized to reduce Burning Ground activities.

Interim Storage of Pits

Once the pit is removed from the weapon, it is stored at Pantex Plant as an interim measure. The term "interim storage" does not refer to a specific timeframe, but rather to the interval of time which will occur until a Record of Decision (ROD) is made on long-term storage and the site and facilities selected in that ROD are ready to receive the pits. The decision on the site and facilities for long-term pit storage will be based on analyses in the *Long-Term Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (S&D PEIS) (DOE/EIS-0229).

As of August 1996, approximately 9,000 pits had accumulated at Pantex Plant as a result of dismantlement activities. Pantex Plant has the authority to provide interim storage for up to 12,000 pits. Decisions regarding interim pit storage beyond this level will be made as a result of this EIS. Pantex Plant has a sufficient number of magazines to safely accommodate 20,000 pits. Eighteen Modified Richmond and 42 SAC magazines have been identified for storage of pits. Each Modified Richmond magazine can accommodate up to 440 pits and each SAC magazine can hold up to 392 pits. The designation of 60 magazines provides for more than 20,000 storage spaces to allow for operational flexibility. Some of the excess magazine capacity may be used for staging of weapons or components. The *Environmental Assessment for Interim Storage of Plutonium Components at Pantex* (DOE/EA–0812) (DOE 1994w) provides a more complete discussion of the SAC and Modified Richmond magazines, as well as a general description of pit storage configurations (DOE 1994w).

The pits removed from weapons are currently packaged in AL–R8 storage containers. These containers were previously used for both transportation and storage. DOE discontinued using them for transportation in 1990, and they are currently used solely for interim storage of pits. A new, more robust storage and transport container, known as AT–400A, is being developed and tested for transportation and long-term storage. Scheduled for use beginning in 1997, the container design incorporates upcoming, more stringent regulatory requirements for transportation. The design of the AT-400A package will meet the latest Type B package certification testing requirements. The AL–R8 and AT–400A containers are further described in volume II, appendix F.

The pit storage containers would be stored in a multiple stacking configuration of containers placed horizontally on steel pallets. Pallets for this configuration have been designed to ensure structural integrity and stability in a maximum credible earthquake scenario. The pallets are placed in storage using a commercially available rotating turret forklift. The forklift has been modified to provide special shielding that reduces operator exposure to extremely low levels of radiation. This electric forklift would be used for storage, retrieval, and inventory operations.

Automated Guided Vehicles (AGVs) have also been developed to place pits in storage facilities and to assist in taking inventories using bar code readers. The use of AGVs virtually eliminates any need for humans to enter any pit storage facilities.

Operations in the storage facilities include periodic inventory and inspections. Inspections coincide with planned inventory activities (generally every 18 months) and consist of a visual inspection of facility conditions and container surfaces, as well as removal of selected containers for surveillance tests. Container integrity is further evaluated via inspection (using both destructive and nondestructive evaluation techniques) of the container surfaces (for corrosion), weld integrity, and integrity of insulation and plastic parts. Both the shielded forklift and the AGVs can carry a bar code reader, camera, and gamma spectrometer to allow inventory and inspection to be performed without operator exposure to radiation.

Transportation of Weapons and Components

Pantex Plant is involved in the transportation of many different types of hazardous materials. These include nuclear explosives, nuclear components, HE components and materials, tritium, industrial chemicals, and other hazardous materials. Typical vehicles and equipment used in transport operations include forklifts, hardened trailers, Safe Secure Tractor Trailers, flatbed trailers, vans, trucks, pallet jacks, and tow motors. Approximately 30,000 transfers of radiological and explosive materials occur each year at Pantex Plant. In addition, Pantex Plant ships and receives radiological components or materials to and from other sites. To ensure the safety of operations, drivers are carefully trained, certified, subjected to physical examinations, and routinely screened for drugs and alcohol. Further information on transportation is provided in sections 4.12 and 4.16 of this volume of the EIS.

Decontamination and Decommissioning

Pantex Plant is currently planning to streamline operations and reduce maintenance and operating costs by consolidating operations into fewer buildings. At this time, no plans have been made for the decommissioning of any facilities at Pantex Plant. The designation of facilities is pending decisions regarding the future of Pantex Plant being made in the *Stockpile Stewardship and Management Programmatic EIS* (SSM PEIS) (see section 1.7).

Facilities at the plant are potentially historic resources in terms of both their age and their role in the Cold War. In accordance with the Pantex Plant Cultural Resource Management Plan being developed, the plant will consult with the Texas State Historic Preservation Office prior to initiation of any decontamination and decommissioning activity to ensure that no historic facilities are inadvertently destroyed. Separate *National Environmental Policy Act* (NEPA) (42 U.S.C. 4341) documentation will be prepared when plans are developed for specific decontamination and decommissioning projects.

1.2.2.2 *Environmental Protection Activities*

The Environmental Protection Program is continuously improving Pantex Plant's ability to ensure that missions are performed in a safe and environmentally protective manner. Currently, the program consists of nine elements:

- Public communication, to inform and involve stakeholders on issues of concern.
- Oversight, to work closely with State agencies in verifying and addressing impacts of facility operations to the environment.
- Quality assurance, to ensure integration of quality assurance practices in environmental protection.
- Compliance, to integrate environmental protection into production line and planning activities.
- Pollution prevention and waste minimization, to encourage waste elimination, waste minimization, air emissions reduction, material substitution, recycling, alternative disposal method studies, energy conservation, and water conservation.
- Environmental monitoring, to document emissions and effluents.
- Cultural resources, to identify and manage archeological and historic resources at Pantex Plant.
- Natural resources, to improve management of lands, surface water and playa wetlands, groundwater, soils, air quality, and flora and fauna at Pantex Plant.

Each of these elements is discussed in detail in the *1994 Environmental Report for Pantex Plant* (DOE 1995b). The DOE Amarillo Area Office is initiating the development of a resource stewardship strategy to guide future planning and management of all environmental resources at Pantex Plant.

Because of the extent of current and planned site investigations and corrective actions, the environmental restoration program is described separately in the section that follows.

1.2.2.3 *Environmental Restoration*

Environmental restoration activities involve determining the nature and extent of contamination, and performing remediation as needed, in compliance with all appropriate regulatory requirements.

In 1989, the U.S. Environmental Protection Agency (EPA) conducted a *Resource Conservation and Recovery Act* (RCRA) (42 U.S.C. 6901, et seq.) facility assessment to identify solid waste management units from which hazardous constituents may migrate. A total of 144 solid waste management units were originally identified at Pantex Plant. These have been organized into 14 groups for corrective action. To evaluate compliance with provisions of the RCRA permit, DOE conducts assessments and audits, and TNRCC and EPA conduct independent inspections. The environmental restoration activities at Pantex Plant will continue until all remediation work is accomplished in accordance with regulatory requirements, regardless of decisions which may be made on other aspects of the plant's mission (see section 4.5 in this volume and appendix I in volume II for further details).

Pantex Plant was placed on the National Priorities List in 1994 under the *Comprehensive*

Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9608). Pantex Plant is currently in the process of negotiating an agreement with EPA and TNRCC to integrate both RCRA and CERCLA requirements into a comprehensive site-wide strategy. The majority of environmental restoration activities are expected to be completed by the year 2000.

Although this EIS does not provide project-specific NEPA documentation for these CERCLA projects, overall effects of these projects are included in this EIS for complete assessment and full disclosure of the cumulative impacts of all operations at Pantex Plant.

1.2.2.4 *Waste Management Activities*

The types of wastestreams generated and managed by Pantex Plant include low-level radioactive waste (LLW), low-level mixed waste (LLMW), hazardous waste (HW), nonhazardous waste (NHW), and recyclable materials. See volume II, appendix G for a discussion of recyclable materials. Three drums of transuranic (TRU) waste were generated in 1993 as a result of an incident during weapons dismantlement. The waste is stored in an appropriately monitored facility awaiting shipment to an approved offsite management facility. No TRU waste is generated on the site as a result of normal operations.

LLW generated, processed, and stored at Pantex Plant is regularly transported to the Nevada Test Site (NTS) for disposal. Building 12–42 provides processing capabilities for LLW.

LLMW generated, processed, and treated is generally stored onsite until it can be shipped offsite for disposal. Building 11–9 and the Burning Ground provide onsite treatment capabilities for LLMW. In 1994, 32.6 cubic meters (42.6 cubic yards) of LLMW was transported to a commercial disposal facility in Utah. In 1996, 70 cubic meters (91 cubic yards) of LLMW were disposed at the same facility. Another shipment in September 1996 further reduced LLMW inventories by a total of 50 percent. Additionally, Pantex Plant is capable of treating and processing (such as compaction and repackaging) hazardous waste including LLMW in tanks and containers.

HW generated, processed, and stored at Pantex Plant is transported by commercial vendors for disposal. The Burning Ground burns HE and HE-contaminated wastes in accordance with regulatory permits.

NHW generated is managed through both onsite and offsite facilities. NHW, including oils and debris, are shipped offsite for disposal. Ordinary trash is either recycled (e.g., aluminum and paper) or shipped to the Amarillo Landfill through commercial vendors for disposal. Construction debris is disposed onsite in a landfill located in Zone 10.

Other types of waste, including asbestos, polychlorinated biphenyls, and medical wastes, are generated, processed, and stored prior to disposal through commercial vendors specifically licensed to manage each waste.

Sanitary and industrial wastewater is treated onsite in the Waste Water Treatment Facility. Industrial wastewater from production and manufacturing of HE components is filtered in Buildings 12–43 and 11–50. All wastewater discharges are disposed of onsite (section 4.6.1.1).

Pantex Plant has a continuing program of pollution prevention and waste avoidance initiatives. These include source reduction, process changes, material substitution, and administrative policies that not only reduce waste and pollution, but also result in cost savings for taxpayers. In 1996, the Pollution Prevention and Waste Minimization (PP/WM) program at Pantex Plant received the President's "Closing the Circle" Award for achievements in recycling and waste prevention. This program saved approximately $4.5 million of taxpayer money in 1995. Appendix G in volume II presents details of the program.

The *Environmental Information Document* provides a detailed description of waste streams and waste management practices and facilities (Pantex 1996). The *Federal Facility Compliance Act* Agreed Order and approved Site Treatment Plan-Compliance Plan contain detailed descriptions of waste treatability groups and waste management milestones.

Waste treatment, storage, and disposal operations are contingent on programmatic decisions resulting from the WM PEIS.

1.2.2.5 *Facility Construction and Upgrade*

Several operations essential to the assembly, disassembly, and maintenance of weapon systems are currently housed in outmoded facilities. To continue Pantex Plant's mission, it is necessary to shift these operations to other existing and newer facilities or to construct new facilities that would maximize worker safety and allow for greater efficiency in meeting all regulatory requirements. An average of one or two new construction projects are funded annually. In 1995, Pantex Plant received $26.4 million for construction and equipment. The *Programmatic Information Document* provides more detail on future construction/modification projects (Pantex 1996b). Those projects that are at a stage of development where sufficient detail is known to perform a NEPA analysis are discussed in this EIS (see volume II, appendix H). As plans for other projects become more detailed and ready for the decision making process, NEPA review will be conducted prior to authorization.

1.3 EVOLUTION OF THIS ENVIRONMENTAL IMPACT STATEMENT

The operations of Pantex Plant were assessed previously in a site-wide EIS (DOE/EIS–0098) published in 1983 (DOE 1983a). The scope of operations at Pantex Plant included the staging of pits prior to transfer to other DOE sites for processing. A new site-wide EIS was in the planning stage, but had not been scheduled, when pit transfer activities were suspended for operational reasons and, later, disarmament commitments. The *Environmental Assessment for Interim Storage of Plutonium Components at Pantex* (DOE/EA–0812) assessed the impacts of interim storage (DOE 1994w).

Prior to the release of this Environmental Assessment, the Secretary of Energy advanced the schedule for the planned Pantex Plant EIS and committed the Department to consider alternate sites for interim storage (Letter 1994). Additionally, the Secretary of Energy directed that the S&D PEIS be prepared to analyze the long-term storage of plutonium in all forms, including pits, and the ultimate disposition of the material. Additional details on the evolution of the S&D PEIS are provided in section 1.7.3.

Volume I, chapter 2 of the SSM PEIS discusses in detail the national security policies, responsibilities, strategies, and directives placed on DOE. For the reasonably foreseeable future, the START II protocol is most useful in helping define a specific time period to bound the reasonably foreseeable future.

The START I Treaty and the START II protocol only control the number of strategic nuclear weapons that can be loaded on treaty-specified and verified strategic missiles and bombers. These nuclear weapons are limited to 6,000 by the START I Treaty and 3,500 by the START II protocol. The treaties do not control the total stockpile or the composition of strategic and nonstrategic nuclear weapons. The U.S.

stockpile will be larger than 6,000 under START I and 3,500 under START II since the stockpile includes retaining weapons for nonstrategic nuclear forces, including DOD operational spares and spares to replace weapons attrited by DOE surveillance testing.

1.4 The Decision Making Process and Decisions to be Made

This Pantex Plant EIS provides both DOE and the public with information on the potential environmental impacts associated with the Proposed Action and Alternatives. This EIS covers all current and reasonably foreseeable facilities and activities at Pantex Plant, interim storage requirements for pits from weapons dismantlement, and the transportation of classified components shipped from Pantex Plant. This EIS was also scoped to address alternate locations for interim pit storage (i.e., until longer-term storage decisions are made and implemented). Accordingly, it also addresses potential environmental impacts at NTS, SRS, Hanford Site, and Kirtland Air Force Base (KAFB) should one of these installations be chosen as an alternative site for the interim storage of up to 20,000 pits.

There are two additional DOE NEPA documents that address the storage of pits. The SSM PEIS addresses the long-term storage of pits that will be needed for national security requirements (strategic reserve pits). The S&D PEIS addresses storage of all pits, including pits that have already been, or later may be, declared surplus to national security requirements, and the approach for dispositioning surplus pits.

The Proposed Action in this EIS was designed specifically to encompass the interim storage of pits from weapons dismantlement until such time as longer-term decisions regarding storage and disposition could be made and implemented. The Preferred Alternative for the interim storage of pits in this EIS is to continue to store them at Pantex Plant. The Preferred Alternative in the Draft SSM PEIS provides for the long-term storage of strategic reserve pits at whatever site is selected for the assembly/disassembly function in the future weapons complex; the Draft SSM PEIS identifies Pantex Plant as the preferred site for that function.

The Draft S&D PEIS analyzed a number of alternatives and suboptions for the storage of pits and other forms of surplus material pending disposition, but it did not identify a Preferred Alternative for the storage of pits. Several alternative sites, including Pantex Plant, were analyzed for the mission of storing surplus material pending disposition. The Draft S&D PEIS contemplated the possible transfer of surplus material to Pantex Plant for storage around the year 2004, after upgrades to existing storage facilities in Zone 12 had been completed. The Rocky Flats Environmental Technology Site (RFETS) was identified in the Draft S&D PEIS as one source of this surplus material.

The Final S&D PEIS will include an alternative that is a refinement of the Draft S&D PEIS alternatives described above. Under this alternative, pits could be transferred from RFETS to Pantex Plant as early as 1997 and stored temporarily in existing Zone 4 facilities until the upgraded facilities in Zone 12 are available. The environmental impacts associated with transferring surplus pits from RFETS to Pantex Plant, including the impacts of their storage at Pantex Plant, will be included in the Final S&D PEIS. The potential addition of RFETS pits at Pantex Plant would not exceed the storage limit of 20,000 pits proposed and analyzed in this EIS. Moreover, surplus RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant. (Refer to sections 1.7.2 and 1.7.3 for more information on the SSM PEIS and the S&D PEIS, respectively.) If this alternative were selected in the ROD for the S&D PEIS, surplus pits already at Pantex Plant would continue to be stored there pending disposition and, in addition, surplus pits from RFETS would be transferred to Pantex Plant in the near term for storage, also pending disposition.

At this time DOE projects that the Records of Decision (RODs) for both the SSM PEIS and the S&D PEIS will be issued in late 1996 or early 1997, at or about the same time as the ROD for this EIS, and that decisions on the longer-term storage of pits will be made in the RODs of the two PEISs. As described above, if DOE selects the Pantex Plant storage alternatives in the SSM PEIS and the S&D PEIS, strategic reserve pits would be stored at Pantex Plant indefinitely and surplus pits (including the pits currently at RFETS) would be stored at Pantex Plant until DOE implements decisions regarding their disposition. The ROD for this EIS will take into consideration the decision-making process for the PEISs when making a decision on the interim storage of pits.

However, if there is a significant delay in RODs for either PEIS, or if DOE does not make a decision on the long-term storage of pits in those RODs, then a decision will be needed on the location of interim storage of pits, uninformed by a decision on long-term storage. In any event, this EIS was completed with the analysis of interim storage alternatives, including addressing the issues and comments received from the public on this EIS, to support a decision relating to the storage of pits until a long-term storage decision has been made and implemented.

DOE encourages interested parties to comment, during the period between issuance of the Final PEISs and issuance of the RODs, on the Preferred Alternative for the SSM PEIS and the alternatives for the S&D PEIS as they affect the storage of pits at Pantex Plant.

The DOE decision-making process for the interim storage of pits will consider the analysis presented in this Final EIS along with mission requirements, costs, other technical factors, the national interest, and public input. The Secretary of Energy will then issue a ROD. The ROD may be issued no sooner than 30 days after the Final EIS. The ROD will explain all factors, including environmental impacts, that DOE considered in reaching its decision. The ROD will specify the alternative or alternatives that are considered to be environmentally preferable.

If the selected alternative is different from the environmentally preferred alternative, the ROD will present the rationale for the Department's selection. Specifically, the ROD will document the decision as to how operations at Pantex Plant would be conducted, at which site(s) interim pit storage should be performed and in what quantity, and what mitigative measures should be taken. As discussed in section 3.1, the ROD may combine aspects of various alternatives in the decision.

If mitigation measures are adopted as part of the agency's decision, these will be summarized in the ROD, as applicable, and included in a Mitigation Action Plan. The Mitigation Action Plan would explain how and when mitigation measures will be implemented. The Mitigation Action Plan must be in place prior to taking any action that is the subject of a mitigation commitment.

1.5 Comment Period, Public Hearings, and the Analysis of Comments

In March 1996, the Department published the *Draft Environmental Impact Statement for the Continued Operation of Pantex Plant and Associated Storage of Nuclear Weapon Components*. A Notice of Availability of the Draft EIS was published in the *Federal Register* (61 FR 15232) on April 5, 1996. The comment period for the Draft EIS began on April 5, 1996, and originally was to end on July 5, 1996. However, at the request of stakeholders in the Amarillo, Texas area, the ending date was extended to July 12, 1996, for a comment period of 98 days. Any comments received after that date were included to the extent practicable.

During the comment period, public hearings were held in Amarillo, Texas; North Las Vegas, Nevada; North Augusta, South Carolina; Albuquerque, New Mexico; and Richland, Washington. In addition, a separate Technical Exchange Meeting was held in Amarillo, Texas, with representatives of the State of Texas, City of Amarillo, Panhandle Water Conservation District No. 3, the University Consortium (Texas Tech University, Texas A&M University, University of Texas, and West Texas A&M University), Amarillo Economic Development Corporation, Pantex Plant Citizens Advisory Board, and members of the public.

All public meeting comments were combined with comments received by all other means (e.g., hand-ins, faxes, letters, e-mail, etc.) during the public comment period. All comments were categorized by subject area and were considered for potential changes or additions to the EIS. For further information, see volume III of this EIS.

1.6 CHANGES SINCE THE ISSUANCE OF THE DRAFT EIS

Since the March 1996 issuance of the *Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*, there have been several changes in information, regulatory status, and related EISs, as well as a revision of the Draft DOE Standard for Aircraft Crash Analysis. In addition, comments from agencies, organizations, and the public requested elaboration and additional assessment of numerous issues. These changes are reflected in this Final Pantex Plant EIS.

New and updated information has been included in the discussions for almost all environmental resources. The new information includes a different pit repackaging concept and a reduced scope for the proposed Hazardous Waste Treatment and Processing Facility (HWTPF). The new pit repackaging concept is still at a very early planning stage and is not detailed in this Final EIS. However, the foreseeable impacts have been bounded to the extent possible in the infrastructure, waste management, and human health sections. Appendix H includes discussion of both a large and a small version of the HWTPF. Since the Draft EIS, the smaller version has become the preferred alternative for this facility. The impacts of the larger version are still discussed in the appropriate sections of the EIS in order to bound the impacts. None of the new or updated information results in a significant difference in the impacts assessed.

The regulatory status of several permits has changed since the Draft EIS. The new permitted levels and resulting changes in operations have been taken into account in the assessment of impacts.

Updated information regarding related EISs has been added in the Summary, section 1.4, section 1.7, and in the discussions of cumulative impacts where appropriate. The information was updated in this EIS as a result of advances in the decision-making process in the related EISs.

The methodologies for assessing the risk of an aircraft crash and for assessing the cumulative impacts have changed to a degree since the Draft EIS. The aircraft crash methodology has been in development throughout the preparation of the Draft and Final EIS. The July 1996 Draft was used for this Final EIS. The assessment of cumulative impacts, which has been changed to more accurately reflect the potential impacts, is discussed in more detail in section 4.21 of volume I of the Final EIS.

The changes due to comments received during the comment period are detailed in volume III of the Final EIS and discussed briefly in the Summary.

1.7 RELATED NATIONAL ENVIRONMENTAL POLICY ACT STUDIES

There are several other ongoing NEPA documents for programs or activities that could also have impacts at Pantex Plant. These include the following:

- The *Waste Management PEIS for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS).
- The *Long-Term Stockpile. Stewardship and Management PEIS* (formerly part of the *Reconfiguration PEIS*).
- The *Storage and Disposition of Weapons-Usable Fissile Materials PEIS.*
- The *Site-Wide EIS for Continued Operation of the Los Alamos National Laboratory* (LANL).
- The *EIS for the Nevada Test Site and Off-Site Locations in the State of Nevada.*

Each of these documents is briefly described in subsections 1.7.1 through 1.7.5. The impacts of these programs on Pantex Plant are addressed in the "Cumulative Impacts" sections of this EIS to the extent that information relevant to Pantex Plant from the other documents is currently available.

1.7.1 *The Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (DOE/EIS–0200)*

DOE is preparing the WM PEIS to evaluate the potential environmental impacts of alternative configurations of DOE's waste treatment, storage, and disposal facilities (DOE 1995t). On the basis of the evaluations in the WM PEIS and other information, DOE will decide whether to consolidate the management of some or all of its five types of waste and, if it does select consolidation, the Department would also select sites that will manage each type of waste. The WM PEIS evaluates consolidation over the next 20 years. In contrast, the Pantex Plant EIS evaluates site-specific impacts over a 10-year period.

Of the 54 sites for which DOE has waste management responsibility, 17 are considered "major" DOE sites in the WM PEIS and are candidates to receive wastes generated at other sites, to host disposal facilities, or manage HLW. Pantex Plant is a major site considered in the WM PEIS and is a potential site for management of its own LLMW, LLW, and HW. Currently, Pantex Plant has only three drums of TRU waste and no HLW. The TRU waste is awaiting shipment to an approved offsite management and disposal facility. After the TRU waste is shipped offsite, Pantex Plant is not expected to handle TRU waste or HLW in the future. This is contingent upon decisions contained in the WM PEIS, SSM PEIS, and S&D PEIS.

To assist DOE in making decisions about whether and where to consolidate waste management, the WM PEIS considers 36 alternatives organized into four major alternative categories (No Action, Decentralized, Regionalized, and Centralized). The following bullets describe the alternative categories and how each alternative could impact waste management at Pantex Plant:

- **No Action** alternatives involve the use of only existing or planned waste management facilities.
  - No Action—*status quo* would be pursued. Only existing or currently planned (i.e., funded) facilities would be operated or constructed at Pantex Plant. Waste currently shipped off-

site would continue to be shipped off-site.

- **Decentralized** alternatives locate waste management facilities where waste is currently located or where it will be generated, treated, or disposed of in the future.
  - — Decentralized—Under this alternative, Pantex Plant would treat and dispose of its LLMW and LLW onsite. All HW would continue to be shipped to commercial facilities.
- **Regionalized** alternatives locate waste management facilities at several sites throughout the Nation.
  - — Regionalized—Under a few alternatives, Pantex Plant would treat and/or dispose of all its LLMW and LLW onsite. However, under most alternatives, Pantex Plant would ship its LLMW and LLW to one or more of DOE's other sites for treatment and disposal. Under all alternatives, HW would continue to be sent to other DOE sites or commercial vendors.
- **Centralized** alternatives locate large waste management facilities at only one or two sites.
  - — Centralized—Under all alternatives, Pantex Plant would ship all its LLMW and LLW to a single DOE site for treatment and disposal. Centralized management of HW was not analyzed.

The Pantex Plant EIS discusses the cumulative impacts of these activities at Pantex Plant. Alternatives analyzed in the WM PEIS for Pantex Plant do not include receipt of wastes from other sites.

Differences in waste volume projections in the WM PEIS and this EIS are a result of different databases. The WM PEIS used waste load forecasts developed for the 1992 Integrated Database (IDB) for LLW; the 1994 Mixed Waste Inventory Report (MWIR) for LLMW; and both the 1992 IDB and the 1993 MWIR for TRU waste. Where more recent data could impact programmatic decision making, updated forecasts and analysis are presented in the Final WM PEIS. DOE plans to update the estimates of LLW at Pantex Plant in the Final WM PEIS. The Pantex Plant EIS uses the Pantex Plant *Environmental Information Document*, the Agreed Order, and approved Plans containing 1995 and 1996 waste stream inventories. Cumulative Impacts of alternatives in the WM PEIS and Pantex Plant EIS are presented in volume I, section 4.13.5.1. The Pantex Plant PP/WM program originally implemented in 1991, has significantly reduced waste volumes. Appendix G in volume II of this EIS discusses in detail the PP/WM program.

1.7.2 The *Stockpile Stewardship and Management Programmatic Environmental Impact Statement* (DOE/EIS-0236)

Stockpile stewardship includes activities required to maintain a high level of confidence in the safety, reliability, and performance of nuclear weapons in the absence of underground testing, and to be prepared to test weapons if directed by the President. Stockpile management activities include maintenance, evaluation, repair, or replacement of weapons in the existing stockpile.

Pantex Plant currently performs missions that are examined in the SSM PEIS. The ROD for this PEIS is expected to determine which facilities at Pantex Plant should be upgraded, downsized, or replaced as part of the future SSM program.

The SSM PEIS evaluated three alternatives relative to Pantex Plant operations: the No Action Alternative, which would allow Pantex Plant to continue providing the weapons assembly and disassembly capabilities, storage of pits, and HE fabrication capability; the Downsize Existing Capability Alternative, which includes downsizing the assembly/disassembly and HE fabrication capability, providing the capability to perform nonintrusive modification for pit reuse, and evaluating the possible storage of strategic reserve materials (plutonium in the form of pits and uranium in the form of canned subassemblies); and the Relocate Capability Alternative, which includes transferring the weapons assembly/disassembly capability to NTS and HE fabrication to LANL and/or Lawrence Livermore National Laboratory; and a complete phase-out of facilities at Pantex Plant.

In the Draft SSM PEIS, DOE announced as its preferred alternative a portion of the Downsize Existing Capability Alternative. That is, assembly/disassembly operations would remain at Pantex Plant; however, no preferred alternative was identified for HE fabrication. Other alternatives in the Draft SSM PEIS, entitled No Action and Relocate Capability, respectively, would have maintained Pantex Plant at its present size, or would have relocated the Pantex Plant activities to another location, were not the Department's preferred alternative. The Final SSM PEIS was issued on November 8, 1996, with a preferred alternative which stated that both assembly/disassembly operations and HE fabrication would remain at Pantex Plant, but would be downsized. The analysis contained in the Final SSM PEIS with respect to Pantex Plant is not significantly different from that presented in the Draft SSM PEIS. The Record of Decision for the SSM PEIS can be issued no earlier than December 16, 1996.

The SSM PEIS evaluated the remaining stockpile in the year 2005 and beyond. The Pantex Plant EIS does not address the impacts of these alternatives. It does, however, incorporate by reference, the effects identified in the WM PEIS as part of the discussion of cumulative impacts at Pantex Plant.

1.7.3 The *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (DOE/EIS–0229)

The S&D PEIS is evaluating alternatives for the long-term storage of weapons-usable fissile materials and for the disposition of weapons-usable plutonium declared surplus to national defense needs by the President. The S&D PEIS generally evaluates storage beginning in the year 2005 with impact evaluation conducted through the year 2055. Storage of weapons-usable fissile materials includes both pit and non-pit forms.

The interim storage of HEU was addressed in the *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Storage Level at the Y-12 Plant, Oak Ridge, Tennessee* (DOE/EA–0929) (DOE 1994).

Disposition of surplus HEU is the subject of a separate EIS, *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (DOE/EIS–0240). The Final EIS was issued on June 17, 1996, and the ROD was issued on July 29, 1996.

DOE decided to implement a program to make surplus HEU non-weapons-usable by blending it down to low-enriched uranium (LEU). DOE will gradually sell up to 85 percent of the resulting LEU over time for commercial use as fuel feed for nuclear power plants to generate electricity (including HEU and natural uranium that will be transferred to the United States Enrichment Corporation), and will dispose of the remaining LEU as LLW. This decision does not affect the Pantex Plant because no activity relating to HEU disposition would occur at Pantex Plant.

DOE sites currently storing weapons-usable fissile materials include Pantex Plant, Hanford

Site, Idaho National Engineering Laboratory, Rocky Flats Environmental Technology Site, SRS, LANL, and ORR. The S&D PEIS is considering four alternatives for the long-term storage of fissile material: No Action, Upgrade Storage Facilities, Consolidate Plutonium at one site, and Collocate Plutonium and HEU at one site. The S&D PEIS is currently examining for long-term storage the same four DOE interim storage sites considered in this EIS as well as ORR. The Pantex Plant EIS includes a discussion of the cumulative impacts of locating a potential storage facility at Pantex Plant, and incorporates and summarizes relevant information from the S&D PEIS.

The Draft S&D PEIS analyzed, as part of its storage alternatives, transfer of RFETS surplus material, including pits, to Pantex Plant. The Draft S&D PEIS considered, as an alternative, the storage of surplus material, including both surplus pits from disassembled weapons and material from RFETS, in existing buildings in Zone 12 at Pantex Plant. These buildings would require upgrades before they could be used for storage, however, and the S&D PEIS estimated that the upgrades could be completed by the year 2004. The environmental impacts of this action were discussed for cumulative purposes throughout Chapter 4 in the Draft Pantex EIS.

The Final S&D PEIS will include an alternative involving the transfer of pits from RFETS to Pantex Plant that is a refinement of the alternatives presented in the Draft S&D PEIS. Under this alternative, materials would be removed from RFETS as soon as practicable in order to assist in the cleanup of that site. Pits now at RFETS could be transferred to Pantex Plant as early as 1997 and stored in Zone 4, in the same facilities as pits from disassembled weapons, until the upgraded facilities in Zone 12 are ready. Other fissile materials at RFETS, in the form of metals and oxides, would be transferred to the Savannah River Site under this alternative.

If this alternative were selected in the ROD for the S&D PEIS, surplus pits already at Pantex Plant would continue to be stored there pending disposition and, in addition, surplus pits from the RFETS would be transferred to Pantex Plant in the near term for storage, also pending disposition. The total number of pits that could potentially be stored at Pantex Plant, including those brought from RFETS, would not exceed the storage limit of 20,000 pits proposed and analyzed in this EIS. Moreover, surplus RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant.

The Final S&D PEIS will contain environmental analyses of the various elements of this alternative including: intersite transportation of the pits from RFETS to Pantex Plant; packaging operations both at RFETS and Pantex Plant; storage of the pits, first in Zone 4, and then in Zone 12; and intrasite transportation from Zone 4 to Zone 12. The environmental impacts of this action have been added to the cumulative impact discussion in Chapter 4 of this Final EIS. These impacts would occur sooner, but would be smaller than the impacts of the Collocation Storage Alternative.

The Collocation Storage Alternative and the Evolutionary Light Water Reactor Disposition Alternative from the S&D PEIS are discussed in this Pantex Plant EIS, because those alternatives, if they occurred at Pantex Plant, could potentially have the greatest impacts to the Pantex Plant Site. It is important to note that these are conservative bounding impacts.

The Final S&D PEIS will designate a preferred alternative for the storage of fissile materials. Furthermore, for disposition, the PEIS will contemplate further site-specific tiered NEPA documentation, as appropriate, before any specific site is selected. If different alternatives or a site other than Pantex Plant were selected in the ROD (and tiered RODs) for the S&D PEIS, then impacts to Pantex Plant from storage and disposition would be reduced and might not occur.

1.7.4 The *Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory* (DOE/EIS–0238)

This site-wide EIS will address foreseeable laboratory operations and planned activities over an approximately 10-year period, paralleling the timeframe considered in the Pantex Plant EIS. The EIS will focus on operating practices and facility management, and provide an analysis of all activities at LANL and all DOE land management activities related to operations at LANL. The Pantex Plant EIS is related to the activities at LANL in that Pantex Plant ships RTGs and pits (for evaluation) to LANL. The Pantex EIS addresses transportation of these components to and from LANL.

1.7.5 The *Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (DOE/EIS–0243)

This site-wide EIS addresses projects and activities at the NTS, the Tonopah Test Range, portions of the Nellis Air Force Range Complex, the Central Nevada Test Area, and the Project Shoal Area. These programs include ongoing activities for the stewardship of the Nation's nuclear weapons stockpile, management of radioactive waste, and environmental restoration. This EIS also examines newer programs such as the proposed Solar Enterprise Zone sites at NTS, Dry Lake Valley, Eldorado Valley, and Coyote Spring Valley.

The EIS addresses potential environmental impacts including those resulting from transportation and disposal of wastes that are generated onsite and offsite of NTS. The Pantex Plant EIS is related to activities at NTS in that Pantex Plant currently ships LLW to NTS for disposal. Continuation of LLW shipments to NTS is also within the scope of the WM PEIS. Impacts of interim pit storage are within the scope of the Pantex Plant EIS only.

1.8 Interagency Cooperation

During the public scoping for the Pantex Plant EIS, DOE received comments recommending that DOD sites be considered as alternative storage sites.

DOE formally requested that the Nuclear Weapons Council Staff identify the viability of available DOD sites for pit storage. In all, 60 DOD sites were assessed for a possible pit storage mission. One of these sites, the Manzano Weapons Storage Area at KAFB, was subsequently selected for consideration as an alternative in the EIS. Upon DOE request, and Pursuant to 40 CFR 1501.6, the U.S. Air Force agreed to become a Cooperating Agency and participated in the preparation of this EIS.

1.9 Agency Consultations for Implementing the Alternatives

Coordination of NEPA documents with other environmental review requirements is required by CEQ regulations (40 CFR 1502.25) and DOE NEPA implementing regulations (10 CFR 1021). The objective is to ensure an integrated assessment and compliance with statutes including, but not limited to, the *Fish and Wildlife Coordination Act* (16 U.S.C. 661 et seq.), the *National Historic Preservation Act of 1966* (16 U.S.C. 470 et seq.), and the *Endangered Species Act of 1973* (16 U.S.C. 1531 et seq.), as well as applicable State laws and regulations.

This EIS examines impacts of the Proposed Action and Alternatives at Pantex Plant, NTS, SRS, Hanford Site, and KAFB. Since the natural environment and potential impacts at each site differ, DOE identified relevant Federal and State agencies that may require formal consultations regarding each site. As part of the consultation process, the March 1996 Draft EIS was provided to each of these agencies for review and comment. Additional details of regulatory requirements are provided in chapter 6 of this EIS.

1.10 ORGANIZATION OF THE ENVIRONMENTAL IMPACT STATEMENT

This Final EIS is comprised of the Summary and three volumes:

- Volume I, 11 chapters of the main report.
- Volume II, 10 appendixes.
- Volume III, the public comments, analyses, and responses.

In volume I, chapter 2 describes the purpose and need for action. Chapter 3 describes the Proposed Action and Alternatives and concludes with a comparison of the environmental impacts of each of the alternatives.

Chapters 4 through 6 provide the core of the environmental impact analysis and actions necessary to implement each alternative. Chapter 4 describes the affected environment and environmental consequences at Pantex Plant. This chapter examines potential environmental impacts within 14 environmental resource and issue areas at Pantex Plant for each of the alternatives. In a similar manner, chapter 5 describes the affected environment and environmental consequences at each of the alternative pit storage sites that were considered for the Pit Storage Relocation Alternative. Chapter 6 describes the environmental compliance requirements for implementing the alternatives.

Chapters 7 through 11 provide supplementary information about this EIS and references for the reader. Chapter 7 provides the list of references cited in the EIS. Chapter 8 contains the list of preparers, and chapter 9 presents the list of agencies, organizations, and persons to whom copies of this EIS were sent. Chapter 10 provides a glossary of terms used in this EIS and chapter 11 is the index.

In Volume II, 10 appendixes are provided for detailed supporting information. Appendix A describes the methodologies applied in the determination of environmental impacts. Appendixes B, C, D, E, F, and I contain additional discussion and data supporting the air quality, water resources, human health, aircraft accident, transportation, and soil quality analyses, respectively. Appendix G addresses the current and planned activities to further objectives for pollution prevention and waste minimization. Appendix H contains a detailed description of six proposed Pantex Plant projects and an assessment of the impacts associated with their construction and operation. Appendix J includes copies of correspondence with consulting agencies.

Volume III describes the public comment and public hearing processes. All public meeting comments were combined with comments received by all other means (e.g., hand-ins, faxes, letters, e-mail, etc.) during the public comment period. All comments were categorized by subject area and were considered for potential changes or additions to the EIS. In addition, volume III details the comments received, the analysis and categorization of the comments, the responses to the comments, and indicates what changes were made in the EIS in response to the comments. Volumes I and II have been marked with a line down the left side of the text columns to indicate where changes or additions have been made to the EIS text.

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CHAPTER 2

Purpose and Need for Action

CHAPTER 2
PURPOSE AND NEED FOR ACTION

The main focus of chapter 2 is a description of the purpose and need for Department of Energy action at Pantex Plant. Following that discussion is a description of the scope of this EIS.

PURPOSE AND NEED FOR AGENCY ACTION

DOE needs to continue to fulfill its responsibilities as mandated by statute, Presidential direction, and Congressional authorization and appropriation. DOE's goal, or purpose, in meeting this need is to do so in a manner that enhances the protection of human health and the environment while preventing a break in DOE's ability to perform its responsibilities.

2.1 Purpose and Need for Action

The requirement for DOE to provide for nuclear weapons operations is provided in Section 91 of the *Atomic Energy Act* of 1954 as amended (42 U.S.C. 2121). That act authorized the Atomic Energy Commission (predecessor to DOE) "to engage in the production of atomic weapons... to the extent that the express consent of the President has been obtained, which consent and direction shall be obtained at least once each year." The consent and direction of the President are given each year in a Presidential Decision Directive. This directive is based on the annual Nuclear Weapons Stockpile Memorandum jointly prepared and agreed upon by the Department of Defense, National Security Council, and DOE. The Nuclear Weapons Stockpile Memorandum specifies the nuclear weapon stockpile levels for current and future years and is the driver for associated production and retirement of all nuclear weapons. DOE then issues the Production and Planning Directive to direct the Nuclear Weapons Complex, which includes Albuquerque Operations Office, to execute the directed workload. Annual appropriations to carry out the Presidential directives are then provided through the combined action of the House of Representatives, the Senate, and the President. It is DOE's responsibility to meet the stockpile management requirements.

The Department's nuclear weapons stockpile management requirements at Pantex Plant include the assembly, disassembly, modification, and maintenance of nuclear weapons; monitoring of the weapons stockpile; production of high explosive(s) (HE) components for nuclear weapons; quality assurance evaluation and testing of weapon components; and research and development activities supporting nuclear weapons.

Recent Presidential directives have sharply reduced the number of weapons required in the nuclear weapons stockpile. This has resulted in a large increase in the number of nuclear weapon components that must be disposed or stored. Pantex Plant is currently the only site at which weapon disassembly operations are performed and is the primary location for interim storage of pits removed from weapons. In accordance with the approved Finding of No Significant Impact (59 FR 3674, January 26, 1994) regarding interim storage levels, Pantex Plant is currently authorized to provide interim storage of up to 12,000 pits. Other nuclear weapon components are currently shipped to other sites, as depicted in Figure 2.1–1.

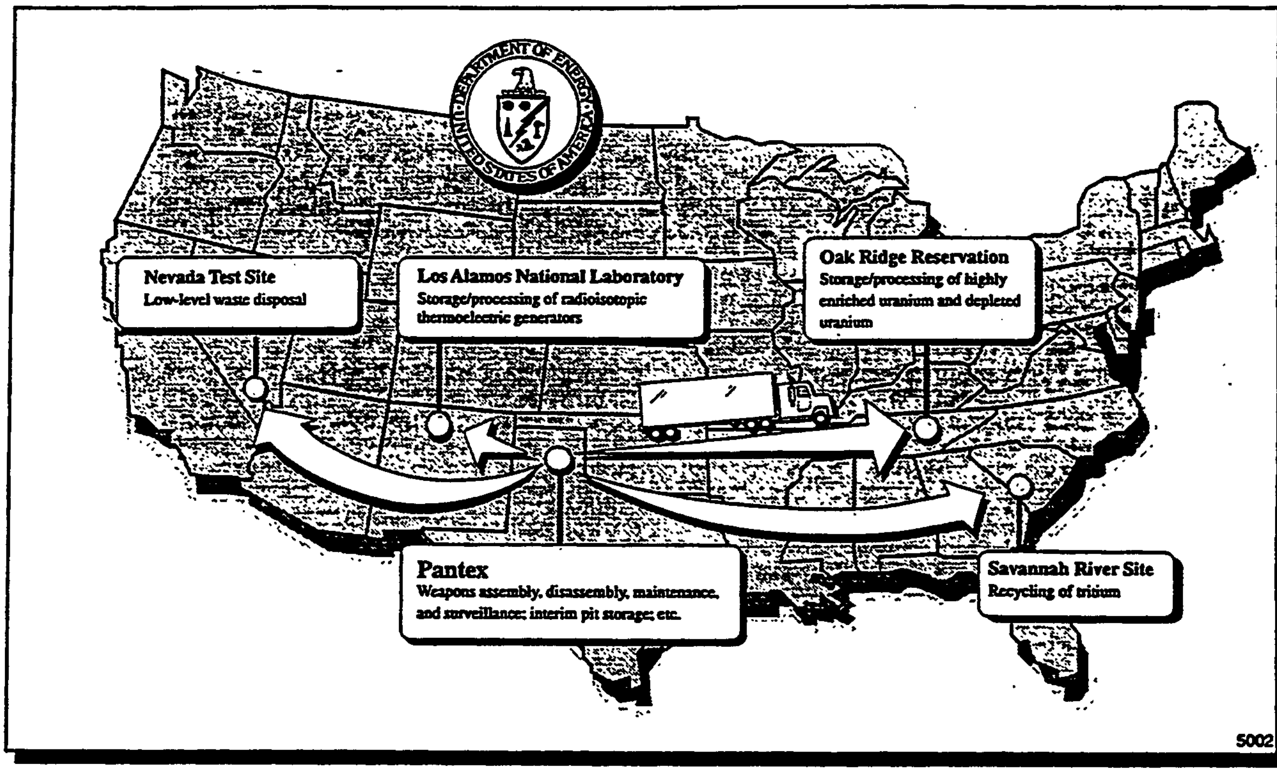

FIGURE 2.1–1.—*Sites That Receive Nuclear Components or Materials from Pantex Plant.*

DOE must fulfill assigned responsibilities for stockpile stewardship and management and must respond to Presidential direction on requirements for the nuclear weapons stockpile. DOE must respond to the military services returning weapons as a result of changes to the nuclear weapons stockpiles and provide storage for components as a result of dismantlement. There is a need at this time to update the Department's evaluation and understanding of environmental impacts associated with ongoing operations at Pantex Plant and evaluate any additional or changed impacts associated with an increase in dismantlement and near-term storage of nuclear components from the dismantlement process.

2.2 SCOPE OF THIS ENVIRONMENTAL IMPACT STATEMENT

The scope of this EIS includes the assessment of impacts relative to each area of the human and natural environment potentially affected by operations performed at Pantex Plant. A complete list of the resource areas investigated in this EIS is provided in volume I, chapter 4. The analysis concentrates on issues related to the proposal as identified through internal and public scoping. Activities that could potentially result in adverse impacts are associated with:

- Ongoing operations, including interim pit storage, at Pantex Plant.
- Transporting pits to and storing them on an interim basis at an alternate site.
- Transporting classified components between Pantex Plant and other sites.

The EIS analysis assumes that the combined activities of assembly, disassembly, and modifications would not exceed 2,000 weapons per year. For assessment of environmental impacts, the EIS examines impacts across a reasonable range of operations by assessing impacts of activity levels for 2,000, 1,000, and 500 weapons per year.

These numbers of weapons per year represent a reasonable, but conservative estimate of work that may be required at Pantex Plant based on current policy directives, and allow a set of defined tasks to be accurately analyzed. The operations on each of the weapons in these defined sets is assumed to be extensive (i.e., representative of full assembly or disassembly). Actual workload and range of tasks to be performed on each weapon processed at the plant may vary, but individual tasks are well understood, and impacts of actual operations are expected to be encompassed by this conservative analysis. Accordingly, over 2,000 weapons per year may be worked on at Pantex Plant without exceeding the environmental impacts identified in this conservative, bounding analysis. The operations on 2,000, 1,000, and 500 weapons per year should not be considered to be specific limits.

As shown in Figure 2.1–1, some nuclear components removed from weapons and nuclear materials are shipped to other sites. Therefore, this EIS considers the impacts of continuing to transport such components to those sites. Whenever appropriate, this EIS incorporates the information and analyses of other NEPA documents.

This EIS includes an assessment of activities over a period of approximately 10 years or until programmatic decisions regarding the nuclear weapons complex, including long-term storage and disposition of weapons components and materials, can be implemented. The scope of activities at Pantex Plant includes mission operations, routine maintenance, facility upgrades and modifications, planned new facilities, and transportation activities. Key areas of Pantex Plant that support these missions are:

- Zone 12, where assembly, disassembly, and surveillance operations are performed and nonnuclear components are staged.
- Zone 11, where HE research and production is performed and nonnuclear components are staged.
- Zone 4 West, where nuclear weapons and classified components are staged and pits are stored on an interim basis.
- Zone 4 East, where HE is stored and nonnuclear components are staged.
- The Burning Ground, where HE materials are burned.

These areas are shown on Figure 1.2–2. Other activities that are included in the EIS are environmental protection, pollution prevention, environmental restoration, waste management, and agricultural operations on the site.

The scope of activities at other sites is related only to interim storage of pits and transport of other weapons components from Pantex Plant to these sites.

There are several other ongoing DOE programs that could have impacts on Pantex Plant. Five of these programs for which NEPA documents have either been prepared recently or are in the process of preparation are identified in volume I, chapter 1. The potential impacts of these programs on Pantex Plant have been included in the cumulative impact sections of this EIS to the extent information was available. Impacts of possible relocation of operations from Pantex Plant are discussed in this EIS, as this is one of the options considered in the *Stockpile Stewardship and Management Programmatic EIS* (DOE/EIS-0236). Cumulative impacts also address the incremental effects of the action added to other past, present, and reasonably foreseeable future actions undertaken by Pantex Plant or other agencies in the specific Region of Influence identified for each environmental resource area.

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CHAPTER 3

The Proposed Action and Alternatives

CHAPTER 3
THE PROPOSED ACTION AND ALTERNATIVES

Chapter 3 describes the Proposed Action, which is the Department's Preferred Alternative, and the alternatives to that Proposed Action. These alternatives include "no action" and the relocation of interim pit storage from Pantex Plant to one of four candidate sites. Following that discussion is a summary of the method whereby the Department identified candidate sites for receiving some or all of the plutonium pit storage function. Also addressed are alternatives that were considered but eliminated from detailed study in this EIS. Chapter 3 concludes with a summary comparison of the environmental impacts of the Proposed Action and Alternatives. Detailed discussions of these environmental impacts are presented in chapter 4 (for Pantex Plant) and chapter 5 (for the four candidate sites).

3.1 RANGE OF ALTERNATIVES

ALTERNATIVES

The Preferred Alternative involves all of the different weapons activities historically performed at Pantex Plant, storage of up to 20,000 pits at the plant, and the possible implementation of six new projects.

The No Action Alternative involves all of the different weapons activities historically performed at Pantex Plant, storage of up to 12,000 pits, and the implementation of only previously funded projects. With this alternative, dismantlement would cease once a storage level of 12,000 pits has been achieved.

The Relocation of Interim Pit Storage Alternative involves all of the different weapons activities historically performed at Pantex Plant, relocation of storage of 8,000 or 20,000 pits to another site, and the possible implementation of six new projects.

The alternatives considered in this EIS are the Proposed Action, the No Action Alternative, and the Relocation of Pit Storage Alternative (for interim pit storage only). These are described in sections 3.1.1 through 3.1.3. The Department's Preferred Alternative is the Proposed Action.

The Proposed Action involves continuing operations at Pantex Plant, increasing the pit storage limit from 12,000 pits up to 20,000 pits, and the construction of several new projects. These new projects, outlined in appendix H, are analyzed at a project-specific level of detail. For each of these projects, there is a range of reasonable alternatives that include, as a minimum, a Proposed Project (i.e., implementing the proposed change) and not implementing the proposed project.

The No Action Alternative involves continuing operations with the limitation of ceasing weapon dismantlement after a storage level of 12,000 pits is reached. No new projects are included with this alternative. DOE also understands that the No Action Alternative does not satisfy the purpose and need for action for weapon disassembly or goals for enhanced management of wastes.

In the March 1996 Pantex Plant Draft EIS, the proposed construction of the Hazardous Waste Treatment and Processing Facility (HWTPF) was considered necessary for improving waste operational efficiency and safety and meeting regulatory requirements established in the Agreed Order. With offsite disposal shipments of mixed waste in 1994 and two shipments in 1996, as described in section 4.13.2.3 of this volume, and changes contained in the August 1996 Federal Facility Compliance Act (FFCA) Compliance Plan Annual Update document, construction of the HWTPF is no longer considered a regulatory requirement. DOE's purpose and need for enhanced efficiency and safety of its current mixed waste, low-level radioactive waste, and hazardous waste operations remain and are discussed in greater detail in volume II, appendix H. Without the HWTPF, waste treatment and processing capabilities are greatly limited.

The Pit Storage Relocation Alternative involves continuing the operations at Pantex Plant, construction of several new projects, and relocating the storage of some or all of the pits to another site. The candidate sites for relocation of interim pit storage provide a range of geographical, operational, and environmental alternatives.

The types and numbers of weapons operations performed at Pantex Plant in any year are principally defined by the Stockpile Memorandum. The Memorandum is set by the President and authorized and funded by Congress. In order to fully encompass the operations of Pantex Plant, different levels of all of the types of operations that Pantex Plant can and has performed are assessed.

Because future stockpile requirements cannot be accurately predicted, this EIS examines the impacts of activity levels for operations on 2,000, 1,000, and 500 weapons per year (see section 2.2). Additional information about activities associated with stockpile management missions is in the Pantex Plant *Programmatic Information Document* (DOE 1996b).

Weapons disassembly operations and weapons assembly operations result in roughly equivalent impacts and are the dominant contributors to the impacts resulting from plant operations. Therefore, the mix of weapons operations that is assessed for each alternative is dominated by these operations. For the No Action Alternative, the operations mix is dominated by assembly operations, once the disassembly operations limitation of 12,000 pits in storage is reached.

The activity levels of operations on 2,000, 1,000, and 500 weapons per year are representative levels of Pantex Plant activity. The 2,000 weapons level represents recent and current levels of activity. The 1,000 weapons level represents the level that will most likely occur in the near future, if there are no changes in current directions in the Stockpile Memorandum. The 500 weapons level represents the minimum level of activity required at Pantex Plant to maintain all of its mission capabilities. An activity level ranging from 330 to 680 weapons per year is evaluated in the SSM PEIS. This is based on the remaining stockpile in the year 2005 and beyond, after the successful disassembly of up to 20,000 weapons.

In the Record of Decision that will follow completion of this EIS, the Secretary of Energy will consider the environmental impacts of each alternative along with mission requirements, technical factors, and the public interest. In balancing these considerations, the Secretary could decide to implement all or part of any alternative. Likewise, the Secretary may decide to include a particular aspect of an alternative in a decision to implement another alternative. For example, the Secretary could decide to implement the No Action Alternative, but include the construction of the HWTPF described in the Proposed Action.

3.1.1 Proposed Action

DOE proposes to continue nuclear weapons stockpile management operations and related activities at Pantex Plant; continue the interim storage of pits at Pantex Plant; continue transportation of nuclear components to the Savannah River Site (SRS), the Oak Ridge

Reservation (ORR), and Los Alamos National Laboratory (LANL); and implement projects and facility upgrades at Pantex Plant consistent with fulfilling these missions for approximately 10 years. Specifically, the Proposed Action includes:

- Continued operation of Pantex Plant, including activities associated with the following stockpile management missions:
  - — Assembly of nuclear weapons.
  - — Disassembly of nuclear weapons.
  - — Modification and maintenance of nuclear weapons.
  - — Quality assurance testing of weapons components (surveillance).
  - — Research and production of high explosives (HE) and weapons components.

Because future stockpile requirements cannot be accurately predicted, the Proposed Action will include impacts of activity levels for operations on 2,000, 1,000, and 500 weapons per year.

- Management of nuclear weapons components and materials as follows:
  - — Increasing the maximum quantity of pits in interim storage at Pantex Plant from 12,000 to 20,000.
  - — Continuing to transport highly enriched uranium (HEU) and depleted uranium components from Pantex Plant to ORR for storage or processing and staging those components pending shipment.
  - — Continuing to transport tritium from Pantex Plant to SRS for storage and recycling and staging these reservoirs pending shipment.
  - — Continuing to transport radioisotopic thermoelectric generators (RTGs) from Pantex Plant to LANL for heat source removal and storage. Some RTGs from disassembled weapons would be retained at Pantex Plant as spares for future use in weapons maintenance, modification, or replacement, as required.
  - — Continuing to transport a few selected pits per year from Pantex Plant to LANL for surveillance, inspection, and testing.
  - — Continuing demilitarization and sanitization of components (including demilitarization and sanitization of HE), equipment, and related materials, and burning of HE and HE-contaminated wastes at the Burning Ground in accordance with applicable Federal and State regulations.
  - — Continuing to dispose of other items resulting from mission operations in accordance with regulatory requirements.
- Performing environmental protection and environmental restoration activities. Environmental protection activities include the management and stewardship of resources as previously noted in section 1.2.2.2. Restoration activities include site characterization to define the nature and extent of contamination, evaluating potential corrective measures, coordinating with State and Federal regulatory agencies, and performing corrective measures.
- Continuing routine Pantex Plant activities such as waste management, infrastructure and building maintenance, operations and equipment relocation and consolidation, routine modifications to buildings, general landscaping, cooperative agreements with universities, technology transfer activities, transportation of materials, and similar support activities.
- Continuing the transportation of nuclear weapons, nuclear components, HE materials, wastes, and other materials to and/

or from Pantex Plant. Additional information describing onsite transportation activities is provided in section 4.12 of this volume of the EIS.

- Performing all required facility upgrades, modifications and replacement of facilities, and new proposed projects that are foreseeable at Pantex Plant, as described below:
  - — A new HWTPF that would accommodate management of low-level, hazardous, and mixed waste. The facility activities would include DOE developed technologies capable of mixed waste treatment.
  - — Modifications of existing facilities to provide a Pit Reuse Facility in Zone 12. This facility would allow non-intrusive modification of certain pits in order to enhance their safety and allow their future reuse.
  - — Construction of a new Gas Analysis Laboratory in Zone 11 to replace a structure of World War II vintage. The facility would provide new analytical laboratory space with the requisite environmental controls for sensitive gas analysis equipment.
  - — Construction of a new Materials Compatibility Assurance Facility in Zone 11 to replace a structure of World War II vintage. The facility would be used for the environmental aging and compatibility testing of nonnuclear weapon components.
  - — Construction of a new Nondestructive Evaluation Facility in Zone 12 to replace a structure of World War II vintage. The facility would house operations such as radiography, ultrasonic analysis, digital imaging, penetrant testing, laser sampling, radiometry, and computer tomography of nonnuclear weapon materials.
  - — Construction of a new Metrology and Health Physics Calibration and Acceptance Facility in Zone 12. The facility would provide the capability and capacity to perform health physics calibration and product acceptance control in support of the disassembly/assembly programs. The Health Physics Laboratory would provide necessary calibration and maintenance support for radiological instrumentation and monitors. The Product Acceptance Control Laboratory would provide the capability for calibration and support of product acceptance testing and equipment.
  - — Operations involving an AT-400A pit repackaging system using existing bays in Zone 12 are planned.

  These projects are further described in volume II, appendix H, except for the pit repackaging operation, which is described in sections 4.3, 4.13, and 4.14 of this volume.

Figure 3.1.1–1 shows the proposed location of these projects, and Table 3.1.1–1 presents relevant data for each project. This EIS provides the project-specific NEPA analysis sufficient for decisions on whether to implement each of these projects. There are two other projects underway which have already been through the NEPA process and have been determined to be in a class of actions that would have no significant environmental impacts (i.e., categorically excluded). Consequently, these projects, described below, are not analyzed in detail in this EIS:

- A Plutonium Resource Center that was approved by Congress and began operation in fiscal year 1995. The center is being developed to study environmental impacts of plutonium storage and future uses of plutonium. It occupies space in an existing commercial building in the City of Amarillo. No radioactive materials are handled or stored in the resource

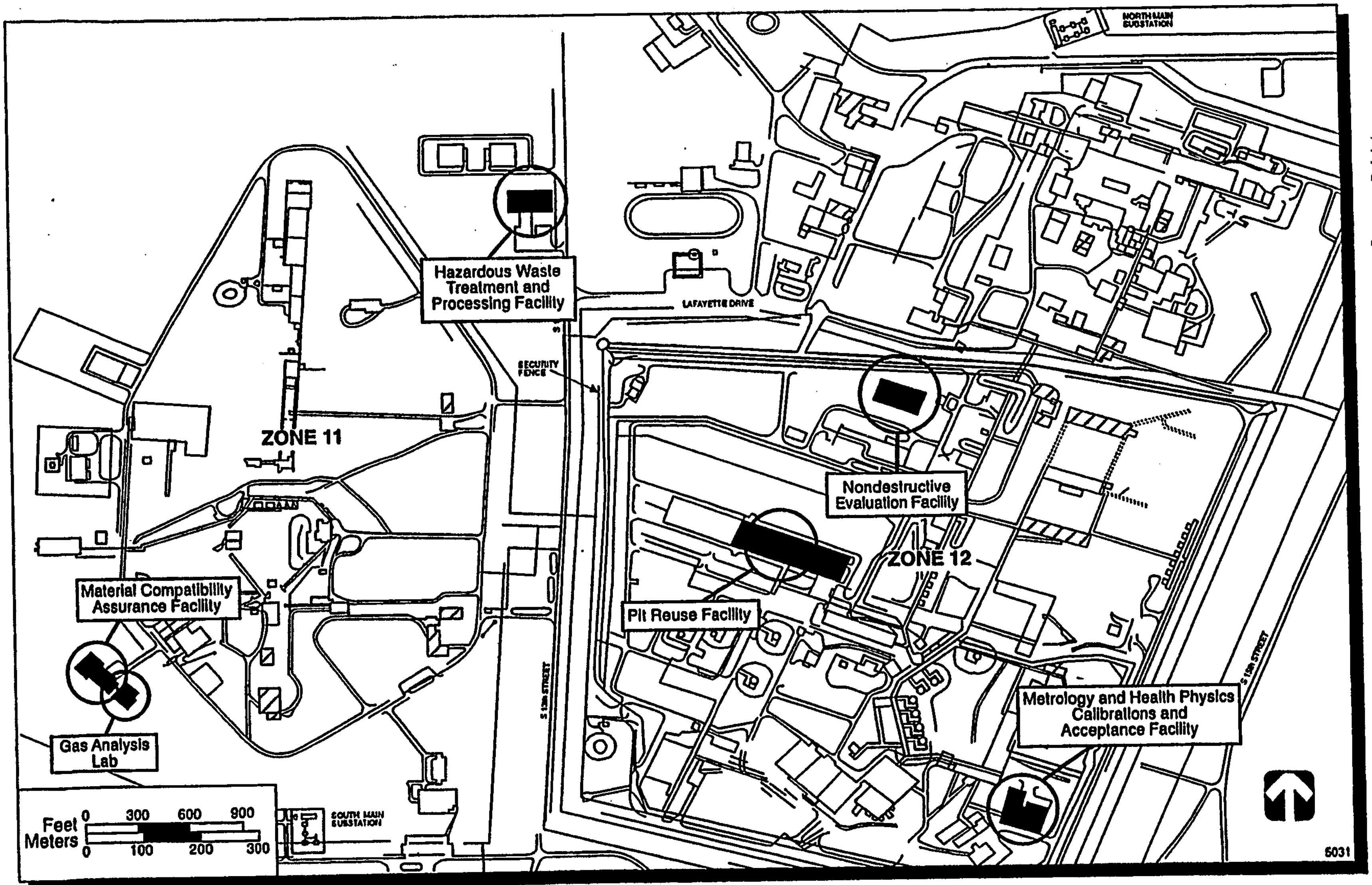


FIGURE 3.1.1–1.—*Location of Proposed Projects at Pantex Plant.*

TABLE 3.1.1–1.—*Proposed Projects at Pantex Plant*

PROJECT	FUNDING YEAR	TOTAL ESTIMATED COST ($Million)	GROSS FLOOR AREA m^2 (ft^2)	OPERATIONAL DATE
HWTPF[1]	1997	13.5	2,648 (28,500)	January 1999
Pit Reuse Facility	1998	8.6	494 (5,314)	January 2002
Gas Analysis Laboratory	1997	13.3	2,537 (27,304)	December 2002
Materials Compatibility Assurance Facility	1997	20.6	2,015 (21,690)	December 2002
Nondestructive Evaluation Facility	1997	51.5	3,734 (40,196)	November 2002
Metrology and Health Physics Calibration and Acceptance Facility	1997	13.7	4,474 (48,156)	February 2002

[1]Bounding alternative

Sources: DOE 1995j; Pantex 1996b

center. The NEPA review was approved in December 1994.

- The Burning Ground Upgrade project would consist of a covered, three-sided structure with a fan to exhaust emissions through an elevated stack. The wood currently used as an auxiliary heat source would be replaced by natural gas. The NEPA review for this project was approved in July 1994.

These projects have been taken into account in the evaluation of the impacts of each of the alternatives assessed in this EIS. It is foreseeable that within the next 10 years, actions (such as movement of pits within Zone 4 or modifications to security) may be required to implement third-party inspections of weapons facilities as a part of the National Nonproliferation Policy. These actions would be implemented to the extent feasible within existing capability. As the implementation of this policy has not yet been fully defined, these actions have not been through the NEPA process nor are they discussed in detail in this EIS.

3.1.2 No Action Alternative

The No Action Alternative includes the continuing and historical nuclear weapons assembly/disassembly operations and related activities of Pantex Plant; continuing the current nuclear components storage activities at Pantex Plant; continuing environmental protection and restoration programs; and continuing transportation of components to ORR, SRS, and LANL, as described in the Proposed Action.

This alternative differs from the Proposed Action in that:

- The six projects described in Table 3.1.1–1 would not be implemented.

- Weapons disassembly operations would cease when 12,000 pits have been placed in interim storage at Pantex Plant. Note, however, that all other stockpile management operations would continue. Because current mission requirements are dominated by dismantlement, a significant drop in the activity level would be expected to occur when dismantlement ceases. However, with the No Action Alternative, Pantex Plant still has the requirement to support the stockpile with other operations, including weapons production, modification, and surveillance activities. Because future stockpile requirements cannot be accurately predicted, the No Action Alternative includes impacts of operations on 2,000, 1,000, and 500 weapons per year.
- Only 12,000 pits from weapons disassembly would be placed in interim storage at Pantex Plant. No pits would be transferred to another site for storage.

It should be noted that the No Action Alternative would allow only partial fulfillment of the Pantex Plant mission, by limiting the amount of weapon disassembly, and would not fully satisfy the purpose and need for agency action discussed in chapter 2.

3.1.3 Relocation of Interim Pit Storage Alternative

With the Relocation of Interim Pit Storage Alternative, only the interim pit storage functions would be transferred to another site. The options detailed below describe how some or all of the pits currently or potentially stored at Pantex Plant would be stored at another site. With this alternative, all weapons operations (e.g., disassembly, assembly, etc.) would continue to be performed at the plant. The new projects (HWTPF, Pit Reuse Facility, Gas Analysis Laboratory, Materials Compatibility Assurance Facility, Nondestructive Evaluation Facility, and Metrology and Health Physics Calibration and Acceptance Facility) are needed to maintain the capability of the plant to perform weapons operations efficiently. Therefore, they are included in this alternative. Additionally, all other functions described in the Proposed Action, including the impacts of operations on 2,000, 1,000, and 500 weapons per year, were assessed for this alternative. This alternative examines the environmental impacts, at Pantex Plant and other sites, of relocating interim pit storage from Pantex Plant to other sites.

Specific features of interim pit storage relocation options are described below:

- Option 1—Relocating interim storage of up to 20,000 pits from Pantex Plant to one of the following candidate sites: Nevada Test Site (NTS), about 104 kilometers (65 miles) northwest of Las Vegas, Nevada; SRS, 19 kilometers (12 miles) south of Aiken, South Carolina; and Kirtland Air Force Base (KAFB), just southeast of Albuquerque, New Mexico.
- Option 2—Relocating interim storage of up to 8,000 pits to one of the following candidate sites: NTS; Hanford Site, just north of Richland, Washington; SRS; and KAFB.

With this alternative, the number of pits stored at Pantex Plant could conceivably be increased beyond 12,000 initially. Once the rate of pit shipments to an alternate site is sufficient to handle the number of pits generated by disassembly operations, the backlog of stored pits would begin to be transported and the number of pits stored on site would decrease. The maximum number of pits stored at Pantex Plant with this alternative would depend on the time needed to implement any required upgrades at the alternate site and the availability of a new container certified by the DOE under the requirements found in 10 CFR 71. Once the alternate site is operational and containers are available, shipments would begin.

For the relocation site alternatives, the EIS scope includes:

- Performing at Pantex Plant all operations, upgrades, and modifications of the Proposed Action.
- Performing at the alternative sites only those facility upgrades and modifications or replacement of facilities that would be needed to accommodate the interim pit storage mission. These sites and their respective storage facilities are described in chapter 5.

3.1.4 Selection of Site Alternatives for Interim Pit Storage

A DOE Site Screening Committee systematically evaluated the potential of DOE and Department of Defense (DOD) sites as alternative interim pit storage sites. The site screening process evaluated a large number of candidate sites to determine the range of reasonable alternative sites. This was accomplished by developing site suitability criteria, applying the criteria to candidate sites, and determining the best sites to represent the range of reasonable site alternatives.

Five exclusionary criteria were used to qualify sites for consideration as reasonable candidates. In order to be considered in the reasonable range, a site must be:

- Located within the boundaries of the 48 contiguous states of the U.S. and accessible during all seasons by all-weather highways.
- Currently owned by or transferable to the Federal Government.
- Available for use by DOE Defense Programs beginning in 1997.
- Under DOE control through at least 2007.
- Capable of storing a minimum of 8,000 pits.

Favorability criteria were then used to assess how well each remaining site was suited for the intended use. The favorability criteria were:

- Degree of construction required to adapt existing facilities for the pit storage mission.
- Degree of isolation from civilian populations.
- Indication of environmental hazards potentially impacting the intended mission.

After applying these favorability criteria to DOE sites and visiting finalist sites to look at the specific facilities that would be used for pit storage, DOE selected NTS, Hanford Site, and SRS as DOE site alternatives for interim pit storage.

In parallel to the committee's screening of DOE sites, the Nuclear Weapons Council Staff conducted a review of 60 DOD installations to determine which ones were feasible for the interim pit storage functions. Using the same site screening criteria, the Council Staff found that most of the examined installations either had military missions incompatible with pit storage or were too far into the base realignment and closure process to be made available to DOE. The Council Staff found that only two bases, KAFB (at Albuquerque, New Mexico) and the Seneca Army Depot (at Romulus, New York) appeared to be feasible for interim pit storage.

DOE then asked the Department of the Air Force and the Department of the Army to concur that these sites were available for DOE use and for each Department to become a Cooperating Agency for the preparation of this EIS. The Air Force agreed that sufficient storage area at the Manzano Weapons Storage Area (WSA) on KAFB could be made available and consented to be a Cooperating Agency. After a visit to the Manzano WSA to validate the suitability of the site under the site selection criteria, the

Manzano WSA was confirmed to be in the reasonable range of alternatives and the impacts associated with interim pit storage at this site are analyzed.

Subsequent to the actions of the Nuclear Weapons Council staff, the Seneca Army Depot was placed on the 1995 Base Realignment and Closure (BRAC) list. Because of this, the Army and DOD could not make a determination as to its availability until the BRAC list was approved. The list was approved September 29, 1995, and Seneca Army Depot was approved for closure in accordance with the procedures established by the *Defense Base Closure and Realignment Act of 1990* (Public Law 101–510). In accordance with these procedures and the Memorandum for Federal Agencies, dated September 29, 1995, Subject: Notice of Availability of Excess Real Property at Seneca Army Depot, Romulus, New York, it was determined that Seneca Army Depot would not serve as a viable alternative within the Pantex Plant EIS, because DOE cannot fulfill a key BRAC requirement in stating that none of its holdings and property can satisfy the purpose for which the base is sought. The requirement for storing nuclear weapons components can be accomplished with DOE's current holdings. Therefore, Seneca Army Depot was not considered further as an alternative pit storage location.

3.1.5 Alternatives Considered but Eliminated from Detailed Study

DOE considered three other action alternatives that were eliminated from detailed study in this EIS. These action alternatives were:

- Relocation of Pantex Plant operations.
- Shutdown of Pantex Plant.
- Relocation of storage for HEU, depleted uranium, tritium, and RTGs.

Each of these is discussed below in sections 3.1.5.1–3.1.5.3.

3.1.5.1 *Relocation of Pantex Plant Operations*

The original Notice of Intent (NOI) (59 FR 26635) for preparation of this EIS included the possibility of relocating some or all of Pantex Plant operations as part of the Relocation Alternative. Upon further review, it was determined that the relocation of operations from Pantex Plant within the time period of this EIS would not meet the purpose and need for DOE to maintain minimum disruption of weapons disassembly operations. As discussed in the Amended Notice of Intent (60 FR 32661), the SSM PEIS evaluated the relocation of Pantex Plant operations. This EIS incorporates by reference and summarizes impacts of relocating operations as identified in the SSM PEIS. These impacts are discussed in qualitative terms in the cumulative effects sections of this EIS.

3.1.5.2 *Shutdown of Pantex Plant*

The original NOI (59 FR 26635) also mentioned an alternative of shutting down Pantex Plant operations as a means of evaluating environmental baseline conditions. However, Pantex Plant is the only facility currently capable of carrying out the requirements to assemble, disassemble, and perform quality assurance tests on the nuclear weapons and weapon components. These activities are required to maintain the safety of the nuclear weapons stockpile. The near-term shutdown of Pantex Plant before any other facility could fulfill these responsibilities would result in the interruption of these safety requirements. Therefore, as announced in the Amended NOI (60 FR 32661), the shutdown of Pantex Plant operations within the near-term scope of this EIS is considered unreasonable.

3.1.5.3 *Relocation of Storage for Nuclear Components Other Than Pits*

The nuclear components (e.g., RTGs, HEU, and depleted uranium) resulting from the disassembly of weapons are either stored at Pantex Plant; stored or processed at LANL, in Los Alamos, New Mexico; or stored or processed at ORR, near Knoxville, Tennessee. Tritium pressure vessels are processed and the tritium is recycled at SRS, near Aiken, South Carolina.

The original NOI (59 FR 26635) suggested that DOE might consider relocation of current nuclear component storage activities to other DOE or Federal sites. However, after further review of the nature of the components being shipped to other sites and the operations that must be performed preparatory to storage, DOE determined that, for the time period of this EIS, there are no other sites with the capability and capacity to perform pre-storage operations and processes than the sites to which the components currently are sent. Thus, tritium must continue to go to SRS for recycling and storage pending reuse. HEU and depleted uranium components must continue to go to the Y–12 Plant at ORR for the specialized component separation, demilitarization, and declassification operations that can only be performed there. Likewise, RTGs must continue to be shipped to LANL, which is the only place where the capability and capacity exists to remove the plutonium pellets for storage or reuse.

Because of the uniqueness of these facilities within the Nuclear Weapons Complex, relocation of storage for nuclear components other than pits is not reasonable during the time period of this EIS. Instead, the detailed study of relocation of HEU, tritium, and RTGs is being assessed in detail in the S&D PEIS, the SSM PEIS, the *Tritium Supply and Recycling PEIS*, and the *Highly Enriched Uranium EIS*, as well as site-wide NEPA documentation for the impacted sites.

3.1.6 Preferred Alternative

The Council on Environmental Quality regulations require an agency to identify its preferred alternative(s) in the Final EIS (40 CFR 1502.14(e)). The preferred alternative is the alternative that the agency believes would best fulfill its statutory mission, giving consideration to environmental, economic, technical, and other factors.

Based on the analyses in the Final EIS and consideration of schedule and technical information, the Department's Preferred Alternative is to continue nuclear weapons operations at Pantex Plant; implement projects and facility upgrades consistent with fulfilling these operations; and increase interim storage levels for plutonium components (pits) from 12,000 to 20,000 pits.

3.2 Comparison of Environmental Impacts of Alternatives

Table 3.2–1 presents a comparative summary of the potential impacts to the environment at or near Pantex Plant that would be expected to result with implementation of the Proposed Action, No Action, and Pit Storage Relocation alternatives. The potential impacts that would be expected to result with implementation of the Pit Storage Relocation Alternative at Pantex Plant and the candidate sites are presented in Table 3.2–2.

For most of the environmental resources assessed in this EIS, there is no real difference among the impacts for the different alternatives. This is due to the nature of the activities described in each alternative. Each of the alternatives examines the activities at Pantex Plant in terms of three levels of activity for operations on 2,000, 1,000, and 500 weapons per year. The differences among the alternatives are in the number of pits that will be stored at Pantex Plant and the new projects that might be implemented.

Impacts to facilities and infrastructure, land resources, air quality, acoustics, cultural resources, socioeconomics, waste management, intrasite transportation, and environmental justice were determined to be similar for each of the alternatives. The main differences in impacts among the alternatives would involve the disturbance to soils and biotic resources due to construction of the new projects, radiation exposure to workers involved in the transfer of pits, and risks associated with aircraft accidents.

Table 3.2–2 presents a comparison of impacts among the candidate sites for the relocation of pit storage activities. Five facilities at four candidate sites were assessed for the storage of 8,000 or 20,000 pits.

For most of the environmental resources assessed in this EIS, there are no real differences in the impacts to the individual resources among the different candidate sites. This is due to the nature of the pit storage activities. The methods and procedures involved in the storage of pits have evolved and been refined at Pantex Plant to reduce the potential for impacts. This analysis assumes that the same methods and procedures would be used at each candidate site should it be chosen for pit storage. While the environments at each of the candidate sites are different, the storage methods minimize the impacts to those environments. The real differences among the candidate sites in regard to pit storage are the frequency and consequences associated with operational and external accidents.

Impacts that would result from pit storage operations at candidate sites on facilities and infrastructure, land resources, geology and soils, water resources, air quality, acoustics, biotic resources, cultural resources, socioeconomic resources, and waste management would be negligible, primarily because no new construction of facilities would be required at any of the candidate sites. Further, normal operations, including handling and storage of pits, do not require substantial amounts of utility or resource use. There would be unavoidable exposures to radiation from handling of the pits during transfer to storage. There would also be additional impacts to Pantex Plant workers from loading the pits for transfer to the storage site, if one is chosen. Likewise, there is a potential for accidents involving forklifts during unloading and storage of pits. Such accidents would affect the workers, but would not result in any health risk to the public.

The risks associated with accidents are discussed in terms of their frequency of occurrence. This EIS uses the following definitions for frequency of occurrence:

- *Anticipated*—frequency of occurrence is less than 10^{-0} and greater than or equal to 10^{-2} per year (less than 1 in 100 chance of occurring per year).
- *Unlikely*—frequency of occurrence is less than 10^{-2} and greater than or equal to 10^{-4} per year (in between 1 in 100 and 1 in a 10,000 chance of occurring per year).
- *Extremely unlikely*—frequency of occurrence is less than 10^{-4} and greater than or equal to 10^{-6} per year (in between 1 in 10,000 and 1 in a 1,000,000 chance of occurring per year).
- *Not reasonably foreseeable*—frequency of occurrence is less than 10^{-6} per year (less than 1 in 1,000,000 chance of occurring per year).

TABLE 3.2–1.—*Summary Comparison of Environmental Impacts at Pantex Plant*

PROPOSED ACTION ALTERNATIVES (Includes Storage of Up to 20,000 Pits)			NO ACTION ALTERNATIVE (Includes Storage of Up to 12,000 Pits)	PIT STORAGE RELOCATION ALTERNATIVE (Pantex Plant Impacts of Relocating 8,000 or 20,000 Pits [See Table 3.2–2 for Impacts to Other Sites])
2,000 WEAPONS LEVEL	1,000 WEAPONS LEVEL	500 WEAPONS LEVEL		
PLANT FACILITIES AND INFRASTRUCTURE (SEE SECTION 4.3 IN MAIN TEXT)				
The annual utility usage for this activity level and six new projects would be: Steam - 181M kg (398M lb) Electricity - 90,400 MWh Natural Gas - 16.2M m^3 (573M ft^3)	The annual utility usage for this activity level and six new projects would be: Steam - 145M kg (319M lb) Electricity - 68,200 MWh Natural Gas - 13.0M m^3 (458M ft^3)	The annual utility usage for this activity level and six new projects would be: Steam - 73M kg (160M lb) Electricity - 57,100 MWh Natural Gas - 6.5M m^3 (229M ft^3)	Lower than the Proposed Action because no new facilities are proposed.	Same as the Proposed Action.
LAND RESOURCES (SEE SECTION 4.4 IN MAIN TEXT)				
New facilities would require an area of 15,902 m^2 (171,160 ft^2), equal to 0.04 percent of the total DOE-owned area of Pantex Plant.			No impacts to land resources.	Same as the Proposed Action. New facilities would require an area of 15,902 m^2 (171,160 ft^2), equal to 0.04 percent of total area of Pantex Plant.
GEOLOGY AND SOILS (SEE SECTION 4.5 IN MAIN TEXT)				
Temporary disturbance of 31,800 m^2 (342,000 ft^2) of soils resulting from construction of new facilities.			No new facilities are proposed.	Temporary disturbance of 31,800 m^2 (342,000 ft^2) of soils resulting from construction of new facilities.

TABLE 3.2–1.—*Summary Comparison of Environmental Impacts at Pantex Plant*-Continued

PROPOSED ACTION ALTERNATIVES (Includes Storage of Up to 20,000 Pits)			NO ACTION ALTERNATIVE (Includes Storage of Up to 12,000 Pits)	PIT STORAGE RELOCATION ALTERNATIVE (Pantex Plant Impacts of Relocating 8,000 or 20,000 Pits [See Table 3.2–2 for Impacts to Other Sites])
2,000 WEAPONS LEVEL	1,000 WEAPONS LEVEL	500 WEAPONS LEVEL		
WATER RESOURCES (SEE SECTION 4.6 IN MAIN TEXT)				
The increase in Pantex Plant annual water usage (currently 0.7 percent of withdrawal from the Ogallala aquifer in Carson County) would not significantly affect the ongoing regional depletion of the aquifer. Wastewater - 647M liters (171M gal) Water - 1,011M liters (267M gal) The new facilities represent 3.9M liters (1.0M gal) of the total water usage.	The amount of annual water usage would decrease from 1994 levels, reducing Pantex Plant's contribution to ongoing regional depletion of the Ogallala aquifer. Wastewater - 522M liters (138M gal) Water - 791M liters (209M gal) The new facilities represent 3.9M liters (1.0M gal) of the total water usage.	The amount of annual water usage would decrease from 1994 levels, reducing Pantex Plant's contribution to ongoing regional depletion of the Ogallala aquifer. Wastewater - 439M liters (116M gal) Water - 689M liters (182M gal) The new facilities represent 3.9M liters (1.0M gal) of the total water usage.	Water and wastewater annual usage and impacts for 2,000, 1,000, and 500 weapons levels would be lower than for the Proposed Action because no new facilities are proposed.	Water and wastewater annual usage and impacts for 2,000, 1,000, and 500 weapons levels would be the same as for the Proposed Action. The new facilities represent 3.9M liters (1.0M gal) of the total water usage.
AIR QUALITY (SEE SECTION 4.7 IN MAIN TEXT)				
Offsite concentrations of air pollutants would be below the TNRCC Effects Screening Levels (ESLs) and no adverse impacts to human health are expected. Onsite air quality levels are below those that would pose health risks to workers. The impacts from temporary increases in emissions during construction of new facilities would be negligible.			Same as the Proposed Action except temporary increases in emissions during construction of new facilities would not occur.	Same as the Proposed Action. The impacts from temporary increases in emissions during construction of new facilities would be negligible. Pollutant emissions from increased SST activity from relocation of the pits would be a small fraction of the total emissions from Pantex Plant.

TABLE 3.2–1.—*Summary Comparison of Environmental Impacts at Pantex Plant*-Continued

PROPOSED ACTION ALTERNATIVES (Includes Storage of Up to 20,000 Pits)			NO ACTION ALTERNATIVE (Includes Storage of Up to 12,000 Pits)	PIT STORAGE RELOCATION ALTERNATIVE (Pantex Plant Impacts of Relocating 8,000 or 20,000 Pits [See Table 3.2–2 for Impacts to Other Sites])
2,000 WEAPONS LEVEL	1,000 WEAPONS LEVEL	500 WEAPONS LEVEL		
ACOUSTICS (SEE SECTION 4.8 IN MAIN TEXT)				
Except for airblast from high explosives detonation, noise levels from Pantex Plant activities would be below 65 dBA at the plant boundary. The detonations could be audible at a distance of 5 to 10 kilometers (3 to 6 miles). Due to the size of the site, noise from construction of the new facilities would not reach the public.			Same as the Proposed Action except no new facilities are proposed.	Same as the Proposed Action. Due to the size of the site, noise from construction of the new facilities would not reach the public.
BIOTIC RESOURCES (SEE SECTION 4.9 IN MAIN TEXT)				
The construction of the new facilities would result in loss of 15,900 m^2 (171,000 ft^2) of common plant and animal habitat.			No new facilities are proposed.	The construction of the new facilities would result in loss of 15,900 m^2 (171,000 ft^2) of common plant and animal habitat.
SOCIOECONOMIC RESOURCES (SEE SECTION 4.11 IN MAIN TEXT)				
For this weapons level, 3,800 direct jobs and 6,257 secondary jobs would continue. A total personal income of $564 million (in 1994 dollars) would continue to be added to the economy annually. Construction of the new facilities would temporarily generate 1,227 direct and indirect jobs. A total of $56 million of personal income would be added to the economy in the peak cor[illegible]tion year.	This weapons level would support 3,000 direct jobs and 4,925 secondary jobs. Personal income additions to the economy would be reduced to $445 million annually. Construction of the new facilities would temporarily generate 1,227 direct and indirect jobs. A total of $56 million of personal income would be added to the economy in the peak construction year.	This weapons level would support 2,400 direct jobs and 3,950 secondary jobs. Personal income additions to the economy would be reduced to $356 million annually. Construction of the new facilities would temporarily generate 1,227 direct and indirect jobs. A total of $56 million of personal income would be added to the economy in the [illegible]k construction ye[illegible]	The socioeconomic impacts for the 2,000, 1,000, and 500 weapons levels would be the same as discussed for the Proposed Action. No new facilities are proposed.	The socioeconomic impacts for the 2,000, 1,000, and 500 weapons levels would be the same as discussed for the Proposed Action. Construction of the new facilities would temporarily generate 1,227 direct and indirect jobs. A total of $56 million of personal income would be added to the economy in the peak construction ye[illegible]

TABLE 3.2–1.—*Summary Comparison of Environmental Impacts at Pantex Plant*-Continued

PROPOSED ACTION ALTERNATIVES (Includes Storage of Up to 20,000 Pits)			NO ACTION ALTERNATIVE (Includes Storage of Up to 12,000 Pits)	PIT STORAGE RELOCATION ALTERNATIVE (Pantex Plant Impacts of Relocating 8,000 or 20,000 Pits [See Table 3.2–2 for Impacts to Other Sites])
2,000 WEAPONS LEVEL	**1,000 WEAPONS LEVEL**	**500 WEAPONS LEVEL**		
INTRASITE TRANSPORTATION (SEE SECTION 4.12 IN MAIN TEXT)				
Approximately 50 workers would be involved in these activities. This weapons level would have an estimated worker exposure of 61 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.024.[1] No impact to the public would result from intrasite transportation.	Approximately 50 workers would be involved in these activities. This weapons level would have an estimated worker exposure of 48 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.019.[1] No impact to the public would result from intrasite transportation.	Approximately 50 workers would be involved in these activities. This weapons level would have an estimated worker exposure of 41 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.016.[1] No impact to the public would result from intrasite transportation.	Approximately 50 workers would be involved in these activities. The No Action Alternative would have the following impacts for the three weapons levels: 2,000 weapons - worker exposure of 44 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.018.[1] 1,000 weapons - worker exposure of 31 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.012.[1] 500 weapons - worker exposure of 25 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.010.[1] No impact to the public would result from intrasite transportation.	Approximately 50 workers would be involved in these activities. The Pit Storage Relocation Alternative would have the following impacts for the two relocation amounts. These exposures include the impacts for the rest of the activities (equivalent to Proposed Action 2,000 weapons level). 20,000 pits - worker exposure of 344 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.14.[1] 8,000 pits - worker exposure of 174 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.07.[1] No impact to the public would result from intrasite transportation.

TABLE 3.2–1.—*Summary Comparison of Environmental Impacts at Pantex Plant*-Continued

PROPOSED ACTION ALTERNATIVES (Includes Storage of Up to 20,000 Pits)			NO ACTION ALTERNATIVE (Includes Storage of Up to 12,000 Pits)	PIT STORAGE RELOCATION ALTERNATIVE (Pantex Plant Impacts of Relocating 8,000 or 20,000 Pits [See Table 3.2–2 for Impacts to Other Sites])
2,000 WEAPONS LEVEL	1,000 WEAPONS LEVEL	500 WEAPONS LEVEL		
WASTE MANAGEMENT (SEE SECTION 4.13 IN MAIN TEXT)				
This weapons level would result in the annual generation of the following amounts of waste: LLW - 249 m^3 (326 yd^3) LLMW - 183 m^3 (240 yd^3) HW - 192 m^3 (251 yd^3) NHW (Class 1) - 742 m^3 (970 yd^3) NHW (Class 2) - 574 m^3 (751 yd^3) Additional LLMW storage could be required in 2004, if no shipment of waste offsite occurs.	This weapons level would result in the annual generation of the following amounts of waste: LLW - 132 m^3 (172 yd^3) LLMW - 118 m^3 (155 yd^3) HW - 108 m^3 (141 yd^3) NHW (Class 1) - 525 m^3 (687 yd^3) NHW (Class 2) - 453 m^3 (593 yd^3) This activity level would not require additional LLMW storage space until after 2007.	This weapons level would result in the annual generation of the following amounts of waste: LLW - 72 m^3 (94 yd^3) LLMW - 81 m^3 (106 yd^3) HW - 64 m^3 (84 yd^3) NHW (Class 1) - 388 m^3 (508 yd^3) NHW (Class 2) - 363 m^3 (475 yd^3) This activity level would not require additional LLMW storage space until after 2007.	The waste management impacts for the 2,000, 1,000, and 500 weapons levels would be the same as the Proposed Action. However, if the new Hazardous Waste Treatment Processing Facility is not implemented, Pantex Plant waste treatment and processing capabilities are greatly limited.	The waste management impacts for the 2,000, 1,000, and 500 weapons levels would be the same as the Proposed Action.

TABLE 3.2–1.—*Summary Comparison of Environmental Impacts at Pantex Plant*-Continued

PROPOSED ACTION ALTERNATIVES (Includes Storage of Up to 20,000 Pits)			NO ACTION ALTERNATIVE (Includes Storage of Up to 12,000 Pits)	PIT STORAGE RELOCATION ALTERNATIVE (Pantex Plant Impacts of Relocating 8,000 or 20,000 Pits [See Table 3.2–2 for Impacts to Other Sites])
2,000 WEAPONS LEVEL	1,000 WEAPONS LEVEL	500 WEAPONS LEVEL		
HUMAN HEALTH (SEE SECTION 4.14 IN MAIN TEXT)				
Approximately 330 workers would be involved in weapons-related activities associated with exposure to radiation. This weapons level would have an estimated worker exposure of 330 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.13.	Approximately 330 workers would be involved in weapons-related activities associated with exposure to radiation. This weapons level would have an estimated annual worker exposure of 165 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.07.	Approximately 330 workers would be involved in weapons-related activities associated with exposure to radiation. This weapons level would have an estimated worker exposure of 82 person-rem, and a group excess cancer fatality risk for 10-year exposure of 0.03.	The human health impacts for the 2,000, 1,000, and 500 weapons levels would be the same as the Proposed Action.	The human health impacts for the 2,000, 1,000, and 500 weapons levels would be the same as the Proposed Action. See Table S–2 (or 3.2–2) for impacts at the other sites.
AIRCRAFT ACCIDENT (SEE SECTION 4.15 IN MAIN TEXT)				
An aircraft accident capable of causing a release from a pit storage or weapons storage magazine is extremely unlikely (frequency of occurrence less than 10^{-4} but greater than or equal to 10^{-6}). A person in the vicinity of the plant has an approximately 3.0×10^{-12} increase in fatal cancer risk from potential aircraft crash plutonium dispersal accidents from pit storage magazines only.	The risks of an aircraft accident at Pantex Plant are dependent on the number of weapons or pits present at any time at the plant, not on the weapons level. The impacts for this weapons level would be equal to or less than those described for the 2,000 weapons level.	The risks of an aircraft accident at Pantex Plant are dependent on the number of weapons or pits present at any time at the plant, not on the weapons level. The impacts for this weapons level would be equal to or less than those described for the 2,000 weapons level.	The No Action Alternative would involve the storage of only 12,000 pits, which would require all 18 Modified Richmond magazines and 18 of the 42 SAC magazines. With fewer magazines used, the likelihood of an aircraft crash into a magazine containing pits is reduced by 44 percent.	The risks of aircraft accidents in Zone 4 are partly dependent on the pit storage level. 20,000 Pit Storage Relocation - With no pits stored at Pantex Plant, the likelihood of an aircraft accident capable of causing a release from a pit storage magazine is reduced to zero. 8,000 Pit Storage Relocation - The likelihood of an aircraft accident capable of causing a release from a pit storage magazine is the same as discussed for the No Action Alternative.

TABLE 3.2–1.—*Summary Comparison of Environmental Impacts at Pantex Plant*-Continued

PROPOSED ACTION ALTERNATIVES (Includes Storage of Up to 20,000 Pits)			NO ACTION ALTERNATIVE (Includes Storage of Up to 12,000 Pits)	PIT STORAGE RELOCATION ALTERNATIVE (Pantex Plant Impacts of Relocating 8,000 or 20,000 Pits [See Table 3.2–2 for Impacts to Other Sites])
2,000 WEAPONS LEVEL	1,000 WEAPONS LEVEL	500 WEAPONS LEVEL		
INTERSITE TRANSPORTATION OF NUCLEAR AND HAZARDOUS MATERIALS (SEE SECTION 4.16 IN MAIN TEXT)				
For the current baseline 10-year weapon shipment schedule, the public would receive an exposure of 2.0 person-rem with a corresponding excess cancer fatality risk of 9.0×10^{-4}. SST crew members would receive 1.6 person-rem with an expected number of excess cancer fatalities of 6×10^{-4}. For a 100-percent increase from the current shipment schedule, the public exposure would be 4.0 person-rem and excess cancer fatality risk would be 1.8×10^{-3}. SST crew members would receive 3.2 person-rem with an expected number of excess cancer fatalities of 1.3×10^{-3}.			Impacts would be the same as for the Proposed Action.	In addition to the impacts described for the Proposed Action, the following impacts would result with this alternative: 20,000 Pit Storage Relocation - Public would receive an additional exposure of 3.0 person-rem (maximum) for a total of 7.0 person-rem with a corresponding increase in excess cancer fatalities of 1.5×10^{-3} for a total number of expected excess cancer fatalities of 3.3×10^{-3}. 8,000 Pit Storage Relocation - Public would receive an additional exposure of 1.2 person-rem (maximum) for a total of 5.2 person-rem with a corresponding increase in excess cancer fatalities of 6.0×10^{-4} for a total number of expected excess cancer fatalities of 2.4×10^{-3}.
ENVIRONMENTAL JUSTICE				
Minority and low-income populations in the Pantex Plant Region of Influence would not be disproportionately affected.				

[1] For the approximately 50 people involved with transportation and staging activities historical dosimetry records indicate a maximum individual dose of 300 mrem with an individual excess cancer fatality risk for 10-year exposure of 1.2×10^{-3}.

FY - fiscal year
HW - Hazardous waste
LLW - Low-level radioactive waste
LLMW - Low-level mixed waste
SST - Safe Secure Tractor Trailer
ER - Environmental restoration
M - Million
NHW - Nonhazardous waste
MWh - Megawatt-hour

TABLE 3.2–2.—*Summary Comparison of Environmental Impacts of Pit Storage Operations at Pantex Plant and Alternative Pit Storage Relocation Sites*

PANTEX PLANT (PIT STORAGE IMPACTS ONLY—20,000 PITS)	ALTERNATIVE PIT STORAGE RELOCATION SITES			
	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WSA
	SITE FACILITIES			
No change in the site's security force. No change in the site's annual electrical demand. No major modifications needed.	A small increase in the site's security force. Annual electrical demand of 4,110 MWh/yr would be 2.3 percent of the site's remaining system capacity. DAF: No major modifications needed. P-Tunnel: Construction of access control at the mouth of the tunnel.	A small increase in the site's security force. Annual electrical demand of 4,110 MWh/yr would be 0.2 percent of the site's remaining system capacity. No major modifications needed.	A small increase in the site's security force. Annual electrical demand of 4,110 MWh/yr would be a 1.2 percent increase over the site's 1994 usage of 345,500 MWh. No major modifications needed.	A small increase in the site's security force. Annual electrical demand of 4,110 MWh/yr would be a 0.7 percent of the site's remaining system capacity. No major modifications needed.
	LAND RESOURCES			
Additional magazines in Zone 4 would be used for pit storage. No change in land use.	DAF: No land disturbance or change in land use. P-Tunnel: Construction of access control in previously disturbed portal area. No change in land use.	No land disturbance or change in land use.		
	GEOLOGY AND SOILS			
No soil disturbance.	DAF: No soil disturbance. P-Tunnel: Construction of access control at the mouth of P-Tunnel in a previously disturbed area.	No soil disturbance.		

TABLE 3.2–2.—*Summary Comparison of Environmental Impacts of Pit Storage Operations at Pantex Plant and Alternative Pit Storage Relocation Sites*-Continued

PANTEX PLANT (PIT STORAGE IMPACTS ONLY—20,000 PITS)	ALTERNATIVE PIT STORAGE RELOCATION SITES			
	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WSA
	WATER RESOURCES			
Operations would not impact surface water or groundwater. The annual water demand would be negligible. The wastewater would not have a measurable effect on groundwater quality.				
	AIR QUALITY			
Impacts to air quality from normal pit storage operations would result entirely from vehicle emissions which would add negligible amounts to regional emissions.	Impacts to air quality from normal pit storage operations would result entirely from vehicle emissions.			Impacts to air quality from normal pit storage operations would result entirely from vehicle emissions. The emissions have been determined not to exceed the specified threshold levels for the Albuquerque-Rio Grande Intrastate Air Quality Control Region.
	ACOUSTICS			
Noise impacts from the pit transportation vehicles and the air conditioning and heating equipment associated with pit storage personnel would be minimal at any of the sites.				
	BIOTIC RESOURCES			
No impacts to sensitive species, their habitats, or wetlands are anticipated. No impacts to biotic resources would be expected.	No impacts to sensitive species, their habitats, or wetlands would be expected. DAF: Area of infrequent desert tortoise activity. No impacts would be expected. P-Tunnel: No desert tortoise activity. No impacts to biotic resources would be expected.	No sensitive species, habitats, or wetlands would be disturbed. No sensitive species reside at P-Reactor. No impacts to biotic resources would be expected.	No sensitive species, habitats, or wetlands would be disturbed. No sensitive species reside at FMEF. No impacts to biotic resources would be expected.	A sensitive plant species and four springs are present within the perimeter of Manzano WSA. However, pit storage activities would not disturb the plants or the springs. No impacts to biotic resources would be expected.

TABLE 3.2–2.—*Summary Comparison of Environmental Impacts of Pit Storage Operations at Pantex Plant and Alternative Pit Storage Relocation Sites*-Continued

PANTEX PLANT (PIT STORAGE IMPACTS ONLY—20,000 PITS)	ALTERNATIVE PIT STORAGE RELOCATION SITES			
	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WSA
	CULTURAL RESOURCES			
Pit storage activities would not disturb any of the resource sites. Therefore, no impacts would be expected.	DAF: Nine cultural resource sites have been identified, but were not recommended for NRHP eligibility. P-Tunnel: No historic resources have been found. Pit storage activities would not result in any direct impacts to cultural resources.	No cultural resources have been found in the vicinity of P-Reactor. Pit storage activities would not result in any impacts to cultural resources.	No cultural resources have been found in the vicinity of the FMEF. Pit storage activities would not result in any impacts to cultural resources.	Historic and prehistoric resources have been found within the Manzano WSA. Pit storage activities in the magazines would not result in any impacts to cultural resources.
	SOCIOECONOMIC RESOURCES			
While pit storage activities at Pantex Plant require security personnel, these personnel are also required for the other storage activities in Zone 4. The security requirements would not change with or without pit storage.	Pit storage activities would require 150 personnel (30 facility, 120 security). Impacts of this employment on each region's economy would be negligible.			

TABLE 3.2–2.—*Summary Comparison of Environmental Impacts of Pit Storage Operations at Pantex Plant and Alternative Pit Storage Relocation Sites*-Continued

PANTEX PLANT (PIT STORAGE IMPACTS ONLY—20,000 PITS)	ALTERNATIVE PIT STORAGE RELOCATION SITES			
	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WSA
	INTRASITE TRANSPORTATION			
Pit storage at Pantex Plant would not result in any impacts beyond those described for all intrasite transportation and staging operations in Table 3.1–1.	Worker exposure at NTS from normal pit unloading and transfer operations would be 283 person-rem for 20,000 pits and 113 person-rem for 8,000 pits, resulting in 0.11 and 0.04 excess fatal cancers, respectively. Pit loading operations at Pantex Plant would result in an additional 283 person-rem for 20,000 pits or an additional 113 person-rem for 8,000 pits.	Worker exposure at SRS from normal pit unloading and transfer operations would be 283 person-rem for 20,000 pits and 113 person-rem for 8,000 pits, resulting in 0.11 and 0.04 excess fatal cancers, respectively. Pit loading operations at Pantex Plant would result in an additional 283 person-rem for 20,000 pits or an additional 113 person-rem for 8,000 pits.	Worker exposure at Hanford from normal pit unloading and transfer operations would be 113 person-rem for 8,000 pits, resulting in 0.04 excess fatal cancers. Pit loading operations at Pantex Plant would result in an additional 113 person-rem for 8,000 pits.	Worker exposure at KAFB from normal pit unloading and transfer operations would be 283 person-rem for 20,000 pits and 113 person-rem for 8,000 pits, resulting in 0.04 excess fatal cancers, respectively. Pit loading operations at Pantex Plant would result in an additional 283 person-rem for 20,000 pits or an additional 113 person-rem for 8,000 pits.
	WASTE MANAGEMENT			
The pit storage operations would generate less than 1 cubic meter each of low-level mixed, low-level, and hazardous waste annually. This amount of waste does not impact current waste management at Pantex Plant.	The pit storage operations would generate less than 1 cubic meter each of low-level mixed, low-level, and hazardous waste each annually. This amount of waste would not impact current waste management at any of the sites.			

TABLE 3.2–2.—*Summary Comparison of Environmental Impacts of Pit Storage Operations at Pantex Plant and Alternative Pit Storage Relocation Sites*-Continued

PANTEX PLANT (PIT STORAGE IMPACTS ONLY—20,000 PITS)	ALTERNATIVE PIT STORAGE RELOCATION SITES			
	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WSA
	HUMAN HEALTH			
The range of potential accidents is dominated by an aircraft accident capable of causing a release from a pit storage magazine. The likelihood of this incident is extremely unlikely (frequency of occurrence: less than 10^{-4} and equal to or greater than 10^{-6} per year). A person in the vicinity of the plant has an approximately 2.5×10^{-12} increase in fatal cancer risk from potential aircraft crash plutonium dispersal accidents from pit storage magazines only.	The range of potential accidents is dominated by the puncture of a pit at the DAF due to a forklift accident (frequency per single pit handling is extremely unlikely [10^{-4} to 10^{-6}]). The impacts of this accident would be 3.3×10^{-5} person-rem to the public in the vicinity of NTS, resulting in a risk of 1.1×10^{-15} excess fatal cancers/yr to an average member of the public.	The range of potential accidents is dominated by the puncture of a pit at the P-Reactor due to a forklift accident (frequency per single pit handling is extremely unlikely [10^{-4} to 10^{-6}]). The impacts of this accident would be 4.6×10^{-3} person-rem to the public in the vicinity of SRS, resulting in a risk of 3.0×10^{-15} excess fatal cancers/yr to an average member of the public.	The range of potential accidents is dominated by the puncture of a pit at the FMEF due to a forklift accident (frequency per single pit handling is extremely unlikely [10^{-4} to 10^{-6}]). The impacts of this accident would be 2.9×10^{-5} person-rem to the public in the vicinity of Hanford Site, resulting in a risk of 5.3×10^{-17} excess fatal cancers/yr to an average member of the public.	The range of potential accidents is dominated by the puncture of a pit at the Manzano WSA due to a forklift accident (frequency per single pit handling is extremely unlikely [10^{-4} to 10^{-6}]). The impacts of this accident would be 4.0×10^{-2} person-rem to the public in the vicinity of KAFB, resulting in a risk of 2.6×10^{-14} excess fatal cancers/yr to an average member of the public.
	AIRCRAFT ACCIDENTS			
An aircraft accident capable of causing a release from a pit storage magazine is extremely unlikely (frequency of occurrence: less than 10^{-4} and equal to or greater than 10^{-6} per year). A person in the vicinity of the plant has an approximately 2.5×10^{-12} increase in fatal cancer risk from potential aircraft crash plutonium dispersal accidents from pit storage magazines only.	The annual aircraft hit probability hazard frequency at the DAF at NTS is 1.5×10^{-6}. Due to the construction of the DAF, a breach of pit containers in storage from aircraft impact resulting in a release of Pu is not reasonably foreseeable (frequency of occurrence: less than 10^{-6} per year). The P-Tunnel would be immune from aircraft accidents.	The annual aircraft hit probability hazard frequency at the P-Reactor at SRS is 1.2×10^{-6}. Due to the construction of the P-Reactor, a breach of pit containers in storage from aircraft impact resulting in a release of Pu is not reasonably foreseeable (frequency of occurrence: less than 10^{-6} per year).	The annual aircraft hit probability hazard frequency at the FMEF at Hanford is 1.2×10^{-6}. Due to the construction of the FMEF, a breach of pit containers in storage from aircraft impact resulting in a release of Pu is not reasonably foreseeable (frequency of occurrence: less than 10^{-6} per year).	The annual aircraft hit frequency hazard frequency at Manzano is 8.8×10^{-5}. Due to construction of magazines designated for potential storage of pits, a breach of pit containers in storage from aircraft impact resulting in a release of Pu is not reasonably foreseeable (frequency of occurrence: less than 10^{-7} per year).

TABLE 3.2–2.—*Summary Comparison of Environmental Impacts of Pit Storage Operations at Pantex Plant and Alternative Pit Storage Relocation Sites*-Continued

PANTEX PLANT (PIT STORAGE IMPACTS ONLY—20,000 PITS)	ALTERNATIVE PIT STORAGE RELOCATION SITES			
	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WSA
	INTERSITE TRANSPORTATION OF NUCLEAR AND HAZARDOUS MATERIALS (TRANSPORTATION OF PITS ONLY)			
Storage of all pits at Pantex Plant (i.e., the Proposed Action) would not require additional intersite transportation. Therefore, there would be no additional impacts to the public at Pantex Plant.	The transportation of a maximum of 20,000 pits to NTS for storage would result in a cumulative dose of 2.0 person-rem to the public. This would result in 1.0×10^{-3} excess cancer fatalities from incident-free operations.	The transportation of a maximum of 20,000 pits to SRS for storage would result in a cumulative dose of 3.0 person-rem to the public. This would result in 1.5×10^{-3} excess cancer fatalities from incident-free operations.	The transportation of a maximum of 8,000 pits to Hanford Site for storage would result in a cumulative dose of 1.2 person-rem to the public. This would result in 6.0×10^{-4} excess cancer fatalities from incident-free operations.	The transportation of a maximum of 20,000 pits to Manzano WSA for storage would result in a cumulative dose of 0.5 person-rem to the public. This would result in 2.5×10^{-4} excess cancer fatalities from incident-free operations.
	ENVIRONMENTAL JUSTICE			
Normal operations would not have any offsite impact. Abnormal events would not disproportionately impact minority or low-income populations.	Normal operations would not have any offsite impact at any of the sites. Abnormal events would not disproportionately impact minority or low-income populations.			

DAF - Device Assembly Facility
FMEF - Fuels and Materials Examination Facility
MWh - Megawatt-hours
Pu - Plutonium
SRS - Savannah River Site
SST - Safe Secure Tractor Trailer
WSA - Weapons Storage Area

CHAPTER 4

Affected Environment and Environmental Consequences at Pantex Plant

CHAPTER 4
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES AT PANTEX PLANT

Chapter 4 provides information on the methods of analysis applied in this EIS and the results of analyses for Pantex Plant. The chapter begins with an introduction and a summary of the impact assessment methodologies that have been applied. The chapter continues with presentations of the affected environment at Pantex Plant and the impacts of the Proposed Action and Alternatives. These presentations are organized by type of resource (e.g., plant facilities and infrastructure, land resources, water resources, etc.) and other issue areas (e.g., intrasite transportation, waste management, intersite transportation, and environmental justice). Also addressed later in this chapter are irreversible and irretrievable commitments of resources, unavoidable adverse environmental impacts, relationships between short-term uses of the environment and long-term productivity, and cumulative impacts.

4.1 INTRODUCTION

The Council on Environmental Quality (CEQ) regulations for implementing NEPA direct Federal agencies to follow the standard format contained in 40 CFR Parts 1500–1508 for preparation of an EIS. However, the regulations allow Federal agencies to use different formats if "the agency determines that there is a compelling reason to do otherwise" (40 CFR 1502.10). Due to the complex, interwoven nature of the activities discussed in this EIS, the number of sites involved with these activities, and the inclusion of additional sites as possible alternatives for relocation of these activities, DOE has determined that a modified format would better serve the public interest and more efficiently satisfy the regulatory requirement for clear presentation of the Proposed Action, the Alternatives, and the associated environmental consequences.

In applying the standard format, agencies frequently use separate chapters for discussions of the affected environment and environmental consequences. This EIS, however, is formatted such that the affected environment for Pantex Plant and associated environmental consequences are contained in chapter 4, while the affected environment and environmental consequences associated with the other sites are contained in chapter 5. Furthermore, both chapters are internally formatted so that the discussion of each aspect of the affected environment at a site (e.g., water resources, air quality, transportation, etc.) is followed by discussions of the impacts to that aspect for the Proposed Action, No Action, and Pit Storage Relocation Alternatives, respectively. Subsequently, the cumulative impacts to that aspect of the environment and potential measures to mitigate adverse environmental impacts are discussed.

This chapter begins with a brief discussion of the methodologies used to characterize each aspect of the affected environment and assess potential impacts to that aspect. In accordance with the CEQ regulations, the affected environment is defined comprehensively to include the natural and physical environment and the relationship of people with that environment (40 CFR 1508.14). In the interest of presenting the reader with the relevant information in the most practical manner, the discussions in this chapter are limited to summaries of key information. Additional information and discussions of analyses are contained in the appendixes.

Affected Environment

The descriptions of the affected environment provide a baseline for understanding the direct, indirect, and cumulative effects of the Proposed Action and Alternatives. The scope of the discussions varies by resource areas to ensure that all relevant issues are included.

For land resources and geology and soils, discussions include Pantex Plant Site and its surroundings, generally an area within 80 kilometers (50 miles) of Pantex Plant Site and referred to as the Region of Influence (ROI) for each resource. This information provides a basis for understanding both direct effects and the overall resource base that could be affected by the changes in the activity levels at Pantex Plant.

Ambient conditions are described for air quality, acoustics (noise), and water resources. Discussions focus on air quality and noise conditions at the site boundaries and the surface water bodies and groundwater aquifers that could be affected. This information serves as a basis for analyzing key air and water quality parameters to obtain results that can then be compared to regulatory standards. Biotic and cultural resources conditions are described for the area within the boundaries of Pantex Plant Site and also at Pantex Lake.

Socioeconomic conditions are described for the counties and communities that could be affected by regional population changes associated with the changes in the activity levels at Pantex Plant. The socioeconomic ROI is large enough to account for growth related to direct project employment as well as secondary jobs that may be induced by the changes in the activity levels at Pantex Plant. The socioeconomic ROI for Pantex Plant includes four counties: Carson, Armstrong, Potter, and Randall.

In addition to those natural and human environmental resources discussed above, the affected environment sections include a number of issues related to ongoing DOE activities at Pantex Plant. These issues involve plant facilities and infrastructure, intrasite and intersite transportation, waste management, and radiological and hazardous chemical impacts on human health during normal operations and accidents, including risks from potential aircraft accidents.

Environmental Impacts

In accordance with CEQ regulations, the environmental consequences discussions provide the analytical detail for comparisons of environmental impacts associated with the changes in the activity levels at Pantex Plant. Discussions are provided for each environmental resource and relevant issues that could be affected.

For comparison purposes, environmental concentrations of emissions and other potential environmental effects are presented with appropriate regulatory standards or guidelines. However, compliance with regulatory standards is not necessarily an indication of the significance or severity of the environmental impact for NEPA purposes.

The purpose of the analysis of environmental consequences is to identify the potential for environmental impacts. The environmental assessment methods used and the factors considered in assessing environmental impacts are discussed in section 4.2, Impact Assessment Methodologies, and in the appropriate appendixes. The potential for impacts to a given resource or relevant issue is described in the introduction to each section that follows (sections 4.3 through 4.17).

4.2 IMPACT ASSESSMENT METHODOLOGIES

The following is a brief description of the impact assessment approaches used in this EIS for addressing potential impacts of Pantex Plant continued operations at different activity levels and at candidate pit storage sites.

Plant Facilities and Infrastructure

Changes to plant facilities and infrastructure are assessed by comparing the support requirements of the Proposed Action and the Alternatives to site infrastructure capacities. These assessments focus on transportation, infrastructure, and utility systems.

Land Resources

Land use impacts are assessed based on the extent and type of land that would be affected and potential direct impacts resulting from the conversion or from the incompatibility of land use changes with special status and protected lands.

Geology and Soils

The geologic setting, structural geology, and the soil and sediment quality are discussed. The geologic setting is composed of the geomorphology and the stratigraphy of the region. Structural geology includes regional geology, seismicity, and subsidence. Potential seismic impacts are assessed based on the locations of capable faults and the history of the seismicity in the region. The section on soil and sediment quality includes discussions on soil types and the current environmental restoration processes at Pantex Plant. Impacts to the soil include any activities which would result in erosion and taking soils out of production, which is discussed in the Land Use section. Impacts from the soil would be contaminated soil potentially impacting human health. Soil types at Pantex Plant Site are described and a qualitative analysis is performed to assess the effects of potential contaminants of concern in soils at Pantex Plant Site.

Water Resources

Surface water impacts are assessed based on wastewater discharges from Pantex Plant activities. The assessment of water quality impacts from wastewater (sanitary and process) and stormwater runoff qualitatively address potential impacts to surface water and groundwater resources at Pantex Plant.

Impacts to floodplains are assessed based on whether any Pantex Plant activities, including construction of new facilities, would be located within floodplains.

Groundwater resource impacts are assessed based on the effects on aquifers, groundwater usage, and groundwater quality within the Pantex Plant ROI. Total groundwater use at Pantex Plant and projections of future usage determine the short- and long-term impacts associated with changing activity levels at Pantex Plant. Impacts of groundwater withdrawals on existing contaminant plumes because of construction and facility operation are also assessed.

Air Quality

The assessment of potential impacts to air quality is based on the comparison of impacts from the Proposed Action and Alternatives with applicable State, local, or National Ambient Air Quality Standards or the potential exceedance of Prevention of Significant Deterioration increments. The more stringent standards serve as the comparison criteria. The comparison of project toxic pollutants includes guidelines or standards adopted by the State of Texas. Air quality modeling was performed in order to assess the conservative maximum concentrations of individual pollutants that the workers or members of the public might experience. Air quality monitoring data collected by the Texas Natural Resources Conservation Commission

(TNRCC) has been used to help benchmark the model. However, the data does not correlate to the modeling on a one-to-one basis, as the placement and operation of air quality monitoring stations do not allow for a comprehensive assessment of the impacts of air emissions to the workers and the public.

Acoustics

Acoustic impacts are assessed qualitatively on the basis of the potential degree of change in noise levels at sensitive receptors with respect to ambient conditions. Blast noise from high explosives detonation is calculated using an airblast prediction model called BLASTO.

Biotic Resources

Potential impacts are assessed based on the degree to which various habitats or species could be affected by Pantex Plant operations. Where possible, impacts are evaluated with respect to Federal and State protection regulations and standards.

Impacts to wildlife are evaluated in terms of disturbance, displacement, or loss of wildlife. Results of biouptake of radionuclides are identified from monitoring data. Impacts are assessed based on the proximity of wetlands to Pantex Plant operations. Impacts resulting from wastewater discharge into a wetland are evaluated, recognizing the effluents would be required to meet Federal and State standards. A list of species potentially present at Pantex Plant Site was obtained from the U.S. Fish and Wildlife Service and appropriate State agencies, and was used in the process of assessing whether Pantex Plant operations would impact any plant or animal under section 7 of the *Endangered Species Act.*

Cultural and Paleontological Resources

Impacts on prehistoric and historic resources are assessed by considering whether continued operations at Pantex Plant could substantially add to existing disturbance of resources in the area, adversely affect National Register of Historic Places-eligible resources, or cause loss of, or destruction to, important prehistoric resources. Impacts on Native American resources are assessed by considering whether Pantex Plant activities have the potential to affect sites that are historically important or have a position in a Native American system of belief. Impact assessments for paleontological resources are based on the numbers and kinds of resources that could be affected, as well as the quality of fossil preservation in a given deposit.

Socioeconomics

The assessment of impacts on local and regional socioeconomic conditions and factors includes changes in population, employment, and income in the ROI. The changes to these factors are projected on an annual basis because an exact schedule for changes in the activity levels are not currently known. The assessment includes bounding cases for activity levels.

Intrasite Transportation

The focus of this analysis is on the intrasite transfer and handling of hazardous materials, particularly the radiological effects from the transportation and handling of radioactive materials. Accidents involving the transportation and handling of hazardous materials have the potential of leading to human fatalities, excess cancer fatalities, and serious environmental contamination. Radiological exposures and excess cancer fatalities are calculated for workers handling the material. Impacts to the public outside the Pantex Plant boundaries are not expected from intrasite transfer and handling of radioactive materials.

Waste Management

The analysis addresses the waste types and waste volumes generated from Pantex Plant operations, including environmental restoration activities. Impacts are assessed in the context of site practices for treatment, storage, and disposal; associated capacities for the different waste types; and the applicable regulatory requirements.

Pantex Plant does not have existing onsite low-level waste disposal; the number of shipments required to transport low-level waste from Pantex Plant to the Nevada Test Site is thus part of the analysis. The risk associated with additional shipments is addressed in the Human Health section.

Human Health

The health effects are determined for Pantex Plant operations by identifying the types and quantities of material to which one is exposed, estimating exposures, and calculating the resultant health effects. The impacts on human health for workers and the public during normal operation and postulated accidents from various alternatives are assessed. Computer codes such as Melcor Accident Consequence Code System (MACCS) and Explosive Release Atmospheric Dispersion (ERAD) are used to simulate impacts. Atmospheric dispersion modeling using Industrial Source Complex Short-Term Model, Version 2 (ISCST2) was performed for the air quality analysis and the results are used in the evaluation of impacts to workers from hazardous chemicals. Data from continuous air monitoring stations are used to assess impacts from radiological emissions.

Public health impacts could result from exposure to radioactive or hazardous chemical materials released during operation. Experience from past and current operations that are similar to future operations is used to estimate the radiological health impacts to workers. Modeling is used to estimate the type and amount of material released and the associated radiological and chemical doses. These doses are converted to health effects using appropriate health risk estimators.

The relative consequences of postulated accidents in the evaluation of each alternative are assessed. The accident analysis involves less detail than a formal Probabilistic Risk Assessment by addressing bounding accidents (relatively low probability/high consequence) and a representative spectrum of possible operational accidents (relatively high probability of occurrence and low consequence). The technical approach for the selection of accidents is consistent with the DOE Office of NEPA Oversight *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statement* guidance, which recommends consideration of two major categories of accidents: within design basis accidents and beyond design basis accidents (DOE 1993).

Aircraft Accidents

One of the scenarios in the accident risk impact assessment is the potential for an aircraft-induced hazardous material dispersal accident. The likelihood and consequences of this accident scenario have been studied extensively since the start of nuclear explosive operations at Pantex Plant, and studies continue to this day. For purposes of this analysis, new data from a Radar Airspace Monitoring System has been used to determine the amount, type, and frequency of aircraft movements in proximity to Pantex Plant. A Draft DOE standard methodology (see appendix E) is used to estimate the likelihood of an aircraft impacting a critical facility at Pantex Plant. Human health risks from aircraft-induced radiological releases are assessed using the MACCS and ERAD computer codes. The resulting doses are converted to a predicted number of excess cancer fatalities.

Intersite Transportation

The intersite transportation assessment was based on the transport mode, weight of material, curies, proximity dose rates (transport index), type of package, number of shipments, and distance. Health impacts are presented for transportation of pits and other nuclear weapon components. Impacts were evaluated for both incident-free transportation and accident conditions using the Analysis of Dispersal Risk Occurring in Transportation (ADROIT) code developed by Sandia National Laboratories.

Environmental Justice

The potential for disproportionately high and adverse human health or environmental effects on minority and low income populations are evaluated in accordance with Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low Income Populations*. The environmental justice analysis addresses selected demographic characteristics of the Pantex Plant ROI, defined as an 80-kilometer (50-mile) circle centered on Pantex Plant. Similar analyses have also been performed within the ROI for each of the alternate sites considered for interim storage of pits.

The analysis of environmental justice presented in this EIS is based on the definitions of minority and low income populations as contained in the notice for the EPA Office of Environmental Justice (59 FR 192). These definitions call for identification of Census Tracts where 25 percent or more of the persons in 1990 were either minority group members or below poverty level based on their income in 1989. For comparison purposes, definitions of minority and low income populations as provided by the Council on Environmental Quality (CEQ) in August 1995, and also reported in *Guidance for Incorporating Environmental Justice Concerns* in EPA's NEPA Compliance Analysis (EPA 1996a), are also applied to the 1990 Census data and results of both analysis are reported in the EIS.

Cumulative Impacts

Cumulative impacts include the incremental impacts of the actions (usually the proposed or preferred action) when added to other past, present, and reasonably foreseeable future actions. Although several DOE programs described in section 1.7 of this EIS have the potential to impact the Pantex Plant ROI, sufficient information for incorporation in this document is currently available for only three programs: the Waste Management (WM), the Stockpile Stewardship and Management (SSM), and the Storage and Disposition of Weapons-Usable Fissile Materials (S&D) programs. Programmatic EISs (PEISs) are being prepared by DOE for each of these programs.

The cumulative impacts associated with the three DOE programs were, in some instances, overestimated in the Draft Pantex Plant EIS. This overestimation was due to conservative assumptions concerning the scope and time period associated with each program. After the Draft PEIS for each program was issued and further coordination among the programs clarified the details of certain alternatives, some assumptions concerning the assessment of the cumulative impacts were modified.

In the Draft Pantex Plant EIS, the cumulative impacts associated with both the waste management program and the storage and disposition program were calculated by adding the impacts from the Pantex Plant EIS Proposed Action (at a 2,000 weapons per year level) to those for the different alternatives discussed in each of the PEISs. However, the cumulative impacts associated with any new mission or facility at Pantex Plant should be placed in the context of the overall impacts at the Pantex Plant Site at the time those new facilities or missions would be implemented.

The Pantex Plant EIS and the SSM PEIS both discuss the operations of the entire Pantex Plant, but over different time frames. The level of operations, and associated impacts, discussed in the Pantex Plant EIS is for an approximately 10-year time frame beginning in the year 1997. The SSM PEIS discusses a lower level of the same kind of operations for the time frame of approximately the year 2005 and later, so that the operational levels discussed in the Pantex Plant EIS Proposed Action will evolve over the next 10 years into the level of operations discussed in the No Action Alternative of the SSM PEIS.

In recognition of this evolutionary process, the Final Pantex Plant EIS has been modified so that the cumulative impacts from potential WM PEIS missions and facilities, which would be implemented during the next five to seven years, are combined with the impacts from the level of operations discussed in the Pantex Plant EIS Proposed Action. However, the cumulative impacts from the potential missions and facilities discussed in the bounding storage and disposition alternatives of the S&D PEIS, which would be implemented during the next seven to 20 years, are combined with the impacts from the level of operations discussed in the SSM PEIS No Action Alternative.

There is one exception to this methodology for presenting cumulative impacts. As discussed in sections 1.4 and 1.7.3 of this volume, the Final S&D PEIS will include an alternative under which pits from the Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex for storage in Zone 4 as early as 1997. This alternative would result in impacts occurring at the Pantex Plant sooner than they would occur under the bounding storage and disposition alternative of the S&D PEIS (1997 vs. 2004); however, these impacts would be less than those for the bounding case because substantially less total fissile material would be transferred to Pantex.

Storage of pits from RFETS would have incremental impacts in addition to the storage of pits from disassembled weapons. However, this increase is generally accounted for within the level of activities assumed for the Proposed Action in this EIS. That is, the pits from RFETS would not cause the total number of pits stored in Zone 4 to exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Likewise, the intrasite transport of the RFETS pits would cause cumulative impacts, but these impacts are also accounted for within the transportation necessary to move 20,000 pits into storage. The receipt of RFETS pits would require an additional repackaging operation (from FL containers into AL-R8 containers) prior to intrasite transport into storage, as compared to the handling of pits from disassembled weapons, and this operation would contribute cumulative impacts that would not be accounted for by the Proposed Action, but that are addressed in the cumulative impacts analysis.

Another factor that resulted in the over-estimation of some cumulative impacts in the Draft Pantex Plant EIS was the double counting of operations that were assessed in all of the EISs. In the Draft Pantex Plant EIS the cumulative impacts associated with the Waste Management program and the Storage and Disposition program were calculated by adding the impacts from the Pantex Plant EIS Proposed Action (at a 2,000 weapons per year level) to those for the different alternatives discussed in each of the PEISs. Since the impacts detailed in both of these documents included all operations at the site (most of which will not change), this addition of impacts resulted in the impacts from many operations being counted twice.

An example of this double counting is the air emissions associated with the steam plant. When the air quality impacts in the Draft Pantex Plant EIS, which included the emissions from the steam plant, were added to those in the S&D PEIS, which also included the steam plant emissions, these emissions were counted twice. While this double counting of many impacts certainly bounded the cumulative impacts to be expected from these programs, it did not provide the best estimate of the cumulative impacts. In the Final Pantex Plant EIS, the cumulative impacts have been recalculated to more accurately reflect the impacts that could be expected if the decisions discussed in the documents were implemented.

In addition to the DOE programs, information on other Federal, State or local projects, including private developments, was sought through contacts with Federal and State regulatory agencies, the Amarillo Economic Development Corporation, the Panhandle Municipal Water Authority, and the City of Amarillo.

This effort yielded only one project (future closure of the Helium Plant) that would contribute to the cumulative impacts in the Pantex Plant ROI. The U.S. Bureau of Mines has been operating the Helium Plant in the Amarillo area since the early 1940s. On October 9, 1996, the President signed the *Helium Privatization Act of 1996*, directing helium operations to discontinue production and sale of refined helium no later than 18 months from the date of enactment (by April 1998). The impacts of this action are analyzed in section 4.11.5, because cumulative impacts of closing or downsizing this facility would be limited to socioeconomic impacts.

Context of Operations on 2,000, 1,000, and 500 Weapons

These workloads were used to determine a reasonably foreseeable impact of operating Pantex Plant. Because the dismantlement of a specific weapon system was not analyzed, a bounding impact per category of operation, i.e., dismantlement, assembly, surveillance (not by weapon type, nor by individual operations) was derived from historical data. Then the total impact was derived by scaling these data by number of weapons or, in some cases, by number of people. This is not a limitation to the number of personnel that can be hired. However, it does mean that the level and type of impacts to individual resource areas must remain within the envelopes as stated in the EIS.

This EIS is focused on determining impacts from full-scale dismantlement or disassembly and assembly of an entire weapon. This imparted a conservative, yet "reasonably foreseeable," estimation as to what the impacts would be from operating Pantex Plant. The use of activity levels for operations on 2,000, 1,000, and 500 weapons was a tool to generate estimates for total emission levels, waste generation, risk, etc. The analysis should therefore envelope the impacts from operating the plant without unnecessarily constraining specific process decisions (see section 2.2).

To restate this conclusion, once impact levels are determined, there may exist several permutations on the number of weapons and impact per weapon that fall within the derived impact levels. Specifically, this EIS does not state what processes are accomplished, or a given ratio of particular processes. If some process is needed whereby work on over 2,000 weapons is necessary, but the impacts remain within the impact envelopes, no supplemental EIS would be required. Ongoing assessments would continue to be necessary to ensure that the level of impacts to the environment have not drastically changed. The total number of weapons operations would be evaluated, because it is a key indicator as to whether or not additional NEPA documentation would be required. However, exceeding these numbers does not, by itself, mandate additional Environmental Assessments or EISs. Understanding whether or not there are additional impacts from specific processes is required, but a simple checklist or screening analysis is typically the only documentation necessary to confirm that no additional impacts would result from a process or set of processes. On the other hand, if the analysis confirmed that impact parameters were surpassed, additional NEPA documentation would be required.

4.3 PLANT FACILITIES AND INFRASTRUCTURE

4.3.1 Affected Environment

This section addresses the current status of Pantex Plant facilities and supporting infrastructure. Included are discussions of the plant's buildings, operations, services, roads, railroads, and utilities. These discussions help the reader understand the current status of operations at the plant to allow for better comparison of the effects of implementing the Proposed Action or the Alternatives.

4.3.1.1 *Facilities*

Pantex Plant Facilities/Buildings

Major operations performed at Pantex Plant include: assembly and disassembly of nuclear weapons, repair and modification of weapons, production of high explosive(s) (HE) components, evaluation and testing of weapon components, research and development, staging (temporary storage) of nuclear weapons, packaging and shipping of weapons and components, and interim storage of pits. These operations are housed in 476 buildings, containing 230,674 square meters (2,483,020 square feet) of work space. The principal building classifications are administrative, storage, production, service, and research and development. An additional 144 structures, containing 39,928 square meters (429,780 square feet), support the principal operations (DOE 1994j:3-3). These structures include temporary buildings, leased trailers and buildings used for additional office space, and temporary storage containers. Zone 4 magazines (95 buildings) are used for staging of nuclear weapons, storage of explosives, and interim storage of pits (Pantex 1991:3).

Table 4.3.1.1–1 provides a summary of the buildings and their gross areas, by selected construction periods. Approximately 48 percent of the buildings at Pantex Plant were constructed prior to 1966. These buildings are being considered for shutdown after consolidation of functions into newer buildings (DOE 1995j:3, 7). Table 4.3.1.1–2 provides the number of buildings occupied by principal missions at the plant.

TABLE 4.3.1.1–1.—*Buildings at Pantex Plant, by Construction Period*

YEAR BUILT	NUMBER OF BUILDINGS	SQUARE METERS	SQUARE FOOTAGE
Pre-1945	126	60,568	651,956
1946–1955	43	13,930	149,948
1956–1965	61	16,283	175,274
1966–1975	60	30,881	332,412
1976–1985	56	36,098	388,571
1986–1990	66	40,519	436,155
1991–1994	50	30,382	327,036
Not Reported	14	2,013	21,668
Total	476	230,674	2,483,020

Source: DOE 1994j

Pantex Plant Operations/Services

The operating contractor for Pantex Plant is Mason & Hanger Corporation. Under the office of the General Manager, the plant is organized into 13 divisions including: Capital Projects; Information Management; Quality; Safeguards, Security, and Fire Protection; Human Resources; Administrative Services; Operations Support; Applied Technology; Facility Operations; Manufacturing; Engineering and Design; Environment Safety and Health; and Waste Management and Environmental Restoration (Pantex 1996:2.1). Extensive descriptions of key operations and services are provided in the *Pantex Plant Safety Information Document*. Additionally, appendix D of the *Pantex Plant Safety Information Document* provides brief descriptions of each current and planned facility and its operations and services (Pantex 1996a:App D; Pantex 1996b:App C).

TABLE 4.3.1.1–2.—*Mission Facilities Summary*[1]

MISSION	APPROX. # OF BLDGS.	EXAMPLE FACILITIES	APPROX. AREA m^2 (ft^2)	YEAR BUILT (average)	REMAINING LIFE (average years)
Assembly, Disassembly, QA Testing, & Maint. & Mod.	94	Assembly & Disassembly Bays, Assembly & Disassembly Cells, Production Support Laboratories, Tool & Component Warehousing, Weapon Staging Magazines	84,400 (908,000)	1966	31
HE Research and Development	124	HE Machining Bays, HE Pressing Bays, HE Formulation, HE Synthesis, Firing Sites, Production Support Laboratories, HE Storage Magazines	46,300 (498,000)	1955	15
Facility Operations	141	Maintenance and Craft Shops, Security, Medical, Fire Department, ES&H, Support Laboratories, Offices	76,600 (814,800)	1977	22
Pit Storage	22[2]	Magazines, Vaults, Staging Facilities	6,900 (74,200)	1949	34

[1]Table excludes tanks, chemical storage, ramps (concrete floor enclosed walkways between buildings), guard towers, utility structures (e.g., pump houses), and miscellaneous structures (e.g., bus stop hut).
ES&H - Environment, Safety, and Health
[2] Represents 18 Modified Richmond Magazines and Buildings 12–44 (Cell 8), 12–55, 12–58, and 12–116. Note 12–26 and 12–42 pit vaults and Steel Arch Construction (SAC) magazines are listed as Component Warehousing and Weapon Staging Magazines, respectively.
HE - High explosive(s)
QA - Quality Assurance
Source: DOE 1994j:5-13 thru 5-16, 6-7 thru 6-10, 7-12 thru 7-14, 8-7, 8-8, 9-8, 14-7

Pantex Plant has a mature maintenance upgrade program supported with appropriate NEPA related documentation. Since 1990, Pantex Plant has initiated 354 environmental checklists and other NEPA related documents; 206 of the 354 were identified as facility upgrades, repairs, improvements, and maintenance related activities (Pantex 1996b:App D).

4.3.1.2 *Infrastructure*

Two categories of infrastructure, transportation access and utilities, are described below for Pantex Plant Site. Transportation access includes roads, railroad, and airport operations. Utilities include steam, electricity, natural gas, water, and wastewater treatment.

Roads

Access to the site is provided by the Texas Farm to Market roads bounding the site on the north, east, and west and by U.S. Highway 60, 1.6 kilometers (1 mile) to the south. Interstate Highways 40 and 27 provide access to the interstate highway system. Additionally, 76 kilometers (47 miles) of roads exist within the plant boundaries (Figure 4.3.1.2–1) (Pantex 1996:2.2).

Onsite transportation involves movement of nuclear explosives, nuclear components, HE components and materials, tritium, chemicals, and other hazardous materials, including waste. Nuclear explosives and components are transported to and from Pantex Plant in Safe

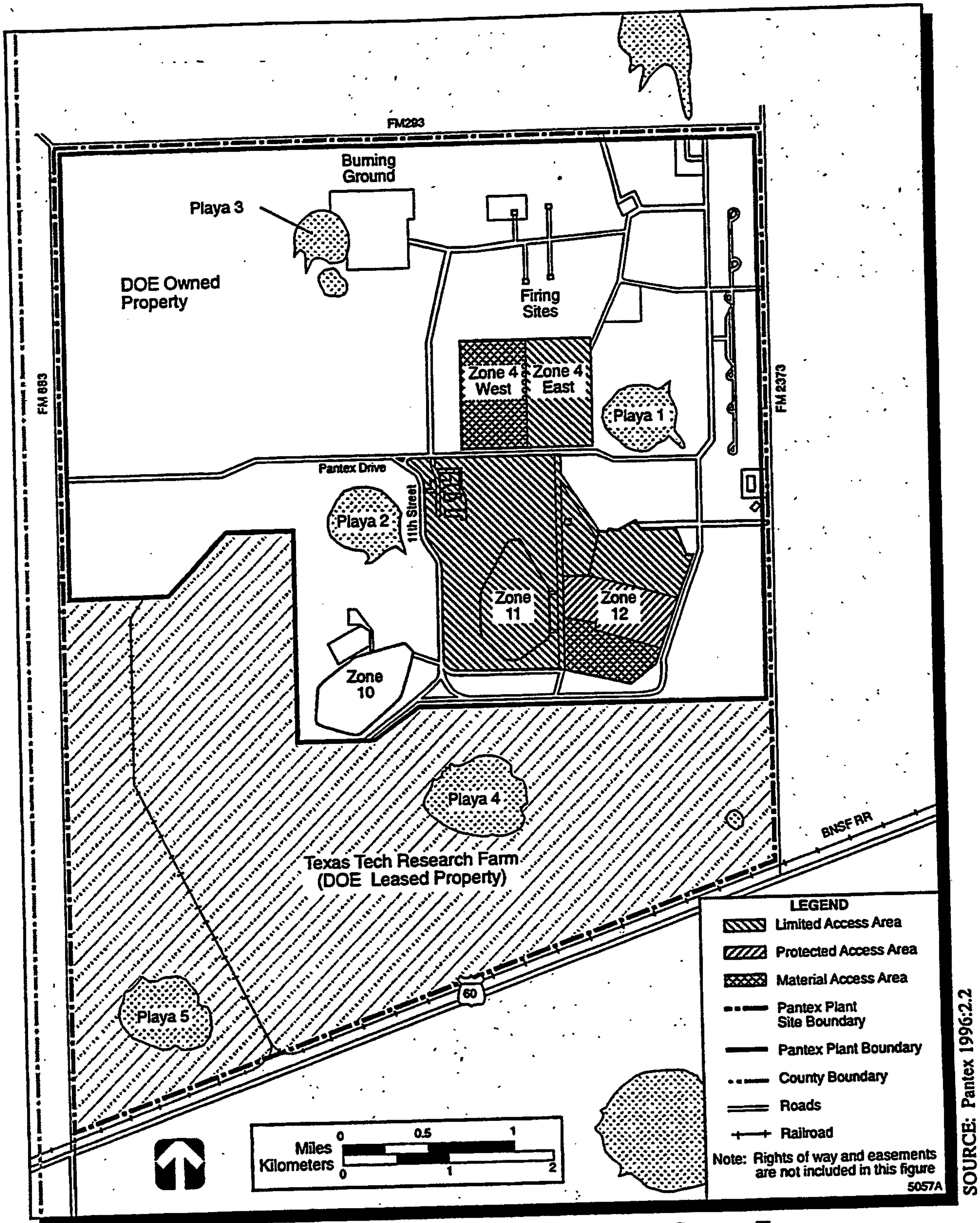


FIGURE 4.3.1.2–1.—*Pantex Plant Site in Carson County, Texas.*

Secure Tractor Trailers by the Transportation Safeguards Division. Onsite transportation is accomplished with hardened trailers and Safe Secure Tractor Trailers as well as other conventional vehicles, which include flatbeds, trailers, vans, trucks, pallet jacks, forklifts, and tow motors. Onsite transport of materials is on paved roadways or enclosed ramps between buildings (Pantex 1996b:3.9). Additional discussion on transportation is provided in section 4.12, Intrasite Transportation, and section 4.16, Intersite Transportation of Nuclear and Hazardous Materials. The Traffic Section of the Packaging and Shipping Department is responsible for the receipt of commercial materials from offsite and for handling materials to be transported out of the plant. Building 16–19, Central Shipping and Receiving, handles commercial materials moving into and out of the plant (Pantex 1996a:5.5).

Railroads

A major rail center for the Burlington Northern Santa Fe Railroad, formerly known as the Atchison, Topeka, and Santa Fe Railroad, is located in Amarillo, Texas. The railroad passes along the southernmost portion of the Texas Tech University (TTU) property at Pantex Plant Site (Pantex 1996:9.5). An operational spur of the railroad extends through the TTU property into Pantex Plant from the southwest (Figure 4.3.1.2–1). Except for occasional bulk concrete shipments, the site railroad track is currently unused (Pantex 1996:9.5).

Airport

The Amarillo International Airport is located approximately 12 kilometers (7.5 miles) southwest of Pantex Plant (Pantex 1996:9.5). The airport is primarily used for commercial aviation and is equipped for international commerce. Pantex Plant leases a small facility at the airport for its own transportation use (Pantex 1996b:2.2). Mason and Hanger Corp. Transportation Department provides the necessary ground transportation.

Utilities

Utilities include steam, electricity, natural gas for fuel, water, and wastewater treatment. Table 4.3.1.2–1 provides current utility usage rates, Pantex Plant system capacity, and offsite utility net capacity for fiscal year (FY) 1994.

Steam. Pantex Plant provides steam for operations and facility heating. Building 16–13,

TABLE 4.3.1.2–1.—*Utility Usage and Capacities at Pantex Plant*

UTILITY[1]	FY 94 USAGE	FY 94 PANTEX PLANT SYSTEM CAPACITY	FY 94 OFFSITE UTILITY EXCESS CAPACITY
Water	836M liters (221M gal)	1,893M liters (500M gal)	5,526M liters (1,460M gal)[2]
Wastewater Treatment	477M liters (126M gal)	829M liters (219M gal)	NA
Steam*	153M kg (337M lb)	596M kg (1,314M lb)	NA
Electricity	84,420 MWh	201,480 MWh	6,053,160 MWh
Natural Gas	14.6M m^3 (515M ft^3)	289M m^3 (10,220M ft^3)	Not Reported

*At 150 psi
M = million
NA - Not Applicable
[1] Approximately 1.8 million liters (0.47 million gallons) of petroleum, oil, and lubricants were used at Pantex Plant in 1994. These supplies, obtained from commercial vendors, are readily available and are not discussed further in this EIS.
[2] City of Amarillo offer of treated wastewater (for industrial use) for potential new Pantex Plant missions.
Sources: DOE 1995j:10; DOE 1991b:16

the plant's boilerhouse, contains four boilers and operates on natural gas (Pantex 1996a:App D; DOE 1994f:7). Two of the boilers each have the capacity to produce 22,680 kilograms (50,000 pounds) of steam per hour and the other two have the capacity to produce 11,340 kilograms (25,000 pounds) of steam per hour each (DOE 1995j:9). Steam heat is used where open flames, flammable liquids, and flammable gases pose a potential safety risk.

Electricity. Pantex Plant receives electrical energy from Southwestern Public Service Company. In 1994, the company had a peak of 3,370 megawatts, a system net capability of 4,061 megawatts, and an excess capacity of 691 megawatts or approximately 6 million megawatthours. In 1994, Pantex Plant consumed approximately 84,420 megawatthours of electricity. In 1995, consumption decreased to 80,500 megawatt hours (Pantex 1996:9.1). Two 115-kilovoltampere electrical substations are located onsite with a capacity of 23 megawatts (DOE 1995j:9). There are several generators, both fixed and portable, that provide standby power in the event of an interruption of normal service to critical systems.

Natural Gas. The Texas Panhandle is one of the major oil and gas producing regions in the country with considerable reserves. Natural gas is supplied to Pantex Plant by Anthem Energy (Pantex 1996:9.1). The natural gas is delivered through a 25-centimeter (10-inch) main supply line, which is capable of supplying 289 million cubic meters (10,220 million cubic feet), sufficient capacity for all future plant requirements (DOE 1995j:10). Tank 12–076 holds a reserve of 2,384,550 liters (630,000 gallons) of fuel oil for use, should interruption of the natural gas supply occur (DOE 1994j:12–1). In 1995, consumption decreased by 1.3 million cubic meters (46 million cubic feet) (Pantex 1996:9.1).

Water. Water for Pantex Plant is pumped from the Ogallala aquifer by five production wells located in the northeast portion of the site. A well and two reservoirs were completed in 1994. The plant pumped 836 million liters (221 million gallons) in 1994. Approximately 25 percent of the water pumped at Pantex Plant was used by TTU for irrigation (DOE 1995j:9). Net plant use was 617 million liters (163 million gallons) in 1995 (Pantex 1996:9.3). Water storage reservoirs are integrated into the water distribution system. Total storage capacity exceeds 20 million liters (5.2 million gallons) (DOE 1994f:6). The City of Amarillo has pledged 5,526 million liters per year (1,460 million gallons per year) of treated wastewater as part of potential plant expansion (DOE 1991b).

The Ogallala formation is capable of yielding adequate water for all current and foreseeable uses by Pantex Plant (PC 1994a:1). Additional discussion on the adequacy of groundwater resources is provided in section 4.6.1.2, Groundwater.

Wastewater Treatment. Pantex Plant has two types of wastewater treatment. The primary wastewater treatment operation is located just south of Playa 1. This system consists of a lagoon that is divided into an aerated section and a facultative (settlement and biotreatment) section. The water is disinfected with chlorine and discharged to Playa 1. Other wastewater treatments are operation specific. Examples are presented in Table 4.3.1.2–2. The wastewater treatment system is permitted to allow a daily average discharge of up to 2.5 million liters (0.65 million gallons). In 1995, wastewater volume decreased to 421 million liters (111 million gallons) (Pantex 1996:9.2). The FY 1996 Sewage Treatment Quality Upgrade will improve the plant's sanitary sewage system to assure wastewater standards are maintained (DOE 1995j:8). The upgrade was covered as a categorical exclusion (NEPA LIN–96–003–C) (Pantex 1996b:App D).

TABLE 4.3.1.2–2.—*Examples of Facility Specific Wastewater Treatment Operations*

BUILDING NUMBER	BUILDING DESCRIPTION	PROCESS DESCRIPTION	CAPACITY	DISCHARGE MANAGEMENT
11–29	Photo Lab	Electroplating and evaporation closed loop system for reprocessing rinsewater.	Information not available	Drummed for offsite silver reclamation.
11–50	HE machining	HE-contaminated water, particle settling tank, and carbon filtration system.	57,000 liters (15,000 gallons) per month	Filtered water discharge to Playa 2.
12–43	HE wastewater filtration	HE-contaminated water is passed through a 1-micron particulate filter and a carbon filter.	15,000 liters (4,000 gallons) per month	Filtered water discharge to Playa 1.
12–121	HE machining facility	HE-contaminated water, particle settling tank, and carbon filtration system.	38,000 liters (10,000 gallons) per month	No discharge. Closed loop system. Scheduled operation date is FY 1996.
Waste Water Treatment Facility	Two part lagoon system with chlorinator and pH adjuster	Sanitary wastewater treatment and industrial wastewater treatment.	76 million liters (20 million gallons) per month	Discharge to Playa 1.

Sources: Pantex 1996a:3.3; DOE 1994f:7; PC 1995d:1; Pantex 1996:14.7

Rights of Way and Easements. In addition to property owned by TTU, Burlington Northern Santa Fe Railroad owns parcels located between Highway 60 and TTU property along the Pantex Plant Site boundary. Anthem Energy and Southwestern Public Service Company have utility easements associated with utility operations. Carson County Farm to Market roads exist along the east, west, and north site boundaries (Pantex 1996:2.2; TNRCC 1995a).

4.3.2 Impacts of Proposed Action

4.3.2.1 *Impacts of Continued Operations*

Weapons-Related Activities

This section discusses the impacts on plant facilities and infrastructure from continued operations at Pantex Plant. With regular maintenance and upgrades, all plant facilities and infrastructure would support the continuing activities and missions without any foreseeable capacity difficulties (DOE 1995j:1, 8, 10). A comparison of estimated utility resource needs for continued operations at three weapons levels is provided in Table 4.3.2.1–1 (see section 2.2). Projections indicate that sufficient capacities exist should demand exceed current expectations (DOE 1995j:1, 8, 10).

In 1994, Pantex Plant experienced a workload slowdown due to facility maintenance. Therefore, 1993 usage rates were chosen as the most recent representative year for the 2,000 weapons per year operational level. In addition, the 1993 consumption rates were higher for all utilities with the exception of electricity (DOE 1994f:7; DOE1995j:10). The 1,000 weapons level utility consumption rate is based on

TABLE 4.3.2.1–1.—*Projected Utility Consumption Rates and Capacities*[1]

WEAPONS LEVELS	STEAM Mkg/yr (Mlb/yr)	ELECTRICITY MWh/yr	NATURAL GAS Mm^3/yr (Mft^3/yr)	WATER Mliters/yr (Mgal/yr)	WASTEWATER TREATMENT Mliters/yr (Mgal/yr)
2,000[2]	181 (398)	90,400	16.2 (573)	1011 (267)	647 (171)
1,000[3]	145 (319)	68,200	13.0 (458)	791 (209)	522 (138)
500[4]	73 (160)	57,100	6.5 (229)	689 (182)	439 (116)
System Capacity[5]	596 (1,314)	201,480	289 (10,220)	1,893 (500)	829 (219)

M = million

[1]Table represents total consumption rates of all Pantex Plant operations.
[2]Based on 1993 consumption rates. Rates include a 10% margin to provide a conservative estimate.
[3]Based on 2005 projected consumption rates. Rates include a 10% margin.
[4]Prorated reduction of electricity, water, and wastewater based on straight-line reduction utilizing 2,000 and 1,000 weapons consumption rates. Reduction of steam and natural gas consumption rates for the 500 weapons level are based on the use of an existing, auxiliary, 25,000 lb rated boiler instead of the 50,000 lb rated boiler. Rates include a 10% margin.
[5]Capacity based on *FY1995 Pantex Plant Site Development Plan* (DOE 1995j).
Sources: DOE 1994f:7; DOE 1995j:10

currently planned needs for FY 2005 (plus 10 percent) (DOE 1995j:10; Pantex 1996b:App A). The 500 weapons level consumption rates were prorated using straight-line reductions based on 2,000 weapons and 1,000 weapons level scenarios.

Data in Table 4.3.2.1–1 show a proportional straight-line decrease in utility consumption rates as the level of activities decreases from the 2,000 weapons level to the 500 weapons level. For example, electricity consumption ranges from 90,400 to 57,200 megawatthours per year; inversely, the system capacity remaining would increase from 111,280 to 144,480 megawatthours per year.

Two exceptions to proportional decrease in utility consumption exist for the 500 weapons level. Steam and natural gas consumption during the 500 weapons level scenario are reduced by 50 percent instead of a 26 percent straight-line reduction in steam and 15 percent straight-line reduction in natural gas. This is because an existing smaller natural gas boiler would be utilized in the 500 weapons level scenario.

Pit Storage Activities

Currently, all existing Modified Richmond and SAC magazines have the necessary utility support and material access control, and are supported by existing plant facilities and infrastructure. SAC magazines are used to stage nuclear assemblies and nuclear components, and require similar levels of infrastructure support as the Modified Richmond magazines (Pantex 1996a:3.2). No new construction of plutonium storage magazines is required as a result of increasing interim storage to 20,000 pits. Therefore, current levels of infrastructure and utility support are expected to continue (DOE 1994w:6-1).

Pit Repackaging Operations

The repackaging of pits from AL-R8 containers into AT-400A containers is expected to begin in late 1996 or early 1997. This operation would be performed in existing bays within Zone 12 and as such will not require new construction nor extensive facility modifications. Utility usage for this operation would be minimal and well within the total usage described for the Proposed Action. The pit repackaging operations would not result in any impacts to land use, geology and soils, water resources, air resources, acoustics, biotics, cultural resources, socioeconomics, or environmental justice and, therefore, are not discussed in those sections. The intrasite transportation impacts have already taken the impacts for pit repackaging into account. The pit repackaging would involve waste management and would result in additional worker radiological exposures. These impacts are discussed in sections 4.13 and 4.14.

Environmental Restoration Activities

Environmental restoration activities are designed to maintain or improve the environment. Since 1989, environmental restoration activities have been assessing inactive sites through temporary field operations that, for the most part, require minimal usage of plant utilities and plant facilities (Pantex 1996:15.0). Heavy equipment such as drill rigs operate with self-sufficient power supplies while field sampling typically uses manual labor or portable power supplies. Portable toilets, fire protection, potable and nonpotable water, and temporary power and lighting are typically required and provided by the contractor (Pantex 1992:4-1, 9-1, Appendix B). By the year 2000, activities are expected to be reduced to monitoring and groundwater and soils management, such as bioremediation of soils and perched zone groundwater remediation. No new facilities would be needed for the environmental restoration activities.

Recycling restoration wastewater is currently under study. After 1999, 65,942 liters (17,420 gallons) could be reclaimed annually (Pantex 1996:14.5).

Waste Management Activities

Waste management activities utility consumption has been accounted for in the facility-wide totals presented in Table 4.3.2.1–1. Impacts of infrastructure support (closures, treatment, storage, and disposal) are discussed in section 4.13, Waste Management.

4.3.2.2 *Impacts of New Facility Construction and Upgrades*

A comparison of site infrastructure and facility resource needs for the proposed facility construction and upgrades is provided in Table 4.3.2.2–1. As noted in this table, sufficient utility capacity exists to handle the demand from these facilities. The Gas Analysis Laboratory, the Materials Compatibility Assurance Facility, the Nondestructive Evaluation Facility, and the Metrology and Health Physics Calibration and Acceptance Facility represent an operational consolidation effort that would not increase utility usage.

The Pit Reuse Facility represents a potential 0.18 percent increase in annual site utility consumption based on the addition of 7 new employees to a 3,800-employee baseline for all utilities except industrial water and steam. No industrial water or steam heat is needed to support the Pit Reuse Facility. The utility consumption increases would be minimal since the Pit Reuse Facility operations would occupy an existing facility (DOE 1995j:4, 5).

The Hazardous Waste Treatment and Processing Facility (HWTPF) project would modernize, consolidate, and expand existing waste operations capabilities (Battelle 1995:1). This project is expected to increase infrastructure requirements by 0.13 percent based on the addition of five new employees. Industrial water usage is estimated to increase by 3.4 million liters (0.9 million gallons) a year or 0.3 percent of 920 million liters (243 million gallons) used in 1993. Discharges of industrial

TABLE 4.3.2.2–1.—*Estimated Annual Utility Consumption by New Facilities*[1]

PROJECT	EMPLOYMENT	DOM. WATER 1,000 L/yr (1,000 gal/yr)	IND. WATER 1,000 L/yr (1,000 gal/yr)	DOM. WASTE-WATER 1,000 L/yr (1,000 gal/yr)	IND. WASTE-WATER 1,000 L/yr (1,000 gal/yr)	ELEC-TRICITY MWH/yr	STEAM (HEAT) Mkg/yr (Mlb/yr)	BOILER-HOUSE WATER 1,000 L/yr 1,000 (gal/yr)	BOILER-HOUSE NATURAL GAS Mm^3/yr (Mft^3/yr)
HAZARDOUS WASTE TREATMENT AND PROCESSING FACILITY									
Proposed	20	912 (241)	3,400 (900)	912 (241)	2890 (765)	598	4.5 (9.9)	564 (149)	0.3 (9.5)
Current	15	685 (181)	0 (0)	685 (181)	0 (0)	411	3.4 (7.4)	451 (119)	0.2 (7.1)
PIT REUSE FACILITY									
Proposed	7	320 (84)	0 (0)	320 (84)	0 (0)	192	0 (0)	0 (0)	0 (0)
Current	0	0 (0)	0 (0)	0 (0)	0 (0)	0	0 (0)	0 (0)	0 (0)
GAS ANALYSIS LABORATORY									
Proposed	20	912 (241)	0 (0)	912 (241)	0 (0)	548	4.5 (9.9)	564 (149)	0.3 (9.5)
Current	20	912 (241)	0 (0)	912 (241)	0 (0)	548	4.5 (9.9)	564 (149)	0.3 (9.5)
NONDESTRUCTIVE EVALUATION FACILITY									
Proposed	42	1,920 (507)	7,200 (1,900)	1,920 (507)	6,100 (1,600)	1,150	2.9 (6.5)	451 (119)	0.2 (6.2)
Current	42	1,920 (507)	7,200 (1,900)	1,920 (507)	6,100 (1,600)	1,150	2.9 (6.5)	451 (119)	0.2 (6.2)
METROLOGY AND HEALTH PHYSICS CALIBRATION AND ACCEPTANCE FACILITY									
Proposed	48	2,200 (579)	8,300 (2,200)	2,200 (579)	7,100 (1,870)	1,315	4.4 (9.6)	564 (149)	0.3 (9.2)
Current	48	2,200 (579)	8,300 (2,200)	2,200 (579)	7,100 (1,870)	1,315	4.4 (9.6)	564 (149)	0.3 (9.2)
MATERIALS COMPATIBILITY ASSURANCE FACILITY									
Proposed	40	1,830 (483)	6,800 (1,800)	1,830 (483)	5,780 (1,530)	1,096	4.4 (9.6)	564 (149)	0.3 (9.2)
Current	40	1,830 (483)	6,800 (1,800)	1,830 (483)	5,780 (1,530)	1,096	4.4 (9.6)	564 (149)	0.3 (9.2)

[1]These facilities are not anticipated to utilize natural gas.

M = Million

Assumptions:

- Number of employees are based on Conceptual Design Report (CDR) information.
- Domestic water use is based on current use per employee.
- Industrial water use is based on current use per employee for the HWTPF, Nondestructive Evaluation Facility, Materials Compatibility Assurance Facility, and Metrology and Health Physics Calibration and Acceptance Facility. No water is expected to be used by Pit Packaging, Pit Reuse, and Gas Analysis Lab.
- Domestic wastewater generated is assumed to equal domestic water use.
- Industrial wastewater generated is assumed to equal 85 percent industrial water use.
- Electricity use is based on current use per employee.
- Natural gas for heating is taken from CDRs.
- Steam requirements are taken from CDRs.
- 0.125 gallon of water is needed to produce one pound of steam.
- 0.96 ft^3 of natural gas is needed to produce one pound of steam.

Source: PC 1995g

water are expected to increase by 2.9 million liters (0.77 million gallons) per year.

4.3.2.3 *Summary of Impacts*

Pantex Plant facilities and infrastructure have adequate capacities for all scenarios covered in the Proposed Action (DOE 1995j:1, 8, 10). As shown in Table 4.3.2.1–1, the largest demand is expected from the 2,000 weapons level. Expected electricity demand, 90,400 megawatthours, represents only 45 percent of the plant's capacity, with an additional 111,080-megawatthour capability. Future water consumption is expected to utilize only 53 percent of capacity with 882 million liters (233 million gallons) per year net reserve. The wastewater treatment facility is predicted to operate at 78 percent capacity or 647 million liters (171 million gallons). The Boilerhouse (Building 16–13) steam supply system is anticipated to function at only 30 percent capacity or 181 million kilograms (398 million pounds) per year. The natural gas needs of the plant utilize only 6 percent of the natural gas main supply line design capacity.

4.3.3 Impacts of No Action Alternative

Weapons-Related Activities

The demands on infrastructure and utilities would remain the same under the No Action Alternative, until the interim storage of pits reached 12,000. At that point weapons disassembly operations would cease. Even after the disassembly operations cease, it is assumed for purposes of analysis that the weapons levels would remain at 2,000, 1,000, or 500, as described for the Proposed Action, because other weapons operations would continue. The infrastructure impacts due to the No Action Alternative would therefore be expected to remain similar to those described for the Proposed Action except that none of the proposed new projects would be built under the No Action Alternative.

Pit Storage Activities

No impacts on plant facilities or infrastructure directly supporting pit storage would occur. Pit storage support operations (e.g., security) are currently in place (DOE 1994w:6-1).

Environmental Restoration Activities

Environmental restoration activities are independent of the No Action Alternative since these activities would continue even if the plant activities are reduced. Therefore, the impacts would be the same as discussed for the Proposed Action.

Waste Management Activities

With the weapons levels remaining at the levels described for the Proposed Action, the waste management activities would not change substantially from those described for the Proposed Action. Further discussion of treatment, storage, and disposal impacts is provided in section 4.13, Waste Management.

4.3.4 Impacts of Pit Storage Relocation Alternative

4.3.4.1 *Impacts of Relocating 20,000 Pits*

Under the scenario of relocating 20,000 pits to other site(s), overall plant impacts would be similar to those identified for the Proposed Action. Only 18 magazines are currently used for pit storage. If all the pits are transferred elsewhere, these 18 magazines would become available for other uses. The 18 Modified Richmond magazines total less than 1,800 square meters (19,000 square feet) of nearly 0.23 million square meters (2.5 million square feet) or 0.8 percent of the total floor space at Pantex Plant. Zone 4 operations include weapon staging and special nuclear material staging. These storage operations, like pit storage, require access control, security, and electricity. Therefore, no reduction in infrastructure support or utility usage is anticipated as a result of relocating 20,000 pits.

4.3.4.2 *Impacts of Relocating 8,000 Pits*

Under the scenario of relocating 8,000 pits, overall infrastructure impacts would remain similar to those described for the Proposed Action. The storage of 12,000 pits would be satisfied from existing magazines at the plant site; no new building construction would be required, other than what is currently required. Increases in infrastructure requirements would not occur.

4.3.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.3.5.1 *Impacts of Alternatives in the Waste Management Draft Programmatic Environmental Impact Statement*

The WM PEIS Decentralized Alternative, which would generate the greatest impacts, would increase the electrical consumption by 3.33 megawatts. The existing total capacities of Pantex Plant and the local area utility system are adequate to handle this increase. Wastewater generation would increase by 43,660 liters (11,535 gallons) per day, The existing total capacity of Pantex Plant is adequate to handle this increase. Water usage would increase by 96,200 liters (25,416 gallons) per day. The existing capacity is adequate for this increase.

4.3.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur, and there would be no construction impacts. Due to the reduced workload expected, future infrastructure impacts are expected to be less than current impacts. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Facilities would be consolidated and impacts would be expected to be less than current impacts. Under the relocation alternative, the facilities would undergo decontamination and decommissioning (DOE 1996b).

4.3.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading existing plutonium storage facilities in Zone 12, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative since it would have the greatest impacts.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant.

For site infrastructure, small increases in available oil resources would be required. During operations, all site infrastructure resource requirements would be less than those already available at the site.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, mixed oxide (MOX) fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

For disposition only, construction and operation would require 24,333 and 1,154,000 megawatthours per year of electricity, respectively. Also, construction and operation would require 1,356,200 liters (354,100 gallons) per year and 844,750 liters (218,473 gallons) per year of oil, respectively. Operations would require 8,976,000 cubic meters (237 million cubic feet) per year of natural gas. Transmission lines would be constructed and upgraded for the increased and redistributed electrical load. Additional primary and secondary access roads as well as railroad right-of-way would be needed and are available. Fuel requirements would exceed current site availability, but can be accommodated through normal contractual means (DOE 1996a:chapter 4).

4.3.6 Potential Mitigation Measures

Since adequate capacities exist for infrastructure as described above at any level of the three weapons activity levels analyzed, no mitigations are currently required or justified under the Proposed Action, No Action, and Pit Storage Relocation Alternatives.

4.4 LAND RESOURCES

4.4.1 Affected Environment

This section discusses land use issues at Pantex Plant and in the surrounding 16-kilometer (10-mile) and 80-kilometer (50-mile) radius areas, hereafter called the Regions of Influence (ROIs). Particular attention is given to the 16-kilometer (10-mile) ROI in response to extensive public comments on agricultural issues in the areas nearest to Pantex Plant Site. The land use discussion includes agricultural, commercial, residential, industrial, institutional, and public lands. The following subsections characterize the existing land use within and adjacent to Pantex Plant, describe regional and site land use plans and policies, identify any access areas restricted to the public due to Pantex Plant operations, address prime and unique farmland, and identify areas of special interest, such as parks and recreational areas, within the ROIs. See Figure 1.2–1 for major features within the land resources ROIs.

4.4.1.1 *Pantex Plant Land Use*

Of the approximately 6,475-hectare (16,000-acre) site, DOE owns approximately 3,683 hectares (9,100 acres) at Pantex Plant and 436 hectares (1,077 acres) of a detached piece of property called Pantex Lake, approximately 4 kilometers (2.5 miles) northeast of the main plant site. Adjacent to the DOE-owned land, approximately 2,347 hectares (5,800 acres) are leased from Texas Tech University (TTU). Pantex Plant activities occur on approximately 809 hectares (2,000 acres) of the 6,475-hectare (16,000-acre) site; the remaining lands are used primarily for safety and security purposes (Figure 1.2–2). As of April 1995, approximately 2,596 hectares (6,421 acres) of the DOE-owned land were being used by TTU for agricultural purposes through a service agreement. The DOE-owned acreage used for agricultural purposes by TTU is variable and subject to periodic changes. Approximately 23 percent of Pantex Plant land, including that leased from TTU, has been developed for industrial use. There are 76 kilometers (47 miles) of roads located within the Pantex Plant boundaries, and a spur of the Burlington Northern Santa Fe (formerly Atchison, Topeka and Santa Fe) Railroad extends onto the site (Pantex 1996:2.2, DOE 1996e:81).

Historically, Pantex Plant Site was divided into functional areas referred to as "Zones". The only current functional areas that retain this designation are Zone 12, which contains fabrication, assembly/disassembly, technical areas, and administrative support areas; Zone 11, which contains the high explosives development area; Zone 10, which serves as an excess property storage site; and Zone 4, which includes the weapons/high explosives magazines and interim pit storage area (see Figure 4.3.1.2–1).

Currently, the following four Security Control Areas occur over both DOE-owned and leased land: Protected Property Area, Limited Area, Pantex Plant Protected Area, and Material Access Area. The Property Protection Area is the entire 3,683 hectares (9,100 acres) of DOE land and the 2,347 hectares (5,800 acres) of leased TTU land, exclusive of the Pantex Lake area, and is commonly referred to as the "Pantex Plant Site." The remaining three areas are shown in Figure 4.3.1.2–1 (Pantex 1996:2.2).

Pantex Plant contains several soil types that, according to the Natural Resources Conservation Service (NRCS [formerly, Soil Conservation Service]), have been classified as prime farmland. Prime farmland, unique farmland, and farmland of Statewide or local importance are identified by the NRCS. Prime farmland, as defined in 7 CFR 657, contains the best combination of physical and chemical characteristics for producing crops. This includes cropland, pastureland, rangeland, and forest land. Prime farmlands must have a dependable and adequate water supply from precipitation or irrigation; must be within a favorable climatic zone; have an adequate growing season; a fairly rockless location; and contain an acceptable acidity, alkalinity, and salt and sodium content. These lands usually are protected from flooding and are only moderately erodable with temporary water saturation (Pantex 1996:7.1). These soil types cover the majority of Pantex Plant. The soil types on Pantex Plant are discussed in section 4.5, Geology and Soils.

The *Farmland Protection Policy Act* (FPPA) (7 U.S.C. §§4201) and the regulations promulgated as a result of FPPA (7 CFR 658) require agencies to make FPPA evaluations part of the NEPA process. The purpose of FPPA is to reduce the conversion of farmland to nonagricultural uses by Federal projects and programs. The Act requires that Federal agencies comply to the fullest extent possible with State and local government policies to preserve farmland. Specifically, FPPA advises that evaluations and analyses of prospective farmland conversion impacts be made early in the planning process before a site or design is selected. Pantex Plant is exempt from FPPA under section 1540(c)(4) (7 U.S.C. §§4201) since the acquisition of Pantex Plant property occurred prior to FPPA's effective date of June 22, 1982.

Pantex lies in the Llano Estacado or Staked Plains portion of the Southern Great Plains. Pantex Plant has a relatively flat topography and is characterized by rolling grassy plains and numerous natural playa basins. This part of the Panhandle is characterized as a semi-arid farming and ranching area. Pantex Plant is surrounded by agricultural land, with several significant industrial facilities located nearby (DOE 1996e:82-83).

Pantex Plant Farmland

A large portion of Pantex Plant is used for grazing cattle and dryland crop production of wheat and sorghum. Cropland is planted under dryland conditions in a winter-wheat/grain-sorghum/fallow sequence that produces two crops every three years within the Pantex Plant boundaries. Grain sorghum and forage sorghum are grown under limited irrigation (on TTU land only) and/or dryland conditions because they are drought resistant. During periods of inadequate rainfall, the TTU property can be irrigated with water from the Ogallala aquifer. In 1994, the plant provided 133 million liters (35 million gallons) of water from the Ogallala well field at Pantex Plant for TTU's onsite use for irrigation and personal consumption (there are only two residences on TTU, so personal usage was limited). About half of the crops grown in the local area are strictly dryland because of the high cost of pumping water from the Ogallala aquifer.

Agricultural chemicals are applied to the Pantex Plant crops in accordance with Pantex Plant Standard 7030 and the Land-Applied Chemical Use Plan. As with other areas in the region, these chemicals have the potential of being transported to the playas through storm water runoff or drift. The chemicals used prior to February 1994 consist of herbicides and insecticides, and their application rates are listed in Table 4.4.1.1–1 (Pantex 1996:10.2). Pesticide use at Pantex Plant is reviewed annually. Table 4.4.1.1–2 shows the pesticides allowed for use during the 1996-1997 growing season. This list is updated annually based on current issues (MH 1996c; PC 1996o).

The TTU property leased to the plant also contains Conservation Reserve Program (CRP) lands which are considered a subset of cropland by the NRCS. CRP is a Federally funded program that allows land owners to place otherwise cultivated cropland in a dormant state for 10 years in return for an annual payment by the government. A grass cover must be planted in the fields to prevent erosion. This program is administered by the Agricultural Stabilization and Conservation Service (Pantex 1996:10.2).

TABLE 4.4.1.1–1.—*Application Rate for Agricultural Chemicals Typically Used at Pantex Plant*

HERBICIDES		INSECTICIDES	
MILO (SORGHAM)			
Bicep™	5.6 to 7.0 L/ha (2.4 to 3.0 qt/acre)	Lorsban 4E™	0.6 kg/ha (0.5 lb/acre)
Atrazine™	1.7 kg/ha + 2.3 L (1.5 lbs/acre + 1 qt) crop oil	Parathion	1.1 kg/ha (1 lb/acre)
WHEAT			
2,4-D	0.6 L/ha (1/2 pt/acre)	Cygon™	0.6 kg/ha (0.5 lb/acre)
2,4-D + Banvel™	1.2 L + 0.3 L/ha (1 pt + 4 oz/acre	Malathion	0.6 kg/ha (0.5 lb/acre)
Amine	0.6 L/ha (1/2 pt/acre)	Lorsban™	1.1 kg/ha (1 lb/acre)
Amber™	24 mL/ha (1/3 oz/acre)	Furadan™	1.1 kg/ha (1 lb/acre)
Ally	7 mL/ha (1/10 oz/acre)	Parathion	0.6 kg/ha (0.5 lb/acre)
		Di-Syston™	0.6 kg/ha (0.5 lb/acre)
FALLOW (SUMMER)			
Landmaster™	3.9 L/ha (54 oz/acre)	—	—
Landmaster™ + Banvel™	3.9 L + 0.3 1/ha (54 oz + 4 oz/acre)	—	—
2,4-D	1.2 L/ha (1 pt/acre)	—	—

Source: Pantex 1996:10.2

TABLE 4.4.1.1–2.—*Agricultural Chemicals for the 1996-1997 Growing Season at Pantex Plant*

CHEMICAL TRADE NAME	ACTIVE INGREDIENT(S)
Activator 90	—
Ally	Metsulfuron methyl
Amber	Triasulfuron
Arsenal	Imazapyr
Aatrex	Atrazine
Banvel	Dicamba
Landmaster	Glyphosphate and 2,4-dichlorophenoxyacetic acid (Amine form only)
Roundup Ultra	Glyphosphate
Tordon 22K	Picloram
Weedar 64	2,4-dichlorophenoxycetic acid, dimethylamine salt

Source: PC 1996o

Livestock Grazed on Pantex Plant

A large portion of the plant is used for grazing cattle. Stocker calves, which are calves that have been weaned and turned out to pasture, are the most typical livestock operation onsite. Cattle are moved to different areas according to the availability of forage. Grazing is allowed on the uplands and in Playa 4 and Pantex Lake.

Stocking rates at the plant are one animal unit per 2 to 4 hectares (5 to 10 acres) of rangeland, with calves being grazed from November to March on winter wheat (when the weather is conducive to forage production) (Pantex 1996:10.2).

Future Land Use at Pantex Plant

Future land and facility use at Pantex Plant will be managed by DOE through the Land and Facility Use Planning process (DOE P 430.1). This guidance for future site development and reuse is based on the shared long-term goals and objectives of Pantex Plant and stakeholders. The planning process allows for the holistic management of the Department's land and facilities through an integration of missions, ecology, economics, and regional cultural and social factors (DOE 1996h).

Future recommendations at the Plant combine agricultural, industrial/commercial, and open space uses. This includes resource management and livestock grazing. Land resources are expected to remain constant at the plant, with continued leasing of TTU land for security and safety reasons. Pantex Plant has a Site Development Plan that represents the plant upon completion of the projects outlined in the Technical Site Information Five Year Plan (Pantex 1996:10.5, DOE 1995j:8) (Figure 4.4.1.1–1).

Management plans for the playas and surrounding areas are being implemented as a best management plan to protect cultural and natural resources. This will ensure surface water quality and facilitate compliance with quality requirements for air, water, and natural resources. The plan will also protect archaeological sites and ecological resources (DOE 1996e:81; Pantex 1996:10.5).

Four playas (including Pantex Lake) located on the DOE-owned portion of the site have been designated as wetlands. These wetland areas are of particular concern and are subject to protection under various statutes, regulations, Executive orders and DOE orders. The Interim Guidance Document for Pantex Plant Playas and the Management Plan for Playa 2 Management Unit: Phase One provide additional oversight for the protection of playas. Management plans for Playas 1, 2, and 3 on DOE-owned land have been implemented. These plans will protect the playas by controlling intensive grazing and the plowing of sensitive areas. The following actions are proposed for the approximate 0.4 kilometer (0.25 mile) radius buffer zone surrounding each playa on DOE-owned land:

- Cattle are excluded from Playa Management Units 1, 2, and 3.
- The farmed area within the buffer zone will be planted in native grasses. The entire ecosystem of the playa, both the wetlands and the prairie, will be inventoried, assessed, and allowed to recover from agricultural disturbances (Pantex 1996:10.5).

4.4.1.2 *Land Use in the Region of Influence*

This section discusses land use within a 16-kilometer (10-mile) and an 80-kilometer (50-mile) radius of Pantex Plant. Urban land use in the Pantex Plant ROIs is dominated by the Amarillo Metropolitan Area, focusing on the City of Amarillo. Other towns in the ROIs are Borger, Claude, Canyon, Pampa, Panhandle, and White Deer, each with populations under 25,000. The ROIs are transected by Interstate

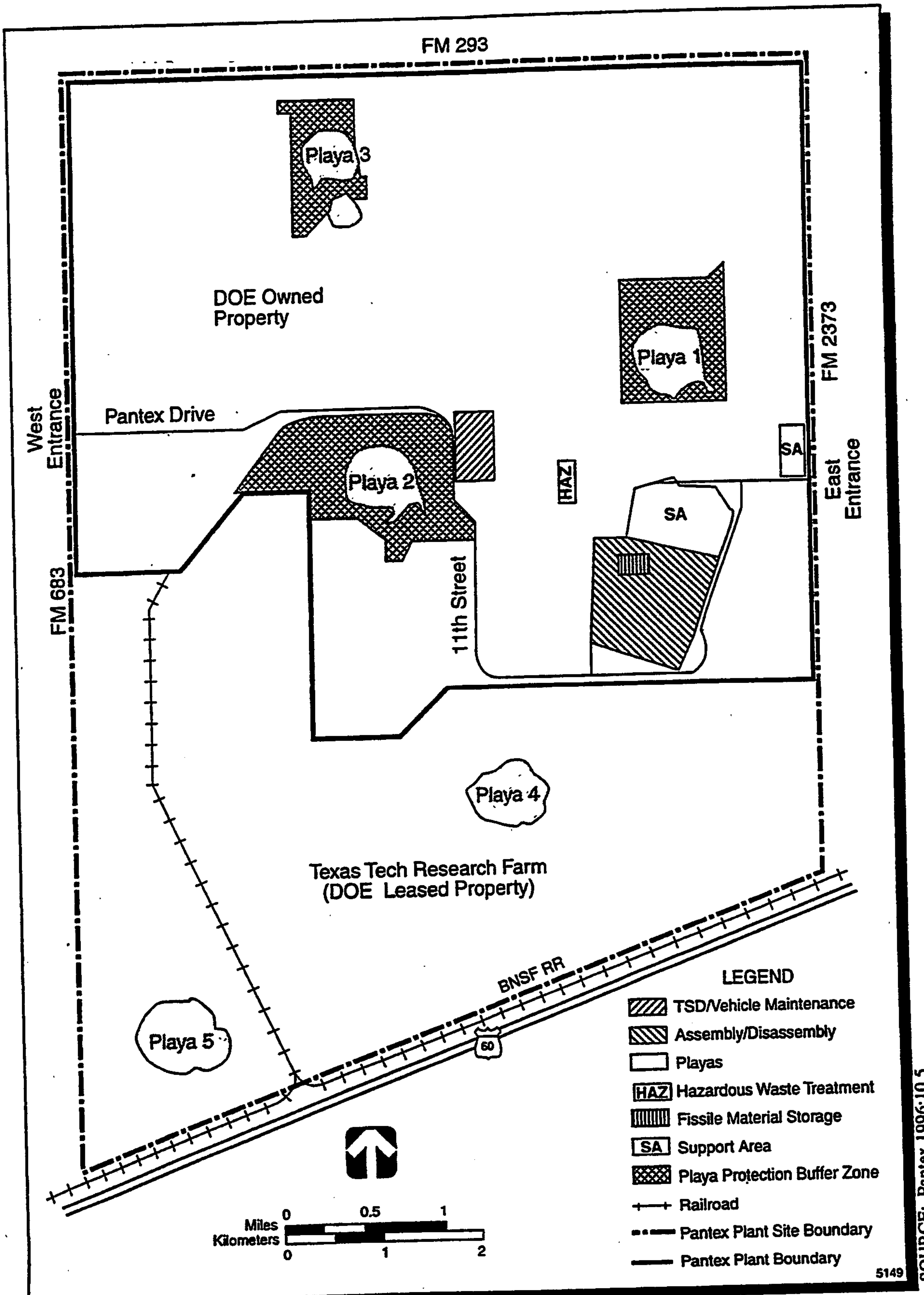


FIGURE 4.4.1.1–1.—*Future Land Usage Projection of Pantex Plant Site Development Plan.*

Highways 40 and 27; U.S. Highways 60, 87, and 287; State Highways 136, 207, and 217; and numerous Farm-to-Market roads.

Current Land Use Within a 16-Kilometer Radius of Pantex Plant

Residences are located throughout the 16-kilometer (10-mile) radius of the plant, with nearly half located to the east, in the town of Panhandle. Another major concentration of residences is located southwest of the plant, in Highland Park Village, which was once associated with the Amarillo Air Force Base. Washburn, located to the south of the Plant, has a somewhat smaller concentration of residences. Within this radius commercial land use is limited to the communities of Panhandle and Washburn, and the Amarillo International Airport. The Iowa Beef Processors Inc., Amarillo Plant, located 10.4 kilometers (6.4 miles) southwest of the center of Pantex Plant, and Fraser Industries, Inc., located 13.3 kilometers (8.3 miles) southwest of the center of the plant make up the area's industrial facilities. Two grain elevators are also located within this area, one to the northeast, the other to the east-southeast of the plant (Pantex 1996:10.3).

Farmland in the 16-Kilometer Region of Influence

Most of the land surrounding the plant is dryland or irrigated farmland, with farms averaging about 518 hectares (1,280 acres) in size. These farms primarily produce corn, wheat, and sorghum.

Data on 729 gardens within the 16-kilometer (10-mile) radius of the plant were obtained in 1995. These gardens usually contained tomatoes, pumpkins, green onions, peas, corn, okra, squash, cucumbers, leafy vegetables, root crops, and fruit trees. Whether these crops were sold at market was not determined. The largest garden in this area, 54.7 hectares (135 acres), belongs to the William P. Clements correctional facility and is maintained for produce for the inmates of that facility (Pantex 1996:10.2).

Livestock in the 16-Kilometer Region of Influence

The herd size of beef cattle (expressed as cow-calf pairs/beef cattle) in the 16-kilometer (10-mile) radius of the plant averages 500 animals or less. As of January 1, 1994 the livestock inventory for Potter and Carson counties was as follows:

- Potter—43,000/5,000.
- Carson—63,000/5,000.

In a 1995 household survey, only two residents in this area indicated that they had dairy cattle. One individual reported 2,000 cows that were under a year old and not yet producing milk. These cattle were being reared as replacement heifers for sale to other dairy farms. The other resident had six animals that were maintained for personal use (Pantex 1966:10.2). Tables 4.4.1.2–1 and 4.4.1.2–2 further discuss the livestock located within a 16-kilometer (10-mile) radius of Pantex Plant.

Land Resources Within an 80-Kilometer (50-Mile) Radius of Pantex Plant

Currently, land within the 80-kilometer (50-mile) radius area is predominately used for agriculture. The largest agricultural area is rangeland that is located along the Canadian River drainage to the north of Pantex and to the south along the tributary drainage of the Red River.

The second largest land use category is irrigated and dryland crops. Commercial, residential, industrial, institutional and public lands comprise a small part of the total land use within this. These areas are predominantly associated with the towns and cities of the region. The City of Amarillo, predominantly a residential area, is the largest urban area in the region. Other major industrial and commercial land areas are

TABLE 4.4.1.2–1.—*Poultry, Swine, and Sheep in a 16-Kilometer (10-Mile) Radius of Pantex Plant*

SECTOR	DISTANCE[1] meters (yards)	TYPE	QUANTITY[2]	USAGE
NE	3,915 (4,281) 11,549 (12,630) 13,732 (15,017)	chickens chickens hogs	6 250 400	personal personal commercial
ENE	5,198 (5,684)	sheep	600-800	commercial
ESE	9,465 (10,351)	pigs	4	personal
SSE	9,939 (10,869) 14,194 (15,522)	chickens pigeons quail pheasants	12 400 500 500	personal commercial
S	11,246 (12,298) 11,356 (12,419) 11,403 (12,470) 11,409 (12,477)	pigs pigs chickens chickens	1 4 20 21	personal personal personal personal
SSW	9,116 (9,969)	chickens	300	commercial
SW	6,325 (6,917) 6,426 (7,027)	sheep chickens	25 6	commercial personal
WSW	10,951 (11,976) 11,258 (12,312)	chickens sheep	12 8	personal commercial
W	11,830 (12,937)	chickens	50	commercial

[1]Distance from center of Pantex Plant
[2] Sectors with zero poultry, swine, and sheep populations are not listed
Source: Pantex 1996:10.2

associated with the towns of Canyon, Pampa, Borger and Dumas.

Industrial land use within the 80-kilometer (50-mile) ROI includes Pantex Plant and over 60 industrial facilities involved primarily with beef packing, chemical plants, and construction materials manufacturing. Amarillo and the area surrounding it support approximately 20 of these facilities, and the Pampa and Borger areas have 13 facilities. There are 29 grain elevators in the 80-kilometer (50-mile) area (see Table 4.4.1.2–3) (Pantex 1996:10.1, 10.3).

Crops and Rangeland

Agriculture is an important industry throughout the ROI. The settlement pattern associated with agriculture in the Texas Panhandle is characterized by a highly dispersed residential distribution. Farmsteads are usually located along major secondary roadways throughout the rural parts of this area. Information on the predominant crops in the 80-kilometer (50-mile) ROI surrounding Pantex Plant was determined using information from the Texas Natural Resource Information System and crop data from TNRCC. The major crops in the ROI include corn, wheat, sorghum, cotton, soybeans, peanuts, sunflowers, and sugar beets (Table 4.4.1.2–4).

Crop patterns vary by year and by season, utilizing both dryland or irrigation methods. When irrigated, the water is usually pumped

TABLE 4.4.1.2–2.—*Beef Cattle in a 16-Kilometer (10-Mile) Radius of Pantex Plant*

SECTOR	DISTANCE[1] meters (yards)	APPROXIMATE HERD SIZE
N	2,196 (2,401)	100
	3,019 (3,301)	190
	3,831 (4,189)	488
	7,163 (7,833)	35
	9,275 (10,143)	70
	10,261 (11,221)	1,500
	13,502 (14,765)	1,300
NNE	2,293 (2,507)	190
	8,060 (8814)	600
	13,104 (14,330)	100
NE	6,697 (7,324)	2,000
	10,017 (10,954)	60
	11,364 (12,427)	60
	12,538 (13,711)	156
	14,137 (15,460)	150
ENE	6,664 (7,287)	75
	7,378 (8,068)	500
	10,305 (11,269)	24
	10,419 (11,394)	220
E	2,118 (2,316)	130
	8,772 (9,593)	260
	10,327 (11,293)	2,000
	10,350 (11,318)	368
	12,142 (13,278)	2,000
	14,804 (16,189)	300
	14,842 (16,231)	6
	15,375 (16,814)	400
ESE	6,062 (6,629)	85
	7,552 (8,259)	260
	15,195 (16,617)	30
SE	5,268 (5,761)	15
	10,316 (11,821)	150
	12,685 (13,872)	400
	14,746 (16,126)	400
	15,281 (16,711)	400

TABLE 4.4.1.2–2.—*Beef Cattle in a 16-Kilometer (10-Mile) Radius of Pantex Plant-Continued*

SECTOR	DISTANCE[1] meters (yards)	APPROXIMATE HERD SIZE
SSE	6,600 (7,217)	450
	7,254 (7,933)	51
	8,432 (9,221)	450
	9,321 (10,193)	300
	11,397 (12,463)	15
	14,019 (15,331)	8
S	7,129 (7,796)	66
	8,899 (9,732)	10
	11,488 (12,563)	25
	11,912 (13,027)	58
SSW	5,725 (6,261)	6,000
	7,174 (7,845)	5
	9,391 (10,270)	10
	12,742 (13,934)	75
	13,314 (14,560)	75
SW	5,050 (5,522)	18
	5,752 (6,290)	1
	6,110 (6,682)	2
WSW	3,339 (3,651)	66
	5,072 (5,546)	300
	5,445 (5,954)	100
	6,918 (7,565)	200
	10,996 (12,025)	3
	11,529 (12,608)	130
W	3,572 (3,906)	300
	5,888 (6,439)	700
	6,398 (6,997)	50
	6,424 (7,025)	100
NW	4,566 (4,993)	1,500
	14,225 (15,556)	10,000
NNW	8,489 (9,283)	3,500
	8,828 (9,654)	1,500
	9,014 (9,857)	600

[1]Distance from center of Pantex Plant

Source: Pantex 1996:10.2

TABLE 4.4.1.2–3.—*Grain Elevators Located Within the 80-Kilometer (50-Mile) ROI Surrounding Pantex Plant*

SECTOR	DISTANCE[1] meters (yards)	NAME	CITY/ COMMUNITY	CAPACITY (bushels)
N	69,045 (75,507)	Dumas Co-op	Morton	1,797,000
	69,375 (75,868)	Perryton Equity Exchange	Pringle	1,152,000
	78,929 (86,316)	Sunray Co-op	Capps Switch	1,955,000
NNE	—	—	—	—
NE	12,764 (13,958)	Robinson Grain Co., Inc.	Abell Switch	681,000
ENE	28,670 (31,353)	H.J. Hughes Grain Elevator, Inc.	Panhandle/Cuyler	346,000
	38,192 (41,766)	Wheeler-Evens Elevator Co.	White Deer	1,596,000
	39,042 (42,696)	Wheeler-Evens Elevator Co.	Hodges Corner	65,000
	49,588 (54,229)	Wheeler-Evens Elevator Co.	Kingsmill	462,000
	62,496 (68,345)	Wheeler-Evens Elevator Co.	Pampa	1,609,000
	73,692 (80,589)	Attenbury Grain Inc.	Hoover	582.000
E	18,501 (20,232)	Robinson Grain Co., Inc.	Panhandle	1,527,000
	19,389 (21,204)	H.J. Hughes Grain Elevator, Inc.	Panhandle	2,647,000
	52,009 (56,877)	Attenbury Grain Inc.	Grandview	111,000
ESE	7,841 (8,575)	H.J. Hughes Grain Elevator, Inc.	Lee Switch	239,000
	34,337 (37,551)	Attenbury Grain Inc.	Lark	1,504,000
	44,523 (48,690)	Attenbury Grain Inc.	Groom	942,000
	46,757 (51,133)	Wheeler-Evens Elevator Co.	Groom	1,867,000
SE	23,151 (25,318)	Robinson Grain Co., Inc.	Conway	1,086,000
	30,592 (33,455)	Attenbury Grain Inc.	Claude	3,511,000
	76,659 (83,834)	Attenbury Grain Inc.	Clarendon	287,531
SSE	62,263 (68,091)	Hereford Grain Co-op	Paloduro	124,000
S	17,891 (19,565)	Attenbury Grain Inc.	Washburn	718,348
	60,168 (65,799)	Dimmitt Agri Industries Inc.	Wayside	65,000
SSW	55,793 (61,015)	Attenbury Grain Inc.	Ogg Switch	512,000
	69,626 (76,143)	Grain Investors Inc.	Happy	1,452,000
	69,726 (76,252)	Attenbury Grain Inc.	Happy	2,926,000
SW	18,081 (19,773)	Attenbury Grain Inc.	Amarillo	5,615,000
	19,787 (21,639)	Continental Grain Co.	Amarillo	8,844,000
	21,831 (23,874)	Cargill Inc.	Amarillo	3,927,000
	28,827 (31,525)	Farmland Industries Inc.	Amarillo	3,226,000
	34,858 (38,120)	Great Plains Term Inc.	Amarillo	5,714,000
	51,076 (55,856)	Consumers Fuel Association Inc.	Canyon	522,478
	51,348 (56,154)	Consumers Fuel Association Inc.	Canyon	576,837
	63,111 (69,018)	Umbarger Co-op Elevators	Umbarger	475,000
	73,116 (79,959)	Farmers Elevators of Dawn Inc.	Dawn	4,616
	73,408 (80,279)	Farmers Elevators of Dawn Inc.	Dawn	2,081,290
WSW	35,514 (38,839)	Coldwater Industries, Inc.	Amarillo	146,464
	46,316 (50,651)	Attenbury Grain Inc.	Bushland	554,802
	46,595 (50,956)	Bushland Grain Co-op	Bushland	1,436,000
	57,873 (63,290)	Hereford Grain Co-op	Wildorado	806,000
	78,699 (86,065)	Hereford Grain Co-op	Ford	644,000
	78,878 (86,261)	Farmers Elevator of Dawn Inc.	Ford	30,000

TABLE 4.4.1.2–3.—*Grain Elevators Located Within the 80-Kilometer (50-Mile) ROI Surrounding Pantex Plant*-Continued

SECTOR	DISTANCE[1] meters (yards)	NAME	CITY/ COMMUNITY	CAPACITY (bushels)
W	76,366 (83,514)	Dalhart Consumers Fuel Association, Inc.	Vega	492,000
	77,947 (85,242)	Hereford Grain Co-op	Vega	724,000
	78,910 (86,296)	Farmers Elevators of Dawn Inc.	Vega	30,890
WNW	—	—	—	—
NW	47,617 (52,074)	Robinson Grain Co. Inc.	Masterson	157,000
	68,000 (74,365)	Dumas Co-op	Middlewell	1,504,000
NNW	68,654 (75,080)	Dumas Co-op	Dumas	2,344,000
	79,655 (87,110)	Dumas Co-op	Sunray	6,442,000

*Distance from center of Pantex Plant

Source: Pantex 1996:10.3

TABLE 4.4.1.2–4.—*Crop Area Within an 80-Kilometer (50-Mile Radius) of Pantex Plant, in Acres*

SECTOR	CROP	0-8 km (0-5 mi)	8-16 km (5-10 mi)	16-24 km (10-15 mi)	24-32 km (15-20 mi)	32-40 km (20-25 mi)	40-48 km (25-30 mi)	48-56 km (30-35 mi)	56-64 km (35-40 mi)	64-72 km (40-45 mi)	72-80 km (45-50 mi)
N	Wheat	1,090	1,270	—	180	120	30	1,140	12,740	15,260	17,860
	Sorghum	550	640	—	90	20	10	230	2,600	3,110	3,650
	Corn	150	170	—	20	40	10	550	5,920	6,390	8,550
NNE	Wheat	1,000	1,940	10	—	—	—	80	20	1,960	9,530
	Sorghum	500	970	—	—	—	—	20	—	400	1,930
	Corn	130	260	—	—	—	—	30	10	640	3,090
NE	Wheat	1,020	3,370	500	—	—	210	780	390	—	190
	Sorghum	510	1,690	250	—	—	100	160	70	—	20
	Corn	140	450	70	—	—	30	250	100	—	10
ENE	Wheat	1,170	3,120	4,860	6,190	7,070	9,250	9,410	9,530	10,630	13,270
	Sorghum	590	1,570	2,440	3,110	3,550	4,420	2,720	2,440	2,140	2,680
	Corn	160	420	650	820	940	1,180	790	750	780	980
E	Wheat	1,090	3,850	5,290	8,270	10,610	12,820	13,230	5,900	390	2,050
	Sorghum	550	1,930	2,650	4,150	5,320	5,310	3,570	1,590	110	550
	Corn	150	510	700	1,100	1,410	1,450	1,050	470	30	160
ESE	Wheat	1,200	3,650	5,240	8,120	6,890	7,800	4,170	1,150	800	700
	Sorghum	600	1,830	2,630	4,080	3,450	3,530	1,240	400	330	290
	Corn	160	490	700	1,080	910	800	320	90	60	50
	Cotton	—	—	—	—	—	—	940	1,000	1,210	1,080
	Peanuts	—	—	—	—	—	—	110	120	140	130
SE	Wheat	1,010	3,130	4,660	5,920	6,350	4,400	4,180	940	1,110	1,000
	Sorghum	510	1,500	2,280	2,360	2,440	1,690	1,600	380	460	420
	Corn	130	570	570	243	180	130	120	60	70	70
	Cotton	—	—	—	—	—	—	80	1,000	1,510	1,570
	Peanuts	—	—	—	—	—	—	10	120	180	190

TABLE 4.4.1.2–4.—*Crop Area Within an 80-Kilometer (50-Mile Radius) of Pantex Plant, in Acres*-Continued

SECTOR	CROP	0-8 km (0-5 mi)	8-16 km (5-10 mi)	16-24 km (10-15 mi)	24-32 km (15-20 mi)	32-40 km (20-25 mi)	40-48 km (25-30 mi)	48-56 km (30-35 mi)	56-64 km (35-40 mi)	64-72 km (40-45 mi)	72-80 km (45-50 mi)
SSE	Wheat	700	3,070	4,220	5,480	7,730	6,410	3,200	40	610	1,080
	Sorghum	350	1,540	1,730	2,100	2,960	2,460	1,230	10	140	220
	Corn	90	410	220	160	220	180	90	—	50	100
	Cotton	—	—	—	—	—	—	—	—	540	1,080
	Peanuts	—	—	—	—	—	—	—	—	20	30
S	Wheat	820	3,400	4,390	6,540	5,920	50	1,870	11,810	11,550	13,430
	Sorghum	410	1,710	1,720	2,460	2,190	20	670	4,320	3,250	3,550
	Corn	110	450	170	200	190	—	70	380	2,170	2,790
	Cotton	—	—	—	—	—	—	—	—	4,960	7,040
	Peanuts	—	—	—	—	—	—	—	—	10	40
	Soybeans	—	—	—	—	—	—	—	—	90	110
	Sugar Beet	—	—	—	—	—	—	—	—	220	290
SSW	Wheat	1,150	3,750	4,020	4,050	1,490	3,420	7,130	10,510	12,410	11,870
	Sorghum	560	1,420	1,330	1,320	480	1,110	2,320	3,420	3,840	3,180
	Corn	140	130	120	170	60	140	300	440	1,170	3,040
	Cotton	—	—	—	—	—	—	—	—	1,730	4,840
	Soybeans	—	—	—	—	—	—	—	—	30	120
	Sugar Beet	—	—	—	—	—	—	—	—	90	350
	Sunflowers	—	—	—	—	—	—	—	—	—	20
SW	Wheat	1,240	2,530	4,660	4,150	5,170	6,810	6,630	8,280	7,920	7,620
	Sorghum	490	850	1,560	1,350	1,680	2,210	2,160	2,730	2,890	3,100
	Corn	60	—	30	170	220	290	280	350	980	1,910
	Cotton	—	—	—	—	—	—	—	—	60	250
	Soybeans	—	—	—	—	—	—	—	—	—	10
	Sugar Beet	—	—	—	—	—	—	—	—	230	520
	Sunflowers	—	—	—	—	—	—	—	—	30	60
WSW	Wheat	1,370	3,400	2,140	270	2,930	7,580	9,500	10,690	9,050	11,750
	Sorghum	500	1,140	720	90	970	2,500	3,100	3,930	3,840	5,170
	Corn	30	—	—	—	60	180	—	1,460	2,290	3,310
	Cotton	—	—	—	—	—	—	—	110	190	280
	Sugar Beet	—	—	—	—	—	—	—	410	700	1,010
	Sunflowers	—	—	—	—	—	—	—	50	80	120
W	Wheat	1,040	420	200	—	—	—	—	800	5,780	9,120
	Sorghum	390	140	70	—	—	—	—	240	1,700	2,690
	Corn	30	—	—	—	—	—	—	—	—	—
WNW	Wheat	680	—	—	—	—	290	—	440	160	540
	Sorghum	280	—	—	—	—	200	—	130	50	150
	Corn	40	—	—	—	—	—	—	—	—	300
NW	Wheat	720	—	—	—	50	130	5,110	7,690	16,030	16,450
	Sorghum	330	—	—	—	16	30	1,050	1,580	3,410	3,800
	Corn	69	—	—	—	—	50	3,140	4,730	10,280	11,630
NNW	Wheat	990	340	—	—	—	—	—	4,640	16,760	21,850
	Sorghum	500	170	—	—	—	—	—	950	3,440	4,490
	Corn	130	40	—	—	—	—	—	2,850	10,290	13,420

Source: Pantex 1996:10.2

from the Ogallala aquifer or from the playas (Pantex 1996:10.1, 10.2).

Livestock

Table 4.4.1.2–5 shows the beef cattle feedlots, open range cattle, and dairy operations located within a 80-kilometer (50-mile) radius of the plant. The beef cattle industry in the Texas Panhandle has four distinct aspects that are affected by precipitation levels and the local and future market prices for beef. These are:

- Cow-calf operations on open range.
- Grazing of stockers on pasture.
- Feedlot operations.
- Slaughter and meat-packaging operations.

The number of calves grazed on wheat pastures during the winter and spring varies significantly based on how the weather affects wheat growth. The number of cow-calf pairs/beef cows recorded in the January 1, 1994 inventory of Texas Agricultural Statistics for the counties within the 80-kilometer (50-mile) area were as follows: Armstrong, 63,000/5,000; Briscoe, 17,000/9,000; Carson, 73,000/9,000; Castro, 283,000/11,000; Deaf Smith, 681,000/15,000; Gray, 114,000/9,000; Hansford, 251,000/8,000; Hartley, 213,000/6,000; Hutchinson, 40,000/7,000; Moore, 189,000/6,000; Oldham, 79,000/12,000; Potter, 51,000/6,000; Randall, 170,000/9,000; Roberts, 35,000/9,000; Sherman,

TABLE 4.4.1.2–5.—*Beef Cattle by County Within the 80-Kilometer (50-Mile) ROI Surrounding Pantex Plant*

COUNTY	COUNTY TOTALS		FARMS WITH 100 HEAD OR MORE	
	FARMS	CATTLE	FARMS	CATTLE
Armstrong	154	39,840	67	36,638
Briscoe	40	5,368	14	4,474
Carson	209	62,257	104	61,045
Castro	18	18,324	11	18,045
Deaf Smith	115	123,075	74	121,398
Donley	131	26,049	35	22,383
Gray	179	72,760	69	69,156
Hartley	23	29,147	11	2,019
Hutchinson	124	65,943	52	63,760
Moore	147	153,876	90	151,831
Oldham	25	20,494	17	20,179
Potter	104	20,290	37	29,107
Randall	327	145,409	125	138,459
Roberts	26	9,675	16	9,265
Swisher	122	81,447	65	79,123

Source: Pantex 1996:10.2

159,000/4,000; and Swisher, 212,000/9,000 (Pantex 1996:10.2).

Table 4.4.1.2–6 shows the 20 cattle feedlots located within the ROI by sector. Local market prices, feed yard capacity, transportation costs, available feed, and the condition of the cattle, govern the number of animals in a feedlot at any time. Four dairies are located in the area (see Table 4.4.1.2–7), and the Plains Creamery in Amarillo is the only creamery in the vicinity.

The slaughter and processing end of the livestock cycle is governed by market costs. This being the case, the carcasses of these Panhandle cattle may be shipped to another state for cutting and packaging. It is estimated that over 25 percent of the beef cattle processed in these large operations are consumed by out of state consumers, and that little of this beef returns to the Amarillo area. Conversely, approximately 95 percent of the cattle processed by the small meat processors in the area are consumed locally (Pantex 1996:10.2).

Future Land Use Within the 80-Kilometer (50-mile) Region of Influence

No future land use has been projected by the City of Amarillo or county planning agencies for the majority of land within the 80-kilometer (50-mile) ROI. Based on the City of Amarillo's Comprehensive Plan, the population is expected to grow to 195,000 by the year 2005. This will require approximately 2,429 hectares (6,000 acres) of new land, two-thirds of which will be located within the existing city limits (Pantex 1996:10.5; City 1989:6-20, 6-22).

Recreational Resources

A number of recreation areas and parks are present within the land resources ROI, including

TABLE 4.4.1.2–6.—*Beef Cattle in Feedlots in an 80-Kilometer (50-Mile) Radius of Pantex Plant*

SECTOR[1]	DISTANCE[2] meters (yards)	NAME	CAPACITY
N	72,580 (79,373) 76,290 (83,430)	Thane & Rex McCloy Feedlot McCloy Feedlot	6,000 12,000
ENE	28,007 (30,628) 79,817 (87,288)	Carson Co. Feedyards Tejas Feeders Inc.	14,000 36,000
ESE	46,874 (51,261)	Holland Feedyard	5,000
SSE	54,293 (59,375)	Joe Blanton Feedyard	600
SSW	68,880 (75,327) 78,758 (86,129)	Lone Star Feedyard Wrangler Feedyard	40,000 38,000
SW	48,006 (52,499) 14,589 (15,954)	Randall Co. Feedyard Comstock Cattle Company	68,000 2,600
WSW	50,828 (55,585) 56,201 (61,461) 74,437 (81,404) 78,217 (85,538) 78,835 (86,214)	Tascosa Feedyard FSW Cattle Co. Bartlett #2 Lookingbill Feedyard Mc6 Cattle Feeders	20,000 27,000 35,000 6,000 21,000
W	67,965 (74,326) 77,394 (84,638)	Rafter O Ranch Feedyard Kirkland Feedyard	1,000 15,000
NNW	68,525 (74,939) 74,347 (81,306) 75,534 (82,604)	Texas Beef Producers Dumas Cattle Feeders DJM Farms	46,000 22,000 1,100

[1]NNE, NE, E, SE, S, WNW, and NW sectors contained no feedlots.
[2]Distance from center of Pantex Plant
Source: Pantex 1996:10.2

TABLE 4.4.1.2–7.—*Dairy Operations in an 80-Kilometer (50-Mile) Radius of Pantex Plant*

SECTOR[1]	DISTANCE[2] meters (yards)	NAME	NUMBER OF COWS	PRODUCTION lb (kg)/day
NE	11,586 (12,670)	Personal use	6	—
SSW	52,222 (57,110)	Hinders Dairy Inc.	300	17,500
SW	14,241 (15,574) 48,218 (52,731)	— New Quest	2,000 620	— 42,000
WSW	77,714 (84,988)	Hi Plains Dairy	100	4,000
WNW	64,966 (71,047)	Boys Ranch Dairy	42	850

[1]Only sectors containing dairies are listed.
[2]Distance from center of Pantex Plant
Source: Pantex 1996:10.2

Lake Meredith National Recreation Area, Palo Duro Canyon State Park, Buffalo Lake National Wildlife Refuge, Alibates Flint Quarries National Monument, Greenbelt Reservoir, Lake McClellan National Grasslands, and the city parks of Amarillo and Canyon. More information on these areas of special interest may be found in the Land Use chapter of the Pantex Plant *Environmental Information Document* (Pantex 1996:10.6).

Other Land Resources

All other land uses are classified as commercial, residential, industrial, institutional, and public lands and comprise only a small part of the total land uses within the ROI. The ROI has 134 primary and secondary schools as well as 6 institutions for higher learning. Amarillo is the medical center for the panhandle region, with 5 hospitals. Additional hospitals are located in the towns of Canyon, Borger, Pampa, and Dumas. The nine-county region also has a total of 27 nursing/convalescent homes that care for the needs of the elderly (Pantex 1996:10.4).

Pantex Plant maintains a full-time capability to respond to any medical, fire, or hazardous materials emergencies that may occur at the plant. Fire departments with full-time and/or volunteer staff are located in the City of Amarillo, and the towns of Borger, Canyon, Channing, Claude, Pampa, Panhandle, Stinnett, Vega, and White Deer.

Commercial areas in the Amarillo metropolitan area are located in the central business district, at major shopping centers and malls, and along major streets in the form of strip development.

4.4.2 Impacts of Proposed Action

4.4.2.1 *Impacts of Continued Operations*

Weapons-Related Activities

Impacts to land resources at Pantex Plant as a result of the weapons-related activities planned under the Proposed Action are expected to be limited. Operations under the Proposed Action would not appreciably change current land use at Pantex Plant; therefore land resources would not be adversely affected.

Pit Storage Activities

The storage of 20,000 pits planned under the Proposed Action would use existing storage space in Zone 4. Therefore, no land resources, including agriculture, floodplains, and wetlands, would be affected.

Environmental Restoration Activities

Environmental restoration activities will have a long-term impact on land resources. Some remediation activities (e.g., soil removal) may temporarily restrict the use of land resources but the cleaned-up lands would then be available for other uses.

Waste Management Activities

Waste management activities would not use any additional land under this alternative than is currently used. Impacts are therefore considered negligible.

4.4.2.2 *Impacts of New Facility Construction and Upgrades*

Under the Proposed Action, six facilities are to be constructed or modified in or adjacent to Zones 11 and 12, in areas that have been previously disturbed. The area required for these facilities is provided in Table 4.4.2.2–1. The total area required for these projects amounts to 15,902 square meters (171,160 square feet), which is 0.04 percent of the DOE-owned property on Pantex Plant Site. Impacts on land resources are therefore considered negligible.

4.4.2.3 *Summary of Impacts*

Continued operations at Pantex Plant would not disturb any new lands; land disturbed by the construction of the new facilities under the Proposed Action amounts to 0.04 percent of the DOE-owned property on Pantex Plant Site. Additional impacts to agriculture and industry in the ROI are not anticipated. Impacts on land resources are therefore considered negligible.

4.4.3 Impacts of the No Action Alternative

Impacts to land resources at Pantex Plant as a result of continued operations, environmental restoration, and waste management under the No Action Alternative are expected to be similar

TABLE 4.4.2.2–1.—*Proposed Facility Construction and Modification for the Proposed Action*

PROPOSED CONSTRUCTION/ MODIFICATION	LOCATION	REQUIRED AREA m^2 (ft^2)
Hazardous Waste Treatment and Processing Facility	Adjacent to Zones 11 and 12	2,648 (28,500)
Pit Reuse Facility	Zone 12	494 (5,314)
Gas Analysis Laboratory	Adjacent to Zone 11	2,537 (27,304)
Materials Compatibility Assurance Facility	Adjacent to Zone 11	2,015 (21,690)
Nondestructive Evaluation Facility	Zone 12	3,734 (40,196)
Metrology and Health Physics Calibration and Acceptance Facility	Zone 12	4,474 (48,156)

Source: PC 1995g

to or less than those identified for the Proposed Action. Under the No Action Alternative discussed in section 3.1.2, no new facilities would be constructed. Activities associated with the No Action Alternative would not create any significant impact to land resources.

4.4.4 Impacts of Pit Storage Relocation Alternative

As discussed in section 3.1.3, the Pit Storage Relocation Alternative would involve relocation of pits from storage at Pantex Plant to storage at one or more alternate sites. Activities at Pantex Plant Site would remain similar to those identified for the Proposed Action, including the construction of six new facilities. Impacts on land resources would, therefore, be similar to those identified for the Proposed Action.

4.4.4.1 *Impacts of Relocating 20,000 Pits*

The interim storage of up to 20,000 pits at other DOE or Department of Defense sites would make the current storage facilities in Zone 4 available for other uses. No land use change is anticipated.

4.4.4.2 *Impacts of Relocating 8,000 Pits*

The interim storage of up to 8,000 pits at other DOE or Department of Defense sites would make some of the current storage facilities in Zone 4 available for other uses. No land use change is anticipated.

4.4.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.4.5.1 *Impacts of the Alternatives in the Waste Management Programmatic Environmental Impact Statement*

In conjunction with the Proposed Action, the location of treatment and disposal facilities as described in the WM PEIS could increase land use by a maximum of 10.6 hectares (26.3 acres) at Pantex Plant Site. Cumulative impacts on land resources would not be considered significant. Moreover, this land is already DOE-owned. The new requirements would not be in conflict with DOE plans and policies or the plans and policies of the local governments in the Pantex Plant vicinity.

4.4.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur, and there would be no change in land use.

Under the downsizing alternative, facilities would be consolidated and impacts would be expected to be less than current impacts. Under the relocation alternative, the Pantex Plant facilities would be decommissioned and no longer active.

4.4.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. Potentially, pits could be stored in Zone 12 for long-term storage. The Collocation Alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. Although the new construction would convert undeveloped land, the proposal would conform with the Pantex Site Development Plan. Therefore, direct effects to land use would be negligible. Land disturbance would be 89.5 hectares (221 acres) during construction and 87 hectares (214 acres) during operations.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor (LWR) is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, mixed oxide (MOX) fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

Land disturbance during construction would be 14 hectares (35 acres) for the pit disassembly and conversion facility, 36 hectares (90 acres) for the plutonium conversion facility, 121 hectares (300 acres) for the MOX facility, and 284 hectares (700 acres) for the evolutionary LWR. Land required for operations would be 12 hectares (30 acres) for the pit disassembly and conversion, 28 hectares (70 acres) for the plutonium conversion facility, 81 hectares (200 acres) for the MOX facility, and 138 hectares (341 acres) for the evolutionary LWR. The evolutionary LWR would be located on land which is in agricultural use in the northwest portion of Pantex, west of the Burning Ground and Zone 5. Construction of the evolutionary LWR would change current agricultural land use (DOE 1996j:S-11, S-130, 131).

Because this proposed action is not part of the Site Development Plan, a potential adverse direct impact to land use could occur. It should be noted that preconstruction activities for disposition would require about 5 years to perform the tiered NEPA analyses and to obtain necessary permits and designs. About another 5 years would be required for construction, startup, preoperational testing, and operational readiness review. Construction of completely new reactors could take longer (DOE 1996a:chapter 4).

4.4.6 Potential Mitigation Measures

Since no long-term adverse impacts to land resources have been identified relative to the Proposed Action, No Action, or the Pit Storage Relocation Alternatives, no mitigation measures are needed.

4.5 Geology and Soils

4.5.1 Affected Environment

This section addresses the geology and soils in and around Pantex Plant. The geologic setting, including geomorphology, stratigraphy, and issues related to structural integrity, such as subsidence and seismology, is discussed. Also included are discussions of baseline soil and sediment quality on and in the vicinity of Pantex Plant.

4.5.1.1 *Geology*

Geomorphology

Pantex Plant is located in the Southern High Plains, a region of relatively flat topography containing many surficial depressions known as playa basins. Playa basins collect surface water runoff via natural and manmade drainage systems. Considerable attention has been given to the possible origin of playas. Researchers have proposed varied ideas concerning the origin of the typical, roughly circular, shallow playa basin. One idea is that the formation of these basins is the collective result of most of the cited origins (i.e., wind, erosion by streams, lake deposits, soil formation processes, dissolution of soil carbonate, salt dissolution and subsidence, and animal activities) all acting intermittently (Pantex 1996:3.4).

Playas have been identified as a source of recharge to the Ogallala aquifer (Scanlon 1994:94). Interplaya areas, such as unlined ditches, and natural drainage areas were also identified as significant additional groundwater recharge points (DOE 1995r:3-38). Investigations of the ditches and playas, related to the potential for contamination, are being performed through the Pantex Plant environmental restoration program (Pantex 1996:5.2).

Surface elevations at Pantex Plant (excluding the playa basins) range from approximately 1,076 meters (3,530 feet) in the southeast corner of Pantex Plant to 1,096 meters (3,596 feet) in the northwest corner of Pantex Plant (USGS, 1973). Erosion by water runoff is negligible at Pantex Plant in the inter-playa areas due to the relatively flat nature of the land surface and short drainage distance (less than 5 kilometers [3 miles]) into numerous local playas (see Figure 4.6.1.1–1 in section 4.6.1.1). The regional slope is about 1.5 to 1.9 meters per kilometer (8 to 10 feet per mile). Slopes within the playa basins reach up to 5 percent; thus, erosion could be more active within the playa basins. Pantex Plant lies within the "Dust Bowl" region of the 1930's. Wind erosion and deposition continue to be active processes. Current agricultural practices make the land surface more susceptible to wind erosion (Pantex 1996:3.4).

Stratigraphy

Figure 4.5.1.1–1 depicts a complete stratigraphic column of the Palo Duro Basin and Amarillo Uplift in the vicinity of Pantex Plant. The stratigraphy of the sediments and rocks beneath Pantex Plant is discussed in descending chronological order from more recent layers (surface deposits) to Permian-age layers (salt deposits). Pre-Permian rocks will not be discussed because they are not relevant to the affected environment.

The uppermost formation at Pantex Plant is the Blackwater Draw Formation. The Blackwater Draw Formation consists of a sheetlike body of windblown sand and silt having a number of buried soil horizons and ranges from 12 to 22 meters (40 to 75 feet) in thickness at Pantex Plant. Surface soils of the Blackwater Draw Formation consist of Pullman soils on the plains and Randall soils in the playas (Pantex 1996:3.3).

The Pullman soils are up to 1 meter (3 feet) thick and consist of unsaturated, silty clay loam,

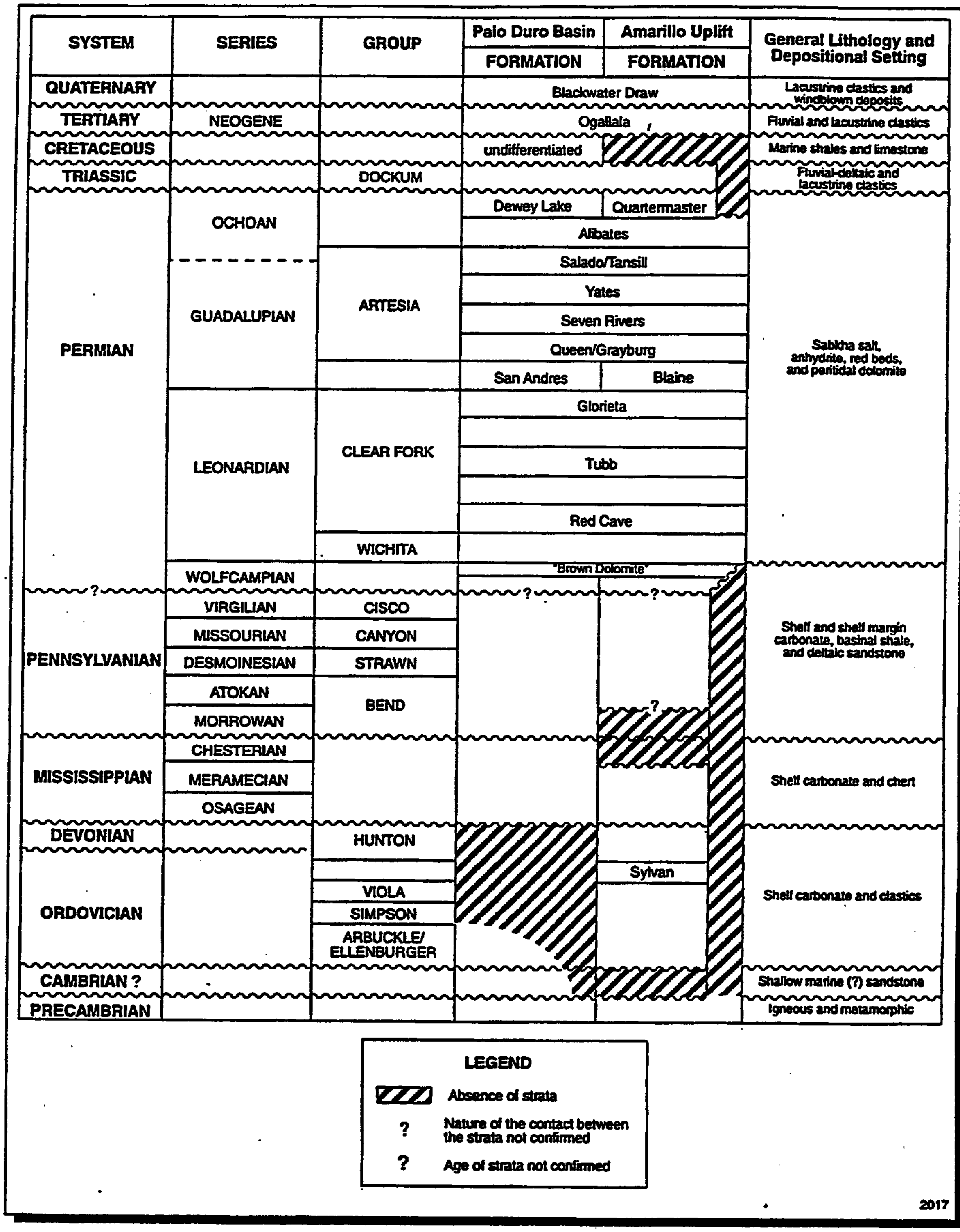


FIGURE 4.5.1.1–1.—*Stratigraphic Column of the Palo Duro Basin and Amarillo Uplift in the Vicinity of Pantex Plant.*

which is slightly permeable. These soils formed in fine-textured, calcareous sediments that probably originated from windblown material. Pullman soils have little or no relief except where they surround intermittent lakes or playas.

The Randall soils are up to 8 meters (25 feet) thick and consist of deep, very poorly drained, noncalcareous massive clay. These soils formed from sediment washed from the surface of surrounding soils within the individual playa watershed. During wet seasons, these soils may remain underwater for long periods of time (USDA 1962:14). Underlying these surface deposits (surface soils or playa basin deposits) is a 12- to 23-meter (40- to 75-foot) thick unit of unsaturated silty sand with caliche of the Blackwater Draw Formation (DOE 1994h:13).

Sediments of the Blackwater Draw Formation encountered in boreholes at the northeast corner and central south boundary of the plant show that these sediments contain numerous open tubules formerly occupied by plant roots. Buried soils within the Blackwater Draw Formation commonly contain fractures that bound soil aggregates. Both root tubules and fractures contain evidence (in the form of clay coatings, manganese stains, and calcium carbonate filaments) that these features have served as groundwater flow paths (Pantex 1996:3.3).

The Ogallala Formation underlies the Blackwater Draw Formation and is the primary water-bearing unit in the Southern High Plains. The Ogallala Formation consists of sediments derived from two distinctive depositional systems: the upper portion which consists of wind-blown deposits and the lower portion which consists of fluvial deposits. It is important to recognize that the Ogallala Formation is a sequence of related deposits rather than a single lithologic unit.

The Ogallala consists of mostly fine to coarse sand, gravel, and silt with some clay and is primarily unconsolidated. A caliche layer has formed in a 1- to 2-meter (3- to 6-foot) thick layer near the top of the formation. Ogallala thicknesses between 60 and 120 meters (200 and 4000 feet) are common in the Palo Duro Basin area with a maximum thickness of 250 meters (800 feet) occurring in the Panhandle Paleovalley northeast of Pantex Plant. There is little relief on the upper surface of the Ogallala, changes in thickness are related primarily to variations in the elevation of the pre-Ogallala surface. The pre-Ogallala surface was controlled not only by erosion but by salt dissolution as well.

The upper portion of the Ogallala Formation consists of 40 to 46 meters (130 to 150 feet) of fine-grained calcareous (calcium carbonate) wind-deposited sand. Many caliche concretions are present throughout this layer. All of these concretions are thin and discontinuous except at the top of the Ogallala Formation, where a relatively persistent caliche layer, called the Caprock caliche, is found (Pantex 1996:3.1).

The lower part of the Ogallala Formation is separated from the upper part by a relatively low permeability zone, 7 to 12 meters thick, referred to as the "fine-grained zone". Stratigraphic test wells drilled near the center and northeast corner of the site have revealed that the fine-grained zone consists of a series of coalescing and upward-fining sequences. It is important to note that the lateral extent of these sequences is unknown but varies from four sequences in the northeast corner of the plant to two sequences near the center of the plant (Pantex 1996:3.3).

Perched groundwater occurs in the discontinuous porous buried channel beneath Pantex Plant (refer to section 4.6.1.2). The position of the buried channel follows the geometry of the fine-grained zone, which was probably aligned along the regional subsurface collapse related to salt dissolution that produced topographic lows beneath and within the Ogallala sediments. Figure 4.6.1.2–3 in section 4.6.1 illustrates a geologic cross section of the inferred lithologies beneath and in the vicinity of Pantex Plant.

The fine-grained zone is composed of a pink, clayey fine-grained sand which is relatively impermeable to water. The irregular top of the fine-grained zone is probably due to a combination of erosion and subsidence. Within the area of Zone 12 and its vicinity, the relief of the top of the fine-grained zone is at least 18 meters (60 feet). The perched zone is bounded below by the fine-grained zone; therefore, the perched zone may not be present in areas where the fine-grained zone is topographically high or absent (DOE 1995f:3).

The lower part of the Ogallala Formation consists of fluvial (stream or river) channel deposits composed of sands and coarse gravels and associated overbank deposits composed of fine sands and clay. These fluvial deposits accumulated in the lowlands. At the same time, wind-blown deposits were accumulating in the highlands. The fluvial sediments are believed to have derived from erosion of the Southern Rocky Mountains. At Pantex Plant, driller's lithology logs for wells penetrating the Ogallala show much lateral variation in the Ogallala deposits; wells only one-half mile apart often are not particularly easy to correlate in detail. Typically, correlations are limited to the upper interval, the fine-grained zone, and the lower interval. The nature of the depositional environments proposed for the Ogallala is such that only the sheets of windblown sediments should exhibit much lateral extent. It is important to note that the complex heterogeneity of the Ogallala Formation plays an important role in groundwater movement (Pantex 1996:3.3). Hydrologic aspects of the Ogallala Formation are discussed in section 4.6.1.2.

The Dockum Group underlies the Ogallala Formation and consists of siltstones, sandstones, conglomerates, and claystone. Less than 30 meters (100 feet) of Dockum Group strata are present below Pantex Plant. Toward the northeast portion of Pantex Plant, the Triassic Dockum strata have been eroded, and the underlying Permian strata are in contact with the Tertiary-age Ogallala Formation (Figure 4.5.1.1–1) (Pantex 1996:3.3).

Underlying the Dockum Group are the Upper and Middle Permian layers, which are composed predominantly of thick and widespread deposits of salt. The Lower Permian consists predominantly of complex accumulations of shale, limestone and argillaceous limestone, and dolomite. The total thickness of salt deposits under Pantex Plant have been estimated to exceed 300 meters (1,000 feet) (Pantex 1996:3.3).

4.5.1.2 *Structural Integrity*

The structural integrity or stability of the geological formations underlying Pantex Plant is important to the geotechnical stability of buildings and other operational features (e.g., utility structures) onsite. Two main geological processes are relevant to the Pantex Plant vicinity: seismic activity and subsidence. Slope stability is not an issue at Pantex Plant due to the relatively flat surface topography.

Regional Geology

The underlying geology is made up of two major basins in the Texas Panhandle; these are the Anadarko and the Palo Duro basins. These basins are separated by a west-northwest trending uplifted area comprised of the Amarillo Uplift and the Oldham-Harmon Trend. The Anadarko Basin is asymmetrical with the deepest portions and steepest flank occurring adjacent to the Amarillo Uplift (Pantex 1996:3.2). The Amarillo Uplift is part of the Pennsylvanian-age Ancestral Rocky

Mountain building belt that extends from Utah to Oklahoma.

The Whittenburg Trough separates the Amarillo Uplift from the Bush and Bravo Domes which are the result of strike slip faulting associated with the formation of the Oldham-Harmon Trend. This narrow deep trough is approximately 15 kilometers (10 miles) wide and 55 kilometers (35 miles) long and extends from the northwestern Tascosa Basin to the southeastern Carson Basin (TBEG 1989a:19, 39). The Pantex Plant is located at the southeastern edge of the Whittenburg Trough in the Carson Basin (see Figure 4.5.1.2–1). The faults that could potentially contribute to the risks associated with earthquakes at the Pantex Plant are related to the structures described above.

Seismicity

Less than 100 years of seismic data are available for the region around Pantex Plant, only a few decades of which is recorded instrumentally. In addition, accurate and sensitive seismic coverage for Pantex Plant is not available; the regional seismicity record is not complete for all events that have occurred in the Texas Panhandle (Pantex 1996:3.5).

An assessment of natural hazards at Pantex Plant, which included a study of seismic events, concluded that intense seismic events could pose a threat to the structural integrity of buildings, including their foundations (Jacobs 1993:5-3). Approximately 25 earthquakes have been recorded in the Texas Panhandle, the largest with a maximum intensity of VI on the

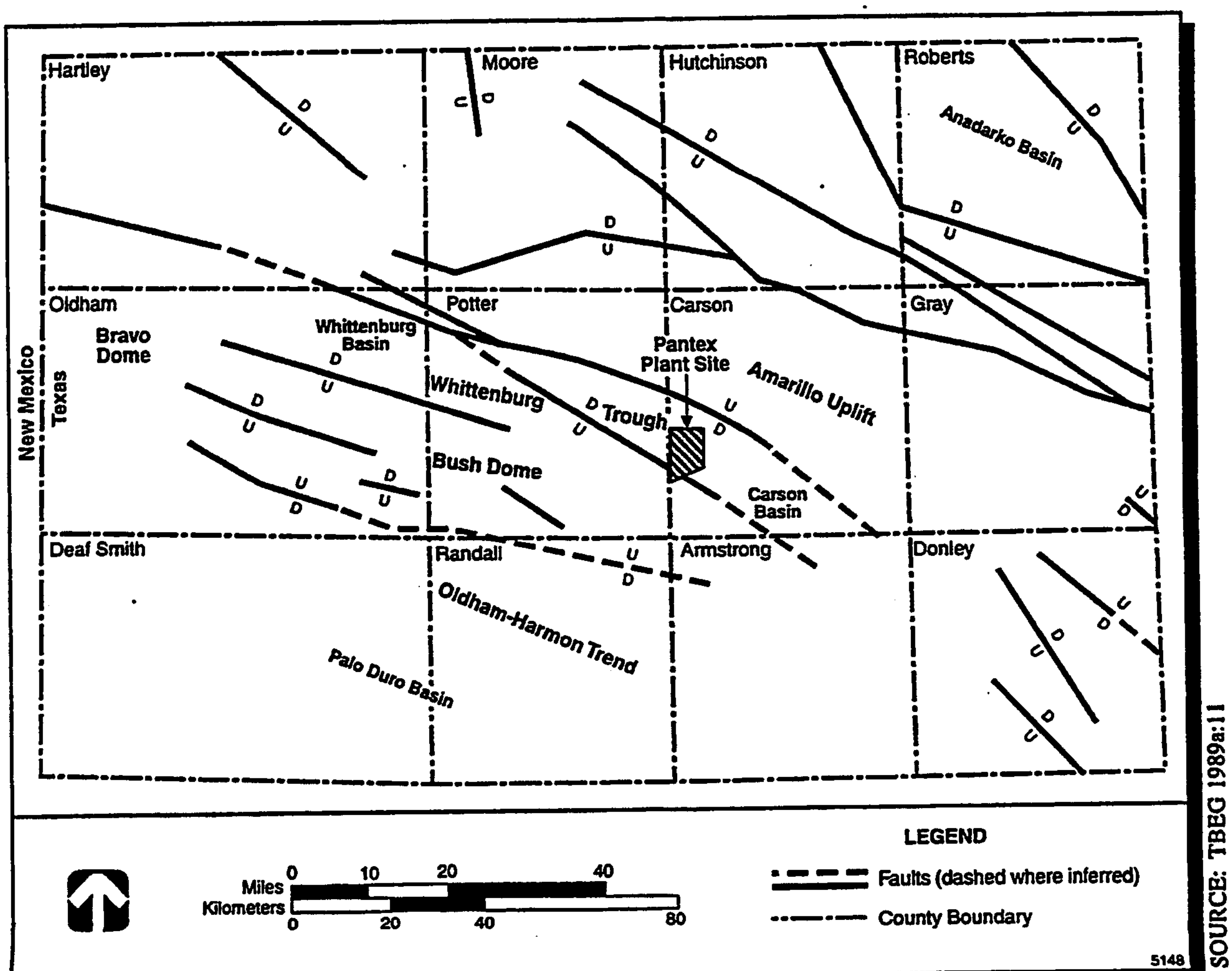


FIGURE 4.5.1.2–1.—*Pennsylvanian and Lower Permian Tectonic Structures.*

Modified Mercalli Scale, a scale based on observed damage that is used in the absence of instrument recording (Table 4.5.1.2–1). An earthquake of this intensity in the Texas Panhandle would not result in structural damage except for a few instances of fallen plaster or damaged chimneys (Pantex 1996:3.5). Figure 4.5.1.2–2 shows the locations and intensities of earthquakes in the Texas Panhandle and their relation to tectonic features.

In the Panhandle region, earthquakes with magnitudes of greater than or equal to 5.0 on the Richter scale are predicted to occur with a frequency on the order of four times in 100 years. The annual probability of a maximum credible earthquake (6.3 on the Richter scale) occurring within a distance of 16 kilometers (10 miles) of Pantex Plant, however, is very low—on the order of 10^{-3} to 10^{-4} (Pantex 1996:3.5).

Three major subsurface faults and one minor surficial fault exist in the area of the Pantex Plant, and these are located as follows: (1) approximately 250 kilometers (155 miles) long, about 40 kilometers (25 miles) north of the site, (2) approximately 69 kilometers (43 miles) long, about 8 kilometers (5 miles) south of the site, (3) approximately 64 kilometers (40 miles) long, about 11 kilometers (7 miles) north of the site, and (4) approximately 6 kilometers (4 miles) long, about 32 kilometers (20 miles) northwest of the site (surficial). However, there is no evidence of active faults at the Pantex Plant (DOE 1995i:11).

The procedure used for evaluating the risk from earthquakes to the Pantex Plant assumes that the largest earthquake to be expected in the region can happen anywhere in the region, which also includes at Pantex itself (DOE 1994aa). Within the southern plains seismic zone, the estimated recurrence interval for a 6.5 Richter magnitude earthquake is once in a thousand years (Blume 1976:41). Section 4.14, Human Health, presents the accident scenarios that could result in a release of radioactive or other hazardous material as a result of an earthquake at the Pantex Plant.

Subsidence

The presence of salt beds in Permian formations and the ongoing dissolution of some of those beds are addressed because of the potential for salt dissolution. Salt dissolution can cause subsidence, which may result in collapse depressions, sinkholes, fractures, or faults. Table 4.5.1.2–2 summarizes the Permian formations and estimated thicknesses of salt deposits beneath Pantex Plant.

The presence of saline springs around the margins of the Southern High Plains indicates active dissolution. Recent work using shallow seismic data has determined that the structures beneath the playas on Pantex Plant and adjacent areas show displacement of Ogallala strata. This displacement is attributed to the dissolution of underlying salt beds (TBEG 1994a:27, 29).

While salt dissolution is an active process in the region, it is a very slow process relative to human activities (Gustavson 1980). Most active salt dissolution in the region is concentrated near the Eastern Caprock and at the Canadian River Escarpments (Pantex 1996:3.7). Figure 4.5.1.2–3 shows zones of active salt dissolution and counties in which associated sinkholes and fractures have been identified. Sinkholes and fractures have not been identified in Carson County, where Pantex Plant is located. However, sinkholes and fractures have been identified in adjacent Armstrong County to the south and Hutchinson County to the north (Gustavson 1981:10).

4.5.1.3 *Soil and Sediment Quality*

Soil Types

The soil types at and in the vicinity of Pantex Plant, including the land leased from Texas Tech University, belong to the Pullman-Randall

TABLE 4.5.1.2–1.—*Modified Mercalli Intensity Scale of 1931 Abridged Version*[1]

INTENSITY	EFFECT
I	Felt by very few under specially favorable circumstances. (I)
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing. (I to II)
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibration like passing of truck. (III)
IV	During the day, felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably. (IV to V)
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop. (V to VI)
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moves; a few instances of fallen plaster or damaged chimneys. Damage slight. (VI to VII)
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motorcars. (VIII-)
VIII	Damage slight in specially designed structures; considerable in ordinary, substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motorcars disturbed. (VIII+ to IX)
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken. (IX+)
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with their foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks. (X)
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII	Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into air.

[1]Equivalent intensities on the Rossi-forel scale, used prior to 1931 in the United States, are given in parentheses.

Note: Many of the criteria in the intensity scale result from the integrated effects of the total sequence of ground motion from an earthquake as experienced at a particular point. Duration is an important factor. Intensities are critically dependent both on distance from the source of earthquake waves and on the local ground conditions. On the other hand, magnitude is a number intended to quantify the size of an earthquake at its source, independent of other considerations. The two scales are difficult to correlate without detailed study of the local geological structure, rock mechanics, and instrument recordings of local earthquakes over an extensive period of time. These studies have not been conducted for the Amarillo region.

Source: Pantex 1996:3.5

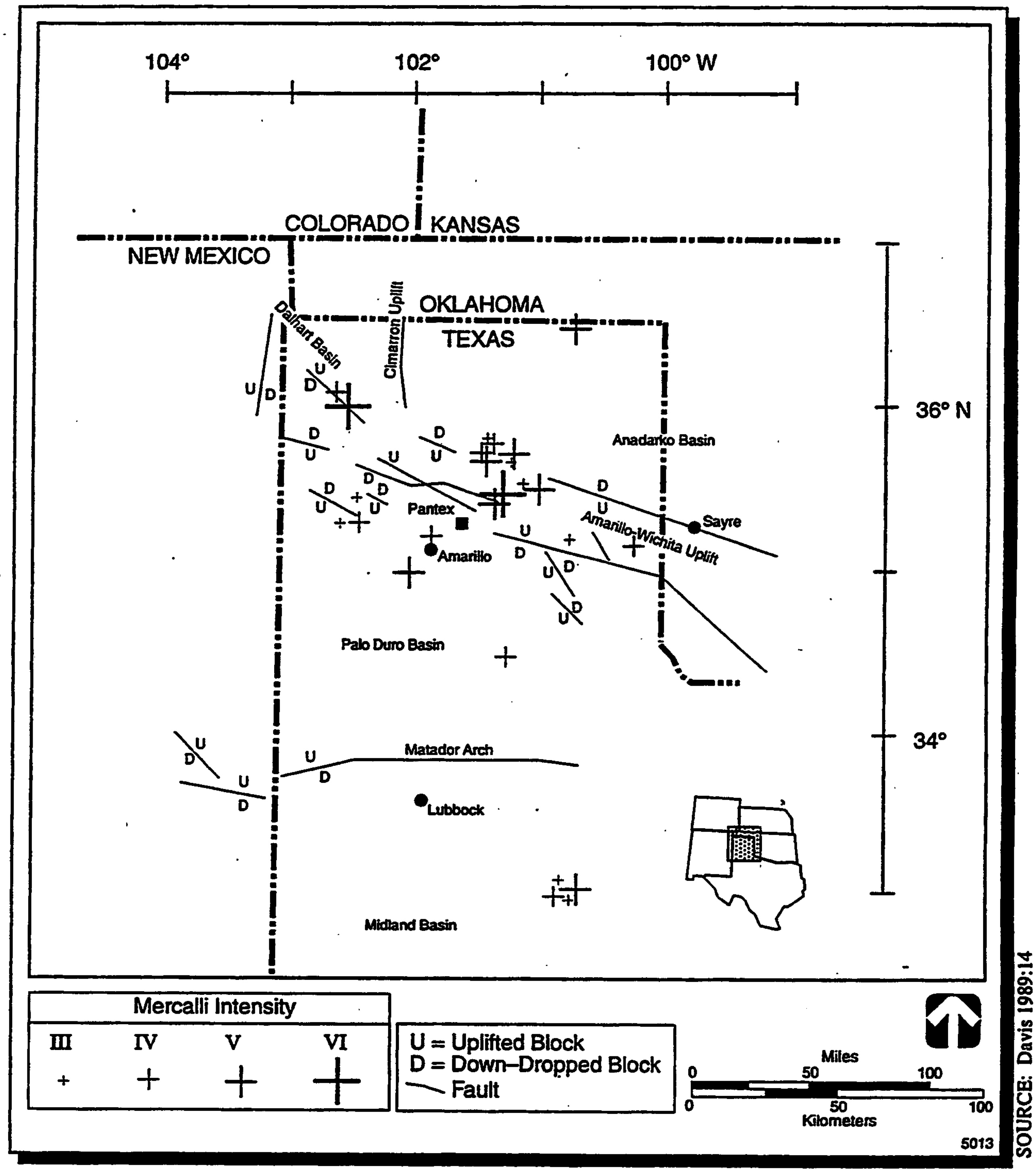


FIGURE 4.5.1.2–2.—*Earthquakes in the Texas Panhandle and Their Relation to Tectonic Features.*

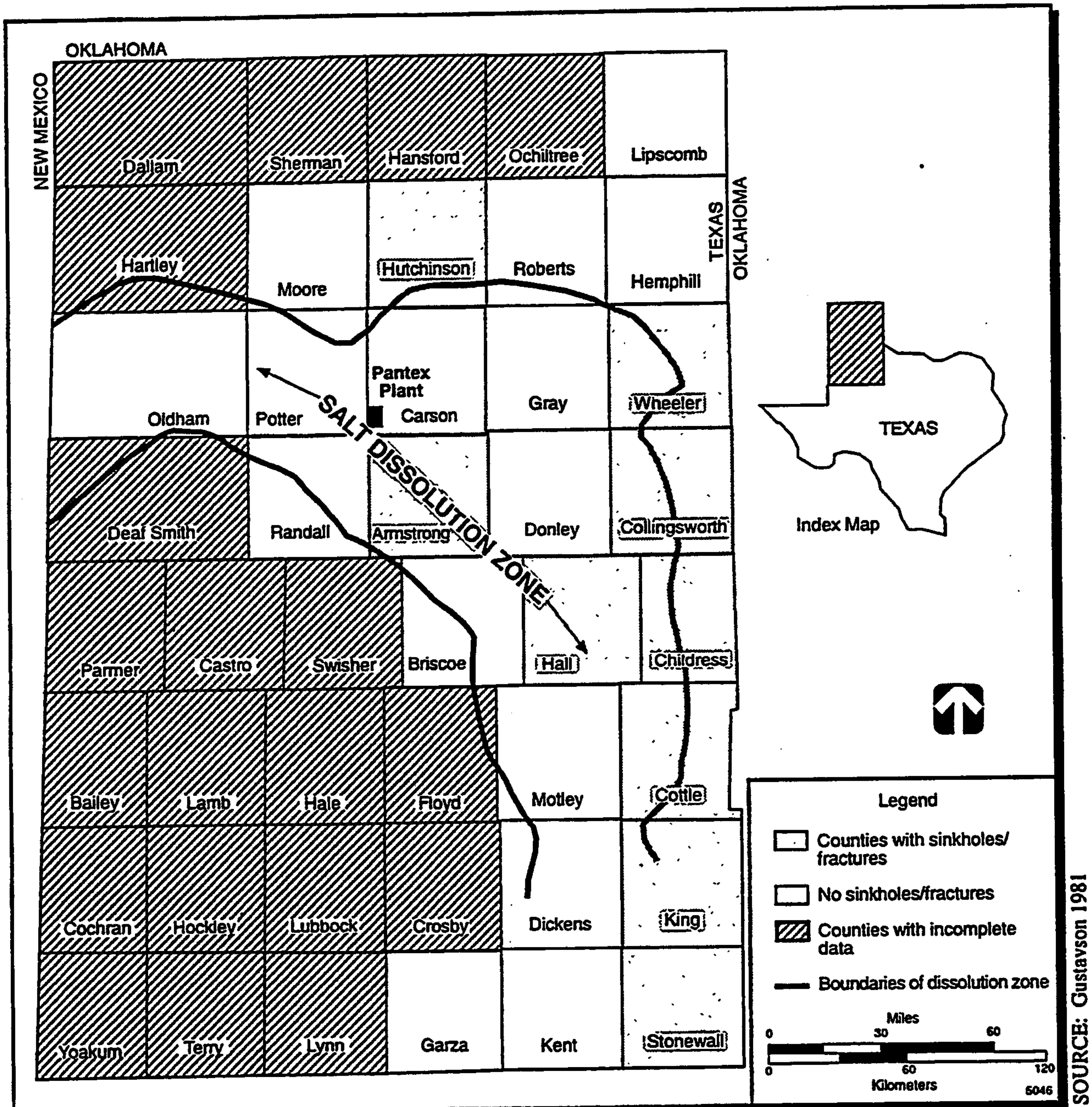


FIGURE 4.5.1.2–3.—*Zones of Active Salt Dissolution and Counties in Which Sinkholes and Fractures Were Identified.*

TABLE 4.5.1.2–2.—*Salt Present Beneath Pantex Plant in the Permian Formation*

FORMATION	NET SALT PRESENT
Dewey Lake	No salt.
Alibates	No salt.
Salado-Tansill	No salt, possibly experienced dissolution in the past.
Yates	No salt.
Seven Rivers	No salt, possibly experienced dissolution in the past, major salt unit elsewhere in Palo Duro Basin.
Queen-Grayburg	No salt.
Upper San Andres	Near the distal end (no salt) of zone of active dissolution. Adjacent formation salt is about 60 meters (200 feet) thick.
Lower San Andres	Near the proximal end (110 meters [350 feet] of salt) of zone of active dissolution. Adjacent formation salt is about 110 meters (350 feet) thick.
Glorieta	About 30 meters (100 feet) of salt.
Upper Clear Fork	About 73 meters (240 feet) of salt.
Tubb	Only a few evaporite layers.
Lower Clear Fork	About 91 meters (300 feet) of salt.
Red Cave	Some evaporite strata.
Wichita	No salt.
Wolfcamp	Limestone, shale, and dolomite with sands.

Source: Pantex 1996:3.3

soil association. The Pullman-Randall soil association consists of nearly level to gently sloping deep noncalcareous loamy soils. The Pullman soils occupy the interplaya areas at Pantex Plant and make up about four-fifths of the Pullman-Randall soil association. These soils consist of silty clay loam and are deep and well drained. The slopes range from 0 to 1 percent in the interplaya areas and 1 to 3 percent near the playas. Pullman soil has a high natural fertility, is slightly permeable, and has the ability to retain a moderate amount of water (Pantex 1996:7.1). This soil is classified as a Mollisol, which is noted by wide, deep cracks throughout the year (USDA 1981:ii). These cracks aid in groundwater recharge. The major land uses are grazing and dryland farming (Foth 1984:268).

The Randall clay soils are generally found in the bottom of the playas. They are somewhat poorly drained but have high natural fertility, very slight permeability, and high available water capacity except during droughts (Pantex 1996:7.1). This soil is classified as a Vertisol, which contains a large amount of clay and has cracks at some times of the year (USDA 1981:ii). Agriculturally, these soils have great potential (Foth 1984:280, 282).

Within the Pantex Plant region of influence (ROI), land use is predominantly agricultural. In the High Plans areas of both Carson and

Potter counties, Pullman soils are the most extensive arable soils in Texas (Pantex 1996:7.1, 10.1). According to the 1992 Census of Agriculture, farming and ranching contributed nearly $300 million to the economy of the ROI. Extensive description of cropland, rangeland, and associated soils are provided in the Pantex Plant *Environmental Information Document* (Pantex 1996).

General Environmental Restoration Process

An environmental restoration (ER) or cleanup process is typically governed by the *Resource Conservation and Recovery Act* (RCRA) or the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (in some cases, both) and their associated regulations. Both sets of regulations govern how environmental contamination is defined, characterized, and remediated. While there are regulatory differences, they generally follow a common process. This common process includes the following steps: initial assessment of suspected areas of contamination; a preliminary prioritizing of areas that should be characterized; planning and implementing a formal sampling and analysis program; drafting of recommendations based on the data as to how much remediation, if any, is needed for each area; review and approval of these recommendations by the regulator; feasibility studies for alternative methods of remediation; and implementation of remedial actions and post-remediation activities. The following is a description of the common process by which environmental contamination is characterized and remediated.

Initially, an assessment of a site or facility is performed. This assessment can be conducted by the facility's personnel or by personnel from the Environmental Protection Agency (EPA) and the State's regulatory agency. This assessment identifies places where hazardous materials (as defined by the appropriate regulations) are being, or could have been, released to the environment. This identification process starts with the review of the existing documentation, discussions with facility personnel, and onsite observations. Areas suspected of being contaminated are called solid waste management units (SWMUs) under RCRA and Operable Units (OUs) under CERCLA. These SWMUs or OUs can be single areas of suspected contamination or a grouping of such places.

After the identification of the SWMUs or OUs, priorities are set by the regulators concerning the timing of investigations and any immediate remediations that might be needed. A detailed and formal priority setting process can involve an investigation of the degree of threat to human health and the environment potentially posed by the suspected contamination. This investigation can include more detailed review of documentation, further discussions with current and past employees, and even some sampling of the SWMUs or OUs. The degree of threat posed by the SWMUs or OUs is determined by considering a conservative estimate of the level of contaminants suspected to be present and the potential pathways for exposure to the human environment. The SWMUs or OUs are then ranked according to the degree of perceived threat. Those SWMUs or OUs with a high ranking are usually designated for immediate remediation. The remainder can be slated for full investigation and sampling according to their perceived threat.

The investigative process involves the preparation and subsequent approval of work plans by the regulators and stakeholders. Sampling and analysis of the areas are then performed. At this point, the types and amounts of contamination present at the facility are fairly well characterized. This allows for reasonable projections as to the amount of cleanup activity that might ultimately be needed to accomplish the ER program goals. Based on the analysis of data, recommendations are made as to whether individual SWMUs or OUs need either immediate remediation, feasibility studies of different remediation methods, additional sampling and characterization, or no further action (NFA). These recommendations are based on evaluations of the types and amounts of contamination indicated by the sampling data and the associated health risk levels set by the regulators. A draft report is sent to the regulator reporting the data and analyses as well as the cleanup recommendations. After review by the regulator, subsequent revision of the report, and final approval by the regulator, the final report is made available to the public. The approval of the report includes approval of the recommendations.

After the approved report is issued, any additional work is performed on those SWMUs or OUs needing further sampling and characterization. Those SWMUs or OUs that do not need additional characterization or cleanup are then taken out of the ER investigation program. Monitoring and maintenance activities may continue at these sites. In accordance with the recommendations approved in the final report, cleanup of the SWMUs or OUs needing immediate remediation is initiated, and feasibility studies to evaluate alternative methods for cleaning up or immobilizing the contamination in the remaining SWMUs or OUs are started. These feasibility studies are submitted to the regulator for review and determination of the appropriate cleanup method. Subsequent to the regulator's determination, cleanup work begins on the remaining SWMUs or OUs.

Once it is demonstrated that a SWMU or an OU has been remediated to the satisfaction of the regulator, it is closed. A closed SWMU or OU can still have some continuing activities, such as ongoing remediation of groundwater. Some remedial actions can be initiated in advance of the formal process, but these remediations are still reviewed by the regulators. If an advance remedial action is not satisfactory to the regulators, further remediation of the SWMU or OU will be required.

Environmental Restoration Process at Pantex Plant

Pantex Plant's ER program is currently being conducted under RCRA in accordance with the Hazardous Waste Permit and EPA and State of Texas regulations. A timeline showing key dates for the Pantex Plant ER program is shown in Figure 4.5.1.3–1. The approval for RCRA methodologies is contained in the hazardous waste permit. All decisions and determinations associated with the ER program are made in negotiation with the regulators. Since CERCLA also applies to Pantex Plant, EPA placed the plant on the National Priorities List on May 31, 1994. Negotiations are currently underway with EPA and the State of Texas to integrate the two processes. The current plan is to complete the remediation process in such a way as to satisfy both RCRA and CERCLA requirements. In addition, Pantex Plant currently plans to perform advance remedial actions (i.e., interim and voluntary corrective actions) where feasible.

Under the RCRA regulations, 144 SWMUs (i.e., places of suspected contamination) have been identified at Pantex Plant. The 144 SWMUs were combined into 14 groups for investigation and are discussed in the Soil and Sediment Quality at Solid Waste Management Units subsection which follows. All prioritization of work activities associated with ER at Pantex Plant has been closely coordinated with EPA and TNRCC. The methodology for Pantex Plant prioritization has been to concentrate on areas of contamination which pose the greatest risk to the public health and other biological populations, and to clean up areas of contamination which are easily corrected. This methodology allows Pantex Plant to focus resources on priority sites while accelerating cleanup and reducing human health and ecological risks. Both EPA and TNRCC have approved this methodology through the issuance of the RCRA permit.

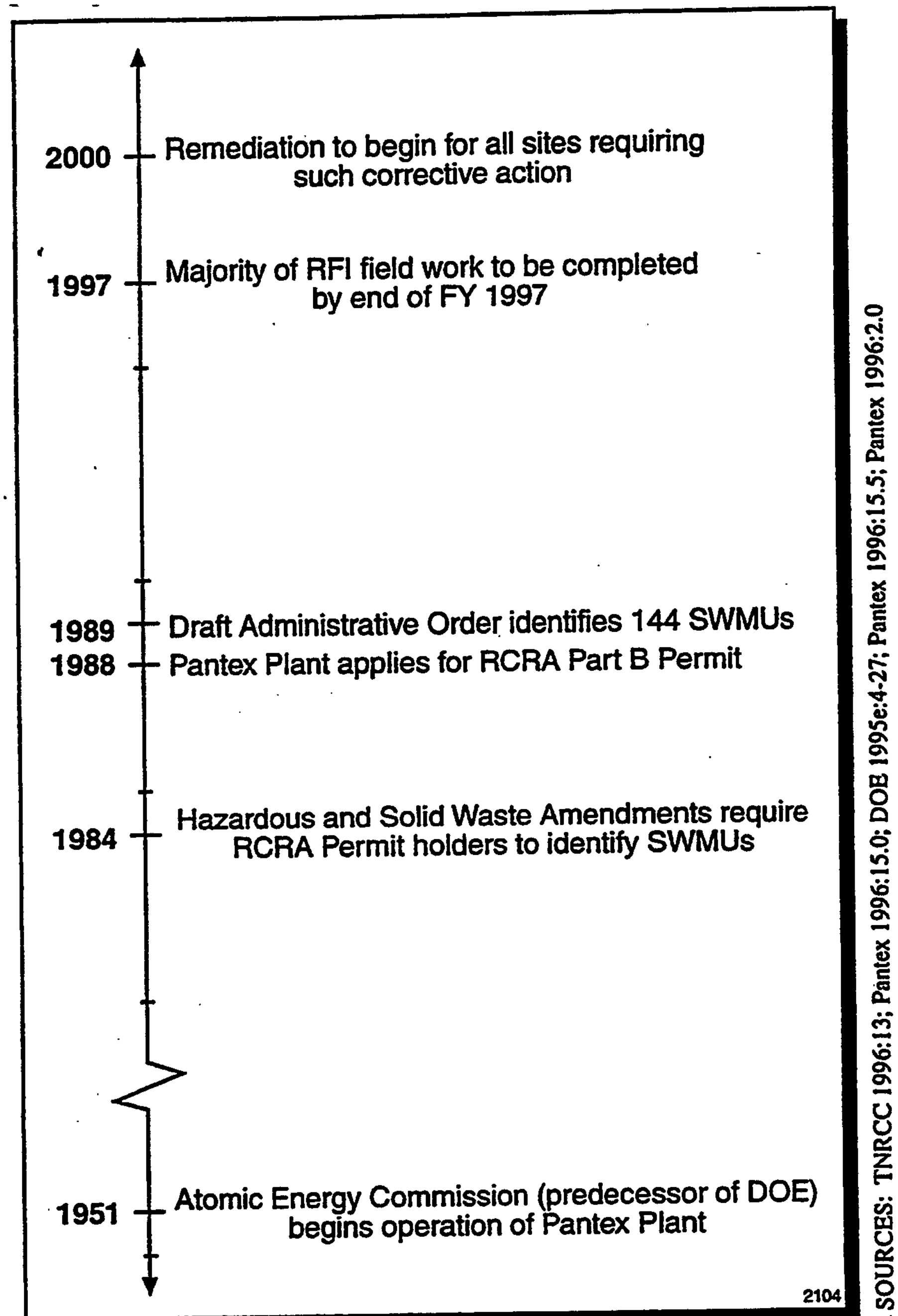


FIGURE 4.5.1.3–1.—*Timeline Showing Important Dates for Pantex Plant Environmental Restoration Program.*

Of the 14 RCRA Facility Investigations (RFIs) ongoing at the plant, 12 have proceeded to the draft report stage. The rest of the RFIs have proceeded only as far as the sampling and analysis stage. At this point, the types and amount of contamination present at Pantex Plant is fairly well characterized, allowing projections to be made as to the amount of cleanup activity that might ultimately be needed to accomplish the ER program goals. Based on the levels of contamination that have been reported in the 12 draft RFIs and the range of contaminant levels that are being seen in the other investigations, many of the 144 SWMUs are expected to be recommended for no further sampling or remediation (i.e., No Further Action (NFA)). While those recommendations are only in draft form and are subject to review and approval by the State of Texas, they indicate that the types and amounts of contamination at the plant are much less than initially estimated. Plans by the plant to initiate advance remedial actions are reflected in the current reduced estimates of impacts and waste projections that would result from the ER program.

Soil and Sediment Quality at Solid Waste Management Units

Past industrial operations at Pantex Plant have generated both solid and liquid wastes, including high explosive(s) (HE) materials, organic solvents, and metals.

In January 1989, EPA conducted a RCRA facility assessment to identify SWMUs, (defined as any unit from which hazardous constituents may migrate) that may require investigation and/or corrective action under the 1984 Hazardous and Solid Waste Amendments to RCRA. In September 1989, the draft Administrative Order of Consent, pursuant to Section 3008(h) of RCRA, was issued. The ER group identified 144 SWMUs, of which 113 SWMUs were organized into 14 groupings (see Figure 4.5.1.3–2, Figure 4.5.1.3–3, and Table 4.5.1.3–1).

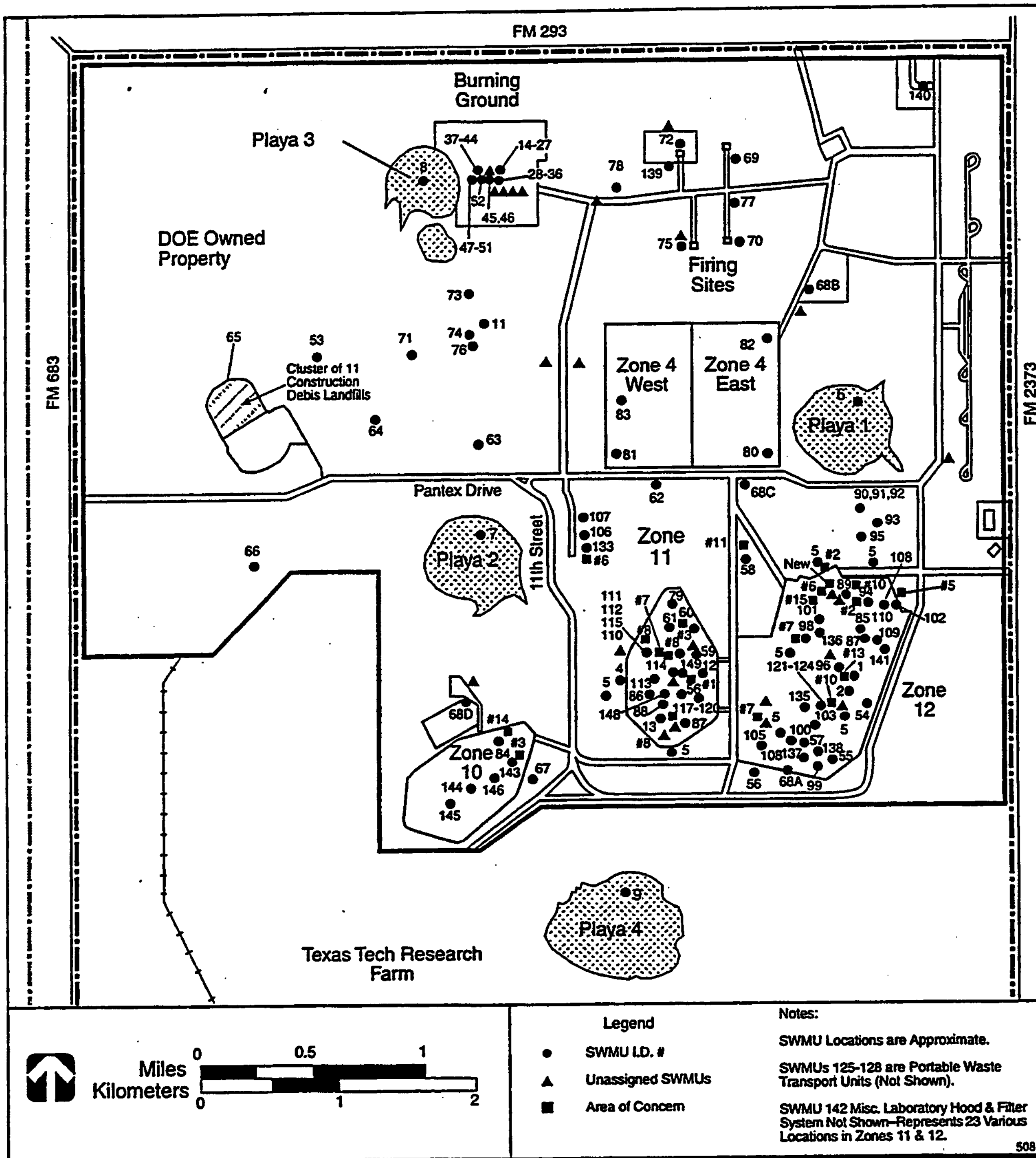
A site may be initially designated as a SWMU during the RCRA facility assessment based on process knowledge, visual observations, or even the recollection of a single employee regarding past accidents, spills, or operations, before confirming the presence of contaminants by collecting and analyzing samples from the site. NFA may be recommended for many of the SWMUs after sampling and analysis of the site confirms either low levels or probable absence of contamination due to natural degradation of the contaminants over time. In addition, NFA may also be recommended if contaminant levels are below appropriate TNRCC Risk Reduction Standards (RRS), which are discussed in detail later in this section.

RFIs are conducted by the ER group at Pantex Plant to determine whether hazardous constituents have been released into the environment from the SWMUs or areas of concern. The 14 groupings are undergoing investigations on independent schedules. Thirty-one of the sites are either active non-RCRA sites or sites that could not be verified and located in subsequent field surveys. The 31 sites are being reviewed to verify that no hazardous materials are present; then they will undergo administrative closure.

TNRCC has established three closure/ remediation performance standards (RRSs 1, 2, and 3) that are applicable to remedial actions undertaken in response to a release or spill. These risk reduction rules attempt to clarify cleanup levels across the state while reducing time delays and accelerating both the investigation and remediation of contaminated sites. The ER group at Pantex Plant has compared analytical results from soil and sediment samples to TNRCC RRSs 1, 2, or 3.

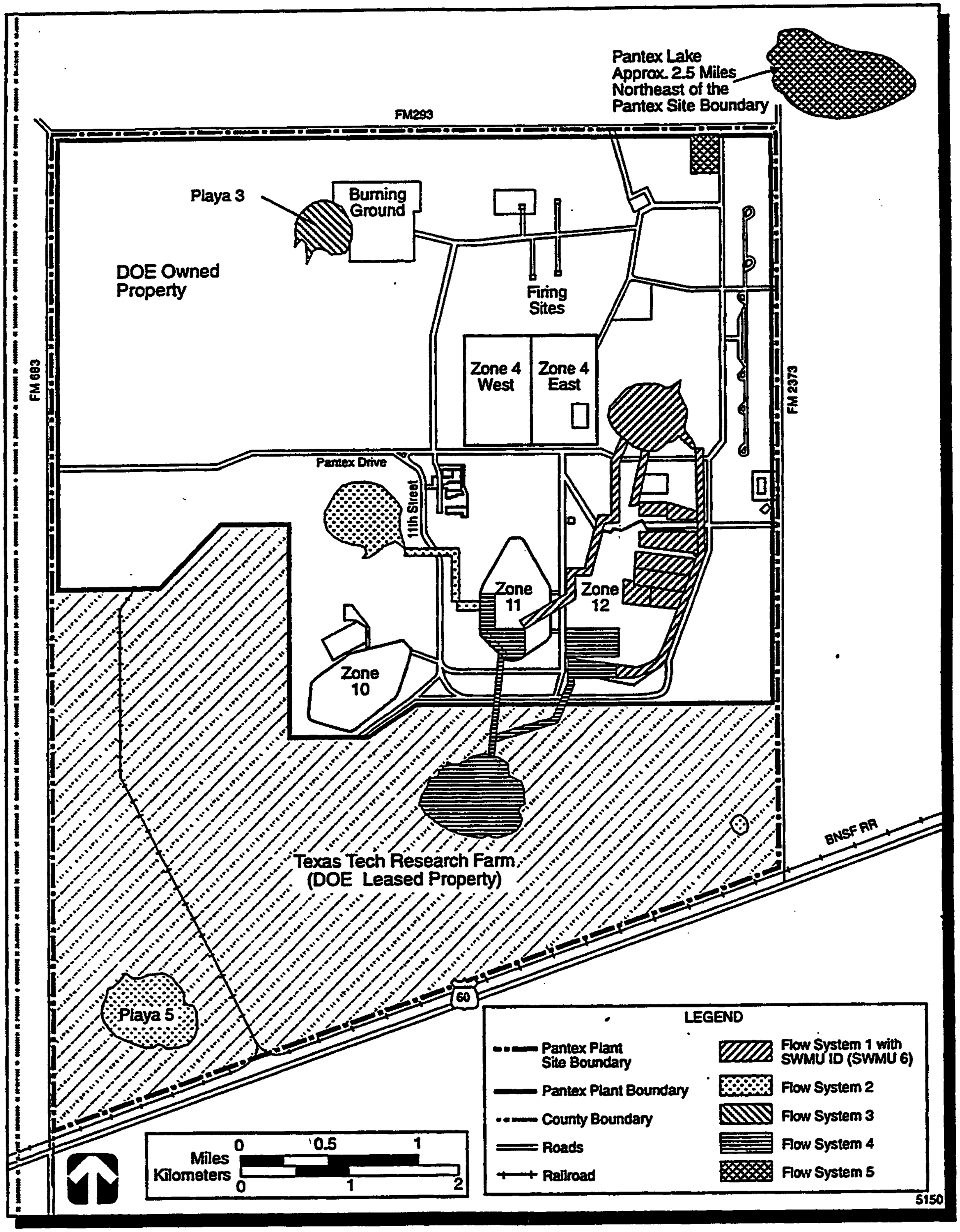
RRS 1 requires removal and/or decontamination of all waste, waste residues, leachate, and contaminated media to background levels unaffected by waste management or industrial activities. 30 TAC 335.554 (d) states that "If the Practical Quantification Limit (PQL) is greater than background, then the PQL rather than the background shall be used as the cleanup level provided that the person satisfactorily demonstrates to the executive director that lower levels of quantification of a contaminant are not possible." The PQLs are generally defined as the lowest level (concentration) quantifiable among laboratories within specific limits during routine laboratory operations.

RRS 2 requires removal and/or decontamination of all waste, waste residues, leachate, and contaminated media to standards and criteria such that any substantial present or future threat



SOURCE: Pantex 1994a

FIGURE 4.5.1.3–2.—*Locations of Solid Waste Management Units of Potential Concern to Soil and Sediment Quality.*



SOURCE: PC 1996p

FIGURE 4.5.1.3–3.—*Pantex Ditches and Playas Flow Systems.*

TABLE 4.5.1.3–1.—*Summary of SWMU Groupings*

SWMU GROUPINGS		NUMBER OF SITES
AL–PX–01*	Burning Ground	37
AL–PX–02*	High Priority Potential Release Sites	8
AL–PX–03	Former Cooling Tower in Zone 12	1
AL–PX–04	Old Sewage Treatment Plant Sludge Beds	1
AL–PX–05	Fire Training Area Burn Pits	1
AL–PX–06*	Zone 12 Groundwater	1
AL–PX–07	Landfills	15
AL–PX–08*	Ditches and Playas	11
AL–PX–09	Firing Sites	7
AL–PX–10	Leaking USTs at Buildings 12–35 and 16–1	2
AL–PX–11	Miscellaneous High Explosive/Radiation Sites	8
AL–PX–12*	Miscellaneous Chemical Spills/Releases	8
AL–PX–13	Supplemental/Verification Sites	8
AL–PX–14	USTs at Other Locations	5
Other		31
Total		144

*More detailed information on these SMWU groupings is provided in appendix I (Table I.1.1–2).
USTs - Underground Storage Tanks
Source: Pantex 1996:15.0

to the human health or environment is eliminated.

RRS 3 requires that removal, decontamination, and/or control of all waste, waste residues, leachate, and contaminated media occur to levels and in a manner such that any substantial present or future threat to human health or the environment is eliminated or reduced to maximum extent practicable. Because of greater concentrations of contaminants that may be left at the site with RRS 3, an evaluation of the effectiveness of the proposed remedy must be submitted to TNRCC and approved before implementation of the remedy.

RRSs 1 and 2 are the goals for determining cleanup levels and as decision criteria for additional sampling needs at a site. The "cleanup" levels represent the concentrations below which any additional site characterization or remedial action initiatives would be for the purpose of satisfying objectives other than minimizing human health risks. For example, observations of a specific chemical hazard in excess of background (RRS 1) but within acceptable risk-based criteria (RRS 2) may be acted upon differently by DOE under differing site-specific conditions. The cleanup for contamination located at 1.5 to 3.0 meters (5 to 10 feet) below ground surface is to background (RRS 1), thus avoiding deed recording requirements with RRS 2 (30 TAC 335.560) and future liability relative to a potential changing land use classification. Conversely, for the same contaminant at the same concentration located at a depth of 1.5 to 30 meters (5 to 100 feet) below ground level, DOE is likely to accept the criteria outlined in RRS 2 in which technical feasibility and cost limitations preclude cleanup to background.

By virtue of 30 TAC 335.557 (3), the future land use designated at Pantex Plant is nonresidential. However, in areas subject to excessation, the land use may revert to residential, thereby requiring increased scrutiny of the site to determine if risk-based criteria for a residential scenario have been satisfied. The DOE risk managers will need sufficient characterization data regarding these sites to quickly determine the most prudent closure strategy to assume; i.e., cleanup to background or to some risk-based level established for residential or nonresidential uses. The decision criteria is generally determined by processes such as the one described above.

The RRSs are continually being revised as new information becomes available. Preliminary Remediation Goals (PRGs) are, therefore, currently accepted cleanup levels and may be revised as RRSs are revised. Further explanation on the methodology for applying the RRSs to RFIs being conducted at Pantex Plant can be found in the *Draft Final Risk Reduction Rule Guidance for Pantex Plant RCRA Facility Investigations* (DOE 1994z).

All RFI work plans have been approved, and field investigations have been initiated at all sites. RFI reports have been completed for five AL–PX groupings: AL–PX–01, AL–PX–02, AL–PX–06, AL–PX–08, and AL–PX–12 (see Tables 4.5.1.3–1 and I.1.1–1). These documents are in draft form and are currently being reviewed by TNRCC. Adequate data have been collected on many of the SWMUs to recommend either NFA or interim corrective measures (ICMs). ER of the SWMUs at Pantex Plant is ongoing concurrently with the generation of this document. The information presented below is the latest published data available. Five of the draft RFIs are at a stage where the data may be referenced in this EIS and are discussed further below. Additional data will be provided in the Final EIS as new information becomes available.

The Burning Ground (AL–PX–01) grouping, located adjacent to the eastern side of Playa 3, consists of the former chemical burn/solvent evaporation pit, explosive burn pads, landfills, burn trays, burn racks and flashing pits, burn cages, and demonstration facilities (USCOE 1995:iii, v). The site is used for the burning of HE components and treatment of HE-contaminated waste and various HE-contaminated liquids and solvents.

Disposal of residues from burning of solvents at the site was discontinued in the early 1980's (Pantex 1994a:2-1). The highest concentrations of contaminants were found in the landfills; however, contaminants have not migrated past the landfill's boundaries (Pantex 1996:15.4). Primary contaminants are HE, solvents, and metals. Phase II of the RFI was completed in November 1995, and a revised Draft Final RFI report has been submitted to TNRCC. Although contamination is generally limited to the upper 6 meters (20 feet) of soil, some volatile organic compounds (VOCs) have been detected at deeper intervals (Pantex 1996:15.4). Hotspot removal ICMs may be required at selected sites. DOE may also recommend to TNRCC some in situ remediation such as soil vapor extraction and bioremediation based on final data review (PC 1996b:3).

The Draft RFI Report for the Burning Ground Assessment was completed in May 1995 and submitted to TNRCC in August 1995. The following is a summary of the contaminants of potential concern identified in the soil during this investigation that exceeded the decision criteria. The contaminants include HE, metals, pesticides, and semivolatile organic compounds (SVOCs). HE compounds that exceed the decision criteria for soil include RDX, 1,3,5-TNB, and 2,4,6-TNT, HMX (surface soil only) and 1,3-DNB (subsurface soil only). Also, a contaminant of potential concern, 4-amino 2,6-dinitrotoluene, has been identified in the soils.

RDX had a range of concentrations exceeding the decision criteria (2.6 milligrams/kilogram for surface and subsurface soil) in surface soils of 2.9 to 510 milligrams/kilogram and 2.6 to 64 milligrams/kilogram in subsurface soil.

Seven metal compounds were detected in soil samples at concentrations which exceed the decision criteria. Nickel and vanadium concentrations only exceeded the surface soil decision criteria (0 to 2 feet [0 to 0.6 meters] in depth). Arsenic only exceeded the decision criteria in one subsurface soil sample. Barium, copper, lead and mercury were detected in surface and subsurfaqe soil samples above decision criteria. Barium had a range of concentrations exceeding the decision criteria for surface soils (200 milligrams/kilogram) of 200 to 2,440 milligrams/kilogram. Lead exceeded the decision criteria for surface soils (15.7 milligrams/kilogram) ranging from 16 to 160 milligrams/kilogram. Mercury exceeded the decision criteria for surface soils (0.20 milligram/kilogram) ranging from 0.22 to 1.7 milligrams/kilogram.

Four pesticides (aldrin, alpha-BHC, dieldrin, and gamma-BHC) were identified in the soil that exceed the decision criteria. SVOCs exceeding the decision criteria for soil include benzyl alcohol and bis-(2-ethylhexyl) phthalate (USCOE 1995). Sampling of soil at the Burning Ground is also conducted on an annual basis. These sampling results are discussed in the soil and sediment sampling subsections that follow.

The High Priority Potential Release Sites group (AL–PX–02) consists of five SWMUs, one area of concern (AOC), and three firing sites. Phase I and II fieldwork has been completed. The nine sites were split into two separate RFI reports. The two Draft Final RFI reports were submitted to the TNRCC for review in September 1994 and March 1995, respectively (Pantex 1996:15.4).

Chemical constituents detected in the soil and sediment at SWMUs north of Pantex Drive include minor amounts of HEs, metals, VOCs and SVOCs. Elevated levels of lead were detected east of Playa 3 and north of Zone 4 at Firing Site 22. Low concentrations of metals and common anions were detected in soils of the inactive, lined, solar evaporation pond located in Zone 11. Elevated levels of lead and chromium were detected in soils on the northeast side of Building 12–68 (an electroplating facility on the east side of Zone 12). Low concentrations of metals were detected in soils near Building 12–59's subsurface leaching system. Lead, VOCs and SVOCs were detected in soils at the former solvent disposal pit located in the northeastern corner of Zone 12.

In 1995, ICMs were conducted on the Building FS–16 surface impoundment and sump, FS–22 container, and Building 12–68 concrete sump. Contaminants included chromium and HE. Confirmation sampling indicated cleanup action attained RRS 2 levels, and Pantex Plant has recommended this grouping to TNRCC for NFA. No additional cleanup is anticipated for this SWMU grouping (Pantex 1994a:3-1 through 3-4, PC 1996b:2).

The Former Cooling Tower (AL–PX–03) was used for the HE machining operations water cooling from 1950 to 1964. The unit was dismantled in the early 1970's, and now only a concrete slab remains. Results from the Phase I analysis revealed low levels of metals, VOCs, SVOCs, nitrogen series (as nitrate and nitrite), and HE in the near-surface and subsurface soils. Barium, lead, and hexavalent chromium were detected in concentrations exceeding background but were below RRS 1 levels. The RFI report prepared and submitted to TNRCC on October 15, 1993 recommended NFA. Subsequent to this investigation, ancillary piping, which may have led to the cooling tower, was discovered. Thus, additional characterization work has been initiated to characterize and evaluate the need for further action (Pantex 1996:15.4; Pantex 1994a:4-1, 4-2; PC 1996b:2). Treatability Study fieldwork started in May of 1996. Soils will be analyzed for total and hexavalent chromium. Treatability/remediation activities will continue into 1997 (Pantex 1996:15.4).

The Old Sewage Treatment Plant (OSTP) Sludge Beds (AL–PX–04) were operational from 1942 until 1987. The OSTP received wastewater from Amarillo Air Force Base, the Amarillo International Airport, Bell Helicopter Plant, and Pantex Plant. The Phase I field work was completed, and low levels of metals and VOCs were detected in the sludge beds and in the subsurface soils. Pantex Plant recommended NFA to TNRCC in September 1993, based on the remote location of the OSTP sludge beds, lack of a continuing source, depth to groundwater, low concentrations of contaminants detected (below RRS 2 levels) and the limited aerial extent of contamination (Pantex 1994a:5-1). Regulatory approval is pending (Pantex 1996:15.4).

The Fire Training Area Burn Pits (AL–PX–05) were used by the Pantex Plant Fire Department as a fire training area. Various solvents, chemicals, and fuels were ignited and extinguished in the training process. Concentrations of zinc, dioxins/furans, fluorine, naphthalene, phenanthrene and 2-methyl-naphthalene were detected in sediment and soil samples. Phase I fieldwork was completed in 1993. Contamination was found to be localized and confined to the upper 1.5 meters (5 feet) of soil (Pantex 1996:15.4, Pantex 1994a:6-1). The ICM was performed in July 1995, and the upper 0.6 meter (2 feet) of soil has been removed and backfilled with clean topsoil (Pantex 1996:15.4). A request for NFA was submitted to TNRCC based on confirmation sampling results that indicated Risk Reduction Level 2 was achieved in the remaining 0.9 meter (3 feet) of soil (Pantex 1996c:52, 53). The Draft Final ICM Closure Report was submitted to TNRCC in November 1995 (Pantex 1996:15.4).

Zone 12 Groundwater group (AL–PX–06) comprises all perched groundwater contamination below Pantex Plant. Details of characteristics and current remedial activities for Zone 12 Groundwater are discussed in section 4.6, Water Resources, and in appendix C. Primary contaminants are RDX, HMX, chromium, and solvents. A dual phase groundwater extraction/soil vapor extraction treatability system has been installed and implemented to determine the feasibility of several remediation options including pump and treat, soil vapor extraction of the vadose and dewatered zones, and oxygen augmentation of the vadose and dewatered zones. Treated groundwater analytical results are showing less than detection limits for HE. With approval of the TNRCC, the treated groundwater is being reinjected in an upgradient monitoring well to aid in the containment of the groundwater contaminant plume and increase the efficiency of the recovery system. Injection began in April 1996. Currently, initial results indicate that the system is injecting 158,987 liters per day (42,000 gallons per day) of treated water into the injection well (Pantex 1996:15.4, Pantex 1994a:7-1).

The Draft RFI for Zone 12 Groundwater was completed in November 1995 and submitted to TNRCC for approval. The purpose of the RFI report is to describe the nature and extent of releases of hazardous constituents to Zone 12 Groundwater at Pantex Plant and to gather sufficient data to support the Corrective Measures Study. Potential sources of contamination to Zone 12 Groundwater identified in the draft RFI include the Burning Ground, Landfill 3, Flow Systems 1 and 4, Leaking Underground Storage Tanks (USTs) at Buildings 12–35 and 16–1, and Miscellaneous HE/Radiation Sites (see appendix I) (Argonne 1995a).

Landfills group (AL–PX–07) has been used to dispose of sanitary and industrial wastes at the plant since 1942. Twenty-three landfills exist throughout Pantex Plant with a majority being located in Zones 11 and 12. Fifteen of these landfills are included in this group (Pantex

1996:15.4). Figure 4.5.1.3–4 illustrates landfills currently under RCRA Facility Investigation (RFI). VOCs were detected in soils above and adjacent to some of the landfills at various concentrations, up to levels where remediation must be considered. Asbestos and VOCs were detected in soil samples of Landfills 1 and 3 (Pantex 1994a:8-1 to 8-8). Characterization data indicate that NFA is recommended on all landfills except Landfill 3. However, maintenance caps will be placed as needed over selected landfills as a proactive measure to prevent potential water infiltration. Preliminary data packages for Phase I fieldwork were submitted to TNRCC for review in December 1994.

The landfills have been separated into three different groupings: Group I, Landfills 4 and 11; Group II, Landfills 5, 6, 7, 9, 10, 12, and 15; and Group III, Landfills 1, 2, 3, and 13, Original Abandoned Zone 10, and Sanitary Landfills. A recommendation for NFA for Group I Landfills was submitted to the TNRCC on June 28, 1995. A Draft Final RFI recommending NFA for all Group II Landfills was submitted to TNRCC on January 15, 1996. A Draft Final RFI for Group III Landfills is scheduled to be submitted to TNRCC by June 28, 1996. The Draft Final RFI for Group III Landfills will recommend NFA for many of the landfills; Landfill 3 may require additional corrective measures (Pantex 1996:15.4). In situ treatment is being evaluated as a potential option for remediation of residual HE contamination found at Landfill 3 (PC 1996b:1).

The Ditches and Playas group (AL–PX–08) consists of five playas (Playas 1, 2, 3, 4, and Pantex Lake) and their associated network of man-made ditches. The ditches receive treated wastewater effluent and stormwater runoff from buildings in Zone 11 and 12. Playa 3 receives stormwater runoff from the Burning Ground, and Playa 4 receives stormwater runoff from the south ends of Zones 11 and 12. In the past, Pantex Lake received wastewater effluent from the OSTP. Playa 4 is currently permitted to receive industrial discharges and stormwater runoff from Pantex Plant (Pantex 1996:15.4). Pantex Lake receives neither industrial discharges nor stormwater runoff from Pantex Plant.

This group has been divided into Flow Systems which are described in Table 4.5.1.3–2. Surface and subsurface soils were collected from various locations throughout the Flow Systems. Table 4.5.1.3–2 is a summary of the types of contaminants identified from analytical results which exceed the decision criteria (Pantex 1994a:9-1, 9-2). An expedited ICM to remove the hotspots within the ditch SWMUs began in June 1996 (Pantex 1996:15.4). Phase II fieldwork (completed in January 1995) involved collection of surface and subsurface soils from various locations throughout flow systems 1 through 5. Proposed ICMs would lower contaminant concentrations in the ditches. The ICMs scheduled for the summer of 1996 include site-specific removals, in situ remediation, and natural attenuation. A baseline risk assessment is being prepared to evaluate the applicability of Risk Reduction Level 3 closure for those sites that are not candidates for ICMs (Pantex 1996c:53).

Of these five flow systems, only flow systems 1 and 4 have been identified as areas suspected of affecting Zone 12 Groundwater (Argonne, 1995a:3-10). Flow System 1 is divided into four subareas: Flow Pathways 1A, 1B, 1C, and Playa 1 area. Contaminants which exceeded the PRGs in Flow Pathway 1A include an HE (HMX), some inorganics (antimony, lead and selenium), SVOCs, one pesticide (dieldrin), and PCBs. Contaminants exceeding the PRGs in Flow Pathway 1B include various inorganics due to historical discharges from Zones 11 and 12 (mercury exceeded the PRG by 28 to 810 percent at six sampling locations), VOC, SVOCs, and pesticides (including aldrin, 4-4'-DDT, and dieldrin). Contaminants which exceeded the PRGs in Flow Pathway 1C include HE (HMX and RDX), various inorganics, SVOCs, pesticides (4-4'-DDT and chlordane),

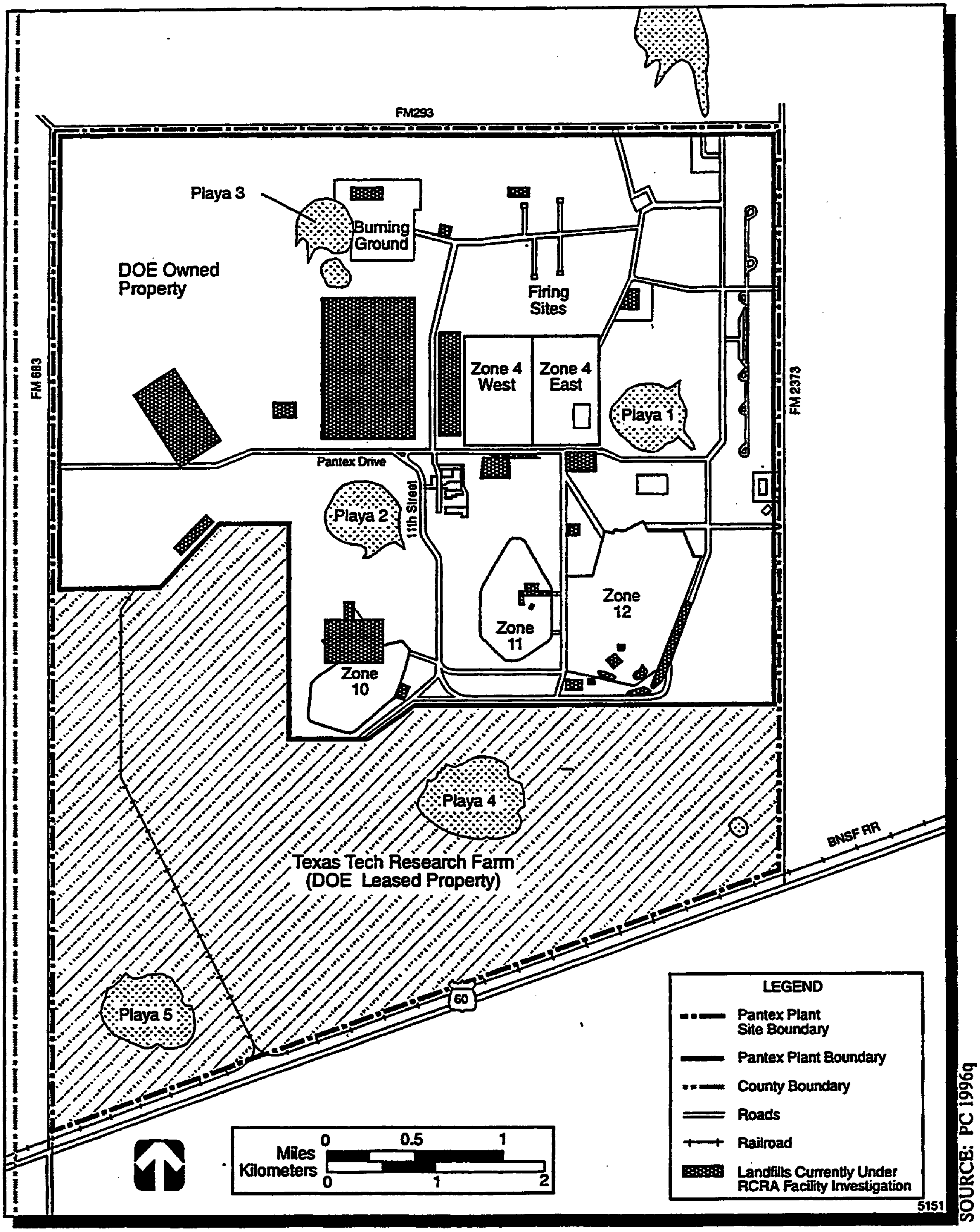


FIGURE 4.5.1.3–4.—*Landfills Currently Under RCRA Facility Investigation.*

TABLE 4.5.1.3–2.—*Summary of Flow Systems 1 Through 5 and Compounds Identified as Exceeding the Decision Criteria in Surface and Subsurface Soils*

FLOW SYSTEM 1	FLOW SYSTEM 2	FLOW SYSTEM 3	FLOW SYSTEM 4	FLOW SYSTEM 5
		DESCRIPTIONS		
Flow system 1 consists of Playa 1 and the unlined, man-made ditches that direct runoff and wastewater discharge away from Zones 11 and 12 to this playa.	Flow system 2 consists of several unlined, man-made ditches that direct runoff and wastewater discharge away from Building 11-50 to Playa 2.	Flow system 3 is composed only of Playa 3.	Flow system 4 consists of several unlined, man-made ditches that direct runoff and wastewater discharge away from Zone 11 and Zone 12 south.	Flow system 5 consists of Pantex Lake and two unlined, man-made ditches that direct runoff and wastewater discharge from the OSTP.
		SURFACE SOILS		
Metals, SVOCs, pesticides/PCBs, HE (HMX)	Metals, VOCs, SVOCs	One sample with lead, barium, cobalt, and nickel. Barium in NE quadrant of playa and lead in NW quadrant.	Metals	Metals
		SUBSURFACE SOILS		
Metals, SVOCs, HE (HMX, RDX)	Metals	None	Pesticides, HE, SVOC, aldrin, and RDX	Metals

Source: Pantex 1994a:9-1, 9-2

and PCBs. Contaminants exceeding the PRGs in Playa 1 include seven inorganics (the most common was chromium, which exceeded the PRG by up to 250 percent at 15 locations), and two pesticides (4-4'-DDT, and aldrin). Contaminants detected above the PRGs at Flow System 4 include metals, VOCs, pesticides, and HE. The Ditches and Playas RFI recommends additional sampling at many locations within this grouping to further define the horizontal and vertical extent of contamination (USCOE 1995f:Vol. 1 of 5).

The Firing Sites group (AL–PX–09) consists of seven firing sites, located in the north-central portion of Pantex Plant, that have been in operation since 1952. Five of the firing sites are active, and two are currently inactive. The sites have been used for testing of HE in connection with quality control and research and development activities. Some radioactive materials, primarily depleted uranium (DU), were involved in the testing program. Sampling of soil at Firing Sites 4, 5, and 10 is conducted on an annual basis and is discussed in the following section.

The Pantex ER program addresses only inactive sites. Active sites are closed under the RCRA permit process. A request has been submitted to TNRCC to remove the four active firing sites from the Pantex Plant ER program. An ICM is being conducted on FS–5 to remove surface DU contamination. Subsequent confirmation sampling and risk assessment will be conducted at FS–5. Confirmation sampling will be conducted to confirm that protective levels have been attained and NFA will be required. Additional hotspot removal will be conducted until the remediation goals have been achieved. FS–6 and FS–15 contaminant levels were below RRSs and have been proposed to TNRCC for NFA (Pantex 1996:15.3, 15.4; PC 1996b:1).

The Leaking USTs group (AL–PX–10) is comprised of two gasoline release sites near Buildings 12–35 and 16–1. The USTs were used to store gasoline, diesel, and used motor oil. Five USTs were removed in 1988 from Building 12–35, and two USTs were removed from Building 16–1 in 1989. The Draft Final Corrective Action Plan, submitted to TNRCC in October 1994, proposed NFA based on the fact that contaminant levels were below remediation goals. Benzene levels below the site in the perched aquifer exceed RRS and will be addressed in the Zone 12 Groundwater assessment (Pantex 1996:15.4; PC 1996b:2).

The Miscellaneous Explosive/Radiation Sites group (AL–PX–11) consists of 12 sites, including a temporary explosives burning site, radioactive residue storage, a subsurface leaching bed, trinitrotoluene settling pits, two buildings where explosives were filtered from wastewater, and the soil surrounding an explosive fabrication building. Analytical results from soil samples taken in 1985 near the temporary explosive burning site indicate the following: low concentrations of silver and pesticides at 0, 3, and 4 meters (0, 9, and 14 feet); total organic compounds of 22,600 parts per million at the surface. All radioactive waste staged below ground at Pantex Plant was retrieved and disposed of at an approved DOE burial ground. The decontamination of this site consisted of the removal of the buried radioactive waste, as well as any soil that may have been contaminated by the buried material.

Soil samples were taken before and after site cleanup. Tritium, uranium, and plutonium-239 were detected below the trench before cleanup. Soil analyses subsequent to the cleanup revealed low levels of the same radionuclides (Pantex 1994a:12-1 to 12-2; Pantex 1996:15.4). The vertical and lateral extent of contamination are currently being evaluated. Buildings 12–43 and 12–24 North are being evaluated for an in situ explosives treatability demonstration. Recent data indicate that explosive contaminants may be degrading naturally as a result of microbial action. Studies are being proposed to define the degradation mechanism and the potential to enhance the process (Pantex 1996c:54).

Twenty-four sites have been identified at Pantex Plant where spills or releases of chemicals have occurred and are referred to as AL–PX–12, Miscellaneous Chemical Spills and Release Sites. These sites are located within Zones 10, 11, and 12 and areas west of Zone 11. Table 4.5.1.3–3 summarizes the contaminants of concern (COCs) identified in the soil at AL–PX–12. No signs of contamination were found at the main electrical substation (AOC No. 2), and TNRCC granted an NFA on the site in September 1993. The primary COCs for the remaining sites include metals, solvents, pesticides/PCBs, and HE. Characterization data are currently under evaluation. Preliminary results indicate that contaminant levels are below RRS 2 and NFA will be required (PC 1996b:1; Pantex 1996c:54; Pantex 1996:15.4).

Supplemental Verification Sites (AL–PX–13) consists of eight inactive SWMUs, including five landfills, a barren area where herbicides were applied, parallel depressions, and the old pistol range. The pistol range is still in operation and was removed from the ER program. The Zone 10 abandoned landfill was also removed from this grouping and added to the AL–PX–7 Landfills investigations. Diesel fuel residuals, hydrocarbon compounds, and dioxins were all detected below RRSs in an area where herbicides were applied near Playa 1. Low levels of VOCs, SVOCs, and pesticides were detected in the depressions in Zone 11 below RRSs. Phase I fieldwork was completed in 1993. All sites within this grouping are being

TABLE 4.5.1.3–3.—*Summary of Contaminants of Concern Identified in the Soil at AL–PX–12 and Recommendations*

SWMUs/ AOCs	COCs FOR SURFACE SOILS	COCs FOR SUBSURFACE SOILS	RECOMMENDATIONS
Zone 10 SWMUs Scrap Salvage and Storage Yard (SWMU #84)	SVOC- Benzo(b)fluoranthene Pesticides/PCBs- Aldrin, Dieldrin, PCBs (total)	Pesticides/PCBs- Aldrin, Dieldrin, PCBs (total) Metals- Chromium (total), Chromium VI	Additional characterization of PCBs to further define the surface extent.
Former Waste Drum Storage Area (SWMU #143)	SVOCs- Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene Pesticides-Aldrin, Dieldrin Toxaphene PCBs (Total) Metals-Cadmium, Lead*	Pesticides/PCBs-Aldrin, Dieldrin PCBs (Total)	This area has not been characterized to background for several analytical groups, including pesticides, PCBs, and metals. Further sampling is recommended to define the extent of constituents identified as COCs.
Battery Storage Areas Former Battery Storage Area (SWMU #103)	Metals-Cadmium, Lead*	Metals-Selenium	Extent of contamination has been defined. No additional site characterization is recommended.
Battery Storage Area (AOC #14)	Metals-Lead*	None identified.	Extent of contamination has been defined. No additional site characterization is recommended.
Overflows From Building 11-36 Collection Sump (SWMU #113)	HEs-1,3,5-Trinitrobenzene, 2,4,6-Trinitrotoluene Metals-Arsenic, Lead*	SVOCs- Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene Di-benzo(a,h)anthracene Metals-Arsenic, Cadmium, Mercury, Lead*	Additional site characterization is recommended. However, it is recommended that further action be deferred until after operations cease, at which time further characterization will occur and efforts will not be duplicated.
Transformer Leak and PCB Spills Transformer Leak (AOC #1)	Pesticides/PCBs- Aldrin, Heptachlor epoxide, PCBs (Total)	Pesticides/PCBs-Aldrin, Dieldrin, PCBs (Total)	Additional surface soil samples to define the lateral extent of PCBs are recommended.
Main Electrical Substation (AOC #2)			NFA has been granted by the TNRCC and was not considered further in the RFI/Corrective Measures Studies process.
Electrical Equipment Boneyard (AOC #5)	Pesticides/PCBs- Aldrin, Chlordane, Dieldrin, PCBs (Total)	None identified.	Extent of contamination has been defined. No additional site characterization is recommended.

TABLE 4.5.1.3–3.—*Summary of Contaminants of Concern Identified in the Soil at AL–PX–12 and Recommendations*-Continued

SWMUs/ AOCs	COCs FOR SURFACE SOILS	COCs FOR SUBSURFACE SOILS	RECOMMENDATIONS
Capacitor Bank Rupture in Zone 12	PCBs (Total)	None identified.	Extent of contamination has been defined. No additional site characterization recommended.
Former Boiler House Areas (AOC #3) Boiler House in Zone 10	Metals-Lead*	None identified.	Extent of contamination has been defined. No additional site characterization recommended.
Boiler House in Zone 11	SVOCs- Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Di-benzo(a,h)anthracene Metals-Mercury, Lead*	None identified.	Additional surface soil analysis using EPA Method 1312 for Synthetic Precipitation Leaching Procedure is recommended to define the lateral extent.
Sulfuric Acid Spills (AOC #7) Oleum Tank at Building 11-36	HE-RDX	None identified.	It is recommended that AOC #7 be considered for NFA, as there is no evidence of a significant release.
Sulfuric Acid Tank near Building 12-4	None identified.	None identified.	This site is recommended for NFA.
Sulfuric Acid Pit at Building 12-64	None identified.	SVOCs- Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene	It is recommended that this site be considered for NFA, as there is no evidence of a significant release.
Various Solvent Leaks (AOC #8) Drum Storage at Pad 11-12/ 11-13	HE-2,4,6-Trinitrotoluene Pesticides/PCBs- Aldrin, Dieldrin, PCBs (Total)	Pesticides/PCBs-Aldrin, Dieldrin, PCBs (Total)	It is recommended that this site be considered for NFA, as there is no evidence of a significant release.
Drum Storage near Building 11-17	Pesticides/PCBs-PCBs (Total), Chlordane, Dieldrin	Pesticides/PCBs-Aldrin, Dieldrin, PCBs (Total)	It is recommended that this site be considered for NFA, as there is no evidence of a significant release.
Drum Storage near Building 11-22	Pesticides/PCBs- Aldrin, Dieldrin, PCBs (Total)	Pesticides/PCBs-Aldrin, Dieldrin, PCBs (Total)	It is recommended that this site be considered for NFA, as there is no evidence of a significant release.
Drum Storage near Building 11-36	SVOC- Di-benzo(a,h)anthracene Pesticides/PCBs- Aldrin, Dieldrin, PCBs (Total)	Pesticides/PCBs-Aldrin, Dieldrin, PCBs (Total)	Extent of contamination has been defined. No additional site characterization recommended.

TABLE 4.5.1.3–3.—*Summary of Contaminants of Concern Identified in the Soil at AL–PX–12 and Recommendations*-Continued

SWMUs/ AOCs	COCs FOR SURFACE SOILS	COCs FOR SUBSURFACE SOILS	RECOMMENDATIONS
Pesticide Releases Pesticide Building 12-43A (AOC #10)	HEs-1,3,5-Trinitrobenzene, 2,4,6-Trinitrotoluene, RDX SVOC-Benzo(a)pyrene Pesticide/PCBs-Chlordane, PCBs (total)	SVOC-Chlordane Pesticides/PCBs-Dieldrin, PCBs (Total)	Extent of contamination has been defined. No additional sampling is recommended.
Pesticide Building 12-51 (AOC #10)	SVOCs-Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene Pesticide/PCBs-Chlordane, PCBs (total)	Pesticide/PCBs-Aldrin, Dieldrin, PCBs (total)	Additional site characterization is recommended to define the extent of pesticide contamination. Leachability studies of soils at this site, using EPA Method 1312 for Synthetic Precipitation Leaching Procedure may support NFA.
DDT Release at Building 12-35 (AOC #15)	SVOCs-Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(a)anthracene Pesticide/PCBs-Chlordane, Heptachlor epoxide, PCBs (total)	Pesticide/PCBs-Aldrin, Dieldrin, PCBs (Total)	Additional characterization is needed to define the extent of pesticide contamination, and lateral extent of PCB contamination.
Evaporation Pits/Leaching Beds Evaporation Pits near Building 11-20	Metals-Chromium (Total), Mercury, Lead*	HE-RDX Metal-Lead*	Extent of contamination has been defined. No further characterization is recommended at the Evaporation Pits Near Building 11-20.
Former Leaching Beds near Building 11-36	HE-RDX Metal-Mercury	None identified.	Extent of contamination has been defined. No additional characterization is recommended for this site.
Building 12-5 Sump	SVOCs-Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(a)anthracene Metals-Chromium (Total), Cadmium, Nickel, Lead*	None identified.	A recommendation has been made to collect additional data to verify that Building 12-5 Sump is the source of contamination and to determine the extent of contamination.

*Lead was eliminated during the toxicity evaluation of the Focused Risk Analysis because there are no published toxicity values in the hierarchy of information sources specified in the Texas Risk Reduction Regulations. However, lead has been treated as a COC at this site because measured concentrations of lead exceed the established background Upper Tolerance Limit values.

Source: USCOE 1995e

considered by the TNRCC for NFA based on the fact that contaminant levels were below remediation goals (Pantex 1996:15.4; Pantex 1996c:55).

AL-PX-14, the USTs at other RFI locations, consists of areas in Zone 12 where five USTs containing diesel fuel and waste oil were removed. Total petroleum hydrocarbons were detected above TNRCC cleanup level of 500 milligrams per kilogram in surface soils at UST-9. All other soil samples collected and analyzed in this unit were within acceptable concentration levels. Phase I fieldwork to remove contaminated soil has been completed and NFA has been recommended for all but UST No. 9. Additional fieldwork will be conducted on this UST, and an in situ treatability demonstration is being conducted (Pantex 1996c:55).

Annual Soil and Sediment Sampling

This section discusses the results of routine and nonroutine (special request) surface soil surveillance at Pantex Plant. The routine soil surveillance program plays an important role in assessing the potential environmental impacts of operations at Pantex Plant. Soil surveillance provides a direct measure of environmental contamination because soil accumulates contaminants that are deposited from the air over time. Thus, soil surveillance allows evaluation of long-term trends. This sampling program is conducted on an annual basis and is separate from the ER programs which deal specifically with SWMU sampling conducted under RCRA and CERCLA as discussed in the previous section.

The following is a summary of the 1994 annual sampling results along with an independent review of these results. The *1995 Environmental Report for Pantex Plant* (Pantex 1996) was released in June 1996. The results from the 1995 annual sampling were reviewed and compared to the 1994 results. A summary of the comparison of sampling results is also included in this section.

Soil quality sampling was conducted in 1994 at 17 offsite and 31 onsite soil surveillance locations at the Burning Ground; Firing Sites 4, 5, and 10; and Playas 1, 2, and 3 (refer to appendix I). One of the offsite sampling areas is at Bushland, approximately 55 kilometers (34 miles) west of Pantex Plant and is considered the control sample. These samples were generally collected from playa bottoms and inter-playa uplands. The soil samples were analyzed for radionuclides, metals, explosives, and VOCs; results are presented in appendix I and summarized below.

Soil samples for radionuclides were collected at Firing Sites 4, 5, and 10; the Burning Ground; Playas 1, 2, and 3; and offsite locations. The samples were analyzed for uranium-234, uranium-238, plutonium-239/240, and tritium.

The average 1994 concentrations of plutonium-239/240 were comparable to Bushland averages, indicating that no plutonium-239/240 contamination from Pantex Plant operations is detectable in area soils. Uranium-238 is the most prevalent radionuclide present in the soils at Pantex Plant. Soils at Firing Site 5 exhibited the highest radionuclide activity, which is attributed to HE test firings with DU components. Firing Sites 4, 5, and 10 have a low uranium-234 to uranium-238 ratio (0.43 or less), indicating DU contamination in these areas.

The Burning Ground, Playas 1 and 3, offsite, and Bushland locations have uranium-234 to uranium-238 ratios near 1.0, indicating that no DU contamination has occurred in these locations. Playa 2 had a uranium-234 to uranium-238 ratio of 0.59, which may indicate DU contamination. Historical averages of uranium-238 and uranium-234 measured at Bushland were 0.74 picocuries per gram and 0.58 picocuries per gram, respectively. The 1994 averages for radionuclide activity at all locations were generally below the historical averages.

Soil samples at the Burning Ground, Playa 3, and Bushland were analyzed for tritium. The average concentrations for tritium were low (0.27 or less) at all locations (Pantex 1996:16.1).

Soil samples for metals were collected at the Burning Ground, Playa 3, and offsite locations. The samples were analyzed for aluminum, boron, cadmium, chromium, cobalt, copper, magnesium, manganese, molybdenum, mercury, nickel, silver, and zinc. All metals were below TNRCC RRS (cleanup levels) and EPA Region III-Risk Based Concentrations (RBCs) with the exception of manganese, which was above RBCs for residential soil. However, manganese concentrations were within the upper limit of background for surface soil (600 milligram/kilogram), with the exception of P3-SS-01 which was slightly higher (640 milligram/kilogram) (DOE 1995b:12-17). All the metals listed above were below industrial standards. RBCs were used for comparison because cleanup levels for manganese do not exist. RBCs are not enforceable standards.

Soil samples for explosives were collected at the Burning Ground, Playa 3, and offsite locations. The samples were analyzed for HMX, RDX, pentaerythritoltetranitrate, and trinitrotoluene. The majority of samples did not have detectable amounts of explosives. Samples that were above detection limits were all below cleanup levels and RBCs (DOE 1995b:12-20, 12-21).

Soil samples collected at Playa 3 and offsite locations were analyzed for VOCs. VOCs were not found at levels above the minimum detection limits (DOE 1995b:12-6). The results of the soil sampling at Pantex Plant and offsite locations do not indicate that deposition of emissions from the Burning Ground activities have substantially impacted the soils.

Average 1995 tritium concentrations were statistically greater than 1994 averages, but were similar to that observed in the control locations. Both uranium 234 and uranium 238 at the Burning Ground were statistically less than the 1994 average concentrations for the same sites. Uranium-234 and uranium-238 at the playa locations were similar to the 1994 ranges of concentrations for the same sites. As in the past, uranium-238 concentrations at the firing sites were higher than concentrations of other radionuclides at Pantex Plant. These higher levels are attributed to the use of DU during test firings of explosives, which ceased in 1986.

The firing sites are scheduled to undergo investigation and remediation under the ER program, and remedial activities have already begun in the area of Firing Site 5. Monitoring data for 1995 are within historic ranges for uranium-238 and uranium-234 at the three firing site areas where samples were collected. Average 1995 concentrations of plutonium-239/240 at all onsite and offsite locations were equivalent to historical and control location averages, indicating no detectable plutonium contamination from Pantex Plant in area soils (Pantex 1996c:12.0).

Results in 1995 for metals at onsite locations were within the expected ranges of concentrations for their soil types, with the exceptions of boron at BG–SS–05, manganese at several Burning Ground locations (BG–SS–01, BG–SS–06, BG–SS–07, BG–SS–08, and BG–SS–09), and zinc at BG–SS-01 (Pantex 1996c:12.0).

Overall soil monitoring results for 1995 were within the observed ranges of concentrations for uncontaminated soil and comparable to historical results and those for the control locations. Boron, manganese, zinc, HMX, and total xylene concentrations in the area of the Burning Ground were higher than those at the control locations and the range of concentrations for native uncontaminated soil.

However, all observed concentrations were less than those considered to indicate environmental risk. Concentrations of these compounds will be carefully monitored to document any trends during 1996 (Pantex 1996c:170).

4.5.2 Impacts of Proposed Action

4.5.2.1 *Impacts of Continued Operations*

Weapons Related Activities

Pantex Plant is located on the northern portion of the Southern High Plains on relatively flat topography. Although erosion is an active process along the northern, eastern, and western margins of the Southern High Plains, it occurs at a rate of only 0.11 meters (0.36 feet) per year. This rate would result in a 1.1-meter (3.6-foot) retreat of the Southern High Plains over 10 years. Weapons-related activities which are mostly confined to Zone 12 and Zone 4 do not result in soil erosion. Some soil erosion occurs as a result of agricultural activities on Pantex Plant Site, but these impacts are considered minimal and similar to the rate experienced in the Southern High Plains in general.

Salt dissolution is another active process in the High Plains area. However, no surficial expression of sinkholes or fractures associated with salt dissolution have been identified in Carson County (Gustavson 1981:10). Potential impacts due to subsidence (resulting in sinkholes and/or surface rupture) are considered negligible, because salt dissolution is a slow process relative to human activities (Gustavson 1980).

There are no capable faults identified beneath Pantex Plant. Holocene faulting, however, has occurred on one portion of the Amarillo Wichita-Uplift structure (the Meers fault in Oklahoma) and may have occurred on another part of the same structure in Potter County. This fault is considered to be capable, as defined in 10 CFR 100 Part A. The Wichita-Ouachita Zone includes the Amarillo Uplift and a surrounding Residual Events Zone that includes Pantex Plant Site. Estimated magnitudes for the maximum earthquake for the Amarillo Uplift and the Residual Events Zone are Richter magnitudes of 6.3 and 5.3, respectively.

The maximum credible earthquake of 6.3 magnitude on the Richter scale occurring within a distance of 16 kilometers (10 miles) of Pantex Plant is considered to be an infrequent event having an annual probability of occurrence on the order of 10^{-3} to 10^{-4} (Pantex 1996:3.5). The damage due to an earthquake to facilities at Pantex Plant would be dependent on the distance from the facilities to the center of the earthquake, the soil structure beneath the facilities, and the construction of each facility. Damage to facilities may or may not cause a release of materials that could result in health impacts. The potential health impacts from accidental releases of contaminants associated with geological hazards and ability of storage facilities to withstand seismic events are discussed in section 4.14, Human Health.

Releases to the soil from continued operations would result from regulated wastewater discharges, deposition from the Burning Ground emissions, and construction activities. As discussed in section 4.5.1, soil sampling at the Burning Ground does not show any contamination above regulatory action cleanup levels. Significant impacts to the sediments and soils would not occur under normal conditions because the Wastewater Treatment Facility has the capacity to treat wastewater generated from weapons related activities (section 4.6) and air emissions have been calculated to be too small to result in a significant impact (section 4.7.2).

Pit Storage Activities

Impacts to pit storage activities due to potential erosion, subsidence, and seismic hazards are the same or less than those addressed for the weapons-related activities. Storage activities do not pose additional impacts to soil and sediment quality under normal conditions because the pits would not come in contact with the soil or sediment. Accident release scenarios are discussed in section 4.14, Human Health.

Environmental Restoration Activities

ER activities pertinent to geology and soils include activities such as soil and sediment sampling, characterization of vertical and horizontal extent of contamination in soils, remediation of soils, and possible removal of contaminated soils. Impacts to the soil as a result of ER activities are predicted to be minimal. Strategies to reduce the amount of waste generated during investigations as well as the amount of waste handled, treated, or disposed of during site cleanups have been implemented. Key points of these strategies include minimizing the amount of waste generated during the RFI by using sonic drilling, hydropunches, geophysical and soil gas survey techniques, and other types of surveys that generate data with minimal waste generation (DOE 1995e:3-7).

Corrective measures will give preference to techniques that do not generate waste or disturb the land's surface topography. Such measures include, for example, in situ bioremediation or capping. Some corrective measures may involve the removal of contaminated soils. In these cases, the waste will be disposed of as described in section 4.13, Waste Management, and excavated areas will be backfilled with clean soil to restore the natural topography. ER activities are expected to be completed by the year 2000. Impacts to soil and sediment at Pantex Plant are expected to be beneficial.

Waste Management Activities

Impacts to soils and sediments at Pantex Plant due to waste management activities are not expected to occur. Waste generated from waste management practices and which come in contact with the sediment and soil are typically nonhazardous. These wastes include treated wastewater from the Wastewater Treatment Facility and construction debris located onsite in a Class 3 landfill. Residuals from the Burning Ground are disposed of in accordance with specifications of the hazardous waste permit. Spills or releases of hazardous wastes and hazardous substances are managed per the Spill Prevention Control and Countermeasures Plan/ RCRA Contingency Plan (TWC 1991a). All of these facilities have the capacity to handle these wastes (sections 4.6, Water Resources, 4.7, Air Quality, and 4.13, Waste Management).

4.5.2.2 *Impacts of New Facility Construction and Upgrades*

Impacts to all new facility construction and upgrades due to potential erosion, subsidence, and seismic hazards would be the same as those addressed in section 4.5.2.1. Temporary soil disturbance for each of the new facilities is summarized in Table 4.5.2.2–1.

During the operations phase of these projects, impacts to the soil and sediment quality would be negligible. Moreover, existing and proposed treatment facilities will have the capacity to handle all discharges associated with the new facilities.

4.5.2.3 *Summary of Impacts*

There are no impacts to geology and soil due to the Proposed Action. Temporary disturbance of soil in Zones 11 and 12 would occur due to construction activities. Potential impacts to the Proposed Action due to erosion and subsidence (resulting in sinkholes or surface rupture) are negligible. The annual probability of the occurrence of a maximum credible earthquake of 6.3 Richter magnitude within a distance of 16 kilometers (10 miles) from Pantex Plant is on the order of 10^{-3} to 10^{-4} (Pantex, 1996:3.5). The potential for a seismic event of this magnitude to result in a release is discussed in section 4.14, Human Health.

4.5.3 Impacts of No Action Alternative

The impacts to geology and soil due to the No Action Alternative are the same or less than those described for the Proposed Action.

4.5.4 Impacts of Pit Storage Relocation Alternative

The Pit Storage Relocation Alternative includes continued operation and maintenance activities at Pantex Plant and transportation and interim storage of pits from Pantex Plant to other DOE and/or Department of Defense facilities. Relocating the pits would not impact the geology and soils at Pantex Plant. There would be no impacts to the soil while pits are stored at Pantex Plant prior to relocation because the pits would not come in contact with the soil under normal conditions. Impacts due to erosion, subsidence, and seismic hazards are the same as those described for the Proposed Action.

4.5.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.5.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

Soil disturbance due to the location of waste management facilities was not addressed in the WM PEIS. However, temporary disturbance of

TABLE 4.5.2.2–1.—*Area of Temporarily Disturbed Soil Due to the Construction of New Facilities*

NEW FACILITY TO BE CONSTRUCTED	LOCATION	AREA OF TEMPORARILY DISTURBED SOIL[1]
Hazardous Waste Treatment and Processing Facility	Adjacent to Zones 11 & 12	5,296 m^2 (57,000 ft^2)
Pit Reuse Facility	Zone 12	987 m^2 (10,628 ft^2)
Gas Analysis Lab	Adjacent to Zone 11	5,073m^2 (54,608 ft^2)
Materials Compatibility Assurance Facility	Adjacent to Zone 11	4,030 m^2 (43,380 ft^2)
Nondestructive Evaluation Facility	Zone 12	7,468 m^2 (80,392 ft^2)
Metrology and Health Physics Calibration and Acceptance Facility	Zone 12	8,948 m^2 (96,312 ft^2)

[1]Area of temporarily disturbed soil is estimated to be twice the floor area of facilities listed above.
Source: PC 1995g:7-10

as much as 21.2 hectares (52.6 acres) could occur during the construction phase. Contamination of the soil and sediments are not expected to occur as a result of construction activities.

The WM PEIS determined that there were no programmatic issues that would affect the selection of alternatives for any waste type at Pantex Plant. Future site-wide or project-specific NEPA reviews would be expected to assess such issues as soil erosion, soil characteristics, etc.

4.5.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur, and there would be no construction. Therefore, impacts to soils are expected to remain the same as those from current operations. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Consequently, no significant land disturbance would occur. Under the relocation alternative, decontamination and decommissioning of the facilities would not be expected to have impacts to the soil.

4.5.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. No apparent direct or indirect effects on the geologic resources are anticipated, because neither facility construction and operational activities nor site infrastructure improvements would restrict access to potential geologic resources. Soil impacts during operation are expected to be minimal.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on choosing the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, MOX fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

No apparent direct or indirect effects on the geologic resources are anticipated, because neither facility construction, operational activities, nor site infrastructure improvements would restrict access to potential geologic resources. The soil erosion potential from direct and indirect impacts associated with construction and operational activities is low for Pantex Plant.

4.5.6 Potential Mitigation Measures

Since there are no impacts to geology and soils, no mitigation measures are required. DOE may choose to implement one or more of the following measures to mitigate the temporary disturbance to soils during construction activities. These measures include erosion control measures such as application of commercial dust suppressants, wind fences for particulates greater than 10 micrometers, sediment traps, diversion of surface water runoff from areas of construction, dikes, silt fences, or covering the disturbed area with rip rap.

4.6 WATER RESOURCES

4.6.1 Affected Environment

This section describes the water resources at and in the vicinity of Pantex Plant. The discussions include identification of prominent surface water features, hydrologic characteristics, floodplains, baseline surface water quality, surface water usage, and surface water rights and permits. Also included are discussions of hydrogeologic characteristics of unsaturated materials and water-bearing units (aquifers); baseline groundwater quality of regional and local aquifers; onsite and offsite groundwater usage; and groundwater rights, agreements, and allocations.

The Region of Influence (ROI) for water resources includes Pantex Plant and the surrounding area that could be impacted by plant operations. The ROI for surface water is the onsite playas and ditch system, and the floodplains delineated by the U.S. Army Corps of Engineers (COE), as discussed in section 4.6.1.1. The ROI for the perched aquifer is based on the extent and migration of contaminants, and is discussed in detail in section 4.6.1.2. Although the ROI for the Ogallala aquifer has not been quantifiably defined, it includes the recharge area and is limited by the extent of drawdown in Pantex Plant wells. The ROI for the Ogallala aquifer is graphically depicted in Figure 4.6.1.2–1.

The discussion of water quality, while including naturally occurring compounds, is mainly concerned with the existence of, and potential for, contamination. Pantex Plant operations have been ongoing since 1951. Over the years, wastes generated from site-related production activities were released, or discharged, at the ground surface to soils, sediment, and surface water. Infiltrating rainwater, stormwater runoff, and other water discharged on the ground surface has moved the contaminants resulting from past discharges downward toward the groundwater. As a result, contaminants that were released at the ground surface over the past 40 years have moved downward and affected the water quality in the uppermost water-bearing zones, known as perched aquifers, where they exist beneath Pantex Plant. DOE is investigating the potential for contaminant migration to the Ogallala aquifer from Pantex Plant in homestead wells that are located southeast of the plant boundary.

Although the low levels of high-explosive(s) (HE) contamination have been detected in a domestic Ogallala well located on private property southeast of Pantex Plant proper, efforts to mitigate further contamination have been completed. The well in question has been properly plugged and sealed under the supervision of TNRCC and a replacement Ogallala well has been drilled and completed in order to prevent further potential cross-contamination of the Ogallala aquifer. Pantex Plant's Groundwater Protection Project addresses these and future steps to assure the integrity of offsite groundwater quality (section 4.6.1.2) (MH 1996a).

Since the late 1980's, wastestreams (liquid and solids) generated in the actual production activities at Pantex Plant have been reworked to greatly reduce the amount of contaminants in current discharges. As a result of enhanced industrial wastewater treatment practices, the potential for surface water contamination from wastewater discharges has been greatly reduced. Pantex Plant has worked very closely with Environmental Protection Agency (EPA) Region 6 and TNRCC to produce wastewater discharge permits (EPA National Pollutant Discharge Elimination System [NPDES] Permit No. TX-0107107 and TNRCC Wastewater Discharge Permit No. 02296) that provide stringent wastewater discharge requirements that are protective of human health and the environment. Pantex Plant's Environmental Protection Department conducts environmental monitoring on a routine basis. The results of environmental monitoring activities are summarized and presented in annual environmental reports that are available to the public.

The potential spread of the contamination in the groundwater from historical site-related activities is influenced by the physical and chemical characteristics of the soil and the underground materials, the presence and flow of groundwater, and the remediation efforts that are planned or underway. This section describes these factors and existing water contamination.

4.6.1.1 *Surface Water*

Hydrology

There are no streams or rivers at or in the vicinity of Pantex Plant; all site water needs are met by groundwater (DOE 1995k:4-292). Six playas are associated with the Pantex Plant Site. Playas 1 through 3 are located on Pantex Plant proper. Playas 4 and 5 are on the property DOE leases from Texas Tech University (TTU). Playa 1 contains water throughout the year. Playas 2 through 5 are dry most of the year. Pantex Lake (the sixth playa) is located approximately 4 kilometers (2.5 miles) northeast of the main site. Pantex Lake does not receive runoff from the plant and is dry most of the year. The only major stream in the area is the Canadian River, which is located approximately 40 kilometers (25 miles) north of Pantex Plant. Since surface runoff at the plant flows into local playa basins, the Canadian River is not affected by activities at Pantex Plant. Most of the surface drainage within the plant is directed to the playas via several major drainage ditches, as shown in Figure 4.6.1.1–1.

Playa 1 receives continuous discharges from the Pantex Plant Wastewater Treatment Facility (WWTF). Only in the ditch running from the WWTF to Playa 1 does flow occur throughout the year, at approximately 950,000 liters (250,000 gallons) per day (Pantex 1996:5.2.2, 5.2.3). All effluents from plant operations are treated and, along with some noncontact industrial discharges, are directed into ditches that drain into Playas 1, 2, and 4 (Pantex 1996c:111). Playa 3 receives stormwater runoff from the Burning Ground. Current Pantex Plant activities do not involve Playa 5 or Pantex Lake. However, wastewater from Pantex Plant was discharged to Pantex Lake from 1942 through 1987. Playa 5 has received wastewater from numerous sources other than Pantex Plant in the past (Pantex 1989:223).

Playas are a significant part of the surface and subsurface hydrologic systems at Pantex Plant. All playas at the site receive stormwater runoff from the Pantex Plant vicinity. The playas have also been identified as possible sources of focused recharge to the groundwater flow system at Pantex Plant. Unlined ditches have been used to convey wastewater and stormwater in the past. This practice continues today; however, the water quality and outfalls are subject to the conditions of surface water discharge permits and permit limits. Unlined ditches transmit treated waters or stormwater from discharge points at Pantex Plant to Playas 1, 2, and 4. These unlined ditches and areas away from the ditches are believed to be additional sources of groundwater recharge (Pantex 1996:4.5.1). Recharge to the area aquifers is not fully understood. Investigations of the ditches and playas, related to the potential for contamination, are being performed through the Pantex Plant environmental restoration (ER) program. Current corrective measures include preventing further migration of contamination by identifying and removing contaminated soils along the ditches to Texas Risk Reduction Standards (RSS) (Stroller 1996:1-1).

Floodplains

Floodplains at Pantex Plant were delineated by the Tulsa Office of COE in accordance with Executive Order 11988 (EO 11988:804; 44 FR 1022:B.7-2). This assessment also fulfills the environmental review requirements under *Compliance with Floodplain/Wetlands Environmental Review Requirements* (10 CFR 1022). Although not formally stated there, the Notice of Intent to prepare this EIS (59 FR 26635) was the Notice of Floodplain/Wetlands Involvement. Locally intense rainfall can cause stormwater runoff and ponding in the playa basins (LLNL 1988:3-1). The COE delineated floodplain boundaries for Playas 1 through 4, Pantex Lake, and Pratt Lake (located north of Pantex Plant), using criteria for 100-year, 500-year, and Standard Project Flood boundaries. Detailed floodplain delineations at Pantex Plant are shown in Figure 4.6.1.1–2. Flood frequencies and their corresponding peak flood elevations as calculated by COE are provided in Table 4.6.1.1–1.

Except for Playa 3, the floodplains are within the drainage boundary for each playa. The 500-year and Standard Project Flood runoff into Playa 3 will overflow out of the drainage basin creating shallow (less than 30 centimeters [1 foot]) flooding of the drainage basins for Playas 1 and 2 (DOE 1995c:2). The elevations of the Burning Ground structures were not included in these floodplain studies, but have been included in Table 4.6.1.1–1 for informational purposes. The only structures that currently exist above land surface at the Burning Ground are the explosive burn trays (USCOE 1995:2-6, 2-7). These structures have a height of 0.6 meters (2 feet) above ground surface and an approximate surface elevation of 1,089 meters (3,572 feet) above mean sea level. The explosive burn trays are outside of the 100- and 500-year delineated floodplains for Playa 3, and are therefore, in compliance with 40 CFR 264.18 (Location Standards for Floodplains).

Surface Water Quality

Surface water monitoring is conducted at Playas 1 through 4 and at Pantex Lake. In addition, offsite surface water quality control samples (used as background samples) were collected from Bushland Playa, located 54 kilometers (34 miles) west of the plant, for comparative purposes (Pantex 1996c:111). Surface water quality sampling was conducted at the locations shown in Figure 4.6.1.1–1 for a full suite of analytical parameters including radionuclides, metals, HE, polychlorinated biphenyls (PCBs), pesticides, herbicides, volatile organics, semivolatile organics, and other miscellaneous constituents and field parameters. Table 4.6.1.1–2 gives the current and historic sources of flow for each monitoring location. Analytical water quality sampling results are presented in volume II, appendix C.

Pantex Plant conducts effluent monitoring at designated sampling locations in accordance with the requirements of the NPDES Permit (EPA 1996) and TNRCC Wastewater Discharge Permit (TNRCC 1996b). Flow from the WWTF is small but continuous. The NPDES Permit specifies a daily average discharge limitation for Outfall 001 of 2.5 million liters (0.65 million gallons) per day. Environmental surveillance monitoring is conducted at the other sampling locations when surface water is present (usually after rainfall). Surface water samples are analyzed for both radiological and non-radiological constituents.

Sampling locations, water quality parameters measured, and sampling frequency may change from one year to the next. Detailed information on surface water quality monitoring is summarized in annual environmental reports prepared for Pantex Plant. Results from 1994

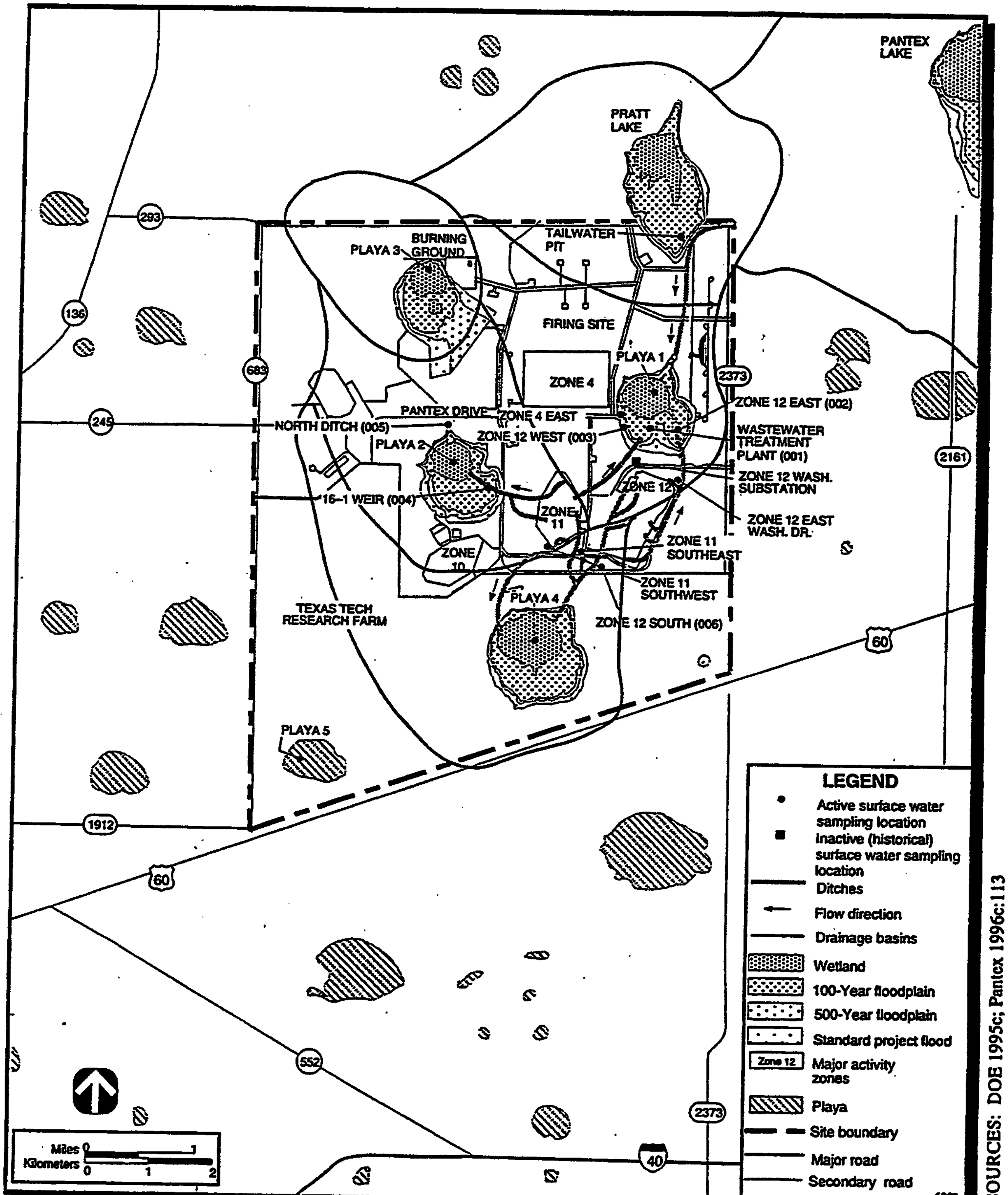


FIGURE 4.6.1.1–1.—*Locations of Primary Outfalls and Floodplains at Pantex Plant Site.*

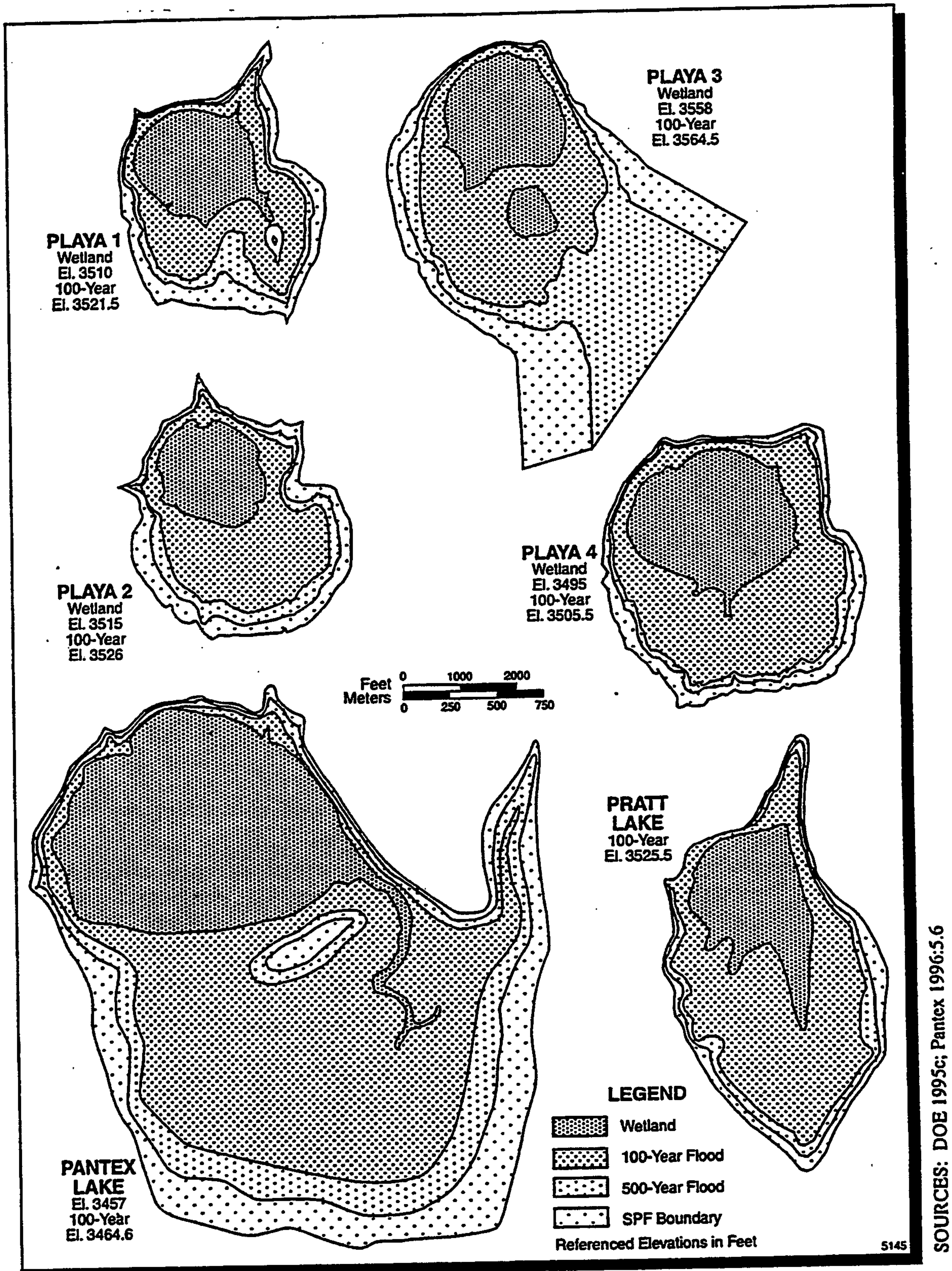


FIGURE 4.6.1.1–2.—*Detailed Floodplain Delineations for Playas 1-4, Pantex Lake, and Pratt Lake.*

TABLE 4.6.1.1–1.—*Flood Frequencies with Corresponding Elevations, Pantex Plant*

PLAYA	FLOODING FREQUENCY (yr)	ELEVATION PEAK meters (ft)	APPROXIMATE ELEVATION OF NEAREST STRUCTURE meters (ft)	HEIGHT OF NEAREST STRUCTURE ABOVE FLOODPLAIN meters (ft)
Playa 1	100 500 SPF	1,073.4 (3,521.5) 1,073.8 (3,523.1) 1,074.7 (3,525.9)	1,077.5 (3,535)	4.3 (14) 3.7 (12) 2.7 (9)
Playa 2	100 500 SPF	1,074.7 (3,526.0) 1,075.2 (3,527.4) 1,076.0 (3,530.1)	1,079.0 (3,540)	4.3 (14) 4.0 (13) 3.0 (10)
Playa 3	100 500 SPF	1,086.5 (3,564.5) 1,086.7 (3,565.3) 1,087.1 (3,566.6)	1,088.7 (3,572)	0.6 (2)
Playa 4	100 500 SPF	1,068.5 (3,505.5) 1,068.8 (3,506.5) 1,069.4 (3,508.6)	1,077.5 (3,535)	9.1 (30) 8.5 (28) 7.9 (26)
Pratt Lake	100 500 SPF	1,074.6 (3,525.5) 1,074.8 (3,526.3) 1,075.3 (3,528.0)	Offsite	Not Applicable
Pantex Lake	100 500 SPF	1,056.0 (3,464.6) 1,056.4 (3,465.9) 1,057.2 (3,468.6)	No Structures Nearby	Not Applicable

SPF = Standard Project Flood
Sources: DOE 1995c:10; LLNL 1988:3-2; USCOE 1995:2-7

TABLE 4.6.1.1–2.—*Surface Water Monitoring Stations and Sources of Flow at Pantex Plant Site*

SAMPLE ID	MONITORING LOCATION	PERMITTED OUTFALL	CURRENT SOURCE OF FLOW	HISTORICAL SOURCES OF FLOW
		PLAYA 1		
OW-WR-08	Playa 1	N/A	A, B, C	B
INCOMING Lagoon ISCO DAC	WWTF Influent WWTF Lagoon WWTF Time Integrated Sample From Chlorinator WWTF Discharge After Chlorination	Wastewater Treatment Facility Outfall 001	A, B, C	
Z-12-EN Z-12-E 12-17-N 12-17-S 12-19-N 12-19-S 12-43 12-24-NE*	Zone 12 East at Pantex Drive Zone 12 East at Washington Drive Bldg. 12-17 North Flume Bldg. 12-17 South Flume Bldg. 12-19 North Flume Bldg. 12-19 South Flume Bldg. 12-43 (from Bldg. 12-24 North) Ditch Northeast of Bldg. 12-24	Outfall 002 N/A Outfall 102 Outfall 202 Outfall 302 Outfall 402 Outfall 602 N/A	B, C	

TABLE 4.6.1.1–2.—*Surface Water Monitoring Stations and Sources of Flow at Pantex Plant Site*-Continued

SAMPLE ID	MONITORING LOCATION	PERMITTED OUTFALL	CURRENT SOURCE OF FLOW	HISTORICAL SOURCES OF FLOW
Z-12-W 11-20	Zone 12 West at Pantex Drive Bldg. 11-44 Ditch (from 11-20)	Outfall 003 Outfall 103	B, C	
Z-12-SUB*	Zone 12 Washington Drive @ Substation	N/A	C	
Z-4-E	Zone 4 East	N/A	C	
		PLAYA 2		
OW-WR-27	Playa 2	N/A	B, C	
16-1 11-50 NDITCH	16-1 Weir Bldg. 11-50 North Ditch	Outfall 004 Outfall 104 Outfall 005	B, C	
		PLAYA 3		
OW-WR-36	Playa 3	N/A	C	D
		PLAYA 4		
OW-WR-24	Playa 4	N/A	C	
Z-12-S	Zone 12 South	Outfall 006	C	
Z-11-SW 11-36*	Zone 11 Southwest Ditch Bldg. 11-36 Ditch	N/A N/A	C	
Z-11-SE	Zone 11 Southeast	N/A	C	
		PLAYA 5		
N/A	Playa 5 (Not Monitored)	N/A	C	E
		OTHER LOCATIONS		
OW-WR-01	Pantex Lake		C	F
OW-WR-34	Bushland (Background/Control Location)			

Current and Historical Sources of Flow:
A - Treated sanitary wastewater.
B - Processed wastewater (water used during the manufacturing of explosive components and the production of explosives, once-through cooling water, and steam condensate).
C - Stormwater.
D - Overflow from the Burning Ground evaporation pit.
E - Local sanitary and industrial wastestreams from former Air Force Base, Amarillo Airport, and Iowa Beef Processors plant.
F - Discharge from old sewage treatment plant.
N/A-Not applicable
* Inactive sampling location.
Sources: Pantex 1996:5.4; DOE 1996c:112

surface water sampling confirm that Pantex Plant was in compliance with all regulations regarding discharge water quality (DOE 1995b:11-1, 11-35). There were no exceedances of the Quality Levels for Inland Waters as established by 30 TAC 319.29 (Pantex 1996c:150). With the exception of a high water level in Playa 1 in May and June 1995 due to rainfall events, all the requirements of the TNRCC Permit No. 02296 were met (Pantex 1996c:150). The high water level does not present a problem to the environment or human health.

Surface water quality samples from 1994 and 1995 that were tested for radionuclides were less than the DOE derived concentration guides for ingested water established by DOE for radiation protection of the public and the environment (DOE Order 5400.5). DOE is self-regulating with respect to standards and requirements for radiation. The *Atomic Energy Act of 1954*, as amended, authorizes DOE to protect public health and safety and the environment in conducting programs, such as Pantex Plant operations. The DOE derived concentration guide values given in DOE Order 5400.5 are reference values for radiological protection programs at operational DOE facilities. Even though no derived concentration guides exist for gross alpha/beta, results indicate that 1995 radionuclide levels in surface water were similar to historical levels, levels at the control location, and levels in water from the Ogallala aquifer. Thus Pantex Plant operations do not affect the radiological content of discharged waters (Pantex 1996c:111).

As at any 50-year old industrial facility, a variety of constituents are occasionally detected at very low concentrations. The semivolatile organic, 3,3'-dichlorobenzadine, and the HEs PETN, RDX, and TNT were detected in surface water quality samples from Playa 1 in 1993, but were not detected in surface water samples collected at this location in 1994. No PCBs, pesticides, or herbicides were detected in 1995. In Outfall 002, the HE HMX (0.047 mg/L) was detected in September and the HE RDX was detected in June and July 1995 (0.28 mg/L and 0.13 mg/L, respectively). Water quality data from 1990 through 1994 are summarized in volume II, appendix C.

In addition to the routine surface water monitoring described above and presented in volume II, appendix C, additional surface water, surface soil, and subsurface soil samples were collected as part of the Ditches and Playas Flow System 1 *Resource Conservation and Recovery Act* (RCRA) Facility Investigation (RFI) (USCOE 1994a:ES-4). Surface water samples were collected from Playa 1 (Flow System No. 1). The following five suspected contaminants were identified in the COE Preliminary RFI Report: chromium, lead, phosphorous, 4,4'-DDT, and heptachlor. Of these, only two, lead and phosphorous, were determined to be statistically significant. Elevated lead levels may be associated with the historical routine use of leaded gasoline in plant vehicles. Studies are currently being conducted to establish an industrial background for lead. Elevated phosphorous levels are assumed to be associated with onsite agricultural fertilizer usage.

Surface Water Uses

Playas at TTU Research Farm are periodically used for grazing livestock, but not on DOE-owned property. This is discussed in section 4.4.1.1 (Pantex 1996:5.5). In addition to the grazing operations, some areas of Pantex Plant are cultivated. Water for irrigation is used only on the TTU Research Farm, and when used, it is potable water pumped from the Ogallala aquifer. Water for irrigation of TTU land is pumped from five Pantex Plant wells and is sold to TTU under an interagency agreement between TTU and DOE (PC 1996v). There is no irrigation of DOE property.

Surface Water Discharge Permits

Pantex Plant is required to conduct all operations in compliance with the water resource permits listed in Table 4.6.1.1–3. These permits include NPDES Permit No. TX-0107107, TNRCC Wastewater Discharge Permit No. 02296 as amended, NPDES General Stormwater Discharge Permit TXR00G138, and a *Clean Water Act* (33 U.S.C. 1251) Section 404 Dredge and Fill Permit (EPA 1996; TNRCC 1996b; EPA 1995; USCOE 1994). Each of these surface water permits are discussed below.

NPDES Permit No. TX-0107107. In 1990, Pantex Playas 1, 2, 3, 4, and Pantex Lake were determined to be jurisdictional wetlands by COE, and are therefore considered to be waters of the United States subject to protection by the NPDES. EPA Region 6 NPDES Permit No. TX-0107107 authorizes Pantex Plant to discharge to the waters of the United States, under specified effluent limitations and monitoring requirements (EPA 1996). Pantex Plant discharges treated domestic and industrial wastewater into ditches and Playas 1, 2, and 4 under the terms and conditions of this permit. The discharge from Pantex Plant is directed into four playa lakes adjacent to the watershed of McClellan Creek (about 8 kilometers [5 miles] to the east), which flows into the North Fork of the Red River (Waterbody Segment Code No. 0224 of the Red River Basin). There are no known surface water connections that could transport potential contaminants from Pantex Plant into the Canadian River. Due to the flat, level topography of Pantex Plant, streams are not well developed on the landscape and surface waters drain to the playa basins.

The NPDES permit has daily average and daily maximum effluent volume limitations of 2.5 and 3.1 million liters (0.65 and 0.82 million gallons) per day respectively for Final Outfall 001. Effluent is regulated in the NPDES Permit for the following parameters or chemical constituents at one or more outfalls:

- *Metals* - antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, cyanide (total and amenable), lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, titanium, and zinc;
- *HEs* - HMX, RDX, PETN, and TNT; and
- ***Miscellaneous Water Quality Parameters*** - ammonia, biochemical oxygen demand, chemical oxygen demand, oil and grease, pH, total suspended solids, and total dissolved solids.

TABLE 4.6.1.1–3.—*Water Resource Permits Issued to Pantex Plant*

ACTIVITY	PERMIT NUMBER	ISSUING AGENCY	EFFECTIVE DATE	EXPIRATION DATE
NPDES Permit	TX-0107107	EPA	6/1/1996	5/31/2001
Wastewater Discharge Permit	02296 (Amended)	TNRCC	6/14/1996	6/14/2001
NPDES General Stormwater Discharge Permit	TXR00G138	EPA	2/15/1995	10/01/1997
Clean Water Act Section 404 Dredge and Fill Permit	Nationwide Permit for Survey Activities	Corps of Engineers	06/16/1994	6/16/1996

Sources: Pantex 1996c:15; EPA 1996; TNRCC 1996b; EPA 1995

Effluent permit limits vary per outfall. Specific NPDES permit requirements are tabulated in volume II, appendix C (Table C.1.2–2). The requirements and limitations specified in this NPDES permit formed the basis for amendments to TNRCC Permit 02296.

TNRCC Permit No. 02296. Historically, Pantex Plant discharged treated domestic and industrial wastewater into ditches and Playas 1 and 2 under the terms and conditions of TNRCC Wastewater No-Discharge Permit 02296, first issued on May 19, 1980 and renewed and modified on May 3, 1988. The term "No Discharge" referred to the playa lakes at Pantex Plant not being considered waters of the State of Texas by the State at the time of permit issuance. Recently TNRCC Permit 02296 was amended (effective June 14, 1996) and generally reflects the same effluent limitations and requirements as the EPA Region 6 NPDES Permit that became effective on June 1, 1996.

Pantex Plant has worked very closely with EPA Region VI and TNRCC to produce wastewater discharge permits (EPA NPDES Permit No. TX-0107107 and TNRCC Wastewater Discharge Permit No. 02296) that provide stringent wastewater discharge requirements that are protective of human health and the environment. The Pantex Plant wastewater discharge permit limits meet or exceed all current regulations that apply to surface water. Since the State of Texas applies regulations through the concentration limits specified in permits, the decision criteria for surface water compliance is based on the permit limits established in the NPDES Permit and Wastewater Discharge Permit for Pantex Plant. EPA and TNRCC determined which constituents would have reporting requirements and/or permit limits specified in the NPDES and Wastewater Discharge permits based on a review of the most recent surface water quality data available for the main outfalls and internal outfalls. The most recent analytical data at the time of regulatory review were from 1993. TNRCC calculated effluent limitations that were based on the Texas State Surface Water Quality Standards (Title 30 TAC 307). The actual effluent limitations, cited in the permits, are more stringent than those calculated by TNRCC and reported in its Fact Sheet (TNRCC 1995a). As stated in the NPDES Permit, EPA has accepted the statistical calculations provided by Pantex Plant and has established metal limitations on a case-by-case basis through best professional judgment under 402 (a) of the *Clean Water Act* for best available technology economically available.

The Pantex Plant Environmental Protection Department conducts environmental monitoring to assure that all regulated surface water outfall discharges are in compliance with the established permit limits. In addition to the constituents that are regulated in the permits, the Pantex Plant Environmental Protection Department also has conducted analyses for the following constituents that were not specified in the permit: nitrite, strontium, vanadium, 4-methylphenol, 3,3-dichlorobenzidine, acetone, benzoic acid, chloroform, ethylbenzene, methylene chloride, phenol, toluene, xylene, boron, and tin. By monitoring for these additional constituents, Pantex Plant is providing additional assurance that any changes in chemical constituents and their relative concentrations are protective of human health and the environment.

TNRCC Wastewater Discharge Permit No. 02296 (as amended) requires that within one year of the effective date of the permit (June 14, 1996), Pantex Plant must conduct a study (which is currently underway) that determines the feasibility of eliminating or minimizing discharges to playa lakes and open ditches or improving the quality of discharge. According to the permit, the study should, at a minimum, include the following proposals:

- Upgrading existing treatment facilities or constructing new treatment facilities to ensure no groundwater quality effects from discharges to playa lakes and ditches;
- Constructing synthetically-lined impoundments to confine treated effluent and a closed collection system from all process areas to the treatment facilities;
- Establishing an irrigation disposal site and accompanying disposal practices plan to eliminate discharges to the playa lakes;
- Establishing a reuse and conservation program for all process wastewaters, thereby eliminating any industrial effluent discharge to the playa lakes and ditches; and
- Developing a schedule for completion of proposals or any other proposals deemed feasible by the permittee.

NPDES General Stormwater Discharge Permit TXR00G138. EPA issued a Stormwater General Permit Coverage Notice on February 15, 1995. Additionally, Pantex Plant has filed Notices of Intent for Stormwater Discharge Associated with Construction Activities for individual construction projects that disturb 2 hectares (5 acres) or more.

***Clean Water Act* Section 404 Dredge and Fill Permit.** This permit, issued by COE, was required for previous field activities conducted for hydrogeologic site characterization. Since these site characterization efforts have concluded, the permit was allowed to expire without renewal.

4.6.1.2 *Groundwater*

Assessment of the affected environment for groundwater resources consists of the following factors. Hydrogeologic properties are characterized to determine the presence and flow characteristics of aquifers, or water-bearing units, beneath Pantex Plant. The physical and chemical properties of soils and subsurface sediments, coupled with the occurrence and flow characteristics of the aquifers, are controlling factors in determining how potential contaminants discharged at the ground surface can migrate into subsurface materials, the presence or probable absence of contamination in groundwater, and the potential for contaminant movement in or between aquifers.

Characterization of the existing (baseline) water quality is necessary to determine the current extent of contamination and to determine how the actions proposed in this EIS may impact the current water quality conditions. The potential impacts to the existing water quality from the Proposed Action are discussed in section 4.6.2. It is important to note and to distinguish between the existing water quality conditions that have been affected by over 40 years of Pantex Plant operations and the associated waste generation versus the water quality of treated wastewater discharges that are currently entering the system.

Past discharges contained what is regarded under today's standards as unallowable amounts of contamination. Since 1980, wastestreams generated from the production activities have been reworked to greatly reduce the potential for contaminants to be discharged. As discussed in section 4.6.1.1, surface water discharge permits have been in effect since 1980, and all future discharges that occur at Pantex Plant will need to be in compliance with the plant's TNRCC and EPA permits. Current groundwater uses and groundwater rights and permits are discussed to provide a general background of groundwater availability and will be used for assessment of impacts in section 4.6.2.

Hydrology

Groundwater provides the primary water supply for the High Plains area, a major agricultural region of the United States. The High Plains aquifer, commonly called the Ogallala aquifer, underlies the whole of the Texas Panhandle and the South Plains, as well as parts of New Mexico, Oklahoma, Colorado, Kansas, Nebraska, Wyoming, and South Dakota. The Ogallala aquifer is the principle aquifer and major source of water in the vicinity of Pantex Plant and the surrounding ROI. The locations of private and municipal supply wells in the vicinity of Pantex Plant are shown in Figure 4.6.1.2–1. A hydrogeologic feature that occurs locally at and in the vicinity of Pantex Plant are perched aquifers; these features form due to the presence of low-permeability materials that impede and may even prevent the downward migration of infiltrating water (Pantex 1996:4.1). Perched groundwater in Zone 12 is the uppermost water-bearing unit that has been affected by Pantex Plant activities.

Hydrogeologic site characterization activities to establish baseline conditions are underway as a component of the site's ongoing ER program. The Texas Bureau of Economic Geology (Texas A&M University) conducted extensive characterization studies at Pantex Plant from 1990 to 1995. Recent and ongoing hydrogeologic field investigations currently are being conducted by Battelle-Pantex and Argonne National Laboratory. These field investigations include the installation of several new wells and test borings, the collection of additional groundwater level measurements, aquifer testing, and groundwater quality sampling. The locations of existing Pantex Plant wells are shown in Figure 4.6.1.2–2. A north-south trending hydrogeologic cross-section is shown in Figure 4.6.1.2–3.

Pantex Plant is underlain by the following hydrogeologic units (from the ground surface downward), as shown in Figure 4.6.1.2–3:

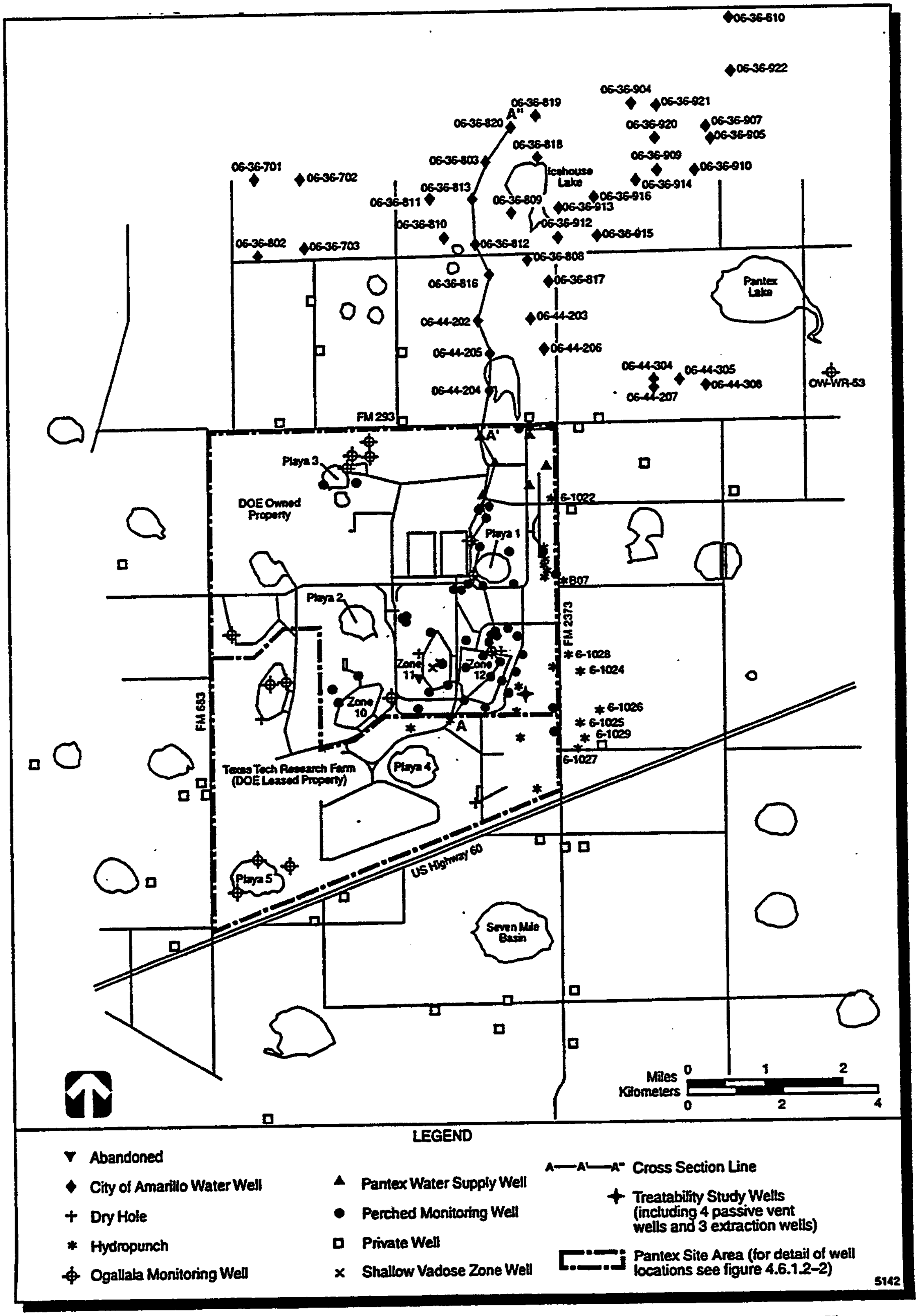
- Unsaturated sands and clays of the Blackwater Draw Formation and upper Ogallala Formation.
- Discontinuous perched aquifers in the upper Ogallala Formation.
- The thick, extensive regional Ogallala aquifer in the lower Ogallala Formation.
- The Dockum Group.

Unsaturated Zone

The unsaturated zone consists of surface soils (generally consisting of Pullman soils on the plains and Randall soils in the playas); Blackwater Draw Formation soils, playa sediments, sands, silts, clays, and gravels; and the discontinuous upper Ogallala Formation Caprock caliche (cemented sediments) that is interbedded with sands, silts, clays, and gravels (Pantex 1996:4.2). Caliche layers, including the Caprock Caliche at the boundary between the Blackwater Draw and the Ogallala Formations, appear to vary locally in composition and thickness (DOE 1994nn:3-21). Shallow saturated or partially saturated zones occur to depths of 14 meters (45 feet) beneath Playa 2 and the major drainage ditches, and approximately 70 meters (230 feet) above the perched aquifer. The infiltration of surface water (e.g., rainfall, plant discharges) occurs within this unsaturated zone. It is possible that in the past this infiltration might have resulted in vertical migration of contaminants (DOE 1994n:5-2).

Perched Aquifer

The perched aquifers are the uppermost saturated subsurface units capable of producing water in the Pantex Plant area. An expedited site characterization was conducted in 1994 and 1995 to characterize the location, shape or geometry, and depth of the perched aquifer; nature of recharge; and direction of groundwater flow. An expedited site characterization for the Pantex Plant Zone 12 groundwater was conducted to develop a working model of the perched aquifer. Specific



SOURCE: Pantex 1996d

FIGURE 4.6.1.2–1.—*Locations of Pantex Plant Area Groundwater Wells.*

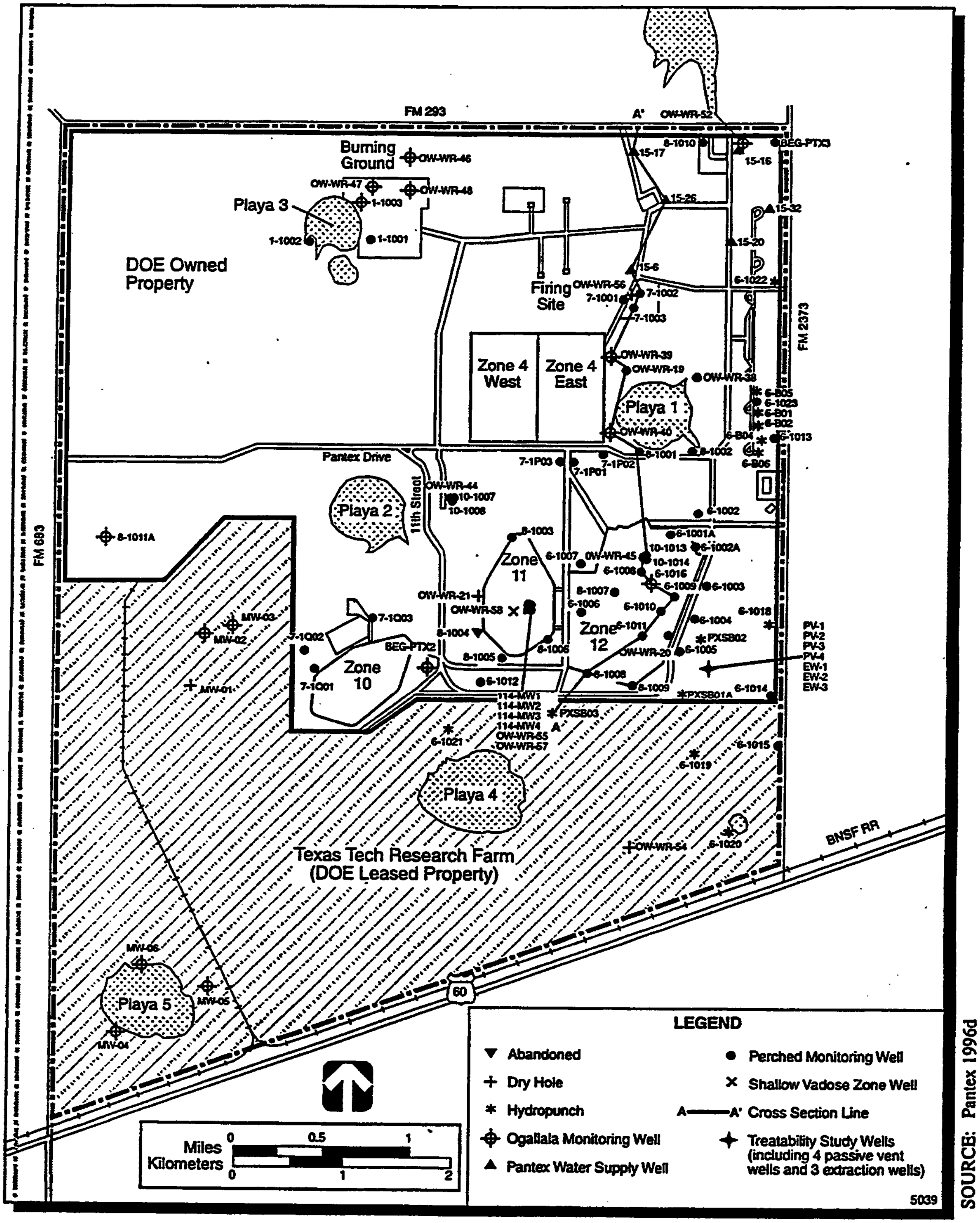
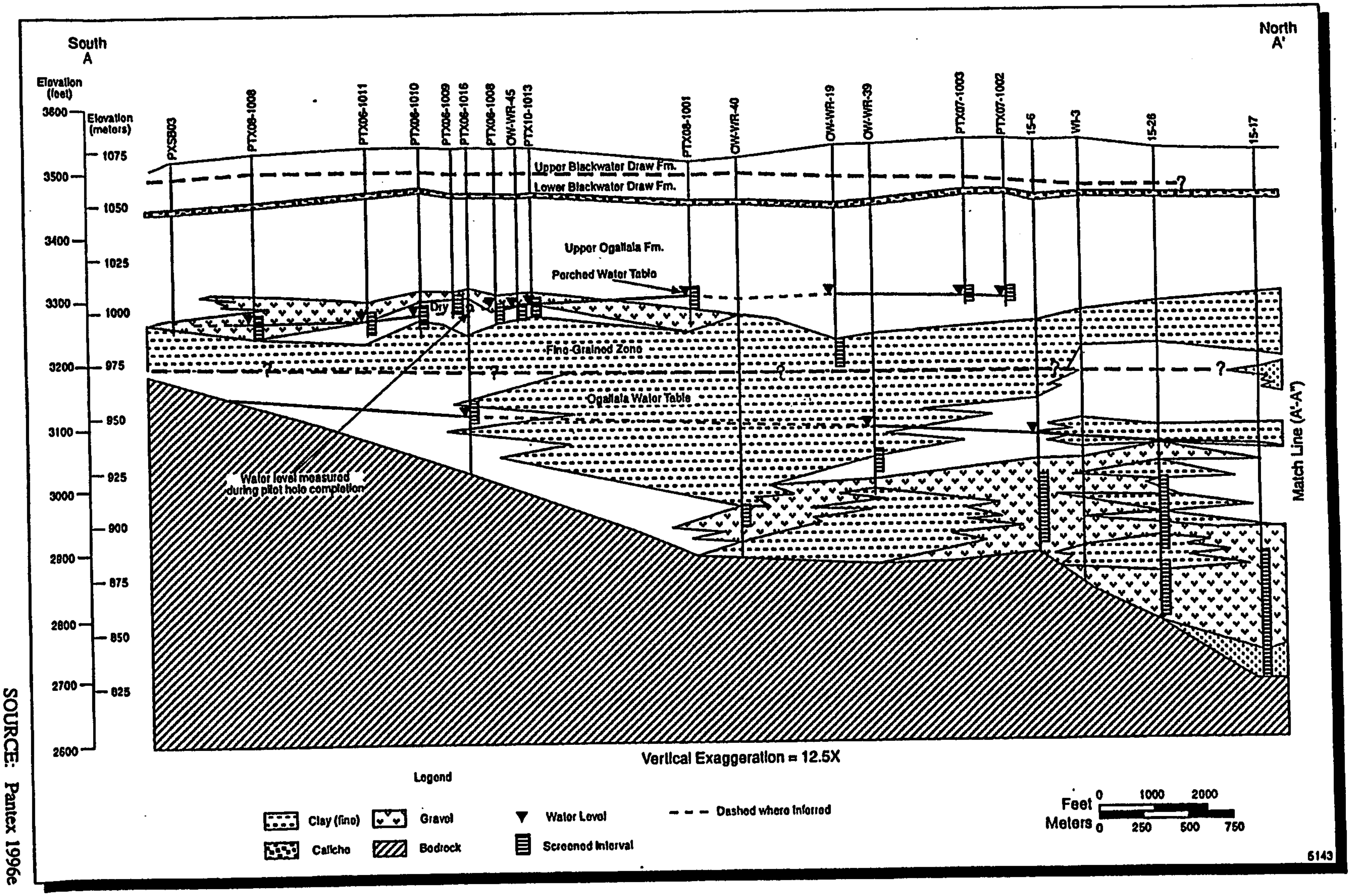
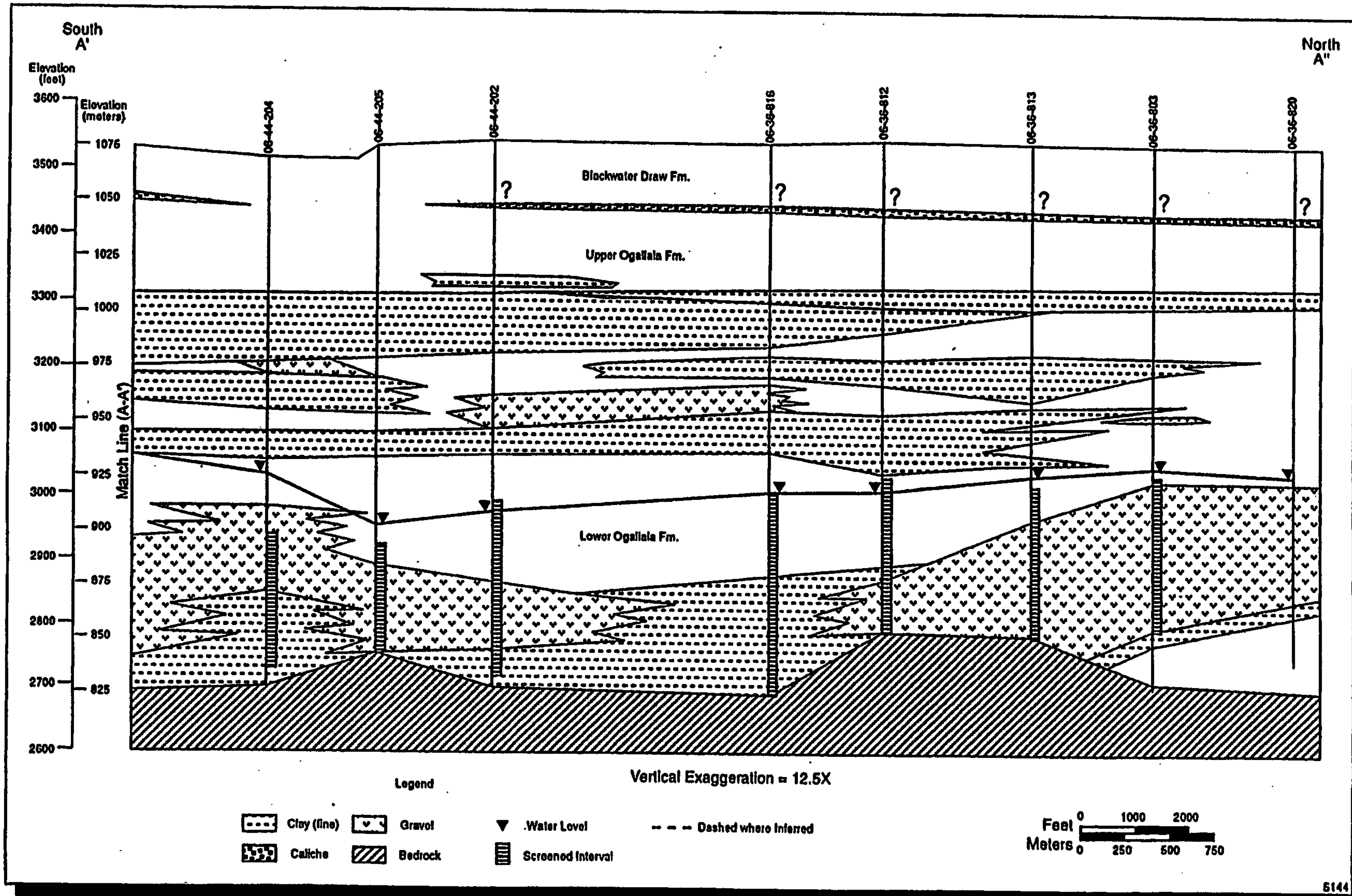


FIGURE 4.6.1.2–2.—*Groundwater Monitoring Locations, Pantex Plant Site.*



SOURCE: Pantex 1996e

FIGURE 4.6.1.2–3.—*South-North Trending Hydrostatigraphic Cross-Section, Pantex Plant Site (A–A').*



SOURCE: Pantex 1996e

FIGURE 4.6.1.2–3.—*South-North Trending Hydrostatigraphic Cross-Section, Pantex Plant Site (A'-A") Extending (Continued).*

objectives included characterizing the extent of the perched aquifer, nature of groundwater recharge, direction of groundwater flow, groundwater contamination, and identification of potential receptors.

The findings of the expedited site characterization are presented in the *Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant* (Argonne 1995a). Data collected during the expedited site characterization were used to predict contaminant movement and to evaluate cleanup options for perched groundwater; the results of this study are reported in *Two-dimensional Groundwater Flow Model and Design Tool for Evaluation of Remedial Options for Perched Groundwater at Pantex Plant* (Battelle 1996a). The primary area of concern in this modeling effort is the perched aquifer underlying Zones 11 and 12 and the area east and southeast of the plant boundary. Additional investigations have been conducted on private property south and southeast of Pantex Plant, under the Pantex Plant Groundwater Protection Project (MH 1996a).

The perched aquifer occurs as localized groundwater mounds that form beneath the playas from focused surface water recharge. Perched groundwater flow is unconfined (i.e., the water table forms the upper boundary of this aquifer). Perched groundwater accumulates in gravel and sand channel deposits at approximate depths of 64 to 88 meters (210 to 290 feet) below the ground surface. These water-bearing buried channel deposits are on top of a zone of fine-grained clays, clayey silts, and sands, as shown in Figure 4.6.1.2–3. The existence of the perched aquifer is dependent on the occurrence of the underlying fine-grained zone, which is of variable thickness, as shown in Figure 4.6.1.2–4. This fine-grained zone has a low vertical hydraulic conductivity that impedes the downward movement of infiltrating groundwater. Vertical hydraulic conductivity measurements for fine-grained sediments ranged from 4.62×10^{-6} to 6.92×10^{-9} centimeters per second (1.31×10^{-2} to 1.96×10^{-5} feet per day) (Texas A&M University 1995a:7).

The perched zone has an irregular surface, and generally occurs 90 meters (300 feet) below land surface (Battelle 1996a:4). Where the fine-grained zone is present, perched groundwater collects in overlying sand and gravel deposits that form subsurface channel features and have a greater permeability than the fine-grained zone deposits. As a result, the buried channel deposits form a conduit for groundwater flow, and groundwater movement follows the course of the buried channel deposits. Variations or heterogeneities in the specific types, grain size distributions, and configurations of subsurface sediments result in preferential subsurface flow.

The changes in the direction and gradient of groundwater flow indicate that the perched aquifer exhibits radial flow from Playa 1. The perched aquifer is thickest beneath Playa 1. The only Pantex Plant playa that contains water throughout the year, Playa 1 is considered to be a source of focused recharge to the perched aquifer. Groundwater in the perched aquifer is considered to flow radially away from Playa 1. As shown in Figure 4.6.1.2–5, the groundwater flow direction in the perched aquifer may be locally to the west, northwest, southwest, and southeast due to radial flow and lithologic changes within the perched aquifer.

The physical boundaries and groundwater flow conditions of the perched aquifer affect the extent and direction of suspected contaminant movement. The groundwater flow direction is primarily to the south and southeast under Zone 12, as shown in Figure 4.6.1.2–5. The perched aquifer is known to extend off the plant site to the east and southeast. Although data suggest that the perched aquifer may extend offsite to the north and to the west, hydraulic continuity is not completely understood due to lack of wells

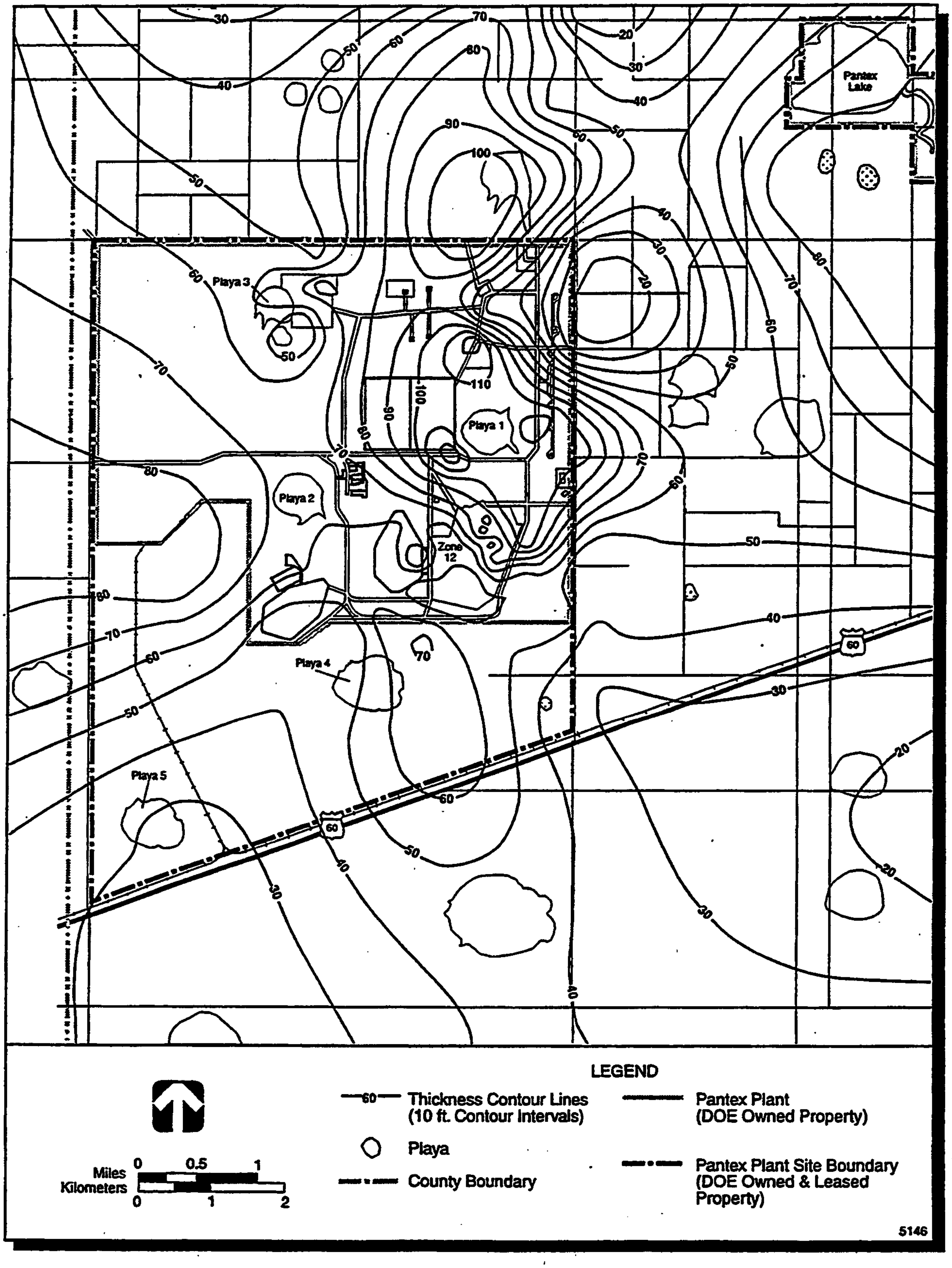


FIGURE 4.6.1.2–4.—*Thickness of the Fine-Grained Zone, Pantex Plant.*

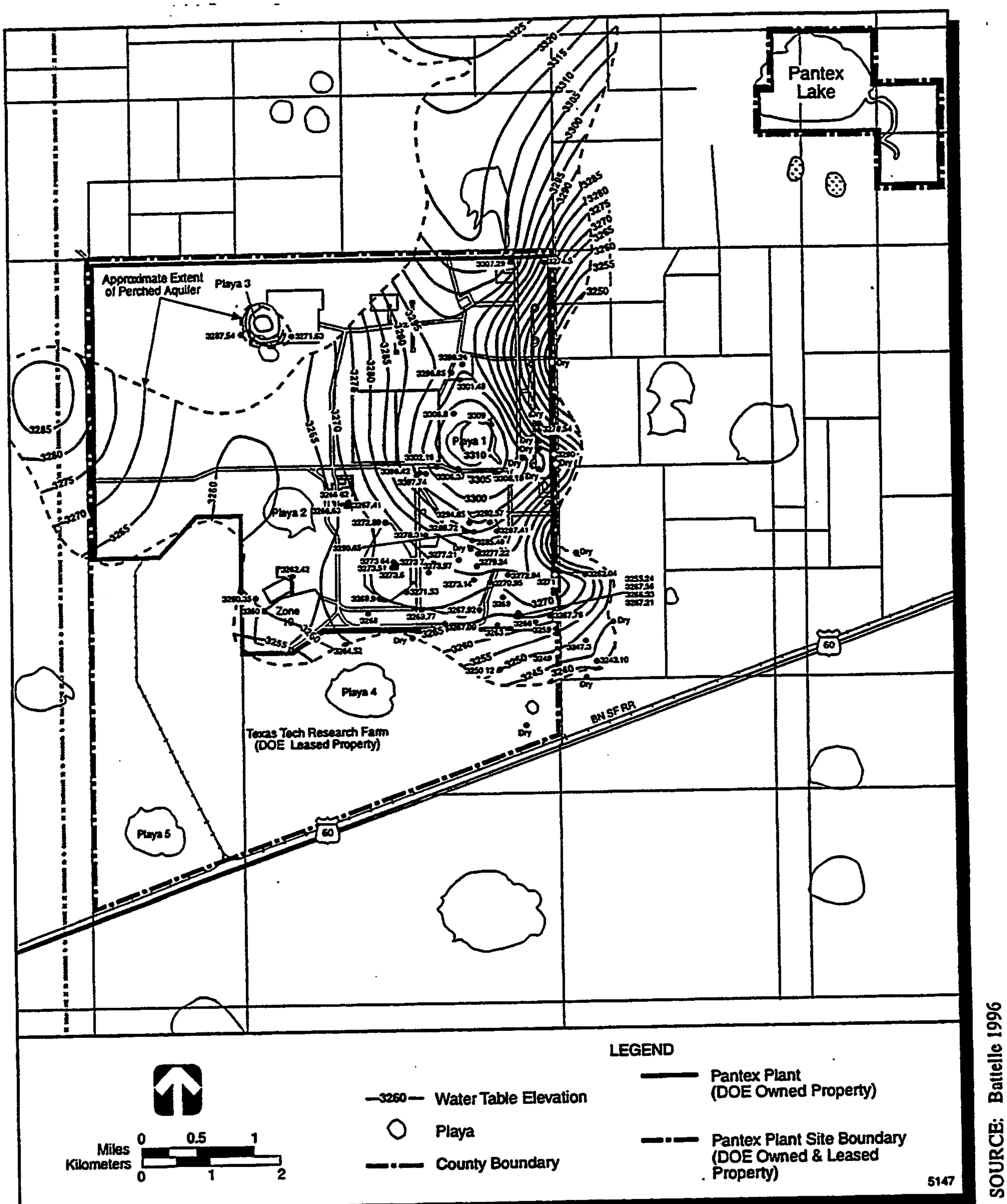


FIGURE 4.6.1.2–5.—*Water Table Contour Map of the Perched Aquifer, Pantex Plant.*

drilled in those areas. Recharge varies laterally between playa, interplaya, and drainage ditch environments.

Although the effectiveness of the fine-grained zone to act as a retardant to vertical groundwater movement is not fully understood, the presence of the fine-grained zone under the perched aquifer probably serves to significantly slow the downward migration of contamination to the Ogallala aquifer while allowing the horizontal spread of potential contamination to be limited to buried channel deposits in the perched aquifer. It is important to note that the perched aquifer is stratigraphically higher (closer to the surface) and not directly hydraulically connected with the underlying Ogallala aquifer. The depth to groundwater ranges from 64 to 88 meters (210 to 290 feet) below land surface in the perched aquifer and from 100 to 140 meters (340 to 460 feet) in the underlying Ogallala aquifer (Figure 4.6.1.2–3).

The rate of groundwater movement, otherwise known as the groundwater velocity, can be calculated from estimates of the following physical hydrogeologic properties: hydraulic conductivity, defined as the estimation of the relative ease of groundwater movement; hydraulic gradient, or slope of the groundwater level; and the effective porosity, or the amount of void space through which groundwater movement can occur. The hydraulic properties have been measured from field and laboratory tests. These properties are used to calculate the rates of groundwater withdrawal and the potential spread of contamination. Aquifer performance tests were used to estimate groundwater velocities.

The results of these aquifer tests are highly variable and are dependent on the testing location, relative heterogeneities in the subsurface sediments from one location to another, duration of the test, variations in testing procedures, and the method of analysis. These variations in aquifer performance testing lead to differences in groundwater velocity estimates. Travel time estimates for groundwater movement in the perched aquifer are provided in Table 4.6.1.2–1. Three estimates are given.

TABLE 4.6.1.2–1.—*Estimated Groundwater Velocities and Travel Times in the Perched Aquifer*

HYDRAULIC PARAMETER	CONSERVATIVE ESTIMATE	REALISTIC ESTIMATE	UPDATED CALCULATION
Hydraulic Conductivity meters/day (feet/day)	24.6 (80.7)	12.3 (40.4)	16.9 (55.6)[a]
Hydraulic Gradient	0.011	0.0071	0.008[b]
Effective Porosity	0.15	0.25	0.34[c]
Linear Velocity meter/day (feet/day)	1.8 (5.9)	0.34 (1.1)	0.06 (0.2) to 0.40 (1.3)
Travel Time (years)	2.1	11	9.5 to 62

[a]Hydraulic conductivity from Neuman analysis of PTX06-1017
[b]Average hydraulic gradient in Zone 12 and east area
[c]Specific yield value from Neuman analysis of PTX06-1017
Sources: Texas A&M University 1995:62; Argonne 1995a:4-19; PC 1996; Pantex 1995K:19, 27

The first two estimates are based on initial onsite aquifer tests conducted in Zones 11 and 12, that assume hypothetical porosity values and a range of hydraulic gradients (Texas A&M University 1995:62, 64, 65). The third estimate is a realistic calculation based on long-duration onsite aquifer testing and field data collected during the Zone 12 Treatability Study in September and October of 1995 (Pantex 1995k).

It should be noted that Texas A&M University's conservative estimate of 1.8 meter (5.9 feet) per day produces a higher velocity than is expected to be generally true. The Texas A&M University report states that a value of 0.34 meter (1.1 feet) per day is more realistic. However, these flow velocity calculations do not include the travel time required for the surface water to percolate through the unsaturated zone or any retarding effects that physical, chemical, or biological processes may have on contaminant transport.

Aquifer performance test data from monitoring wells PTX06–1014 and PTX06–1017, obtained from the Zone 12 Treatability Study, were used to calculate groundwater flow velocities. Perched groundwater in the Zone 12 Treatability Study area moves to the east-southeast, at velocities ranging from 0.07 to 0.49 meter (0.23 to 1.6 foot) per day. Eliminating the outliers yielded a groundwater flow velocity of 0.18 meter (0.6 foot) per day. Similarly, velocities from each Treatability Study well to the pumping well, PTX06–1014 were calculated using the same hydraulic conductivity and water level measurements used in the Treatability Study calculations. Values ranged from 0.009 to 0.07 meter (0.03 to 0.24 foot) per day; eliminating outliers yielded a velocity of approximately 0.06 meter (0.2 foot) per day. From the velocity results, local velocities in the Treatability Study area and the velocities to the Pantex site boundary vary by a magnitude of three. These velocity differences may stem from changes in hydraulic conductivities or, more likely, from lithologic controls and the undulating perched aquifer surface (PC 1996a). Velocities ranging from 0.10 to 0.3 meter (0.32 to 0.96 foot) per day may most accurately characterize perched groundwater movement towards the Pantex Plant boundary in Zone 12 (Argonne 1995a:4-19).

The conclusion drawn from this data is that actual movement of contaminated groundwater offsite, once the contaminants percolate down to the perched aquifer, would require about 10 to 20 years, and may take as long as 50 or more years, to move a contaminant plume offsite using the most current test data described above. Recent investigations have indicated that contaminated groundwater in the perched aquifer has migrated to the eastern plant boundary and has migrated offsite. Because contaminated groundwater does migrate offsite in the perched aquifer, DOE conducted a program, known as the Pantex Plant Groundwater Protection Project, to identify and evaluate abandoned homestead wells and prevent potential pathways of contamination to the Ogallala aquifer. The Groundwater Protection Project, completed in September 1996, involved sealing 5 onsite and 2 offsite homestead wells; drilling 2 offsite wells completed in the perched aquifer and 1 offsite well completed in the Ogallala aquifer; and upgrading existing onsite wells.

If perched groundwater that has exceedances of contaminants of concern (COCs) is used for domestic or agricultural purposes, a potential for human exposure could result (Argonne 1995a:5-37). A groundwater treatability study is currently underway to evaluate perched groundwater treatability and potential reuse of treated water as a Pantex Plant water supply.

Ogallala Aquifer

The Ogallala aquifer underlies the whole of the Texas Panhandle and the South Plains, as well as parts of New Mexico, Oklahoma, Colorado, Kansas, Nebraska, Wyoming, and South Dakota. It is the principal aquifer and the major source of water in the vicinity of Pantex Plant. Groundwater flow directions in the regional Ogallala aquifer in the vicinity of Pantex Plant trend from the southwest to northeast as shown in Figure 4.6.1.2–6. Groundwater movement is unconfined in the Ogallala aquifer. Depth to groundwater in the regional Ogallala aquifer ranges from 104 meters (340 feet) at the southern boundary of Pantex Plant to 140 meters (460 feet) at the northern boundary. The saturated thickness of the Ogallala Formation ranges from 15 meters (50 feet) to more than 120 meters (400 feet) and in some areas is capable of producing yields in excess of 4,000 liters (1,000 gallons) per minute (DOE 1991b:13). A summary of hydraulic parameters measured onsite is presented in volume II, appendix C.

Regional hydraulic conductivity in the Ogallala aquifer ranges from 0.9 to 79 meters (3 to 260 feet) per day. Estimates of annual recharge rates to the Ogallala aquifer vary from 0.02 to 4.1 centimeters (0.01 to 1.6 inches) per year, based on earlier studies that investigated slow regional infiltration of precipitation and recent studies that explored recharge of water through playa lakes and leakage from the Dockum Group aquifer into the Ogallala aquifer (Texas A&M University 1988:16, 25; TWD 1993:6). While these studies support the concept of Dockum recharge to the Ogallala in some areas of the Panhandle, the hydraulic characteristics of the Dockum Group aquifer have not been fully investigated in the vicinity of Pantex Plant. In 1990, the recoverable volume of water in storage and available for use in the Ogallala aquifer was estimated at approximately 5.15×10^{14} liters (1.36×10^{14} gallons) in the High Plains aquifer system (TWD 1993).

Dockum Group

The Dockum Group underlies the Ogallala aquifer and consists of shales, clayey siltstones, and sandstones. Beneath the Dockum Group are Permian salt beds and salt dissolution residues, as discussed in section 4.5, Geology and Soils. Aquifer properties of the Dockum Group near Pantex Plant are highly variable, but generally have low permeability, low average yields of 400 liters (105 gallons) per minute, and poor water quality (high total dissolved solids) relative to the overlying Ogallala aquifer. Near Pantex Plant, however, water quality in the Dockum Group aquifer is relatively good, possibly due to intermixing of waters from the overlying Ogallala aquifer (Pantex 1996:4.3). Several wells near Pantex Plant lie in what is considered the Dockum aquifer and are used for domestic and livestock purposes. However, since the overlying Ogallala aquifer is the primary source of groundwater for the area, pumping in the Ogallala is expected to cause upward groundwater movement from the Dockum Group. Furthermore, leakage from the Dockum Group upward into the Ogallala aquifer has been reported as a potential source of recharge to the Ogallala aquifer (TWD 1993:6).

Groundwater Quality

Assessment of the existing groundwater quality is necessary to establish a baseline, in order to assess the potential for the Proposed Action to impact groundwater resources. It is important to note that this section only describes a water quality "snapshot" of the existing conditions (baseline) of contaminants that were released in the past and have reached the water table. It does not describe the quality of surface water discharge that is currently being released at the ground surface (see section 4.6.1.1, and volume

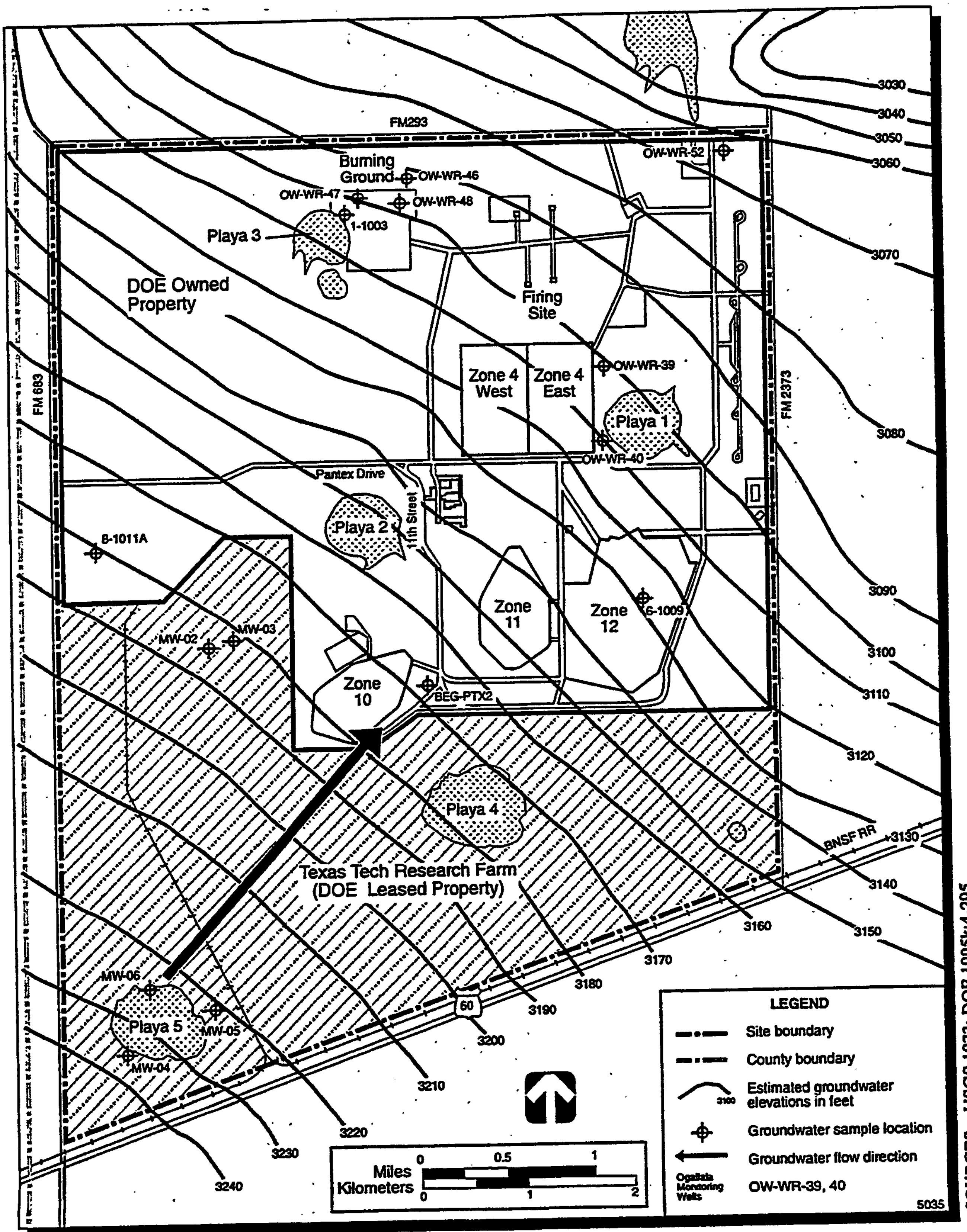


FIGURE 4.6.1.2–6.—*Contour Map of the Ogallala Aquifer, Pantex Plant.*

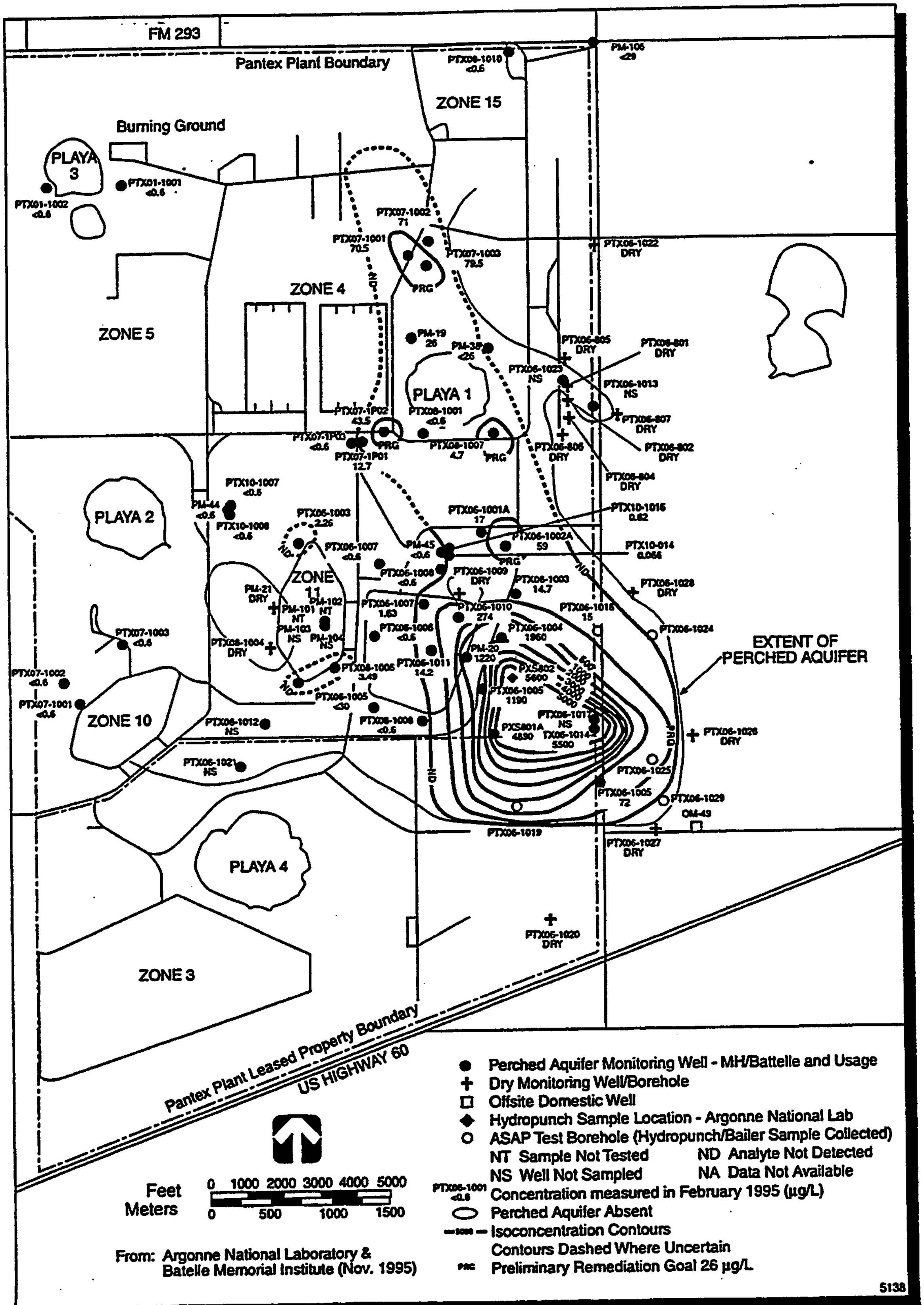
II, appendix C). Potential sources of historical contamination include the solid waste management units (SWMUs) that were identified during an RFI in January 1989. Discussion of these SWMUs is presented in section 4.5.1.3.

Under the existing DOE environmental monitoring program, groundwater monitoring of the perched and Ogallala aquifers has been conducted at Pantex Plant for the past 20 years. Before the initiation of the RFI activities, the scope of perched groundwater quality sampling was limited and consisted of sampling five wells on a monthly basis. However, due to the absence of appropriate quality control methods, analytical data obtained from these wells before 1990 are generally considered unreliable (USCOE 1995a:4). After instituting appropriate quality control procedures in 1990, monitoring wells in the perched and Ogallala aquifers continued to be sampled. After the RFI work began, groundwater monitoring wells installed by COE in conjunction with the RCRA site investigations were compiled into a network of wells that are used to routinely monitor perched groundwater quality for a wide range of constituents (volume II, appendix C). Available groundwater quality data that have been collected from 1990 to 1994 and reported in either the Annual Site Environmental Reports (published annually by DOE) or the COE investigation have been compiled in volume II, appendix C.

Pantex Plant perched and Ogallala monitoring wells are sampled and analyzed for radionuclides, metals, explosives, PCBs, pesticides, herbicides, volatile organics, and other selected parameters, as discussed in volume II, appendix C. Results of five years of groundwater quality data, presented in volume II, appendix C, indicate that the perched aquifer is contaminated with HE, volatile organics, and metals. Based on the number of exceedances and magnitude of contamination, the most significant contaminants are RDX, 1,3,5-trinitrobenzene, trichloroethylene, and chromium. Overall, results for 1995 were similar to those for 1994 (Pantex 1996c:82).

Suspected HE COCs include RDX, 1,3,5-trinitrobenzene, 2,4,6-trinitrotoluene, and HMX. An additional HE, DNT, was detected in 13 out of 211 samples in 1995 (Pantex 1996c:85). In terms of areal extent and magnitude, RDX and 1,3,5-trinitrobenzene are the most significant HE compounds. Problem wells, in terms of the highest concentrations of multiple HE compounds, are perched monitoring wells PTX06–1004 and PTX06–1005 (USCOE 1995a:51). The most extensive HE contaminant plumes (for all suspected HE COCs) have developed just east of Zone 12 beneath the approximate location of Landfill 3. Concentrations of RDX in perched monitoring wells PTX06–1004 and PTX06–1005 range from over 1,000 micrograms per liter to almost 5,000 micrograms per liter, which significantly exceed Pantex Plant RRS of 26 micrograms per liter. Contamination from RDX extends beyond the eastern boundary of Pantex Plant (Figure 4.6.1.2–7).

The migration of RDX is to the southeast from the east side of Zone 12 and appears to occur within the buried channel deposits of the perched aquifer (DOE 1995f:5-20). RDX contamination has been determined to extend offsite. Concentrations of 1,3,5-trinitrobenzene in these perched monitoring wells have ranged from over 300 micrograms per liter to over 2,200 micrograms per liter, which significantly exceed the standard of 5.11 micrograms per liter. Trinitrotoluene and trinitrobenzene were only found in groundwater at the base of the perched aquifer. In contrast, RDX and HMX generally decreased in concentration from the top to the bottom of the aquifer near the source and reversed this trend away from the source.



SOURCE: Argonne 1995a

FIGURE 4.6.1.2–7.—***RDX Concentrations in the Perched Aquifer, Pantex Plant.***

The absence of trinitrotoluene in the upper part of the perched aquifer may indicate a decline in historical usage and disposal of trinitrotoluene over time, and the subsequent release of trinitrotoluene from the unsaturated zone, since discharge of HE-contaminated water ceased in 1989 (DOE 1995f:5-20). Evidence of natural attenuation and degradation of HE compounds, such as trinitrotoluene, has been documented during treatability studies. In order to define the stratification of contaminants within the perched aquifer, due to different densities of the contaminants, it is necessary to sample at discrete intervals and depths.

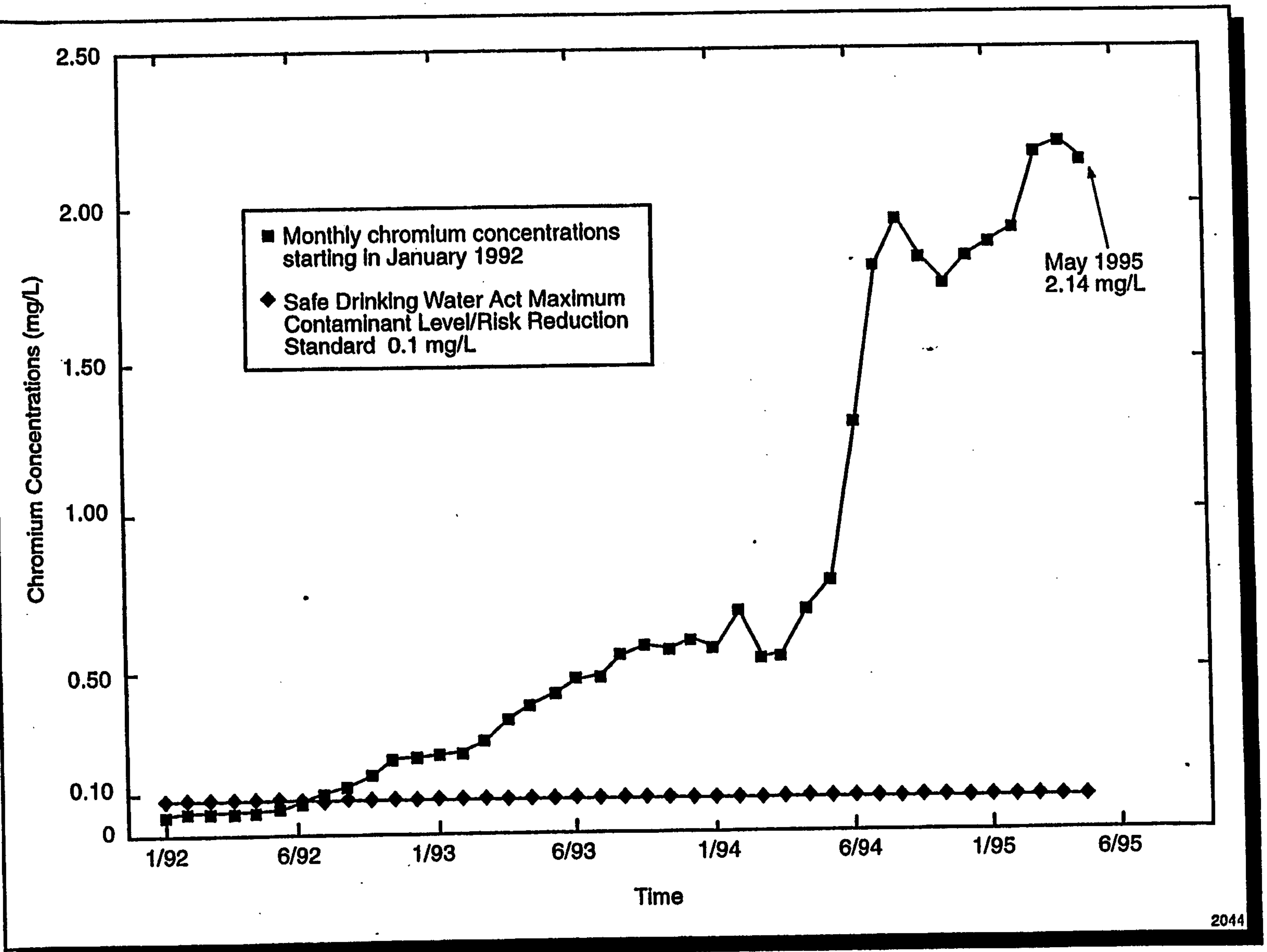
Volatile organic COCs include trichloroethylene, 1,2-dichloroethane, methylene chloride, tetrachloroethene, and benzene. Based on the number of exceedances and magnitude of contamination, trichloroethylene is the most significant volatile organic contaminant. However, much of the trichloroethylene contamination occurred at levels that often barely exceeded the RRS decision criteria of 5 micrograms per liter. Additional information is presented in volume II, appendix C.

Metal COCs include chromium, hexavalent chromium, copper, nickel, iron, lead, and manganese. Chromium and hexavalent chromium are the most widespread and have the highest concentrations of the metals detected in perched groundwater. In several perched aquifer wells, chromium concentrations exceeded the decision criteria standard of 100 micrograms per liter (TNRCC Primary Maximum Contaminant Levels for Drinking Water and Pantex Plant RRS). These exceedances ranged from barely over the standard to over 9,000 micrograms per liter in perched monitoring well PTX06–1010.

An example of how concentrations of chromium have changed over time is shown in a graphical plot of time versus chromium concentration for one well, OW–WR–20, in Figure 4.6.1.2–8. The areal extent of chromium concentrations in the perched aquifer is shown in Figure 4.6.1.2–9. Chromium concentrations for the perched aquifer are shown as isopleths (lines showing levels of equal concentration). One area of chromium contamination that requires further delineation occurs along the eastern plant boundary, in the vicinity of offsite borehole PTX06-1025, where filtered and unfiltered perched aquifer samples were collected and analyzed for chromium. The concentration of chromium measured in the filtered sample was less than the detection limit of 10 micrograms per liter, whereas the concentration of chromium measured in the unfiltered sample was 198 micrograms per liter (Figure 4.6.1.2–9) (MH 1995c:18).

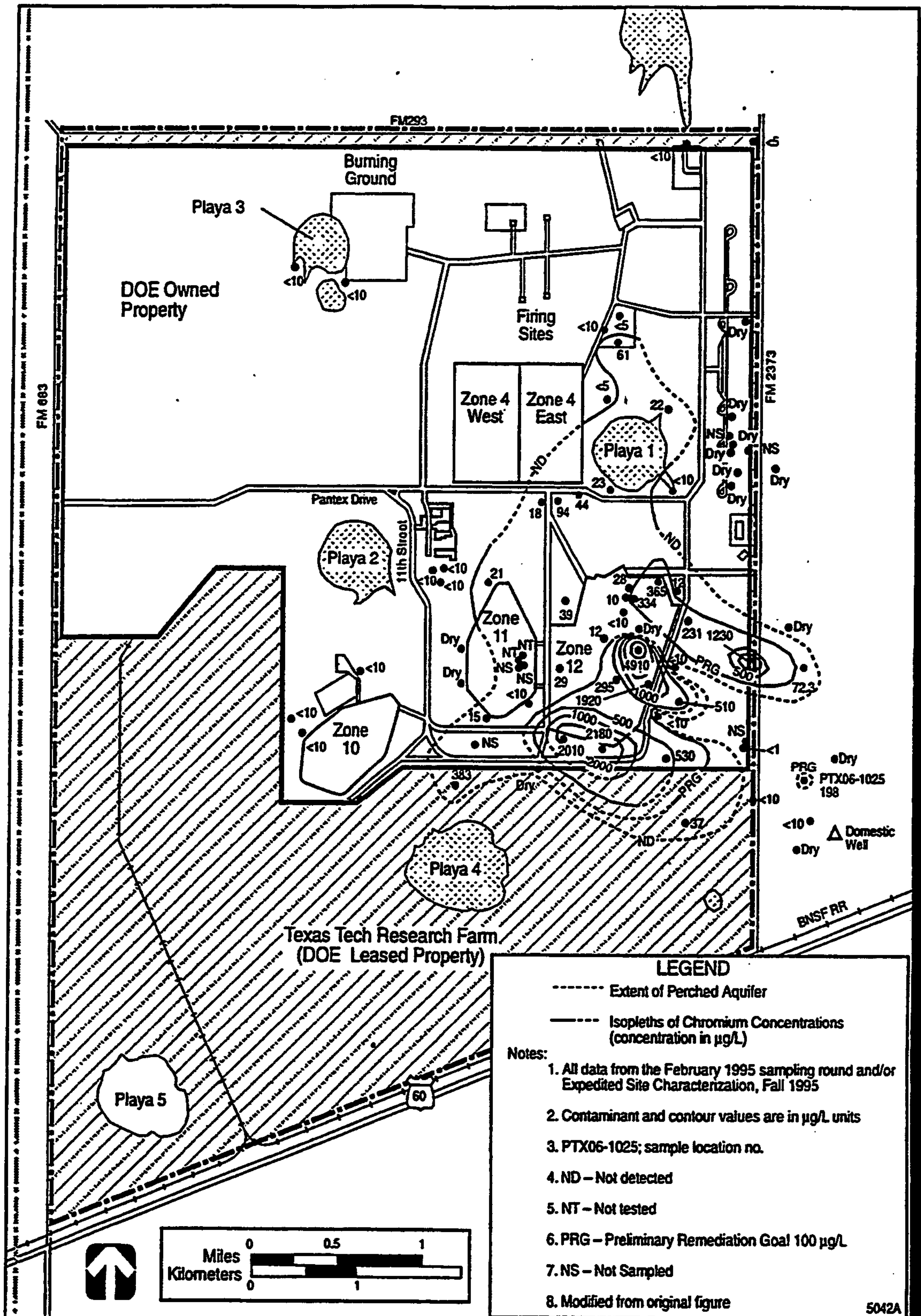
The historical sources of chromium processing were located in the vicinity of where the highest chromium concentrations occur. For example, chromium was processed in Zone 12 at an electroplating facility (tool and die shop) in the form of a chrome plating solution between 1976 and 1986. During this time, electroplating wastewater effluent would be discharged to a below-grade sump that would occasionally overflow. Other historical sources of chromium at Pantex Plant include chromate compounds used in the former cooling tower operations (from 1950 to 1964); residues of chromic acid in old sewage treatment plant sludge beds, the construction debris landfills, waste products at the Burning Ground, past effluent disposal at Playa 1, and in containers and materials dumped in Landfills 1, 5, and 13 (Argonne 1995:3-29 to 3-49). It is highly likely that these earlier releases contributed to the high concentrations of chromium that occur in the perched monitoring wells today.

Investigations regarding the sources, concentrations, and removal of chromium at Pantex Plant are ongoing. These chromium investigations include determining whether elevated chromium levels could have been



SOURCE: PC 1995i

FIGURE 4.6.1.2–8.—*Chromium Concentrations at OW–WR–20 from January 1992 through May 1995.*



SOURCE: Argonne 1995a

FIGURE 4.6.1.2–9.—*Chromium Concentrations in the Perched Aquifer, Pantex Plant.*

caused by the amount of chemicals used for conditioning cooling water during the tower's operational period (1950 to 1964), chromium anion exchange and column studies to determine whether ion exchange resins would be an effective treatment technology, and geochemical modeling to predict the fate and transport of chromium species in groundwater. Additional data for metals that exceed the decision criteria are provided in volume II, appendix C.

Radionuclides are also measured in groundwater quality samples; however, the levels (or activities) of radionuclides are less than the decision criteria specified in the DOE derived concentration guides for ingested water for radiation protection (DOE Order 5400.5). As a result, radionuclides are not considered to be suspected COCs in perched groundwater at Pantex Plant.

Groundwater quality in the perched aquifer has been affected by the activities that have occurred over the past 40 years at Pantex Plant. Since the perched aquifer is the shallowest water-bearing zone in the area, it is the first groundwater unit affected by migration of contaminants that were released from past industrial operations. These operations generated HE materials, organic solvents, and metals in liquid and solid wastes. The direction and rates of contaminant movement in the perched aquifer are controlled by the location of buried channel deposits and the underlying fine-grained zone, direction and rate of groundwater movement, and source areas of historical contamination. Contaminants originating in Zone 12 have reached the perched aquifer through historical vertical infiltration from ditches, landfills, and other past localized source areas in the interplaya area (DOE 1995f:5-16).

Available information on the historical sources of contamination and the waste disposal history has revealed that the inorganic wastes were discarded primarily in acid pits in the southern part of Zone 12. Explosive wastes were disposed of in the ditches in the eastern part of Zone 12 and at other locations cited in Table 4.6.1.2–2 (DOE 1994nn:3-33, 3-38). Argonne National Laboratory has noted that HE contaminant distributions suggest that a significant or dominant proportion of recharge to the perched aquifer in the Zone 12 area has occurred between the playas. This may be a result of vertical infiltration from unlined surface ditches used to carry liquid wastes onsite. HE was found at a depth of 14 meters (45 feet) in unsaturated zone samples collected from a ditch leading from Zone 12 to Playa 1. At this location RDX and HMX were found to a depth of 6 meters (20 feet), and 1,3,5-trinitrobenzene was found between 6 and 14 meters (20 and 45 feet). No trinitrotoluene was detected in the unsaturated zone. Because of its solubility and biodegradable characteristics, it is believed to have been leached or degraded since the practice of discharging effluent that may have contained HE was discontinued (DOE 1995f:5-20).

Downward migration of perched groundwater could potentially affect the groundwater quality of the underlying Ogallala aquifer. The low vertical permeability of the fine-grained zone could potentially be compromised by abandoned homestead wells that could provide contaminant pathways through the fine-grained zone to the Ogallala aquifer. Low levels of HE contamination have been detected by TNRCC at less than one part per billion of RDX in a domestic Ogallala well located on private property southeast of Pantex Plant. As a precautionary measure, DOE has identified and evaluated abandoned homestead wells in order to prevent potential pathways of contamination into the Ogallala aquifer. Efforts to mitigate further possible contamination have been completed. The well in question was properly

TABLE 4.6.1.2–2.—*Source Areas of Suspected Contaminants of Concern to Groundwater Resources at Pantex Plant*

CONTAMINANT	SOURCE	LOCATION
Chromium	Zone 12	12-5W, 12-68, 12-68 sump, 12-59 subsurface leaching system, 12-64 sulfuric acid pit, 12-44E subsurface leaching bed.
	Zone 11	11-36 sump, 11-36 leach bed.
	Former cooling tower	Near 12-17 and 12-19.
	Zone 13	OSTP (discharge to Playa 1).
RDX	Zone 12	12-17, 12-19, 12-21, 12-24, 12-43, 12-73, 12-59 subsurface leaching system.
	Zone 11	11-36 sump, 11-36 leach bed, 11-20, 11-44.
Acids/Solvents	Zone 12	12-4B, 12-5, 12-5D, 12-9, 12-18, 12-21, 12-41, 12-44, 12-59, 12-64.
	Zone 13	OSTP (discharge to Playa 1).
	Zone 11	11-36 leaching bed.
Construction Debris, Petroleum Waste	East Zone 12	Landfill #3.
	South Zone 12	Landfill #4.
	Southwest Zone 12	Landfill #5.
	South Zone 12	Landfill #6.
Diesel	Zone 12	12-5B, 12-17E, 12-84A.
Fuels	Fire Training burn pits	North of 16-18.
Gasoline	Zone 12	12-3, 12-35, 12-67.
	Zone 16	16-1.
HE	Zone 12	12-9, 12-10, 12-17, 12-19, 12-24, 12-43, 12-59, 12-73.
	Zone 13	OSTP (discharge to Playa 1).
	Burning Ground	Burning Ground.
	Zone 11	11-36 sump.
	Zone 11	11-36 leaching bed, two evaporation pits (adjacent to 11-20).
Metals	Zone 12	12-5W, 12-5D, 12-9, 12-18, 12-21, 12-59, 12-68, 12-81, 12-110.
	Former cooling tower	Near 12-17 and 12-19.
	East Zone 12	Landfill #3.
	Zone 13	OSTP (discharge to Playa 1).
PCBs	Zone 12	12-5E, 12-67.
Pesticides	Zone 12	12-35, 12-43, 12-51.
Solvents	Former cooling tower	Near 12-17 and 12-19.
	East Zone 12	Landfill #3.
	Burning Ground	Burning Ground.
	Fire Training burn pits	North of 16-18.
Volatile Organic Compounds	Zone 11	Two evaporation pits (adjacent to 11-20).
Waste Oil	Burning Ground	Burning Ground.
	Zone 16	16-1.

Source: DOE 1994nn:2-16 through 2-32

plugged and sealed under the supervision of TNRCC and a replacement Ogallala well was drilled and completed in order to prevent further potential cross-contamination of the Ogallala aquifer.

Pantex Plant's Groundwater Protection Project was conducted to ensure the integrity of offsite groundwater quality (MH 1996a). The scope of this project included performing three distinct tasks to protect groundwater beneath Pantex Plant from cross contamination between the perched aquifer and the Ogallala aquifer. The activities associated with these tasks were completed in September 1996 at 23 different well locations. These tasks included upgrading existing monitoring wells, sealing offsite homestead wells, and installing new wells offsite.

Monitoring well upgrade activities included installation of barrier posts, installation of protective metal casings, construction or repair of concrete pads, painting exposed steel structures, and resurveying well locations. Well sealing and plugging was necessary for existing vintage Ogallala production wells that could potentially result in cross-contamination between the perched and Ogallala aquifers. Under this task, five wells at Pantex Plant and two private production wells on land adjacent to the plant were sealed. The third task involved installing three monitoring wells, two new perched wells and one new Ogallala well, on private property adjacent to and east of the plant. The Ogallala well has also been designated for use as a domestic production well.

Available routine groundwater quality analytical results from 1990 through 1994 are summarized in volume II, appendix C for groundwater samples collected from the regional Ogallala aquifer. Levels of copper in one Pantex Plant well, iron in four wells, and lead in three wells measured in the Ogallala aquifer have either met or been higher than Pantex Plant RRS and drinking water maximum contaminant levels on several occasions, as shown in volume II, appendix C. However, no exceedances of HE, organic compounds, or radionuclides were measured in Ogallala wells onsite. There was no evidence of contaminated groundwater from the overlying perched zone reaching the Ogallala aquifer in samples collected from Ogallala aquifer monitoring wells (Pantex 1996c:87). Elevated concentrations of copper, lead, iron, and zinc may be related to other factors, such as well construction and piping, rather than the spread of contaminants in groundwater.

Additional Investigations

The rate of potential contaminant transport under and beyond Pantex Plant boundaries is dependent upon the rate of infiltrating surface water recharge; the concentrations of contaminants; the solubility of these contaminants; vertical and horizontal groundwater movement; the mixture of contaminants present; soil and sediment characteristics; and physical, chemical, and biological processes, such as adsorption and biodegradation. Investigations to characterize the potential for contaminant migration are ongoing.

The University Consortium (University of Texas Austin, Texas A&M University, and TTU Water Resources Information Center) is conducting several investigations to support, supplement, and enhance the activities of the Pantex Plant ER Program. A perched aquifer tracer test at the Pantex Plant Zone 12 treatability site is being conducted to evaluate the efficiency of groundwater recirculation for remediation, to determine potential retardation effects on HEs from the injection of treated wastewater, and to predict long-term performance of the remediation system. Soil vapor extraction modeling and a tracer test in unsaturated sediments above the perched aquifer is being conducted to predict the efficiency of soil vapor extraction. Several bioremediation investigations are being conducted, including an evaluation of the effectiveness of selected microorganisms for HE degradation.

Ecological risk assessments are being conducted to determine potential contaminant pathways for biota. Ongoing chromium investigations include determining whether elevated chromium levels could have resulted from chemicals used for conditioning cooling water during the tower's 14-year operational period, determining potential soil and groundwater geochemical reactions through chromium anion exchange and column studies, determining whether ion exchange resins would be an effective treatment technology, and geochemical modeling to predict the fate and transport of chromium species in groundwater, as previously discussed.

Groundwater Uses

The Ogallala aquifer is a primary source of groundwater in the High Plains and is used for irrigation, industrial process water, and the municipal potable water supply at and in the vicinity of Pantex Plant. This aquifer has not been classified by EPA. The City of Amarillo draws its raw water from the Ogallala aquifer and Lake Meredith. During the 1995 water year (from October 1994 through September 1995), approximately 23.6 billion liters (6.2 billion gallons) were pumped from the Carson County wellfield, located just north and northeast of Pantex Plant (Table 4.6.1.2–3). This wellfield consists of 37 wells and 2 standby wells completed in the Ogallala aquifer (Pantex 1996:4.8).

The withdrawal of water from regional pumping in the Ogallala aquifer continues to exceed recharge, causing groundwater levels in the Ogallala aquifer to decline in the Pantex Plant area at a rate of approximately 0.6 to 2 meters (2 to 5 feet) per year (DOE 1995k:4-293). Water levels have declined approximately 30 meters (100 feet) since the Carson County production wells went into use (DOE 1990b:16). From 1980 to 1990, the Carson County Wellfield experienced up to 20 meters (60 feet) of water level decline, which may have contributed to a depression in the groundwater surface northeast of Pantex Plant (TWD 1993:11).

TABLE 4.6.1.2–3.—*1995 Water Withdrawal by Pantex Plant, City of Amarillo, and Irrigation in Carson County*

SOURCE	WITHDRAWAL OR USE Mliters (Mgal)	PERCENT OF TOTAL WITHDRAWAL/USE
Pantex Plant Wells Approximately 25 percent was used by TTU	869 (230)	0.7
City of Amarillo's Carson County Well Fields	23,610 (6,210)	18.8
Carson County Irrigation Use	100,767 (26,622)	80.5
Total Withdrawal	125,264 (33,062)	100

Sources: Pantex 1996c:9,11; PC 1996c

Five Ogallala production wells (15–17, 15–6, 15–20, 15–16, and 15–26) in the northeast corner of Pantex Plant serve the plant's industrial and potable water needs. An additional water supply well (15–32) has been drilled to the east of 15–26 but has not been completed (Pantex 1996:4.8). In 1995, Pantex Plant reported a total production level of 869 million liters (230 million gallons) of water from onsite production wells; 618 million liters (163 million gallons) were used by Pantex Plant for industrial or domestic purposes, and 251 million liters (66 million gallons) were used by TTU for irrigation or domestic consumption (Table 4.6.1.2–3). The 1995 plant consumption was a reduction from the 1994 consumption, which was 707 million liters (186 million gallons) (Pantex 1996c:9, 11).

The Ogallala aquifer is a critical resource for the Texas Panhandle, and its capacity, while quite large, is being drawn down. Typically, Carson County agriculture relies heavily upon irrigation to achieve economic production rates. The current operations of Pantex Plant have not impacted the region's agriculture. Water use at Pantex Plant accounted for only 0.7 percent of the total estimated water use in Carson County for 1995 (Table 4.3.1.2–3). In 1995, Carson County irrigated 25,751 hectares (63,629 acres), using 101 billion liters (26.6 billion gallons) per year. Thus irrigation use accounted for 80.5 percent of the total water consumption in 1995 for Carson County. Production and use of groundwater in the vicinity of Pantex Plant are affected by the growing season, climatic conditions, and demand for irrigation water for crop production (Pantex 1996:4.8).

In addition to water use from the Ogallala aquifer, at least two private wells tap the perched aquifer(s) within 0.8 kilometers (0.5 miles) of Pantex Plant Site. These two private wells located north and west of Pantex Plant are believed to be cross gradient (i.e., groundwater moves in a different direction) from the contaminated groundwater in Zone 12, which flows to the southeast. The approximate locations of all private and municipal supply wells are shown in Figure 4.6.1.2–1. Investigations to determine the potential for contaminant migration are ongoing.

Groundwater Rights and Permits

Texas enacted a groundwater law in 1949 that authorized the formation of local districts having the power to make and enforce regulations governing groundwater withdrawal. By virtue of this law, Texas has given the power of regulation to local groups, thus placing the responsibility for regulation at the lowest possible governmental level capable of performing the desired functions (USGS 1976). The Texas Water Code Section 52.024 grants the Texas Water Commission the authority to designate Underground Water Management Areas in the State of Texas in the form of a rule to protect groundwater resources. Groundwater resources in the area governed by the Panhandle Groundwater Conservation District, including the Pantex Plant area, have not been designated as Class I or a critical area. Pantex Plant is located in Panhandle Groundwater Conservation District No. 3, which has the authority to require permits and limit the quantity of water pumped.

Historically, the Panhandle Groundwater Conservation District does not limit the quantity of water pumped (DOE 1995k:4-297). However, for new wells drilled after July 19, 1995 that produce annually more than 1.3 million liters (350,000 gallons) of water per acre owned, on a section by section basis, landowners will be required to obtain a High Production Permit from the Panhandle Groundwater Conservation District (PGCD 1995:25). TNRCC and the Texas Water Development Board are the two State agencies primarily involved with groundwater fact finding, data gathering, and analysis.

4.6.2 Impacts of Proposed Action

4.6.2.1 *Impacts of the Continued Operations*

Weapons-Related Activities

Surface Water. Operations at Pantex Plant have not substantially impacted delineated flood-prone areas in the past, and continued operations are not expected to cause impacts in the future. The proposed areas of activity are outside of 100-year, 500-year, and Standard Project Flood boundaries. Pantex Plant is in compliance with current wastewater and stormwater discharge permits. Wastewater discharge associated with operations on 2,000, 1,000, or 500 weapons per year is expected to continue. These discharges are not expected to impact surface water quality because, while the projected annual wastewater discharges represent a 36 percent increase over fiscal year (FY) 1994 usage for the 2,000 weapons level, the levels of contaminants in the wastewater are held by current regulations to levels that do not impact the environment. This increase is only 48 percent of the site's remaining wastewater treatment capacity. The 500 weapons level would represent an 8 percent decrease in wastewater production (Table 4.6.2.1–1).

Groundwater. Section 4.6.1.2 provided an assessment of the existing (baseline) hydrogeologic and water quality conditions that exist at Pantex Plant. The existing groundwater contamination that has been detected in the perched aquifer is the result of over 40 years of past activities and waste generation at Pantex Plant. Over this time period, contaminants that were previously released at the ground surface had to percolate through unsaturated soil and sediments to the perched aquifer. Groundwater contamination of the perched aquifer has been detected offsite to the east and southeast. As stated in section 4.6.1.2, if contaminated groundwater from the Zone 12 perched aquifer is used in the future for domestic or agricultural purposes, a potential exposure pathway (i.e., ingestion, bathing, or irrigation) could result (Argonne 1995a:5-37). Pantex Plant's Groundwater Protection Project was implemented to ensure the integrity of offsite water quality by sealing homestead wells, upgrading some monitoring wells, and drilling additional monitoring wells (MH 1996a).

Assessment of the impacts of the continued operations to groundwater resources at the plant involves the evaluation of the potential for additional groundwater contamination from wastewater discharge activities, and the

TABLE 4.6.2.1–1.—*Current and Projected Annual Water Usage and Capacities, Pantex Plant (million liters [million gallons])*[1]

	FY 1994 USAGE	FY 1994 CAPACITY	2,000 WEAPONS LEVEL	1,000 WEAPONS LEVEL	500 WEAPONS LEVEL
Wastewater	477 (126)	830 (219)	647 (171)	522 (138)	439 (116)
Water	836 (221)	1,890 (500)	1011 (267)	791 (209)	689 (182)

[1]Water consumption and capacity are shown in liters to be consistent with the units used in section 4.3, Plant Facilities and Infrastructure. (Liters can be converted to cubic meters by multiplying with 0.001.) Projected annual rates include a 10 percent margin.
FY – fiscal year

Sources: DOE 1995j:10; DOE 1994f:7

evaluation impacts from future groundwater use projections; these areas of concern are considered in this section. The potential for additional impacts to groundwater quality from wastewater discharge activities is minimal due to the contaminant removal efficiency of the industrial and sanitary wastewater treatment process currently being used. Although the projected annual wastewater discharges represent a 36 percent increase over FY 1994 usage, the quantity of wastewater discharge is less than the total wastewater discharge capacity. The quality of the wastewater discharge is such that it will not degrade the quality of the groundwater in either the perched or Ogallala aquifers, because the wastewater discharge is regulated through the EPA Region 6 NPDES Permit and TNRCC Wastewater Discharge Permit. Pantex Plant has worked very closely with EPA Region 6 and the TNRCC to produce wastewater discharge permits (EPA NPDES Permit No. TX-0107107 and TNRCC Wastewater Discharge Permit No. 02296) that provide stringent wastewater discharge requirements that are protective of human health and the environment (section 4.6.1.1).

The hydrology and recharge of the perched aquifer is very complex and the effects upon the vadose zone from continual discharge of water into the existing playas and drainage ditches does not necessarily result in contaminated groundwater being driven into the Ogallala aquifer. ER investigations, conducted at or before the time of publication, have indicated that the extent of offsite contamination detected in the perched groundwater has been limited to within one-half mile southeast of the main Pantex Plant site boundary. The ER Program is currently conducting corrective actions to protect human health and the environment.

Groundwater contamination has occurred in the perched aquifer as a result of past site-related activities. For the past seven years, the Pantex Plant ER Program has assessed inactive sites, conducted investigations to determine the nature and extent of contamination, and implemented remediation strategies to eliminate any present or future threat to human health and the environment. These activities to investigate historical sources of contamination and correct the extent of problems created by past practices will continue in the future through the ER program. Wastewater discharge would be released to the playas and natural drainage channels in accordance with the EPA NPDES and TNRCC Wastewater Discharge Permit requirements. There are no direct discharges to groundwater (DOE 1995k:4-327).

No additional impacts to groundwater quality conditions from routine continued operations are anticipated since all wastewater discharge must comply with TNRCC and EPA wastewater discharge permit limits. Although groundwater in the perched aquifer is contaminated as a result of past site-related activities, the ER program is currently conducting field activities to characterize the nature and extent of contamination. Groundwater monitoring for the perched and Ogallala aquifers will continue, and groundwater treatability options are currently being explored. The impacts of discharging treated wastewater, within permit limits, to the playas and ultimately to the groundwater system are negligible when compared to baseline conditions and in consideration of the ongoing ER activities at Pantex Plant.

Groundwater used for continued operations would be withdrawn from the onsite Pantex Plant production wells, completed in the Ogallala aquifer, at the projected withdrawal rates listed in Table 4.6.2.1–1. The 2,000 weapons level would represent a 20 percent increase over FY 1994 withdrawals. This increase represents 16 percent of the remaining water supply capacity at the plant.

Pit Storage Activities

Under the Proposed Action, the maximum number of pits that could be stored at Pantex Plant would be increased from 12,000 to 20,000. Storage activities do not pose additional impacts to water quality or availability beyond those described for the continued operations above.

Environmental Restoration Activities

Under the Environmental Protection program, routine surface water and groundwater monitoring is conducted at Pantex Plant. Since a potential exists for the migration of contamination from the soils into groundwater resources, impacts to water resources would be expected to decrease as a result of ER activities.

Groundwater characterization efforts are ongoing at Pantex Plant. Current activities include determining the extent of groundwater contamination; determining the sources of contamination, contaminant mobility and transport properties; and technical support and information transfer for site characterization studies from the University Consortium of the University of Texas at Austin, Texas A&M University, and Water Resources Center at TTU (section 4.6.1.2).

DOE completed a Groundwater Protection Project to clean up the groundwater to residential drinking water standards beyond the facility boundary. The Groundwater Protection Project included efforts to identify, evaluate, and seal homestead wells which could provide contaminant pathways of contamination to the Ogallala aquifer, as previously discussed. Additional remediation activities that are currently underway at Pantex Plant include contaminated soil removal within the vicinity of onsite ditches and playas and a groundwater treatability study to determine the most effective method(s) to clean up perched groundwater (Stroller 1996:1-1).

The groundwater treatability system, located in Zone 12, combines a dual groundwater pump-and-treat system with a soil vapor extraction system to remediate and abate the migration of onsite HE, volatile organic compounds, and metal contaminants beneath Zone 12 and its immediate vicinity. This system is designed to treat contaminants in both the unsaturated soils and groundwater of the perched aquifer (MH 1995a:1). Granulated activated carbon adsorption would be expected to remove most of the COCs. A resin-based treatment to remove chromium is also included in the process. Groundwater treatment involves pumping contaminated groundwater out of the perched aquifer, treating the contaminated groundwater in a carbon-filtration system to remove HE contamination, and then draining it back into the perched aquifer. The only direct discharge is the draining of treated groundwater to the perched aquifer. This ER treatability study has been approved by the TNRCC.

When the treated groundwater is reintroduced into the perched aquifer, it flushes and displaces the existing contaminated groundwater, moving it toward the treatment system wells for cleanup. Groundwater moves through void spaces in between unconsolidated sand, silts, and gravels, and is treated at an approximate rate of 160,000 liters (42,000 gallons) per day. The treatability system began operating just eight months after the initial boundary contamination was discovered. The treated water now meets drinking water standards, as confirmed by co-sampling conducted by the TNRCC (Pantex 1996c:55). Evidence of natural attenuation and degradation of HE compounds including trinitrotoluene have been documented during the treatability studies (PC 1996n).

4.6.2.2 *Impacts of New Facility Construction and Upgrades*

Six new facilities have been proposed for Pantex Plant. The projected construction phase for these facilities spans from 1996–2001. All of these facilities would be located in Zones 11 and 12. Since no 100-year, 500-year, or Standard Project Flood boundaries have been delineated in Zones 11 and 12, there would be no impacts to floodplains. Surface water use is not an issue because all water required for construction or operation would be supplied from groundwater. The treated effluent from the process wastewater treatment would be discharged to the playas and monitored to comply with EPA NPDES Permit and TNRCC Wastewater Discharge Permit requirements. Environmental impacts to water resources from the proposed facility construction and upgrades for each of the six facilities are summarized in Table 4.6.2.2–1.

All water required for construction or operation would be supplied from groundwater withdrawn from Pantex Plant wells. Projected water usage is compared to current water usage on a site-wide and facility-specific basis. The upper bounding conditions (i.e., 2,000 weapons level) would result in a projected annual groundwater withdrawal of 1,011 million liters (267 million gallons), or an increase of 64 percent over FY 1995 industrial and domestic water use. Under the 2,000 weapons scenario, Pantex Plant groundwater withdrawals would only account for 0.8 percent of the total estimated annual groundwater withdrawals in Carson County.

Hazardous Waste Treatment Plant Facility

Domestic wastewater from the Wastewater Treatment Facility (HWTPF) would be collected in the Pantex Plant sanitary sewer system and treated in the WWTF prior to discharge into Playa 1. A treatment facility, such as the HWTPF, that is constructed and maintained properly would prevent further

TABLE 4.6.2.2–1.—*Current and Projected Annual Water Usage for Facility Upgrades, Pantex Plant (million liters [million gallons])*

USAGE	HWTPF	PIT REUSE	GAS ANALYSIS LABORATORY	MCAF	NDEF	METROLOGY HPCAF
WASTEWATER GENERATED						
Current	0.685 (0.181)	0 (0)	0.912 (0.241)	7.62 (2.013)	8.02 (2.1)	9.30 (2.45)
Projected	3.80 (1.00)	0.32 (0.084)	0.912 (0.241)	7.62 (2.013)	8.02 (2.1)	9.30 (2.45)
Change[1]	+3.12 (+0.819)	+0.32 (+0.084)	0	0	0	0
WATER USAGE						
Current	0.685 (0.181)	0 (0)	0.912 (0.241)	8.64 (2.28)	9.12 (2.41)	10.5 (2.78)
Projected	4.31 (1.14)	0.32 (0.084)	0.912 (0.241)	8.64 (2.28)	9.12 (2.41)	10.5 (2.78)
Change[1]	+3.63 (+0.959)	+0.32 (+0.084)	0	0	0	0

[1]Change designates the difference between current and projected usage. "+" denotes a projected increase in usage.
MCAF-Materials Compatibility Assurance Facility
NDEF-Nondestructive Evaluation Facility
HPCAF-Health Physics Calibration and Acceptance Facility

Sources: DOE 1995j:10; PC 1995g

injury to natural resources. Industrial wastewater generated by operations associated with waste treatment would be disposed of in accordance with applicable Federal, State, and local environmental laws and regulations.

Particular industrial disposal options are discussed in section 4.13.1. An additional 0.227 million liters (0.06 million gallons) of domestic wastewater and 2.9 million liters (0.77 million gallons) of industrial wastewater would be generated each year, based on the difference between current and projected generation for the HWTPF (Table 4.6.2.2–1). However, this additional output is less than a 0.7-percent increase of the 477 million liters (126 million gallons) total site-wide FY 1994 volume of treated wastewater, less than 0.5 percent of the 649 million liters (171 million gallons) projected wastewater volume for the 2,000 weapon level, and less than 1.8 percent of the total remaining wastewater system capacity of 181 million liters (48 million gallons). The increased usage of 3.6 million liters (0.96 million gallons) per year of water that would be required for the HWTPF would be less than 0.4 percent of the reported groundwater usage in FY 1994 (836 million liters [221 million gallons]) and just over 0.3 percent of the remaining total system capacity.

Pit Reuse Facility

Discharge of domestic water from the Pit Reuse Facility would be collected in the Pantex Plant sanitary sewer system and treated in the WWTF. The projected annual demands are anticipated to be 0.32 million liters (0.084 million gallons) per year for water and wastewater (Table 4.6.2.2–1). Pit reuse is not a current activity at Pantex Plant so there are no existing water consumption and wastewater generation figures. Treated wastewater generated from the Pit Reuse Facility would be less than a 0.07 percent increase over the plant's FY 1994 wastewater discharges. The additional water demands of the pit reuse facility represent less than a 0.04 percent increase over the total amount of water used in FY 1994 at Pantex Plant. Therefore no increase in impacts is expected.

Gas Analysis Laboratory

Water consumption and wastewater generation are expected to remain the same at 0.912 million liters (0.241 million gallons) per year (Table 4.6.2.2–1). Thus there would be no change in impacts to water resources from this facility.

Materials Compatibility Assurance Facility

Proposed water consumption and wastewater generation are expected to remain the same as current conditions of 8,640 million liters (2,280 million gallons) of water usage and 7.62 million liters (2.013 million gallons) of wastewater generated (Table 4.6.2.2–1). No change in impacts is anticipated.

Nondestructive Evaluation Facility

The total annual volume of water consumed and treated wastewater generated is not expected to change from the current conditions of 9.1 million liters (2.4 million gallons) per year of water usage and 8.02 million liters (2.1 million gallons) of wastewater generated (Table 4.6.2.2–1). As a result, no change in impacts to water resources would be expected.

Metrology and Health Physics Calibration and Acceptance Facility

Wastewater generated at this new facility is expected to remain at 9.30 million liters (2.45 million gallons) per year. No additional inputs for wastewater generation are expected as a result of construction. Water usage is expected to remain at 10.5 million liters (2.78 million gallons) per year.

4.6.2.3 *Summary of Impacts*

This is the Floodplain Statement of Findings as required by 10 CFR 1022. Continued operations and increasing pit storage would not affect the delineated floodplains.

An analysis of wastewater discharged to the playas indicates that the volume of the release would be within the TNRCC permitted limit of 2.5 million liters (0.65 million gallons) per day (PC 1995d). Impacts to groundwater quality from normal operations during the period covered by this EIS are expected to be negligible because only wastewater that complies with EPA and TNRCC permit limits would be released to ditches and playas.

Site-wide groundwater use at Pantex Plant is projected as approximately 1,011 million liters (267 million gallons) per year for the 2,000 weapons scenario. The plant pumped 618 million liters (163 million gallons) for industrial or domestic uses in 1995. The 2,000 weapons scenario would result in an increase of approximately 393 million liters (104 million gallons) per year above the 1995 plant water use. Therefore, under the 2,000 weapons scenario, total Plant water use would increase by approximately 64 percent. In 1995, Pantex Plant's actual water usage was approximately 33 percent of the plant's total groundwater production capacity. Under the 2,000 weapons scenario, the projected water usage is 53 percent of the plant's total capacity of 1,890 million liters (500 million gallons), representing an increase of 20 percent of the total production capacity for industrial and domestic water uses. Pantex Plant production wells withdraw a relatively small amount of groundwater from the Ogallala aquifer, currently only about 0.7 percent of the total amount of groundwater used in Carson County (section 4.6.1.2). Typically, Carson County agriculture relies heavily upon irrigation to achieve economic production rates. Irrigation use currently accounts for 80.5 percent of the total water consumption in 1995 for Carson County.

4.6.3 Impacts of No Action Alternative

Under the No Action Alternative, DOE would continue current and planned activities at Pantex Plant as discussed in section 3.1.2. The potential impacts that could result from continued operations, ER, and waste management are similar to or less than those identified for the Proposed Action. No additional impacts to water resources are anticipated beyond the effects of existing and planned activities.

4.6.4 Impacts of Pit Storage Relocation Alternative

The Pit Storage Relocation Alternative involves continued operation and maintenance activities at Pantex Plant and transportation and interim storage of pits from Pantex Plant to other DOE or Department of Defense sites. The impacts to water resources from activities other than storage that would continue at Pantex Plant are the same as those discussed for the Proposed Action. While the pits are stored at Pantex Plant, they are placed in secured buildings on concrete slabs that do not permit contact with soils, surface water, or groundwater. The transportation of pits that would be relocated (20,000 or 8,000) would not affect the water resources at Pantex Plant.

4.6.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No

Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.6.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

If the facilities described in the WM PEIS were located at Pantex Plant, no groundwater quality impacts are expected, i.e., there would be no exceedances of water quality standards or permitted levels. Section 4.3.5.1 discusses water use and wastewater generation impacts.

4.6.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, impacts to water resources from operations would be expected to be less than current impacts. Water requirements would be met without increased aquifer drawdowns. Under the downsizing alternative, the groundwater withdrawals would reduce by 16 percent compared to those under the No Action Alternative. Under the relocation alternative, all water use for assembly and disassembly operations and HE fabrication would cease.

4.6.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. Water requirements for construction and operation would require approximately 107 million liters (28 million gallons) per year and 130 million liters (34 million gallons) per year, respectively. For the Proposed Action, and if the Waste Management program is located at Pantex Plant, a total of 96,200 liters (25,416 gallons) per year.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, MOX fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

Construction for the Disposition Alternative would require 110.2 million liters (29.1 million gallons) per year of wastewater discharge and 130.2 million liters (34.4 million gallons) per year of groundwater use.

Operation for the Disposition Alternative would require 484.7 million liters (128 million gallons) per year of wastewater discharge and 572.9 million liters (151.8 million gallons) per year of groundwater use.

4.6.6 Potential Mitigation Measures

The Proposed Action is not expected to have a significant impact on water resources at Pantex Plant. However, new best management practices and institutional controls, coupled with the ongoing ER activities, could further mitigate the occurrence of any impacts to water resources. ER activities will continue and are an integral part of each alternative. In addition, DOE could choose any of the new measures being considered to reduce effects from stormwater runoff during construction, including silt fences, dikes, and sediment traps to divert runoff away from disturbed areas. Soils and materials such as rip rap or mulch could be used for stabilization in order to prevent direct exposure to soils and runoff. Surface recharge from wetted areas of ditches in playas is naturally mitigated, to some extent, by high evaporation rates (TTU 1994).

Groundwater conservation measures that could be considered include decreasing TTU Research Farm irrigation demands through dry land farming, limiting groundwater production hours, installing dripless faucets, and process water reuse. If there were a Pantex Plant mission that required large quantities of treated wastewater, the City of Amarillo would consider developing reclaimed wastewater from the City of Amarillo Hollywood Road Wastewater Treatment Plant. The use of reclaimed wastewater could curtail the annual withdrawal rate of the Ogallala aquifer (TIE 1996).

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4.7 AIR QUALITY

4.7.1 Affected Environment

The following sections describe the affected environment at Pantex Plant and surrounding region for meteorology and climate, atmospheric dispersion, air quality, and atmospheric radiological environment.

4.7.1.1 *Meteorology and Climate*

Pantex Plant is located in the Texas Panhandle, approximately 27 kilometers (17 miles) northeast of Amarillo, at an elevation of approximately 1,085 meters (3,560 feet).

Regional Climate

The climate at Pantex Plant and the surrounding region is characteristically that of middle latitude steppe. It is typified by large variations in temperature and precipitation from year to year, with summers that are hot and dry and winters that are mild. A high percentage of sunshine and a rather low humidity prevail over the region. The region is subject to rapid and large temperature changes, especially during the winter when cold fronts from the northern Rocky Mountains and Plains move across the region at speeds up to 64 kilometers (40 miles) per hour. In the spring, moving low-pressure systems produce high winds, with March and April having the strongest. Severe local storms are infrequent, though a few thunderstorms, with damaging hail, lightning, and wind in very localized areas occur most years, usually in spring and summer. These storms are often accompanied by very heavy rain, which produces local flooding.

Local Climate

The nearest representative station with long-term climatological data (30 years) is 16.1 kilometers (10 miles) west of Pantex Plant at the Amarillo International Airport. Meteorological data have been recorded at the airport over a period of more than 60 years (1931 to present).

The annual average temperature in the area is 13.6 °C (56.4 °F); average daily temperatures vary from a minimum of -5.7 °C (21.8 °F) in January to maximum of 32.8 °C (91.1 °F) in July and August. The average annual precipitation is 49.7 centimeters (19.56 inches). Seventy-five percent of the total annual precipitation falls between April and September. The average annual snowfall is 42.9 centimeters (16.9 inches). The snow usually melts in a few days (Pantex 1996:6.2).

Pantex Plant is located in an area with a relatively high frequency of tornados. Fifty-three tornados were recorded in Carson County between 1950 and 1994 (Pantex 1996:6.3). The estimated probability of a tornado striking a point at Pantex Plant is 2.3×10^{-4} per year (DOE 1995q).

Average wind speeds at Amarillo are relatively high. For the period 1944 through 1993, the average speed was 22 kilometers (14 miles) per hour. Calms occur about 1 percent of the time. The wind blows predominantly from the south from May to September and from the southwest the remainder of the year (Pantex 1996:6.2). Figure 4.7.1.1–1 is a wind rose for the Amarillo International Airport (EPA 1995a).

4.7.1.2 *Atmospheric Dispersion*

Once pollutants are emitted into the atmosphere, the prevailing weather conditions determine their dispersion. Atmospheric stability controls the dispersion of pollutants in the vicinity of a source. This factor is especially important to the assessment of primary pollutant impacts. Stability is affected by thermal and mechanical turbulence of the atmosphere and wind velocity of the layer of air closest to the ground. When the atmosphere is unstable, usually during daytime, dispersion of airborne particulates increases. Data collected at the Amarillo

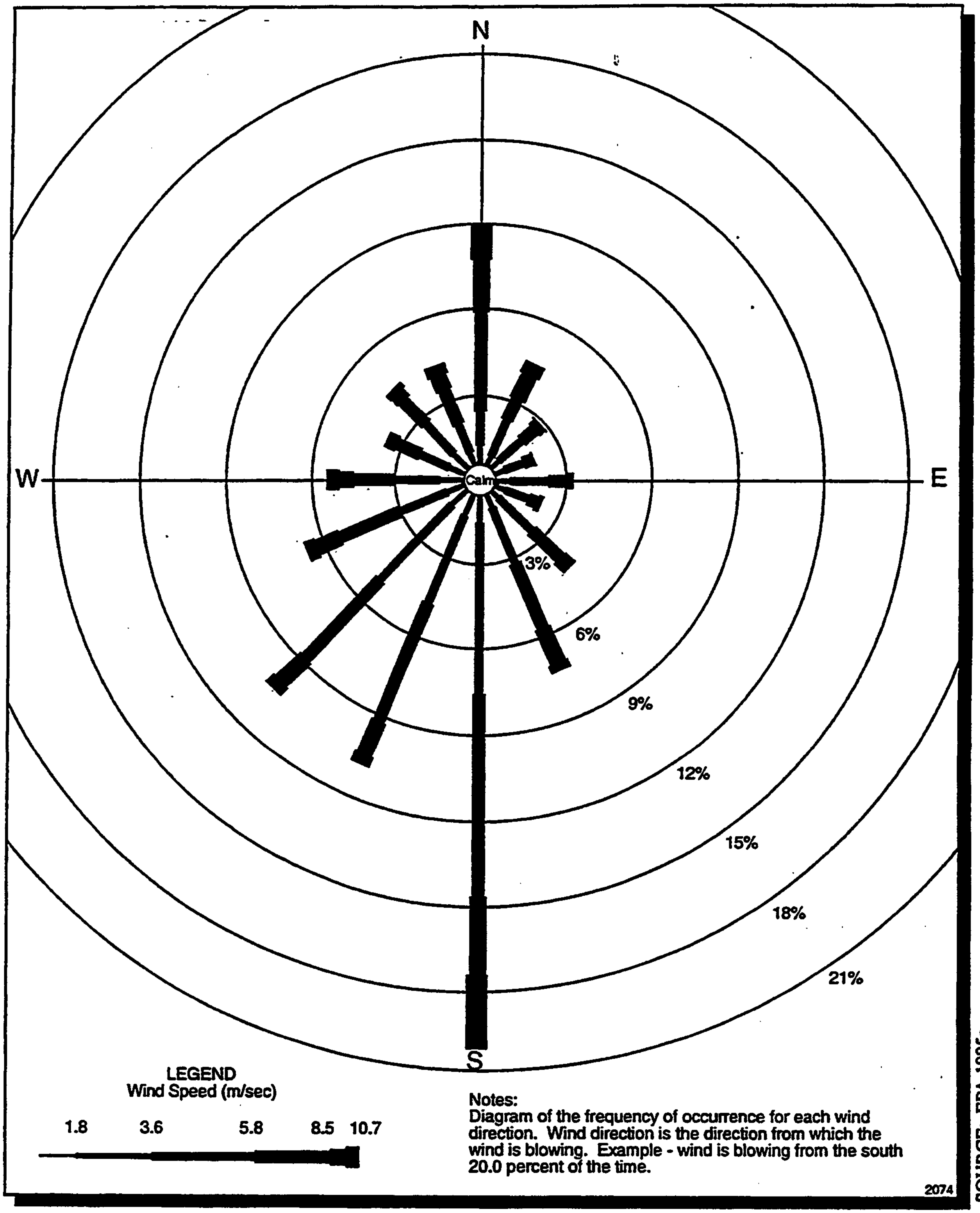

FIGURE 4.7.1.1–1.—*Distribution of Wind Speed and Direction at the Amarillo International Airport, Texas, 1988.*

National Weather Service station for 1988 indicated that unstable conditions occurred approximately 16 percent of the time, neutral conditions approximately 60 percent, and stable conditions approximately 24 percent, on an annual basis (DOE 1995q:B–17). Thus, relatively good vertical dispersion occurs about 76 percent of the time in the vicinity of Pantex Plant.

Another meteorological element that influences dispersion is the mixing height. The mixing height is the height above the ground through which relatively vigorous vertical mixing occurs. The mixed layer dilutes pollutants released in it. Annual average mixing heights over the Amarillo area range from about 328 meters (1,076 feet) in the morning to about 1,973 meters (6,473 feet) in the afternoon (Pantex 1996:6.4). Therefore, based on stability and mixing height considerations, atmospheric dispersion at Pantex Plant and vicinity is, in general, quite good.

4.7.1.3 *Ambient Air Quality*

Ambient air quality is determined by the emission of pollutants and their interaction with atmospheric conditions. Air quality is described in terms of concentrations of pollutants. If these concentrations in the ambient air are high enough to cause health concerns or effect visibility in visual resource areas then emissions are regulated to bring the concentrations down. Ambient air quality is assessed by the monitoring of pollutant levels in the air and modeling of emissions' interactions with atmospheric conditions. This subsection discusses the regulation and control of air pollutants, the air quality monitoring at Pantex Plant, and the modeling performed to evaluate potential impacts of the Proposed Action and the Alternatives.

Regulation of Air Quality

Concentrations. Air quality in a given location is described by the concentration of various pollutants in the atmosphere expressed in units of parts per million or in micrograms per cubic meter. The standards and limits set by regulations on air quality are listed in concentrations averaged over certain time limits (e.g., 30 minutes, 1 hour, 3 hours). The averaging times listed in the tables in this section correspond to the regulatory averaging times for the individual pollutants. Ambient air is defined as that portion of the atmosphere external to the buildings to which the general public has access. Ambient air quality standards specify upper limits of concentrations and durations of pollutants in the ambient air that are consistent with the goal of preventing harmful effects.

The impact of exposure to ambient contaminants is a function of the pollutant involved, the duration of the exposure, and the concentrations reached during the exposure. The significance of pollutant concentrations is determined by comparing the concentrations with appropriate Federal or State ambient air quality standards. These standards represent the allowable pollutant concentrations at which public health and welfare are protected and include a reasonable margin of safety.

Another determining factor in the significance of pollutant concentrations is whether the area is in attainment or nonattainment for that pollutant. An area is designated by the U.S. Environmental Protection Agency (EPA) as being in attainment for a pollutant if ambient concentrations of that pollutant are below the National Ambient Air Quality Standards (NAAQS) and nonattainment if exceedances of NAAQS occur. Areas where insufficient data are available to make an attainment status designation are listed as unclassified. Unclassified areas are treated as attainment areas for regulatory purposes.

The NAAQS were established by EPA. The State of Texas implements and enforces the NAAQS, plus TNRCC has placed regulations on additional pollutants. NAAQS have been established for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (fine dust) of aerodynamic diameter less than 10 micrometers (PM_{10}), and lead (Pb). These NAAQS pollutants are sometimes referred as "criteria" pollutants. TNRCC has also set net ground level limitations for total suspended particulate matter, inorganic fluoride compounds calculated as hydrogen fluoride (HF), hydrogen sulfide, sulfuric acid, and beryllium. NAAQS and the Texas Air Quality Standards are presented in Table 4.7.1.3–1 (TNRCC 1993a).

The EPA has granted to TNRCC the authority to implement regulations to prevent the significant deterioration of air quality in areas that are designated as attainment or unclassifiable. The Prevention of Significant Deterioration (PSD) program is implemented in large part through the use of "increments" and area classifications that effectively define what "significant deterioration" is for individual pollutants. The *Clean Air Act's* area classification scheme for PSD establishes three classes of geographic areas (Class 1, 2, and 3) and applies increments of different stringency to each class. Air quality impacts, in combination with other PSD sources in the area, must not exceed the maximum allowable increments presented in Table 4.7.1.3–2 (TNRCC 1993a).

Visibility. Class 1 areas are those of special National concern where any appreciable deterioration in air quality is considered significant. Consequently, the most restrictive increments apply in Class 1 areas. Class 1 areas include all international and National parks, wilderness areas, and memorial parks that exceed certain sizes.

The *Clean Air Act* (CAA) (42 U.S.C. 7401) requires a visibility analysis for any new or modified major stationary sources, in an attainment or nonattainment area, whose emissions would affect the visibility in a Class 1 area. The nearest PSD Class 1 areas to Pantex Plant are the Salt Creek Wilderness, in New Mexico, approximately 274 kilometers (170 miles) to the southwest, and the Wichita Mountains Wilderness, in Oklahoma, approximately 290 kilometers (180 miles) to the east-southeast (40 CFR 81.421 and 81.424). Since these Class 1 areas are approximately 274 kilometers (170 miles) from Pantex Plant, pollutant emissions from Pantex Plant facilities would not have an adverse impact on the air quality in these areas and no additional analyses would be required. No public recreational areas are located within 16 kilometers (10 miles) of Pantex Plant.

Less restrictive increments apply in areas designated as Class 2 or Class 3. Class 2 areas are all PSD areas that are designated as attainment or unclassifiable with respect to the NAAQS and are not classified in CAA as Class 1 areas. Individual states have the authority to redesignate Class 2 areas to Class 3 areas to allow for higher levels of industrial development and emissions growth. There are as yet no designated Class 3 areas.

PSD requirements apply to major stationary sources. CAA specifies 26 categories of stationary sources which are considered major sources if they emit or have potential to emit 90.7 metric tons (100 tons) per year or more of any pollutant subject to CAA regulation (40 CFR Section 52.21). Any other stationary source which emits or has the potential to emit 226.8 metric tons (250 tons) per year or more of any air pollutant subject to regulation under CAA is considered a major source and is subject to PSD requirements.

Pantex Plant stationary sources do not fall within the 26 categories of stationary sources. Also, plant stationary sources emit less than 226.8 metric tons (250 tons) per year of any regulated pollutant (see Tables 4.7.1.3–3 and 4.7.1.3–6). Pollutant emissions from future

TABLE 4.7.1.3–1.—*National Ambient Air Quality Standards and Texas Limitations*

POLLUTANT	AVERAGING TIME	NATIONAL STANDARDS[1] PRIMARY CONCENTRATION	NATIONAL STANDARDS[1] SECONDARY CONCENTRATION	TEXAS STANDARDS
Ozone (O_3)	1-hour	0.12 ppm (235 μg/m³)	Same as primary standard	Same as NAAQS
Carbon Monoxide (CO)	8-hour	9 ppm (10,000 μg/m³)	—	Same as NAAQS
	1-hour	35 ppm (40,000 μg/m³)	—	Same as NAAQS
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 μg/m³)	Same as primary standard	Same as NAAQS
Sulfur Dioxide (SO_2)	Annual	0.03 ppm (80 μg/m³)	—	Same as NAAQS
	24-hour	0.14 ppm (365 μg/m³)	—	Same as NAAQS
	3-hour	—	0.5 ppm (1,300 μg/m³)	Same as NAAQS
	30-minute[5]	—	—	0.4 ppm[2] (1,021 μg/m³)
PM_{10}	Annual	50 μg/m³	Same as primary standard	Same as NAAQS
	24-hour	150 μg/m³		Same as NAAQS
Lead	Calendar Quarter	1.5 μg/m³	Same as primary standard	Same as NAAQS
Total Suspended Particulates	3-hour[5]	—	—	200 μg/m³
	1-hour[5]	—	—	400 μg/m³
Hydrogen Fluoride (HF)	30-day[5]	—	—	1.0 ppb (0.82 μg/m³)
	7-day[5]	—	—	2.0 ppb (1.63 μg/m³)
	24-hour[5]	—	—	3.5 ppb (2.86 μg/m³)
	12-hour[5]	—	—	4.5 ppb (3.68 μg/m³)
	3-hour[5]	—	—	6 ppb (4.9 μg/m³)
Hydrogen Sulfide	30-minute[5]	—	—	0.08 ppm[3] 0.12 ppm[4]
Sulfuric Acid	24-hour[5]	—	—	15 μg/m³
	1-hour[5]	—	—	50 μg/m³
Beryllium	24-hour[5]	—	—	0.01 μg/m³

[1]National standards for ozone and PM_{10} are determined by statistical methods. Both ozone and PM_{10} NAAQS are based on exceedances; i.e., non-sampling days must be accounted for when calculating attainment determination. NAAQS is attained when expected number of days per calendar year, averaged over a three-year period, with a maximum hourly average concentration for ozone and 24-hour average concentration for PM_{10} above the standard, is equal to or less than one. Sulfur dioxide annual, nitrogen dioxide annual, and lead quarterly NAAQS are not to be exceeded. Carbon monoxide 1-hour and 8-hour, and sulfur dioxide 3-hour and 24-hour standards cannot be exceeded more than once per year.

[2]Conversion from ppm to μg/m³ assuming temperatures of 90 °F, standard is 0.28 ppm for Galveston and Harris Counties and 0.32 ppm (no ground-level concentrations from all sources on property) for Jefferson and Orange Counties

[3]If it affects a residential area, business, or commercial property.

[4]If it affects only property used for other than residential, recreational, business, or commercial purposes.

[5]Texas net ground level limitations applicable at the property line. The maximum predicted concentration is compared with the appropriate standard for each averaging time. These are TNRCC's standards.

Sources: TNRCC 1993a; TNRCC 1994b; 40 CFR 50.4 through 50.12.

TABLE 4.7.1.3–2.—*Maximum Allowable Concentration Increases Under Prevention of Significant Deterioration Regulations*

POLLUTANT	AVERAGING TIME	MAXIMUM ALLOWABLE INCREMENT (µg/m³)		
		CLASS 1	CLASS 2	CLASS 3
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
Sulfur Dioxide	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
Nitrogen Dioxide	Annual	2.5	25	50

Source: 40 CFR 52.21

Pantex Plant operations would also be less than 226.8 metric tons (250 tons) per year (see Tables 4.7.2.1–3 and 4.7.2.1–4). Therefore, Pantex Plant would not be subject to PSD requirements.

Assessment of Air Quality

Assessment Parameters. Existing ambient air quality in the region is defined by air quality data and emissions information. Air quality data were obtained from air quality monitoring stations maintained by TNRCC (TNRCC 1993c; TNRCC 1995d). Information on pollutant concentrations measured for short-term (24 hours or less) and long-term (annual) averaging periods were extracted from the monitoring station data to characterize the existing air quality background of the area. The emission inventory for the region was obtained from EPA and Pantex Plant. Inventory data are separated by pollutant and reported in pounds and tons per year to describe the baseline conditions of pollutant emissions in the area (EPA 1988). Since the TNRCC air quality monitoring stations do not operate continuously and are not placed at the borders of Pantex Plant, the monitoring data do not indicate the impacts to the public from plant air emissions.

Identifying the Region of Influence (ROI) for an air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, the proximity relationship of project emission sources to other emission sources, and local and regional meteorological conditions. For inert pollutants (all pollutants other than SO_2, O_3, and its precursors NO_2 and volatile organic compounds [VOCs]) the ROI is generally an area extending a few miles downwind from the source. The ROI for O_3 may extend much farther downwind than the ROI for inert pollutants. For the purpose of this air quality analysis, the ROI is defined as Carson County and its eight surrounding counties: Potter, Randall, Armstrong, Donley, Gray, Roberts, Hutchinson, and Moore.

The windrose in Figure 4.7.1.1–1 indicates that pollutants from Pantex Plant might be transported into any of these surrounding counties. As mentioned previously, the ROI for O_3 extends farther downwind than the ROI for inert pollutants. This greater distance occurs because in the presence of solar radiation, the maximum effect of precursor emissions on O_3 levels usually occurs several hours after they are emitted and therefore, many miles from the source.

The ROI and Pantex Plant are located in the Amarillo-Lubbock Intrastate Air Quality Control Region (AQCR) 211. AQCR 211 is designated by EPA as "better than national standards" for SO_2, "unclassifiable/attainment" for CO and O_3, "cannot be classified or better than National standards" for NO_2, "unclassifiable" for PM_{10}, and "not designated" for lead (40 CFR 81.344).

Air Monitoring Results. TNRCC operates six air quality monitoring stations in the ROI, one at Amarillo and five at Pantex Plant. The Amarillo station only monitors PM_{10}. The monitoring report issued by the TNRCC for the year 1992 indicated that concentrations of this pollutant in Amarillo were within the NAAQS (Pantex 1996:6.5).

TNRCC, through a grant from DOE, established five air quality monitoring stations at Pantex Plant in September 1992. Locations of these stations are shown in Figure 4.7.1.3–1. In August 1995, one of these monitoring stations (Site No. 3) was repositioned to a new location (Site No. 6). The first annual report on this program covered the period January 1 to December 31, 1993 (TNRCC 1995d). Twenty-four hour sampling is conducted once every six days. The TNRCC measures inorganic pollutants as PM_{10} and HF. Organic pollutants are measured as VOCs in parts per billion by volume (ppbv). A few samples have been analyzed for metals, but this is not done on a regular basis. At two sites, wind speed, wind direction, temperature, and relative humidity are measured.

A Fourier Transform Infrared (FTIR) continuous monitor has also been installed at the Masterson Pump station located two miles north of Pantex Plant. The data collected with this sampler is considered developmental data since the TNRCC is still developing procedures (including quality assurance procedures) for this method. Initial screening of the data, however, does not indicate levels that might be harmful to public health and/or welfare. The first annual report on this program covered the period from January 1, 1993 to December 31, 1993 (Pantex 1996).

During 1993, only one 24-hour PM_{10} measurement exceeded the NAAQS while, in 1994, the standard was exceeded on one day in January and one day in June. From July 6, 1993, through December 31, 1994, TNRCC air sampling coincided with Pantex Plant burn days on 57 occasions. Of those 57 days, all had valid PM_{10} samples at one or more sites; however, the exceedance of the standard on the January day was a non-burn day and TNRCC stated that windblown dust particles are strongly suggested as a major contributor to that exceedance (TNRCC 1995c; Pantex 1996:6.5).

Two compounds, methylene chloride and 1,2-dibromoethane, exceeded the TNRCC Effects Screening Levels (ESLs) once each during 1993. Methylene chloride was measured at 213.7 ppbv on July 6, 1993 (TNRCC 1993c). The concentration was approximately seven times the ESL (30 ppbv) established by TNRCC. In 1994, the maximum concentration of methylene chloride was measured at 11.75 ppbv, which is lower than the ESL (TNRCC 1995c).

The TNRCC ESLs are "tools" the Toxicology and Risk Assessment Staff of TNRCC use to evaluate the impacts of air pollutant emissions. They are not ambient air standards. If predicted or measured airborne levels of a certain chemical do not exceed its screening level, it would not be expected to have any adverse health or welfare effects. If ambient levels of air contaminants exceed the screening levels, it does not necessarily indicate a problem. It is just a trigger for a more in-depth review. Therefore, TNRCC sets the ESL at levels where TNRCC would not expect adverse effects. These levels are sometimes below the limit of detection for a pollutant.

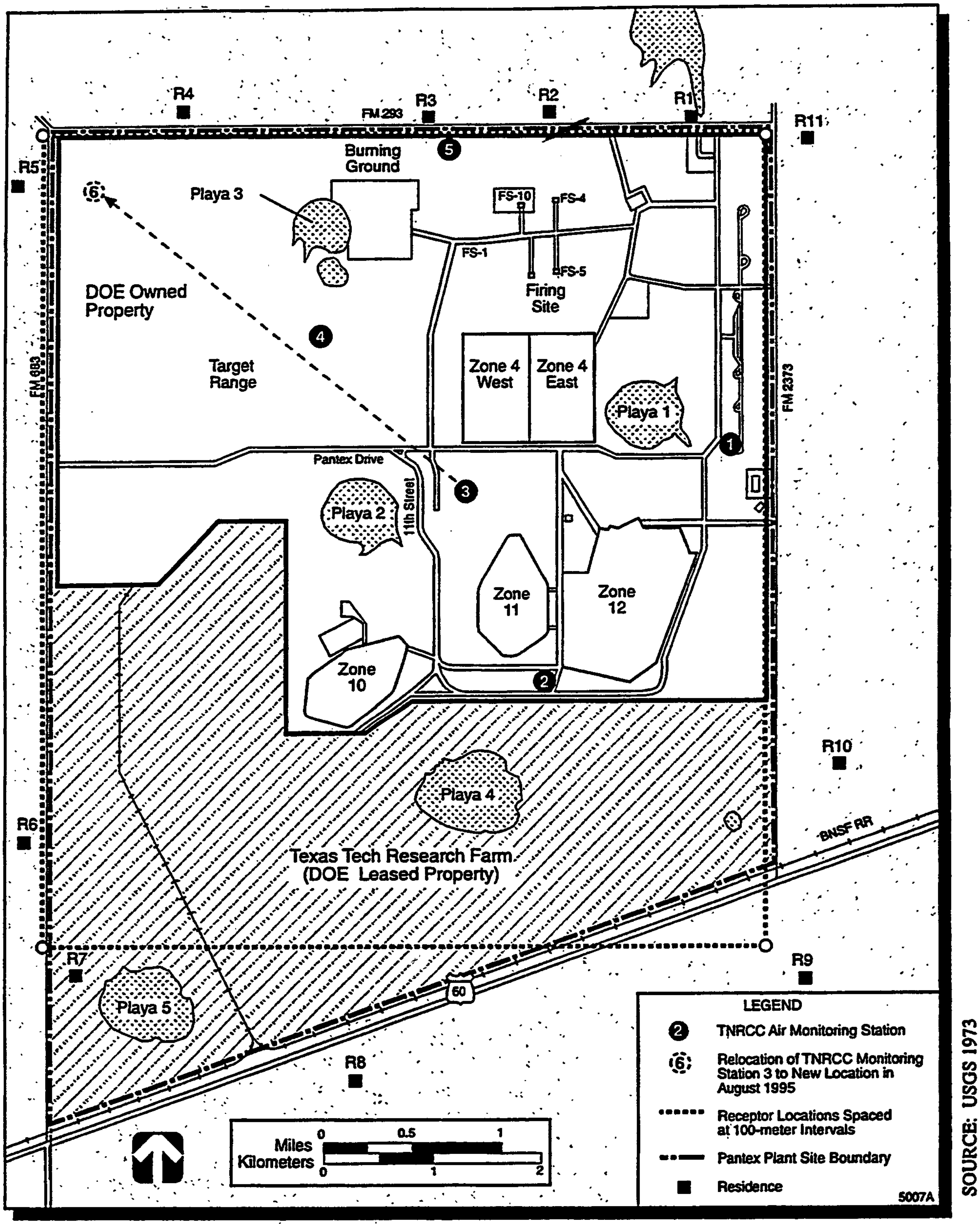

FIGURE 4.7.1.3–1.—*Air Quality Monitoring Stations at and Residences near Pantex Plant Site.*

In 1995, 1,2-dibromoethane was detected at 0.23 ppbv (TNRCC 1993b), which exceeded the ESL (0.2 ppbv). In 1994, the concentration of 1,2-dibromoethane (0.72 and 0.51 ppbv) exceeded the ESL on two occasions (TNRCC 1995c). In 1995, the concentration (0.29 ppbv) of 1,2-dibromoethane exceeded the ESL once (TNRCC 1996d).

The TNRCC concluded that in the 1993 and 1995 case of the 1,2-dibromoethane, it was not certain the compound was actually present at the reported concentration. In the case of the 1993 methylene chloride exceedance, the TNRCC Toxicology and Risk Assessment Section staff stated that the one exceedance was not expected to result in any long-term health effects. Monitoring in the last quarter of 1995 indicated that all organic compounds were measured below their respective ESLs, concentrations of HF were measured below the TNRCC Regulation III Standard, and measured concentrations of PM_{10} were below the NAAQS. The October-December 1995 TNRCC Ambient Air Monitoring Report for Pantex Plant is the last quarterly report the TNRCC will produce; however, quarterly data summaries will be accessible via the Internet, at the following address:

http://www.tnrcc.state.tx.us/air/monops

Annual reports will continue to be published (Pantex 1996).

Air Quality Modeling

Since the onsite air quality monitoring network cannot be used to evaluate the effect of Pantex Plant pollutant emissions on offsite ambient concentrations, air dispersion models were applied to assess the maximum pollutant concentrations that could occur on or near the Pantex Plant boundary. Modeling was performed with EPA preferred Industrial Source Complex Models (ISCST2 and ISCLT2). Hourly surface and upper air data from the Amarillo International Airport were used in the ISCST2 model. The meteorological data were for the year 1988. This year's data is the only data with mixing heights approved by TNRCC. For the ISCLT2 model, the joint frequency distribution of wind speed, wind direction, and stability contained in the stability array program output, based on 1985 through 1989 Amarillo International Airport data, were used.

Discrete receptors with a spacing of 100 meters were established along the northern, eastern, and western boundaries of the site. The southern line of receptors were located on an east-west line south of the Pantex Plant boundary, but generally north of the site boundary along U.S. Highway 60 (see Figure 4.7.1.3–1).

The emission rates used in the Industrial Source Complex models were provided by Pantex Plant personnel (PC 1994b). These emission rates are consistent with the submittal to TNRCC. Emissions from the Burning Ground, where high explosive(s) (HE) are burned, were confined to particular hours of the day. For all explosives that emitted HF, the burning hours were limited to the period 11:00 a.m. to 6:00 p.m., while all other explosives could be burned during the period 7:00 a.m. to 6:00 p.m.

Two scenarios were assumed for the Burning Ground. One scenario assumed that 363 kilograms (800 pounds) of explosives were burned while the second scenario assumed a 45.4-kilogram (100-pound) burn. The 360 kilograms (800 pounds) of HE was assumed to consist of a mixture of 90.7 kilograms (200 pounds) of LX–17 and 272.1 kilograms (600 pounds) of PBX–9404, while the 45.5 kilograms (100 pounds) of HE consisted of 11.4 kilograms (25 pounds) of LX–17 and 34.1 kilograms (75 pounds) of PBX–9404. The different kinds of HE are mixed to maximize the heat produced by the burning and keep the amount of HF emitted below the regulatory limits. In order to be conservative, the HE mixes modeled in this EIS were chosen for the lowest heat output and highest emission of HF allowed by regulation.

Modeling Results. Four criteria air pollutants, 36 air pollutants that are listed in CAA, and 50 air pollutants that are listed by the TNRCC have been identified that are emitted from existing Pantex Plant operations (Pantex 1996:6.6). All 90 air pollutants were modeled. The Pantex Plant chemical air emissions inventory is summarized in Table 4.7.1.3–3. The maximum estimated fence line concentrations of these pollutants are presented in Tables 4.7.1.3–4 and 4.7.1.3–5. Table 4.7.1.3–4 presents the results for the criteria pollutants CO, NO_2, PM_{10}, and Pb. The NAAQS for each pollutant is also presented in Table 4.7.1.3–4. As shown in the table, none of the pollutant concentrations exceeded standards at the Pantex Plant boundary.

The results for the rest of the chemical air pollutants emitted by Pantex Plant are presented as two groups. The first group includes those chemical air pollutants emitted by Pantex Plant that are listed in CAA, as amended, plus those pollutants with estimated concentrations above the appropriate ESL. Only alcohols, modeled as a group, were estimated to exceed an ESL. The second group includes those chemical air pollutants emitted by Pantex Plant that are listed in State of Texas regulations (except for alcohols as mentioned above). Both groups were originally modeled for the current status of the plant (i.e., Affected Environment) and the potential future impacts related to the alternatives.

The maximum estimated fence line concentrations for both groups are presented in Table 4.7.1.3–5 in comparison with the appropriate TNRCC ESLs. The first group, including alcohols, was also modeled for the maximum estimated concentrations at eleven of the residences near the boundaries of the Pantex Plant Site. These results are presented in Table B.4.1–1 in appendix B. All of the air pollutants except alcohols were estimated to be below their respective ESLs at the Pantex Plant boundary.

The group of alcohols consisted of those alcohols used by Pantex Plant for which there were no individual emission rates. TNRCC does not have an ESL for the family of alcohols, but rather chose in their modeling of Pantex Plant to use a conservative ESL equal to 100 $\mu g/m^3$ as the ESL for the group of alcohols. The group of alcohols exceeded the conservative 1-hour ESL at and near the Pantex Plant boundary. The maximum estimated fence line concentration for alcohols (195 $\mu g/m^3$) was almost twice the conservative ESL. As explained earlier, the exceedance of an ESL does not necessarily indicate a problem. It is just a trigger for a more in-depth review.

A subsequent review of the inventory of the amounts of the individual alcohols present at the Plant showed that the ESL used in the modeling was excessively conservative (PC 1996b). Since the emission rates for the individual alcohols in the group were not speciated in the original emissions inventory, a second inventory was obtained to determine quantities of individual alcohols maintained on-hand at the plant. An estimation of the maximum fence line concentration for each of the alcohols was then calculated based on the ratio of the amount of each alcohol to the total inventory of the group of alcohols present at Pantex Plant (see Table B.4.1–2 in appendix B). None of the individual alcohols were found to exceed their respective ESLs at or near the plant boundary.

HF is a pollutant regulated by TNRCC. The modeling results predicted a maximum 3-hour average concentration of 1.52 $\mu g/m^3$. This concentration is below the standard of 4.90 micrograms per cubic meter. This concentration resulted from a 45.4-kilogram (100-pound) burn of HE. For a 363-kilogram (800-pound) burn of HE, the 3-hour average maximum concentration was also below the standard (see Table 4.7.1.3–5).

TABLE 4.7.1.3–3.—*Estimated Pantex Plant Chemical Air Emissions Inventory*

POLLUTANT	CHEMICAL ABSTRACT SERVICE NUMBER	KILOGRAMS (POUNDS) PER YEAR	METRIC TONS (TONS) PER YEAR
CLEAN AIR ACT LISTED AIR POLLUTANTS			
1,1,2-trichloroethane	79005	3.78 (8.34)	0.00 (0.00)
1,3-butadiene	106990	51.76 (114)	0.05 (0.06)
2-nitropropane	79469	1.71 (3.76)	0.00 (0.00)
Benzene	71432	91.27 (199)	0.09 (0.10)
Carbon Disulfide	75150	27.03 (59.60)	0.03 (0.03)
Carbon Tetrachloride	56235	15.60 (34.4)	0.02 (0.02)
Chlorobenzene	108907	1.79 (3.94)	0.00 (0.00)
Chromium	7440473	1.51 (3.33)	0.00 (0.00)
Cresols	1319773	0.05 (0.11)	0.00 (0.00)
Cresylic Acid	1319773	0.05 (0.11)	0.00 (0.00)
Dibenzofurans	132649	0.07 (0.16)	0.00 (0.00)
Dimethylformamide	68122	0.95 (2.09)	0.00 (0.00)
Ester Glycol Ethers	NA	0.86 (1.89)	0.00 (0.00)
Ethyl Acetate	141786	5,625 (12,400)	5.54 (6.20)
Ethyl Benzene	100414	1.51 (3.33)	0.00 (0.00)
Ethylene Dichloride	107062	1.33 (2.93)	0.00 (0.00)
Formaldehyde	50000	54.89 (121)	0.06 (0.06)
HCl (Hydrogen chloride)	7647010	5,206.59 (11,478.37)	1.11 (1.22)
HCN (Hydrogen cyanide)[a b]	74908	0.00 (0.00)	0.00 (0.00)
HF (Hydrogen fluoride)	7664393	3,973.54 (8,760)	1.18 (1.30)
Lead	7439421	7.71 (17.0)	0.19 (0.20)
Mercury[b]	7439976	0.00 (0.00)	0.00 (0.00)
Methanol	67561	1,093.18 (2,410)	1.10 (1.21)
Methyl Cyanide[b]	NA	0.00 (0.00)	0.00 (0.00)
Methyl Ethyl Ketone	78933	7,076.16 (15,600)	7.07 (7.79)
Methyl Isobutyl Ketone	108101	0.62 (1.36)	0.00 (0.00)
Methylene Chloride	75092	187.79 (414)	0.18 (0.20)
Naphthalene	91203	0.41 (0.90)	0.00 (0.00)
Nickel[a]	7440020	0.16 (0.36)	0.00 (0.00)
Nitrobenzene	98953	0.05 (0.11)	0.00 (0.00)
Phenol	108952	2.22 (4.90)	0.00 (0.00)
Tetrachloroethylene	127184	6.44 (14.20)	0.01 (0.01)
Titanium[a]	7440326	0.03 (0.07)	0.00 (0.00)
Toluene	108883	2,227.18 (4,910)	0.47 (0.51)
Trichloroethylene	79016	19.50 (43.00)	0.02 (0.02)
Triethylamine	121448	0.00 (0.00)	0.00 (0.00)
Xylene	1330207	222.72 (491)	0.22 (0.25)

TABLE 4.7.1.3–3.—*Estimated Pantex Plant Chemical Air Emissions Inventory-Continued*

POLLUTANT	CHEMICAL ABSTRACT SERVICE NUMBER	KILOGRAMS (POUNDS) PER YEAR	METRIC TONS (TONS) PER YEAR
TNRCC LISTED AIR POLLUTANTS			
1,1,1-chloroethane	75003	22.74 (50.14)	0.02 (0.03)
1,3,5-trinitrobenzene	99354	0.00 (0.00)	0.00 (0.00)
1-butanol	71363	0.09 (0.02)	0.00 (0.00)
2,4,6-trinitrotoluene	118967	0.02 (0.04)	0.00 (0.00)
2,4-dinitrotoluene	121142	0.05 (0.10)	0.00 (0.00)
2,6-dinitrotoluene	606202	0.09 (0.19)	0.00 (0.00)
2-nitronaphthalene	NA	0.02 (0.05)	0.00 (0.00)
2-ethoxyethanol	110805	1.81 (3.98)	0.00 (0.00)
Acetone	67641	3,519 (7,750)	3.36 (3.88)
Acetylene	74862	84.44 (186)	0.08 (0.09)
Alcohols	NA	1,185 (2,610)	1.18 (1.31)
Aluminum	7429905	0.02 (0.043)	0.00 (0.00)
Ammonia	7664417	18.16 (40.0)	0.02 (0.02)
Barium	7440393	2.24 (4.94)	0.00 (0.00)
Benzo(a)anthracene	56553	0.04 (0.08)	0.00 (0.00)
Benzo(a)pyrene	50328	0.02 (0.05)	0.00 (0.00)
Bismuth	1304821	0.01 (0.01)	0.00 (0.00)
Butane	106978	85.35 (188)	0.09 (0.09)
Butene	2516673	99.43 (219)	0.11 (0.11)
Calcium	7440702	0.38 (0.85)	0.00 (0.00)
Chlorinated Fluorocarbon	NA	53.12 (117)	0.05 (0.06)
Copper	7440508	3.78 (8.32)	0.00 (0.00)
Cyanogen	460195	0.00 (0.00)	0.00 (0.00)
Cyclohexane	110827	312.35 (688)	0.31 (0.34)
Cyclohexanone	108941	4.34 (9.56)	0.00 (0.00)
Dioxane	123911	40.90 (90.1)	0.04 (0.05)
Ethyl Ether	60297	4,903.2 (10,800)	4.90 (5.40)
Ethylene	74851	213.8 (471)	0.21 (0.24)
Formic Acid[b]	64186	0.00 (0.00)	0.00 (0.00)
Iron	7439896	22.50 (49.57)	0.02 (0.03)
Isobutane	75285	11.80 (26.0)	0.01 (0.01)
Isobutanol	78831	1.11 (2.45)	0.00 (0.00)
Ketene[b]	763514	0.00 (0.00)	0.00 (0.00)
Ketone	NA	0.28 (0.61)	0.00 (0.00)
Lithium	NA	0.00 (0.00)	0.00 (0.00)
Magnesium	546930	0.77 (1.69)	0.00 (0.00)
Methane	74828	1,889 (4,160)	1.89 (2.08)
N-butyl Alcohol	71363	0.39 (0.86)	0.00 (0.00)

TABLE 4.7.1.3–3.—*Estimated Pantex Plant Chemical Air Emissions Inventory-Continued*

POLLUTANT	CHEMICAL ABSTRACT SERVICE NUMBER	KILOGRAMS (POUNDS) PER YEAR	METRIC TONS (TONS) PER YEAR
Non-F Listed Solvents	NA	0.021 (0.46)	0.00 (0.00)
Ortho-dichlorobenzene	95501	0.29 (0.64)	0.00 (0.00)
Propane	74986	103 (227)	0.10 (0.11)
Propene	115071	158.9 (350)	0.16 (0.18)
Pyrene	129000	0.00 (0.00)	0.00 (0.00)
Pyridine	110861	1.85 (4.08)	0.00 (0.00)
Silicon	7440213	46.31 (100)	0.05 (0.05)
Silver	7440224	1.05 (2.32)	0.00 (0.00)
Tetrahydrofuran	109999	776.34 (1710)	0.78 (0.85)
Trichlorofluoromethane	75694	157.99 (348)	0.16 (0.17)
Trichlorotrifluoroethane	76131	11.39 (25.1)	0.01 (0.01)
Zinc	7440666	0.031 (0.68)	0.00 (0.00)

[a]Projected emissions that would result from future Burning Ground upgrade. Only included in modeling for 2,000, 1,000, and 500 projected activity levels.
[b]These chemicals are emitted but in amounts far below 0.01 kilograms or pounds per year.
NA - Not available.
Sources: CAA Nov 1990; Pantex 1996, 6.6; PC 1994; TNRCC 1996a

TABLE 4.7.1.3–4.—*Estimated Maximum Fence Line Concentration of Criteria Pollutants at Pantex Plant Site*

POLLUTANT	AVERAGING TIME	NAAQS $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION $\mu g/m^3$
CO - 45.4 kg (100 lb) HE	1-hour	4.00×10^4	9.24×10^2
	8-hour	1.00×10^4	1.61×10^2
CO - 363 kg (800 lb) HE	1-hour	4.00×10^4	9.24×10^2
	8- hour	1.00×10^4	1.61×10^2
Lead	1st Qtr	1.50	1.02×10^{-3}
	2nd Qtr	1.50	9.60×10^{-4}
	3rd Qtr	1.50	1.58×10^{-3}
	4th Qtr	1.50	9.50×10^{-3}
NO_2 - 45.4 kg (100 lb) HE	Annual	1.00×10^2	8.95×10^{-1}
NO_2 - 363 kg (800 lb) HE	Annual	1.00×10^2	5.79×10^{-1}
PM_{10} - 45.4 kg (100 lb) HE	Annual	5.00×10^1	8.73
	24-hour	1.50×10^2	8.85×10^1
PM_{10} - 363 kg (800 lb) HE	Annual	5.00×10^1	1.51
	24-hour	1.50×10^2	2.24×10^1

Note: Table shows the ISCST2 and ISCLT2 modeling results (maximum fence line concentrations).
Source: TNRCC 1993a

TABLE 4.7.1.3–5.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants at Pantex Plant Site*

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION $\mu g/m^3$
CLEAN AIR ACT LISTED AIR POLLUTANTS[b]			
1,1,2-trichloroethane	Annual 30-minute	5.50×10^{1} 5.50×10^{2}	8.07×10^{-2} 1.73×10^{1}
1,3-butadiene - 45.4 kg (100 lb) HE	Annual 30-minute	1.10×10^{1} 1.10×10^{2}	9.09×10^{-3} 3.76
1,3-butadiene - 363 kg (800 lb) HE	Annual 30-minute	1.10×10^{1} 1.10×10^{2}	9.09×10^{-3} 3.76
2-nitropropane	Annual 30-minute	5.00 5.00×10^{1}	3.56×10^{-2} 8.55
Alcohols[c]	Annual 30-minute	NA 1.00×10^{2}	7.01×10^{-1} 1.95×10^{2}
Benzene	Annual 30-minute	3.00 7.50×10^{1}	5.47×10^{-2} 1.94×10^{1}
Carbon Disulfide	Annual 30-minute	3.00 3.00×10^{1}	9.39×10^{-2} 2.26×10^{1}
Carbon Tetrachloride	Annual 30-minute	1.30×10^{1} 1.26×10^{2}	8.19×10^{-2} 1.97×10^{1}
Chlorobenzene	Annual 30-minute	4.60×10^{1} 4.60×10^{2}	8.13×10^{-2} 1.95×10^{1}
Chromium - 45.4 kg (100 lb) HE	Annual 30-minute	1.00×10^{-1} 1.00	1.91×10^{-3} 9.72×10^{-2}
Chromium - 363 kg (800 lb) HE	Annual 30-minute	1.00×10^{-1} 1.00	8.00×10^{-5} 7.62×10^{-3}
Cresols	Annual 30-minute	NA 5.00	1.72×10^{-3} 4.13×10^{-1}
Cresylic Acid	Annual 30-minute	NA 5.00	2.14×10^{-3} 5.13×10^{-1}
Dibenzofurans - 45.4 kg (100 lb) HE	Annual 30-minute	NA NA	2.00×10^{-5} 9.60×10^{-4}
Dibenzofurans - 363 kg (800 lb) HE	Annual 30-minute	NA NA	0.00[e] 8.00×10^{-5}
Dimethylformamide	Annual 30-minute	3.00×10^{1} 3.00×10^{2}	6.19×10^{-2} 2.80×10^{1}
Ester Glycol Ethers	Annual 30-minute	NA NA	1.50×10^{-1} 3.59×10^{1}
Ethyl Acetate	Annual 30-minute	1.44×10^{3} 1.44×10^{4}	6.93 1.99×10^{3}
Ethyl Benzene	Annual 30-minute	4.34×10^{2} 2.00×10^{3}	1.29×10^{-1} 3.11×10^{1}

TABLE 4.7.1.3–5.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants at Pantex Plant Site*-Continued

POLLUTANT	AVERAGING TIME	ESL μg/m³	MAXIMUM FENCE LINE CONCENTRATION μg/m³
Ethylene Dichloride	Annual 30-minute	4.00 1.60×10^{2}	3.99×10^{-2} 9.58
Formaldehyde - 45.4 kg (100 lb) HE	Annual 30-minute	1.50 1.50×10^{1}	4.03×10^{-3} 3.66×10^{-1}
Formaldehyde - 363 kg (800 lb) HE	Annual 30-minute	1.50 1.50×10^{1}	4.03×10^{-3} 3.66×10^{-1}
Hydrogen chloride - 45.4 kg (100 lb) HE	Annual 30-minute	1.00×10^{-1} 7.50×10^{1}	8.76×10^{-2} 5.98
Hydrogen chloride - 363 kg (800 lb) HE	Annual 30-minute	1.00×10^{-1} 7.50×10^{1}	3.54×10^{-2} 3.75
Hydrogen fluoride - 45.4 kg (100 lb) HE	3-hour 12-hour 24-hour	4.90 3.68 2.86	1.52 3.81×10^{-1} 2.70×10^{-1}
Hydrogen fluoride - 363 kg (800 lb) HE	3-hour 12-hour 24-hour	4.90 3.68 2.86	1.07×10^{-1} 2.67×10^{-2} 2.08×10^{-2}
Mercury	Annual 24-hour 30-minute	5.00×10^{-2} 2.50×10^{-1} 5.00×10^{-1}	0.00[e] 0.00[e] 0.00[e]
Methanol	Annual 30-minute	2.62×10^{2} 2.62×10^{3}	5.75×10^{-1} 2.45×10^{2}
Methyl Cyanide - 45.4 kg (100 lb) HE	Annual 30-minute	NA NA	0.00[e] 0.00[e]
Methyl Cyanide - 363 kg (800 lb) HE	Annual 30-minute	NA NA	0.00[e] 0.00[e]
Methyl Ethyl Ketone	Annual 30-minute	5.90×10^{2} 3.90×10^{3}	5.10 1.40×10^{3}
Methyl Isobutyl Ketone	Annual 30-minute	2.05×10^{2} 2.05×10^{3}	1.85×10^{-2} 4.45
Methylene Chloride	Annual 30-minute	2.60×10^{1} 2.60×10^{2}	7.37×10^{-1} 1.80×10^{2}
Naphthalene - 45.4 kg (100 lb) HE	Annual 30-minute	5.00×10^{1} 4.40×10^{2}	1.10×10^{-4} 5.48×10^{-3}
Naphthalene - 363 kg (800 lb) HE	Annual 30-minute	5.00×10^{1} 4.40×10^{2}	0.00[e] 4.30×10^{-4}
Nitrobenzene	Annual 30-minute	5.00 2.40×10^{1}	2.14×10^{-3} 5.13×10^{-1}
Phenol - 45.4 kg (100 lb) HE	Annual 30-minute	1.90×10^{1} 1.54×10^{2}	5.70×10^{-4} 2.92×10^{-2}
Phenol - 363 kg (800 lb) HE	Annual 30-minute	1.90×10^{1} 1.54×10^{2}	2.00×10^{-5} 2.29×10^{-3}

TABLE 4.7.1.3–5.—*Estimated*[a] *Maximum Fence Line Concentration of Air Pollutants at Pantex Plant Site*-Continued

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION $\mu g/m^3$
Tetrachloroethylene	Annual 30-minute	3.40×10^1 3.40×10^2	7.33×10^{-2} 1.76×10^1
Toluene	Annual 30-minute	1.88×10^2 1.88×10^3	1.73 5.68×10^2
Trichloroethylene	Annual 30-minute	1.35×10^2 1.35×10^3	2.12×10^{-1} 5.11×10^1
Triethylamine	Annual 30-minute	4.00 4.00×10^1	2.38×10^{-3} 1.08
Xylene	Annual 30-minute	4.34×10^2 3.70×10^3	4.74×10^{-1} 1.45×10^2
TNRCC LISTED AIR POLLUTANTS[d]			
1,1,1-chloroethane	Annual 30-minute	5.00×10^1 5.00×10^2	5.28×10^{-1} 1.27×10^2
1,3,5-trinitrobenzene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 2.00	0.00[e] 3.00×10^{-5}
1,3,5-trinitrobenzene - 363 kg (800 lb) HE	Annual 30-minute	NA 2.00	0.00[e] 0.00[e]
1-butanol	Annual 30-minute	7.60×10^1 7.60×10^2	1.99×10^{-2} 4.79
2,4,6-trinitrotoluene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00	0.00[e] 3.30×10^{-4}
2,4,6-trinitrotoluene - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00	0.00[e] 2.00×10^{-5}
2,4-dinitrotoluene - 45.4 kg (100 lb) HE	Annual 30-minute	1.50×10^{-1} 1.50×10^1	0.00[e] 5.00×10^{-5}
2,4-dinitrotoluene - 363 kg (800 lb) HE	Annual 30-minute	1.50×10^{-1} 1.50×10^1	0.00[e] 3.00×10^{-5}
2,6-dinitrotoluene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 1.50×10^1	0.00[e] 5.00×10^{-4}
2,6-dinitrotoluene - 363 kg (800 lb) HE	Annual 30-minute	NA 1.50×10^1	0.00[e] 4.00×10^{-5}
2-ethoxyethanol	Annual 30-minute	NA 1.80×10^2	3.91×10^{-1} 9.42
2-nitronaphthalene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00×10^2	1.00×10^{-5} 4.20×10^{-4}
2-nitronaphthalene - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00×10^2	0.00[e] 2.00×10^{-5}
Acetone	Annual 30-minute	5.90×10^2 5.90×10^3	3.39 5.19×10^2

TABLE 4.7.1.3–5.—*Estimated*[a] *Maximum Fence Line Concentration of Air Pollutants at Pantex Plant Site*-Continued

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION $\mu g/m^3$
Acetylene - 45.4 kg (100 lb) HE	Annual 30-minute	2.66×10^3 2.66×10^4	3.33×10^{-3} 1.11
Acetylene - 363 kg (800 lb) HE	Annual 30-minute	2.66×10^3 2.66×10^4	3.33×10^{-3} 1.11
Aluminum - 45.4 kg (100 lb) HE	Annual 30-minute	5.00 5.00×10^1	1.28×10^{-3} 5.22×10^{-2}
Aluminum - 363 kg (800 lb) HE	Annual 30-minute	5.00 5.00×10^1	1.17×10^{-3} 4.94×10^{-2}
Ammonia	Annual 30-minute	1.70×10^1 1.70×10^2	2.89×10^{-2} 1.31×10^1
Barium	Annual 30-minute	5.00×10^{-1} 5.00	1.25×10^{-3} 2.93×10^{-3}
Benzo(a)anthracene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00×10^{-1}	1.00×10^{-5} 5.00×10^{-4}
Benzo(a)anthracene - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00×10^{-1}	0.00[e] 4.00×10^{-5}
Benzo(a)pyrene - 45.4 kg (100 lb) HE	Annual 30-minute	3.00×10^{-3} 3.00×10^{-2}	1.00×10^{-5} 4.10×10^{-4}
Benzo(a)pyrene - 363 kg (800 lb) HE	Annual 30-minute	3.00×10^{-3} 3.00×10^{-2}	0.00[e] 2.00×10^{-5}
Bismuth	Annual 30-minute	5.00 5.00×10^2	3.00×10^{-5} 1.13×10^{-3}
Butane	Annual 30-minute	1.90×10^3 1.90×10^4	2.98×10^{-2} 1.12×10^1
Butene	Annual 30-minute	NA 1.60×10^2	2.81×10^{-1} 1.18×10^1
Calcium	Annual 30-minute	5.00 5.00×10^1	5.00×10^{-5} 1.90×10^{-3}
Chlorinated Fluorocarbon	Annual 30-minute	NA 1.80×10^4	2.90×10^{-1} 6.93×10^1
Copper	Annual 30-minute	1.00 1.00×10^1	3.08×10^{-3} 1.25×10^{-1}
Cyanogen - 45.4 kg (100 lb) HE	Annual 30-minute	2.10×10^1 2.10×10^2	1.00×10^{-5} 2.00×10^{-4}
Cyanogen - 363 kg (800 lb) HE	Annual 30-minute	2.10×10^1 2.10×10^2	0.00[e] 2.00×10^{-5}
Cyclohexane	Annual 30-minute	3.40×10^2 1.44×10^3	3.68×10^{-1} 9.41×10^1
Cyclohexanone	Annual 30-minute	1.00×10^2 4.81×10^2	6.09×10^{-2} 1.44

TABLE 4.7.1.3–5.—*Estimated*[a] *Maximum Fence Line Concentration of Air Pollutants at Pantex Plant Site*-Continued

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION $\mu g/m^3$
Dioxane	Annual 30-minute	9.00×10^{1} 9.00×10^{2}	7.88×10^{-1} 3.57×10^{1}
Ethyl Ether	Annual 30-minute	NA 9.27×10^{2}	3.33×10^{-1} 7.96×10^{1}
Ethylene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 1.17×10^{3}	6.04×10^{-1} 2.53×10^{2}
Ethylene - 363 kg (800 lb) HE	Annual 30-minute	NA 1.17×10^{3}	6.04×10^{-1} 2.44×10^{2}
Formic Acid - 45.4 kg (100 lb) HE	Annual 30-minute	9.40 9.40×10^{1}	0.00[e] 8.00×10^{-5}
Formic Acid - 363 kg (800 lb) HE	Annual 30-minute	9.40 9.40×10^{1}	0.00[e] 2.00×10^{-5}
Iron - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00×10^{1}	4.99×10^{-2} 1.82
Iron - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00×10^{1}	2.44×10^{-2} 1.02
Isobutane	Annual 30-minute	1.90×10^{3} 4.85×10^{3}	4.01×10^{-2} 1.39×10^{1}
Isobutanol	Annual 30-minute	1.52×10^{2} 1.52×10^{3}	2.27×10^{-2} 5.46
Ketene - 45.4 kg (100 lb) HE	Annual 30-minute	9.00×10^{-1} 9.00	0.00[e] 0.00[e]
Ketene - 363 kg (800 lb) HE	Annual 30-minute	9.00×10^{-1} 9.00	0.00[e] 0.00[e]
Ketone	Annual 30-minute	NA 1.00×10^{2}	1.39×10^{-1} 3.34×10^{1}
Lithium	Annual 30-minute	NA 1.00×10^{1}	4.00×10^{-5} 1.84×10^{-3}
Magnesium	Annual 30-minute	NA 5.00×10^{1}	1.05×10^{-3} 4.41×10^{-2}
Methane - 45.4 kg (100 lb) HE	Annual 30-minute	NA 3.00×10^{4}	7.16×10^{-1} 2.64×10^{1}
Methane - 363 kg (800 lb) HE	Annual 30-minute	NA 3.00×10^{4}	7.16×10^{-1} 2.61×10^{1}
N-butyl Alcohol	Annual 30-minute	7.60×10^{1} 7.60×10^{2}	1.35×10^{-1} 3.25
Non-F Listed Solvents[f]	Annual 30-minute	NA 1.00×10^{1}	9.40×10^{-4} 2.26×10^{-1}
Ortho-dichlorobenzene	Annual 30-minute	NA 1.50×10^{3}	6.36×10^{-1} 1.53×10^{2}

TABLE 4.7.1.3–5.—*Estimated*[a] *Maximum Fence Line Concentration of Air Pollutants at Pantex Plant Site*-Continued

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION $\mu g/m^3$
Propane	Annual 30-minute	1.80×10^3 1.80×10^4	4.21×10^{-2} 1.32×10^1
Propene	Annual 30-minute	NA 3.00×10^4	3.71×10^{-1} 1.56×10^2
Pyrene - 45.4 kg (100 lb) HE	Annual 30-minute	5.00×10^{-2} 5.00×10^{-1}	5.00×10^{-4} 1.57×10^{-3}
Pyrene - 363 kg (800 lb) HE	Annual 30-minute	5.00×10^{-2} 5.00×10^{-1}	0.00[e] 9.00×10^{-5}
Pyridine	Annual 30-minute	1.50×10^1 6.90×10^1	3.78×10^{-1} 9.08
Silicon	Annual 30-minute	5.00 5.00×10^2	0.00[e] 2.90×10^{-4}
Silver	Annual 30-minute	1.00×10^{-2} 1.00×10^{-1}	1.45×10^{-3} 6.22×10^{-2}
Tetrahydrofuran	Annual 30-minute	5.90×10^2 5.90×10^3	7.55×10^{-1} 3.42×10^2
Trichlorofluoromethane	Annual 30-minute	5.62×10^3 2.80×10^4	4.21×10^{-1} 1.01×10^2
Trichlorotrifluoroethane	Annual 30-minute	NA 7.60×10^4	1.77 4.73×10^2
Zinc	Annual 30-minute	5.00 5.00×10^1	1.32×10^{-3} 5.58×10^{-2}

[a]EPA Model ISCST2 was used to calculate maximum fence line concentrations.
[b]Hours of operations were taken into account for emissions from open burning and engine emissions for CAA listed air pollutants.
[c]The group of alcohols, while not listed in CAA, were estimated to exceed the conservative ESL used by TNRCC. Therefore, alcohols were included for more complete presentation of results.
[d]Hours of operation were not taken into account and emissions were modeled for an entire year of meteorological data for TNRCC listed air pollutants.
[e]The ISCST2 air quality model returns a value of 0.00 for any concentration equal to or less than 1.00×10^{-5} $\mu g/m^3$ (i.e., less than one ten millionth of a part per billion or less than ten parts per quadrillion).
[f]Solvents that are not listed under 40 CFR 261.33 (Hazardous Waste from Non-Specific Sources).
NA - An ESL has not been established by TNRCC.
Sources: TNRCC 1996a; CAA as amended

The maximum pollutant concentrations which were predicted to occur at 11 residences that are located near the plant boundaries are all below respective NAAQS. Appendix B presents tables of these concentrations for each of the 11 residences.

In summary, the modeling results presented in this document are the highest concentrations predicted by the model. The modeling results suggest that existing short-term air quality may be slightly degraded on or near the boundary of Pantex Plant by alcohol emissions. However, subsequent review of specific alcohol concentrations indicates that this degradation would not occur and that the regional and long-term air quality is good.

Emissions. The amount of pollutants entering the atmosphere (from all sources) in a given time period is used by EPA to determine the overall emissions in an area. This definition facilitates the identification of the sources that can be defined as the major sources whose control can lead to a considerable reduction in the pollutant levels for the area. There are various other sources that contribute to overall pollutant emissions, including mobile sources, point (stationary) sources, and area emissions.

Mobile sources include conventional motor vehicles (including Safe Secure Tractor Trailers) and others such as boats, trains, planes, and off-road motor vehicles. Point sources include most industrial and energy-producing facilities that have stacks, vents, or flues from which emissions discharge. Area sources are groups of similar emission sources that do not individually contribute significant amounts of air pollutants, but that do contribute collectively.

CAA, as amended in August 1977 and November 1990, dictates that project emission sources must comply with ambient air quality standards and regulations that have been established by Federal, State, and county regulatory agencies. These standards and regulations focus on the maximum allowable ambient pollutant concentrations resulting from project emissions, both separately and combined with other surrounding sources, and the maximum allowable emissions from the project.

The primary emission sources of criteria pollutants at Pantex Plant are steam plant boilers, the explosives burning operation, diesel and gasoline engines and motor vehicles. Potential emission sources of chemical air pollutants include the HE synthesis facility, the explosive burning operation, miscellaneous laboratories, and other small operations. Table 4.7.1.3–6 presents a summary of the 1993 criteria pollutant emission inventory for stationary and mobile sources at Pantex Plant (Pantex 1996: 6.6.1). The mobile source emissions were developed using emission factors from the EPA mobile sources emission factor model MOBILE 5a and estimates of the traffic volumes on Pantex Plant (EPA 1994; Pantex 1996: 9.5).

The 1990 CAA amendments established a new control standard for air toxics called Maximum Achievable Control Technology (MACT), which will have as its foundation the maximum level of control achieved in practice within industry. The MACT standard must be achieved by sources with the potential to emit 9.08 metric tons (10 tons) per year of any single hazardous air pollutant (HAP), or more than 22.7 metric tons (25 tons) per year of any combination of HAPs. Since, as shown in Table 4.7.1.3–3, none of the emissions of the individual HAPs at Pantex Plant exceed 9.1 metric tons (10 tons) per year and the combined emissions of all the HAPs are less than 22.7 metric tons (25 tons) per year, MACT standards are not applicable.

A summary of the criteria pollutant emissions for the nine counties in the ROI is shown in Table 4.7.1.3–7. These emissions include both stationary and mobile source emissions and were obtained from the EPA National Emissions Data System. Pantex Plant emissions are also shown in the table for comparison with ROI emissions.

Pantex Plant emissions contribute a small portion of pollutants to the overall pollutant burden in the ROI. Because of good atmospheric dispersion and relative low emissions over the region, the existing air quality in the ROI is generally very good.

4.7.1.4 *Atmospheric Radiological Environment*

The population of the Texas Panhandle is exposed to environmental radiation from both natural and manmade sources. This section

TABLE 4.7.1.3–6.—*Estimated Criteria and Non-Criteria Pollutant Emission Inventory for Stationary and Mobile Sources at Pantex Plant*

SOURCE	POLLUTANT					
	CO	NO_2	PM_{10}	SO_2	Pb	VOC[1]
STATIONARY SOURCES						
Building 10–2 kg/yr (lb/yr)	6.4 (14.0)	0.02 (0.04)	—	—	0.07 (0.15)	—
Zone 11 (8 Buildings) kg/yr (lb/yr)	101.7 (224.1)	504.0 (1,111.1)	11.7 (25.7)	—	—	—
Zone 12 (17 Buildings) kg/yr (lb/yr)	3,018.2 (6,654.1)	3,641.7 (8,028.5)	217.9 (480.3)	—	—	—
Firing Sites kg/yr (lb/yr)	90.5 (199.6)	3.9 (8.6)	1.1 (2.4)	—	—	—
Burning Trays kg/yr (lb/yr)	3,393.3 (7,480.8)	12,519.8 (27,600.9)	6,486.4 (14,300.0)	—	—	—
Buildings 16-7, 16-8, 16-10, 16-12, 16-13, 16-15 kg/yr (lb/yr)	7,955.6 (17,539.0)	28,918.0 (63,753.2)	1,028.7 (2,267.8)	—	7.6 (16.8)	—
Buildings 9-4, 9-5, 9-6 kg/yr (lb/yr)	7.9 (17.4)	39.5 (87.0)	1.0 (2.2)	—	—	—
Natural Gas Engines kg/yr (lb/yr)	570.6 (1,258.0)	4,421.6 (9,748.0)	—	—	—	—
Gasoline and Diesel Engines kg/yr (lb/yr)	2,671.3 (5,889.3)	8,485.4 (18,707.1)	605.8 (1,335.5)	—	—	—
Welding, Cutting, and Grinding kg/yr (lb/yr)	—	—	86.6 (191.0)	—	—	—
Subtotal kg/yr (lb/yr)	17,815.5 (39,276.3)	58,533.9 (129,044.44)	8,439.2 (18,604.9)	0.0 (0.0)	7.7 (17.0)	2,806.45 (6,187.06)
Subtotal metric tons/yr (tons/yr)	17.82 (19.64)	58.53 64.52	8.44 (9.30)	0.00 (0.00)	0.01 (0.01)	2.81 (3.09)
MOBILE SOURCES						
Mobile Sources metric tons/yr (tons/yr)	567.22 (625.25)	246.36 (271.57)	—	—	—	61.49 (67.79)
TOTALS						
Total metric tons/yr (tons/yr)	585.04 (644.89)	304.89 (336.09)	8.44 (9.30)	0.00 0.00	0.01 (0.01)	64.3 (70.88)

[1]Based on VOCs in Table 4.7.1.3–3
Source: Pantex 1996; PC 1994

TABLE 4.7.1.3–7.—*Estimated Criteria and VOC Pollutant Emission Inventory for the Region of Influence Counties and Pantex Plant*

COUNTY/YEAR	POLLUTANT (metric tons [tons] per year)				
	SO_2	NO_2	VOC	CO	PM_{10}
Carson/1988	177 (195)	2,106 (2,321)	1,281 (1,412)	3,500 (3,858)	7,442 (8,204)
Potter/1988	25,139 (27,711)	28,077 (30,950)	22,550 (24,857)	51,529 (56,801)	33,591 (37,028)
Randall/1988	318 (351)	3,002 (3,309)	3,209 (3,537)	13,024 (14,356)	22,635 (24,951)
Armstrong/1988	43 (47)	483 (532)	275 (303)	1,198 (1,321)	8,955 (9,871)
Donley/1988	68 (75)	77 (85)	501 (552)	2,087 (2,300)	9,082 (10,011)
Gray/1988	8,149 (8,983)	19,608 (21,614)	7,052 (7,773)	56,990 (62,821)	15,413 (16,990)
Roberts/1988	19 (21)	202 (223)	199 (219)	806 (889)	6,920 (7,628)
Hutchinson/1988	26,356 (29,052)	14,552 (16,041)	18,644 (20,551)	86,981 (95,880)	18,512 (20,406)
Moore/1988	4,267 (4,704)	11,347 (12,508)	5,227 (5,762)	31,087 (34,268)	9,461 (10,429)
Pantex Plant/1993	0 (0)	304.89 (336.09)	64.3 (70.88)	585.04 (644.89)	8.44 (9.3)

Source: EPA 1988; Pantex 1996

summarizes the sources and levels of radiation exposure in this geographical region, including sources of airborne radionuclide emissions from Pantex Plant. Estimates of radioactivity levels and radiological doses from current Pantex Plant operations are provided and discussed (DOE 1995b).

Sources of Radioactivity

The major source of radioactive exposure in the Texas Panhandle is natural background radiation. Sources of radioactivity related to Pantex Plant operations contribute a negligible amount of additional exposure.

Background radiation includes sources such as cosmic rays; radioactivity naturally present in soil, rocks, and the human body; and the airborne radionuclides of natural origin (such as radon). Radioactivity still remaining in the environment as a result of atmospheric testing of nuclear weapons also contributes to the background radioactivity level, although in very small amounts. The natural background dose for residents of the Texas Panhandle is about 95 millirem per year. For comparison, the average annual dose equivalent to any citizen of the U.S. is about 160 millirem, excluding exposure to radon (NCRP 1987).

Potential sources of radioactivity at Pantex Plant from weapons activities include radioactive materials that may be present in the components of weapons and in radiation-generating devices. The radioactive materials in weapons include tritium, various isotopes of plutonium and uranium, and thorium. Gamma radiation is produced by equipment that contains sealed gamma sources (e.g., cobalt-60 and cesium-137), Van de Graaf generators, and linear accelerators.

In normal operating situations, little potential exists for exposure to Pantex Plant personnel, the public, or the environment from release of radioactive materials. Small amounts of tritium escape as a gas or vapor during normal operations, and some tritium residual is present onsite as a result of an accidental release in 1989. Recent amounts of tritium released in 1993 and 1994 were 0.312 curie and 0.446 curie, respectively (DOE 1994b: 4-4; DOE 1995b:7-2). On May 17, 1989, an unplanned release of tritium occurred in Cell 1 in Zone 12 during a routine disassembly operation. The accidental release of tritium in 1989 was conservatively estimated as 40,000 curies (Pantex 1996:16.1).

Existing Radiological Conditions

Monitoring and assessment activities are conducted to characterize existing radiological conditions at Pantex Plant and the surrounding environment (DOE 1995b:8-6 to 8-7). Results of these activities show that exposures resulting from airborne radionuclide emissions are well within applicable standards and are a small fraction of the dose from background sources. These results are discussed separately below for onsite and offsite environments.

Onsite Doses. An indication of onsite radiological conditions is obtained by comparing measured onsite concentrations with those from Pantex Plant nearby locations and a distant location. Results from onsite and nearby locations include contributions from background conditions and Pantex Plant emissions, while the distant location represents background conditions beyond the influence of Pantex Plant emissions. Pantex Plant has 10 offsite, 7 onsite, and 17 perimeter air sampling locations for the air monitoring program for airborne radioactive emissions only. Nine of the 10 offsite units are located within an approximately 8-kilometer (5-mile) radius of the plant. A control site, used to collect background air data is located 48 kilometers (30 miles) west of Pantex Plant at the Bushland Agricultural Research Station (Pantex 1996:16.1).

The data show that 1994 average airborne radioactivity and radiation exposure levels within and around Pantex Plant were only slightly different than those at the control station. The average annual dose (as measured by thermoluminescent dosimeters during 1994) was 97 millirem onsite, 95 at the nearby offsite locations and 93 at the control station (DOE 1995b).

Offsite Doses. The offsite population may receive a very small radiation dose as a result of radiological conditions directly attributable to Pantex Plant operations. The dose associated with baseline radiological emissions is assessed for a maximally exposed individual. The maximally exposed individual is a hypothetical person whose habits and proximity to Pantex Plant are such that the person would receive the highest dose projected to result from site-wide radiological emissions.

The dose calculated for the maximally exposed individual for 1994 was 5.8×10^{-5} millirem per year. The offsite radiation doses from onsite sources were calculated using the CAP88/PC model and 1994 meteorological data in accordance with 40 CFR 61, Subpart H (Pantex 1996). This value was obtained for tritium, the only radionuclide that was released in 1994. The maximally exposed individual dose was well below the National Emissions Standards for HAPs dose limit (10 millirem per year) and the dose received from background sources (95 millirem per year).

The collective dose to the surrounding population as a result of Pantex Plant emissions, assessed using the total population residing within a circular area with an 80-kilometer (50-mile) radius extending from the plant, was 1.37×10^{-4} person-rem in 1994. This population dose was distributed over a population of about 267,000. This population dose is very small when compared with the dose received by the same population from background sources (over 26,000 person-rem).

Results of fence line monitoring for oxidized tritium, elemental tritium, uranium-234, uranium-238, plutonium-239, plutonium-240, and gross alpha and beta were compared to the Derived Concentration Guidelines (DCG) for inhalation listed in DOE Order 5400.5 "Radiation Protection of the Public and the

Environment." The measured concentrations of these radionuclides were found to be several orders of magnitude below the DCG levels (DOE 1995b).

Health risks associated with maximum potential exposure levels in the onsite and offsite environments are described in section 4.14, Human Health.

4.7.2 Impacts of Proposed Action

4.7.2.1 *Impacts of Continued Operations*

Weapons-Related Activities

Ambient Concentrations. The estimation of air quality impacts for continued operations was made using the following assumptions:

- Continued operations cover the 10-year period examined.
- Three weapons levels are representative of the range of likely levels:
  - — 2,000 weapons per year.
  - — 1,000 weapons per year.
  - — 500 weapons per year.

The term "weapons level" includes activities related to the assembly and disassembly of nuclear weapons, certain maintenance and monitoring activities regarding the nuclear weapons stockpile, modification of nuclear weapons, production of HE, and the open burning of HE.

Air quality modeling was performed for each level of continued operations using the ISCST2 and ISCLT2 models to estimate ambient concentrations. The modeling methodology was the same as outlined in section 4.7.1.3 (Ambient Air Quality) and more fully described in appendix B.

The emissions inventory used for the 2,000 weapons level was the same as that used for the Affected Environment (section 4.7.1.3 and appendix B), except that the Burning Ground Upgrade emissions were added and the HE explosive mixture that was burned included LX–04 and PBX–9404 rather than LX–17 and PBX–9404. Information from Pantex Plant personnel indicated that LX–17 would not be burned in the 1997 to 2007 period.

The Burning Ground Upgrade project would replace the current methods of removing HE contamination from equipment and parts. The upgrade would consist of a covered three-sided structure with a fan to exhaust emissions through an elevated stack. The wood currently used as an auxiliary heat source for the burns would be replaced by natural gas. The modeling results are presented in Tables 4.7.2.1–1 and 4.7.2.1–2.

Table 4.7.2.1–1 presents the maximum criteria pollutant concentrations that were obtained at or near the Pantex Plant boundary. The NAAQS for these pollutants are also shown for comparison. Table 4.7.2.1–2 presents the maximum chemical pollutant concentrations that were obtained at or near the Pantex Plant boundary. The applicable State of Texas ESL is also shown for comparison. Table 4.7.2.1–2 presents the concentrations calculated for the continued operations at the 2,000, 1,000, and 500 weapons levels for those pollutants that are listed in CAA (plus alcohols) and the 2,000 weapons level for those pollutants that are listed by TNRCC.

The tables show that, except for alcohols, all criteria pollutant and chemical air pollutant concentrations are below their respective ambient air quality standards or their respective ESLs for continued operations at all three levels. For those pollutants listed by TNRCC, the estimated concentrations are low enough for the 2,000 weapons level that the results for the reduced operations levels (i.e. 1,000 and 500 weapons levels) were not calculated.

TABLE 4.7.2.1–1.—*Estimated Maximum Fence Line Concentration of Criteria Pollutants for the 2,000, 1,000, and 500 Weapons Levels*

POLLUTANT	AVERAGING TIME	NAAQS $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION $\mu g/m^3$		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
CO - 45.4 kg (100 lb) HE	1-hour	4.00×10^4	9.24×10^2	9.24×10^2	9.23×10^2
	8-hour	1.00×10^4	1.61×10^2	1.61×10^2	1.61×10^2
CO - 363 kg (800 lb) HE	1-hour	4.00×10^4	9.24×10^2	9.24×10^2	9.23×10^2
	8-hour	1.00×10^4	1.61×10^2	1.61×10^2	1.61×10^2
CO - BGU	1-hour	4.00×10^4	2.90×10^3	2.90×10^3	2.90×10^3
	8-hour	1.00×10^4	6.02×10^2	6.02×10^2	6.02×10^2
Lead	1st Qtr	1.50	1.02×10^{-3}	5.10×10^{-4}	2.55×10^{-4}
	2nd Qtr	1.50	9.64×10^{-4}	4.82×10^{-4}	2.41×10^{-4}
	3rd Qtr	1.50	1.58×10^{-3}	7.90×10^{-4}	3.95×10^{-4}
	4th Qtr	1.50	9.50×10^{-3}	3.25×10^{-3}	1.62×10^{-3}
Lead - BGU	1st Qtr	1.50	2.28×10^{-2}	1.89×10^{-2}	1.87×10^{-2}
	2nd Qtr	1.50	6.62×10^{-2}	3.22×10^{-2}	3.20×10^{-2}
	3rd Qtr	1.50	9.36×10^{-2}	4.41×10^{-2}	4.38×10^{-2}
	4th Qtr	1.50	4.14×10^{-2}	2.08×10^{-2}	2.08×10^{-2}
NO_2 - 45.4 kg (100 lb) HE	Annual	1.00×10^2	2.15	2.15	2.15
NO_2 - 363 kg (800 lb) HE	Annual	1.00×10^2	6.39×10^{-1}	6.26×10^{-1}	6.19×10^{-1}
NO_2 - BGU	Annual	1.00×10^2	5.42×10^{-1}	5.28×10^{-1}	5.21×10^{-1}
PM_{10} - 45.4 kg (100 lb) HE	Annual	5.00×10^1	8.73	8.68	8.67
	24-hour	1.50×10^2	8.85×10^1	8.84×10^1	8.83×10^1
PM_{10} - 363 kg (800 lb) HE	Annual	5.00×10^1	1.51	7.64×10^{-1}	5.63×10^{-1}
	24-hour	1.50×10^2	2.24×10^1	9.97	9.84
SO_2 - BGU	Annual	8.00×10^1	0.00	0.00	0.00
	24-hour	3.65×10^2	2.00×10^{-5}	2.00×10^{-5}	2.00×10^{-5}
	3-hour	1.30×10^3	8.00×10^{-5}	8.00×10^{-5}	8.00×10^{-5}
	30-minute	1.02×10^3	1.60×10^{-4}	1.60×10^{-4}	1.60×10^{-4}

Note: Table shows the ISCST2 and ISCLT2 modeling results (maximum fence line concentrations).
BGU - Burning Ground Upgrade
Source: TNRCC 1993a

TABLE 4.7.2.1–2.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants for the 2,000, 1,000, and 500 Weapons Levels at Pantex Plant*

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
CLEAN AIR ACT LISTED AIR POLLUTANTS[b]					
1,1,2-trichloroethane	Annual	5.50×10^{1}	8.07×10^{-2}	3.97×10^{-2}	1.99×10^{-2}
	30-minute	5.50×10^{2}	1.73×10^{1}	8.53	4.27
1,3-butadiene - 45.4 kg (100 lb) HE	Annual	1.10×10^{1}	9.09×10^{-3}	8.06×10^{-3}	7.55×10^{-3}
	30-minute	1.10×10^{2}	3.76	3.73	3.72
1,3-butadiene - 363 kg (800 lb) HE	Annual	1.10×10^{1}	9.09×10^{-3}	8.06×10^{-3}	7.55×10^{-3}
	30-minute	1.10×10^{2}	3.76	3.73	3.72
2-nitropropane	Annual	5.00	3.56×10^{-2}	1.78×10^{-2}	8.88×10^{-3}
	30-minute	5.00×10^{1}	8.55	4.27	2.13
Alcohols[c]	Annual	NA	7.01×10^{-1}	6.37×10^{-1}	6.05×10^{-1}
	30-minute	1.00×10^{2}	1.95×10^{2}	1.95×10^{2}	1.95×10^{2}
Benzene	Annual	3.00	5.47×10^{-2}	4.54×10^{-2}	4.48×10^{-2}
	30-minute	7.50×10^{1}	1.94×10^{1}	1.83×10^{1}	1.82×10^{1}
Carbon Disulfide	Annual	3.00	9.39×10^{-2}	4.70×10^{-2}	2.35×10^{-2}
	30-minute	3.00×10^{1}	2.26×10^{1}	1.13×10^{1}	5.64
Carbon Tetrachloride	Annual	1.30×10^{1}	8.19×10^{-2}	4.07×10^{-2}	2.03×10^{-2}
	30-minute	1.26×10^{2}	1.97×10^{1}	9.77	4.89
Chlorobenzene	Annual	4.60×10^{1}	8.13×10^{-2}	4.07×10^{-2}	2.03×10^{-2}
	30-minute	4.60×10^{2}	1.95×10^{1}	9.77	4.89
Chromium - 45.4 kg (100 lb) HE	Annual	1.00×10^{-1}	1.91×10^{-3}	1.91×10^{-3}	1.91×10^{-3}
	30-minute	1.00	9.72×10^{-2}	9.72×10^{-2}	9.72×10^{-2}
Chromium - 363 kg (800 lb) HE	Annual	1.00×10^{-1}	8.00×10^{-5}	8.00×10^{-5}	8.00×10^{-5}
	30-minute	1.00	7.62×10^{-3}	7.62×10^{-3}	7.62×10^{-3}
Chromium - BGU	Annual	1.00×10^{-1}	1.49×10^{-3}	1.49×10^{-3}	1.49×10^{-3}
	30-minute	1.00	1.33×10^{-1}	1.33×10^{-1}	1.33×10^{-1}
Cresols	Annual	NA	1.72×10^{-3}	8.60×10^{-4}	4.30×10^{-4}
	30-minute	5.00	4.13×10^{-1}	2.07×10^{-1}	1.03×10^{-1}
Cresylic Acid	Annual	NA	2.14×10^{-3}	1.07×10^{-3}	5.30×10^{-4}
	30-minute	5.00	5.13×10^{-1}	2.56×10^{-1}	1.28×10^{-1}
Dibenzofurans - 45.4 kg (100 lb) HE	Annual	NA	2.00×10^{-5}	2.00×10^{-5}	2.00×10^{-5}
	30-minute	NA	9.60×10^{-4}	9.60×10^{-4}	9.60×10^{-4}
Dibenzofurans - 363 kg (800 lb) HE	Annual	NA	0.00[e]	0.00[e]	0.00[e]
	30-minute	NA	8.00×10^{-5}	8.00×10^{-5}	8.00×10^{-5}
Dimethylformamide	Annual	3.00×10^{1}	6.19×10^{-2}	6.19×10^{-2}	6.19×10^{-2}
	30-minute	3.00×10^{2}	2.80×10^{1}	2.80×10^{1}	2.80×10^{1}

TABLE 4.7.2.1–2.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants for the 2,000, 1,000, and 500 Weapons Levels at Pantex Plant*-Continued

POLLUTANT	AVERAGING TIME	ESL µg/m³	MAXIMUM FENCE LINE CONCENTRATION (µg/m³)		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
Ester Glycol Ethers	Annual 30-minute	NA NA	1.50×10^{-1} 3.59×10^{1}	7.45×10^{-2} 1.79×10^{1}	3.72×10^{-2} 8.95
Ethyl Acetate	Annual 30-minute	1.44×10^{3} 1.44×10^{4}	6.93 1.99×10^{3}	6.79 1.99×10^{3}	6.71 1.99×10^{3}
Ethyl Benzene	Annual 30-minute	4.34×10^{2} 2.00×10^{3}	1.29×10^{-1} 3.11×10^{1}	6.47×10^{-2} 1.56×10^{1}	3.24×10^{-2} 7.78
Ethylene Dichloride	Annual 30-minute	4.00 1.60×10^{2}	3.99×10^{-2} 9.58	1.95×10^{-2} 4.62	9.74×10^{-3} 2.31
Formaldehyde - 45.4 kg (100 lb) HE	Annual 30-minute	1.50 1.50×10^{1}	4.03×10^{-3} 3.66×10^{-1}	4.03×10^{-3} 3.66×10^{-1}	4.01×10^{-3} 3.66×10^{-1}
Formaldehyde - 363 kg (800 lb) HE	Annual 30-minute	1.50 1.50×10^{1}	4.03×10^{-3} 3.66×10^{-1}	4.03×10^{-3} 3.66×10^{-1}	4.01×10^{-3} 3.66×10^{-1}
Hydrogen chloride - 45.4 kg (100 lb) HE	Annual 30-minute	1.00×10^{-1} 7.50×10^{1}	7.59×10^{-2} 5.19	7.59×10^{-2} 5.19	7.59×10^{-2} 5.19
Hydrogen chloride - 363 kg (800 lb) HE	Annual 30-minute	1.00×10^{-1} 7.50×10^{1}	3.06×10^{-2} 3.24	3.06×10^{-2} 3.24	3.06×10^{-2} 3.24
Hydrogen chloride - BGU	Annual 30-minute	1.00×10^{-1} 7.50×10^{1}	6.89×10^{-2} 6.17	6.89×10^{-2} 6.17	6.89×10^{-2} 6.17
Hydrogen cyanide - BGU	Annual 30-minute	5.50 5.50×10^{1}	1.00×10^{-5} 7.70×10^{-4}	1.00×10^{-5} 7.70×10^{-4}	1.00×10^{-5} 7.70×10^{-4}
Hydrogen fluoride - 45.4 kg (100 lb) HE	3-hour 12-hour 24-hour	4.90 3.68 2.86	4.21 1.05 7.46×10^{-1}	4.21 1.05 7.46×10^{-1}	4.21 1.05 7.46×10^{-1}
Hydrogen fluoride - 363 kg (800 lb) HE	3-hour 12-hour 24-hour	4.90 3.68 2.86	2.94×10^{-1} 7.36×10^{-2} 5.73×10^{-2}	2.94×10^{-1} 7.36×10^{-2} 5.73×10^{-2}	2.94×10^{-1} 7.36×10^{-2} 5.73×10^{-2}
Hydrogen fluoride - BGU	3-hour 12-hour 24-hour	4.90 3.68 2.86	3.59 1.32 7.49×10^{-1}	3.59 1.32 7.49×10^{-1}	3.59 1.32 7.49×10^{-1}
Mercury	Annual 24-hour 30-minute	5.00×10^{-2} 2.50×10^{-1} 5.00×10^{-1}	0.00[e] 0.00[e] 0.00[e]	0.00[e] 0.00[e] 0.00[e]	0.00[e] 0.00[e] 0.00[e]
Methanol	Annual 30-minute	2.62×10^{2} 2.62×10^{3}	5.75×10^{-1} 2.45×10^{2}	5.58×10^{-1} 2.45×10^{2}	5.50×10^{-1} 2.45×10^{2}

TABLE 4.7.2.1–2.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants for the 2,000, 1,000, and 500 Weapons Levels at Pantex Plant*-Continued

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
Methyl Cyanide - 45.4 kg (100 lb) HE	Annual	NA	0.00[e]	0.00[e]	0.00[e]
	30-minute	NA	0.00[e]	0.00[e]	0.00[e]
Methyl Cyanide - 363 kg (800 lb) HE	Annual	NA	0.00[e]	0.00[e]	0.00[e]
	30-minute	NA	0.00[e]	0.00[e]	0.00[e]
Methyl Ethyl Ketone	Annual	5.90×10^{2}	5.10	4.89	4.78
	30-minute	3.90×10^{3}	1.40×10^{3}	1.40×10^{3}	1.40×10^{3}
Methyl Isobutyl Ketone	Annual	2.05×10^{2}	1.85×10^{-2}	9.16×10^{-3}	4.58×10^{-3}
	30-minute	2.05×10^{3}	4.45	2.20	1.10
Methylene Chloride	Annual	2.60×10^{1}	7.37×10^{-1}	6.69×10^{-1}	6.69×10^{-1}
	30-minute	2.60×10^{2}	1.80×10^{2}	1.80×10^{2}	1.80×10^{2}
Naphthalene - 45.4 kg (100 lb) HE	Annual	5.00×10^{1}	1.10×10^{-4}	1.10×10^{-4}	1.10×10^{-4}
	30-minute	4.40×10^{2}	5.48×10^{-3}	5.48×10^{-3}	5.48×10^{-3}
Naphthalene - 363 kg (800 lb) HE	Annual	5.00×10^{1}	0.00[e]	0.00[e]	0.00[e]
	30-minute	4.40×10^{2}	4.30×10^{-4}	4.30×10^{-4}	4.30×10^{-4}
Nickel - BGU	Annual	1.50×10^{-2}	2.40×10^{-4}	2.40×10^{-4}	2.40×10^{-4}
	30-minute	1.50×10^{-1}	2.16×10^{-2}	2.16×10^{-2}	2.16×10^{-2}
Nitrobenzene	Annual	5.00	2.14×10^{-3}	1.07×10^{-3}	5.35×10^{-4}
	30-minute	2.40×10^{1}	5.13×10^{-1}	2.56×10^{-1}	1.28×10^{-1}
Phenol - 45.4 kg (100 lb) HE	Annual	1.90×10^{1}	5.70×10^{-4}	5.70×10^{-4}	5.70×10^{-4}
	30-minute	1.54×10^{2}	2.92×10^{-2}	2.92×10^{-2}	2.92×10^{-2}
Phenol - 363 kg (800 lb) HE	Annual	1.90×10^{1}	2.00×10^{-5}	2.00×10^{-5}	2.00×10^{-5}
	30-minute	1.54×10^{2}	2.29×10^{-3}	2.29×10^{-3}	2.29×10^{-3}
Tetrachloroethylene	Annual	3.40×10^{1}	7.33×10^{-2}	3.67×10^{-2}	1.83×10^{-2}
	30-minute	3.40×10^{2}	1.76×10^{1}	8.81	4.41
Titanium - BGU	Annual	NA	6.50×10^{-4}	6.50×10^{-4}	6.50×10^{-4}
	30-minute	5.00×10^{2}	5.82×10^{-2}	5.82×10^{-2}	5.82×10^{-2}
Toluene	Annual	1.88×10^{2}	1.73	1.45	7.15×10^{-1}
	30-minute	1.88×10^{3}	5.58×10^{2}	5.41×10^{2}	2.66×10^{2}
Trichloroethylene	Annual	1.35×10^{2}	2.12×10^{-1}	1.06×10^{-1}	5.27×10^{-2}
	30-minute	1.35×10^{3}	5.11×10^{1}	2.55×10^{1}	1.26×10^{1}
Triethylamine	Annual	4.00	2.38×10^{-3}	2.38×10^{-3}	2.38×10^{-3}
	30-minute	4.00×10^{1}	1.08	1.08	1.08
Xylene	Annual	4.34×10^{2}	4.74×10^{-1}	2.34×10^{-1}	1.17×10^{-1}
	30-minute	3.70×10^{3}	1.45×10^{2}	7.26×10^{1}	3.62×10^{1}

TABLE 4.7.2.1–2.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants for the 2,000, 1,000, and 500 Weapons Levels at Pantex Plant*-Continued

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
TNRCC LISTED AIR POLLUTANTS[d]					
1,1,1-chloroethane	Annual 30-minute	5.00×10^{1} 5.00×10^{2}	5.28×10^{-1} 1.27×10^{-2}	The maximum estimated fence line concentrations of these air pollutants for these operation levels would be lower than those concentrations estimated for the 2,000 weapons operation level.	
1,3,5-trinitrobenzene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 2.00	0.00[e] 3.00×10^{-5}		
1,3,5-trinitrobenzene - 363 kg (800 lb) HE	Annual 30-minute	NA 2.00	0.00[e] 0.00[e]		
1-butanol	Annual 30-minute	7.60×10^{1} 7.60×10^{2}	1.99×10^{-2} 4.79		
2,4,6-trinitrotoluene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00	0.00[e] 3.30×10^{-4}		
2,4,6-trinitrotoluene - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00	0.00[e] 2.00×10^{-5}		
2,4-dinitrotoluene - 45.4 kg (100 lb) HE	Annual 30-minute	1.50×10^{-1} 1.50×10^{1}	0.00[e] 5.00×10^{-5}		
2,4-dinitrotoluene - 363 kg (800 lb) HE	Annual 30-minute	1.50×10^{-1} 1.50×10^{1}	0.00[e] 3.00×10^{-5}		
2,6-dinitrotoluene - 45.4 kg (100lb) HE	Annual 30-minute	NA 1.50×10^{1}	0.00 5.00×10^{-4}		
2,6-dinitrotoluene - 363 kg (800 lb) HE	Annual 30-minute	NA 1.50×10^{1}	0.00[e] 4.00×10^{-5}		
2-ethoxyethanol	Annual 30-minute	NA 1.80×10^{2}	3.91×10^{-1} 9.42		
2-nitronaphthalene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00×10^{2}	1.00×10^{-5} 4.20×10^{-4}		
2-nitronaphthalene - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00×10^{2}	0.00[e] 2.00×10^{-5}		
Acetone	Annual 30-minute	5.90×10^{2} 5.90×10^{3}	3.39 5.19×10^{2}		
Acetylene - 45.4 kg (100 lb) HE	Annual 30-minute	2.66×10^{3} 2.66×10^{4}	3.33×10^{-3} 1.11		
Acetylene - 363 kg (800 lb) HE	Annual 30-minute	2.66×10^{3} 2.66×10^{4}	3.33×10^{3} 1.11		
Aluminum - 45.4 kg (100 lb) HE	Annual 30-minute	5.00 5.00×10^{1}	1.28×10^{-3} 5.22×10^{-2}		
Aluminum - 363 kg (800 lb) HE	Annual 30-minute	5.00 5.00×10^{1}	1.17×10^{-3} 4.94×10^{-2}		
Ammonia	Annual 30-minute	1.70×10^{1} 1.70×10^{2}	2.89×10^{-2} 1.31×10^{1}		
Barium	Annual 30-minute	5.00×10^{-1} 5.00	1.25×10^{-3} 2.93×10^{-3}		

TABLE 4.7.2.1–2.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants for the 2,000, 1,000, and 500 Weapons Levels at Pantex Plant*-Continued

POLLUTANT	AVERAGING TIME	ESL μg/m^3	MAXIMUM FENCE LINE CONCENTRATION (μg/m^3)		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
Benzo(a)anthracene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00×10^{-1}	1.00×10^{-5} 5.00×10^{-4}	The maximum estimated fence line concentrations of these air pollutants for these operation levels would be lower than those concentrations estimated for the 2,000 weapons operation level.	
Benzo(a)anthracene - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00×10^{-1}	0.00[e] 4.00×10^{-5}		
Benzo(a)pyrene - 45.4 kg (100 lb) HE	Annual 30-minute	3.00×10^{-3} 3.00×10^{-2}	1.00×10^{-5} 4.10×10^{-4}		
Benzo(a)pyrene - 363 kg (800 lb) HE	Annual 30-minute	3.00×10^{-3} 3.00×10^{-2}	0.00[e] 2.00×10^{-5}		
Bismuth	Annual 30-minute	5.00 5.00×10^{2}	3.00×10^{-5} 1.13×10^{-3}		
Butane	Annual 30-minute	1.90×10^{3} 1.90×10^{4}	2.98×10^{-2} 1.12×10^{1}		
Butene	Annual 30-minute	NA 1.60×10^{2}	2.81×10^{-1} 1.18×10^{1}		
Calcium	Annual 30-minute	5.00 5.00×10^{1}	5.00×10^{-5} 1.90×10^{-3}		
Chlorinated Fluorocarbon	Annual 30-minute	NA 1.80×10^{4}	2.90×10^{-1} 6.93×10^{1}		
Copper	Annual 30-minute	1.00 1.00×10^{1}	3.08×10^{-3} 1.25×10^{-1}		
Cyanogen - 45.4 kg (100 lb) HE	Annual 30-minute	2.10×10^{1} 2.10×10^{2}	1.00×10^{-5} 2.00×10^{-4}		
Cyanogen - 363 kg (800 lb) HE	Annual 30-minute	2.10×10^{1} 2.10×10^{2}	0.00[e] 2.00×10^{-5}		
Cyclohexane	Annual 30-minute	3.40×10^{2} 1.44×10^{3}	3.68×10^{-1} 9.41×10^{1}		
Cyclohexanone	Annual 30-minute	1.00×10^{2} 4.81×10^{2}	6.09×10^{-2} 1.44		
Dioxane	Annual 30-minute	9.00×10^{1} 9.00×10^{2}	7.88×10^{-1} 3.57×10^{1}		
Ethyl Ether	Annual 30-minute	NA 9.27×10^{2}	3.33×10^{-1} 7.96×10^{1}		
Ethylene - 45.4 kg (100 lb) HE	Annual 30-minute	NA 1.17×10^{3}	6.04×10^{-1} 2.53×10^{2}		
Ethylene - 363 kg (800 lb) HE	Annual 30-minute	NA 1.17×10^{3}	6.04×10^{-1} 2.44×10^{2}		
Formic Acid - 45.4 kg (100 lb) HE	Annual 30-minute	9.40 9.40×10^{1}	0.00[e] 8.00×10^{-5}		
Formic Acid - 363 kg (800 lb) HE	Annual 30-minute	9.40 9.40×10^{1}	0.00[e] 2.00×10^{-5}		
Iron - 45.4 kg (100 lb) HE	Annual 30-minute	NA 5.00×10^{1}	4.99×10^{-2} 1.82		

TABLE 4.7.2.1–2.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants for the 2,000, 1,000, and 500 Weapons Levels at Pantex Plant*-Continued

POLLUTANT	AVERAGING TIME	ESL μg/m³	MAXIMUM FENCE LINE CONCENTRATION (μg/m³)		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
Iron - 363 kg (800 lb) HE	Annual 30-minute	NA 5.00×10^{1}	2.44×10^{-2} 1.02	The maximum estimated fence line concentrations of these air pollutants for these operation levels would be lower than those estimated concentrations for the 2,000 weapons operation level.	
Isobutane	Annual 30-minute	1.90×10^{3} 4.84×10^{3}	4.01×10^{-2} 1.39×10^{1}		
Isobutanol	Annual 30-minute	1.52×10^{2} 1.52×10^{3}	2.27×10^{-2} 5.46		
Ketene - 45.4 kg (100 lb) HE	Annual 30-minute	9.00×10^{-1} 9.00	0.00[e] 0.00[e]		
Ketene - 363 kg (800 lb) HE	Annual 30-minute	9.00×10^{-1} 9.00	0.00[e] 0.00[e]		
Ketone	Annual 30-minute	NA 1.00×10^{2}	1.39×10^{-1} 3.34×10^{1}		
Lithium	Annual 30-minute	NA 1.00×10^{1}	4.00×10^{-5} 1.84×10^{-3}		
Magnesium	Annual 30-minute	NA 5.00×10^{1}	1.05×10^{-3} 4.41×10^{-2}		
Methane - 45.4 kg (100 lb) HE	Annual 30-minute	NA 3.00×10^{4}	7.16×10^{-1} 2.64×10^{1}		
Methane - 363 kg (800 lb)	Annual 30-minute	NA 3.00×10^{4}	7.16×10^{-1} 2.61×10^{1}		
N-butyl Alcohol	Annual 30-minute	7.60×10^{1} 7.60×10^{2}	1.35×10^{-1} 3.25		
Non-F Listed Solvents	Annual 30-minute	NA 1.00×10^{1}	9.40×10^{-4} 2.26×10^{-1}		
Ortho-dichlorobenzene	Annual 30-minute	NA 1.50×10^{3}	6.36×10^{-1} 1.53×10^{2}		
Propane	Annual 30-minute	1.80×10^{3} 1.80×10^{4}	4.21×10^{-2} 1.32×10^{1}		
Propene	Annual 30-minute	NA 3.00×10^{4}	3.71×10^{-1} 1.56×10^{2}		
Pyrene - 45.4 kg (100 lb) HE	Annual 30-minute	5.00×10^{-2} 5.00×10^{-1}	5.00×10^{-4} 1.57×10^{-3}		
Pyrene - 363 kg (800 lb) HE	Annual 30-minute	5.00×10^{-2} 5.00×10^{-1}	0.00[e] 9.00×10^{-5}		
Pyridine	Annual 30-minute	1.50×10^{1} 6.90×10^{1}	3.78×10^{-1} 9.08		
Silicon	Annual 30-minute	5.00 5.00×10^{2}	0.00[e] 2.90×10^{-4}		
Silver	Annual 30-minute	1.00×10^{-2} 1.00×10^{-1}	1.45×10^{-3} 6.22×10^{-2}		
Tetrahydrofuran	Annual 30-minute	5.90×10^{2} 5.90×10^{3}	7.55×10^{-1} 3.42×10^{2}		

TABLE 4.7.2.1–2.—*Estimated[a] Maximum Fence Line Concentration of Air Pollutants for the 2,000, 1,000, and 500 Weapons Levels at Pantex Plant*-Continued

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)		
			2,000 LEVEL	1,000 LEVEL	500 LEVEL
Trichlorofluoromethane	Annual 30-minute	5.62×10^3 2.80×10^4	4.21×10^{-1} 1.01×10^2	The maximum estimated fence line concentrations of these air pollutants for these operation levels would be lower than those estimated concentrations for the 2,000 weapons operation level.	
Trichlorotrifluoroethane	Annual 30-minute	NA 7.60×10^4	1.77 4.73×10^2		
Zinc	Annual 30-minute	5.00 5.00×10^1	1.32×10^{-3} 5.58×10^{-2}		

[a]EPA Model ISCST2 was used to calculate maximum fence line concentrations for all three operations levels.
[b]Hours of operations were taken into account for emissions from open burning and engine emissions for CAA listed air pollutants.
[c]The group of alcohols while not listed in CAA were estimated to exceed the conservative ESL used by TNRCC. Therefore, alcohols were included here for more complete presentation of results.
[d]Hours of operation were not taken into account and emissions were modeled for an entire year of meteorological data for TNRCC listed air pollutants.
[e]The ISCST2 air quality model returns a value of 0.00 for any concentration equal to or less than 1.00×10^{-5} $\mu g/m^3$ (i.e., less than one ten millionth of a part per billion or less than ten parts per quadrillion).
[f]Solvents that are not listed under 40 CFR 261.33.
BGU - Burning Ground Upgrade
NA - An ESL has not been established by TNRCC.
Sources: TNRCC 1996a; CAA as amended

The maximum concentrations of criteria pollutants and CAA listed air pollutants estimated to occur at the 11 residences located near the Pantex Plant boundary are below their respective ambient air standards or their respective ESLs. Appendix B presents tables of these concentrations for each of the 11 residences.

Alcohols exceeded the ESL at the boundary and at residence 10. These alcohols were modeled as a group and compared with the conservative ESL used by TNRCC. However, subsequent review of the inventories of the types of alcohols and quantities on hand at the plant showed that the use of the conservative ESL for the group of alcohols was excessively conservative. When the total concentrations of the individual alcohols were prorated, none of the individual alcohols exceeded their respective ESLs at or near the fence line. Table B.4.1–2 in appendix B shows the prorated concentrations of these alcohols.

Since ambient concentrations of all criteria pollutants and HAPs do not violate any of the ambient standards or ESLs beyond the Pantex Plant boundary, the air quality impacts from continued operations under the Proposed Action would be minor and would not be considered significant.

Criteria and VOC Pollutant Emissions

A summary of criteria and VOC pollutant emissions for the 2,000, 1,000 and 500 weapons levels are presented in Tables 4.7.2.1–3, 4.7.2.1–4, and 4.7.2.1–5, respectively. Emissions for the 2,000 weapons level would be about the same as those shown in Table 4.7.1.3–6 with the addition of emissions projected for the Burning Ground upgrade. In general, emissions for 1,000 and 500 levels are less than those for the 2,000 weapons. However, emission reductions are not directly proportional to weapons level reductions. This result occurs because some facility emissions would not be reduced when weapons levels are reduced (e.g., heating of buildings).

TABLE 4.7.2.1–3.—*Estimated Criteria and VOC Pollutant Emissions Inventory for Stationary and Mobile Sources at Pantex Plant for 2,000 Weapons Level*

SOURCE	POLLUTANT					
	CO	NO_2	PM_{10}	SO_2	Pb	VOC[1]
STATIONARY SOURCES						
Building 10–2 kg/yr (lb/yr)	6.4 (14.0)	0.02 (0.04)	—	—	0.07 (0.15)	—
Zone 11 (8 Buildings) kg/yr (lb/yr)	101.7 (224.1)	504.0 (1,111.1)	11.7 (25.7)	—	—	—
Zone 12 (17 Buildings) kg/yr (lb/yr)	3,018.2 (6,654.1)	3,641.7 (8,028.5)	217.9 (480.3)	—	—	—
Firing Sites kg/yr (lb/yr)	90.5 (199.6)	3.9 (8.6)	1.1 (2.4)	—	—	—
Burning Trays kg/yr (lb/yr)	867.2 (1,911.9)	31,851.4 (70,219)	6,486.4 (14,300.0)	—	—	—
Burning Ground Upgrade kg/yr (lb/yr)	5,005.8 (11,036.0)	1,081.2 (2,383.6)	—	0.10 (0.2)	177.5 (391.4)	—
Buildings 16-7, 16-8, 16-10, 16-12, 16-13, 16-15 kg/yr (lb/yr)	7,955.6 (17,539.0)	28,918.0 (63,753.2)	1,028.7 (2,267.8)	—	7.6 (16.8)	—
Buildings 9-4, 9-5, 9-6 kg/yr (lb/yr)	7.9 (17.4)	39.5 (87.0)	1.0 (2.2)	—	—	—
Natural Gas Engines kg/yr (lb/yr)	570.6 (1,258.0)	4,421.6 (9,748.0)	—	—	—	—
Gasoline and Diesel Engines kg/yr (lb/yr)	2,671.3 (5,889.3)	8,485.4 (18,707.1)	605.8 (1,335.5)	—	—	—
Welding, Cutting, and Grinding kg/yr (lb/yr)	—	—	86.6 (191.0)	—	—	—
Subtotal kg/yr (lb/yr)	20,295.2 (44,743.4)	78,946.7 (174,046.1)	8,439.2 (18,604.9)	0.1 (0.2)	185.2 (408.4)	2,806.45 (6,187.06)
Subtotal metric tons/yr (tons/yr)	20.30 (22.37)	78.95 (87.02)	8.44 (9.30)	0.00 (0.00)	0.19 (0.20)	2,81 (3.09)
MOBILE SOURCES						
Mobile Sources metric tons/yr (tons/yr)	567.22 (625.25)	246.36 (271.57)	—	—	—	61.49 (67.79)
TOTALS						
Total metric tons/yr (tons/yr)	589.51 (647.6)[2]	325.31 (358.6)[2]	8.44 (9.30)	0.00 0.00	0.19 (0.20)	64.3 (70.88)

[1]Based on VOCs in Table 4.7.1.3–3
[2]Totals are different from those of Table 4.7.1.3–7 because of differences in future operation at the 2,000 weapons per year level compared to the Affected Environment which was based on 1993 data.
Note: SO_2 is emitted only from BGU operation; therefore, this pollutant is considered only for 2,000, 1,000, and 500 weapons scenarios.
Sources: Pantex 1996; PC 1994

TABLE 4.7.2.1–4.—*Estimated Criteria and VOC Pollutant Emissions Inventory for Stationary and Mobile Sources at Pantex Plant for 1,000 Weapons Level*

SOURCE	POLLUTANT					
	CO	NO_2	PM_{10}	SO_2	Pb	VOC[1]
STATIONARY SOURCES						
Building 10-2 kg/yr (lb/yr)	3.2 (7.0)	0.01 (0.02)	—	—	0.04 (0.08)	—
Zone 11 (8 Buildings) kg/yr (lb/yr)	101.2 (223.2)	503.9 (1,111.0)	11.6 (25.6)	—	—	—
Zone 12 (17 Buildings) kg/yr (lb/yr)	2,927.2 (6,453.4)	3,586.2 (7,906.2)	157.6 (347.4)	—	—	—
Firing Sites kg/yr (lb/yr)	45.3 (99.8)	2.0 (4.3)	0.5 (1.2)	—	—	—
Burning Trays kg/yr (lb/yr)	867.2 (1,911.2)	31,851.4 (70,219)	3,243.2 (7,150.0)	—	—	—
Burning Ground Upgrade kg/yr (lb/yr)	5,005.8 (11,036.0)	1,081.2 (2,383.6)	—	0.1 (0.2)	177.5 (391.4)	—
Buildings 16-7,16-8,16-10, 16-12,16-13,16-15 kg/yr (lb/yr)	7,574.5 (16,699.0)	28,916.8 (63,750.6)	1,028.5 (2,267.4)	—	3.8 (8.4)	—
Buildings 9-4, 9-5, 9-6 kg/yr (lb/yr)	7.9 (17.4)	39.5 (87.0)	1.0 (2.2)	—	—	—
Natural Gas Engines kg/yr (lb/yr)	570.6 (1,258.0)	4,421.6 (9,748.0)	—	—	—	—
Gasoline and Diesel Engines kg/yr (lb/yr)	2,671.3 (5,889.3)	8,485.4 (18,707.1)	605.8 (1,335.5)	—	—	—
Welding, Cutting, and Grinding kg/yr (lb/yr)	—	—	86.6 (191.0)	—	—	—
Subtotal kg/yr (lb/yr)	19,774.2 (43,594.3)	78,888.0 (173,916.8)	5,134.8 (11,320.3)	0.1 (0.2)	181.3 (399.9)	2,267.02 (4,997.83)
Subtotal metric tons/yr (tons/yr)	19.77 (21.80)	78.89 (86.96)	5.13 (5.66)	0.00 (0.00)	0.18 (0.20)	2.27 (2.50)
MOBILE SOURCES						
Mobile Sources metric tons/yr (tons/yr)	414.06 (456.42)	88.86 (97.95)	—	—	—	46.93 (51.73)
TOTALS						
Total metric tons/yr (tons/yr)	433.83 (478.22)	167.75 (184.91)	5.13 (5.66)	0.00 (0.00)	0.18 (0.20)	49.2 (54.23)

[1]Based on VOCs in Table 4.7.1.3–3

Note: SO_2 is emitted only from BGU operation; therefore, this pollutant is considered only for 2,000, 1,000 and 500 weapons scenarios.

Source: Pantex 1996; PC 1994

TABLE 4.7.2.1–5.—*Estimated Criteria and VOC Pollutant Emissions Inventory for Stationary and Mobile Sources at Pantex Plant for 500 Weapons Level*

SOURCE	POLLUTANT					
	CO	NO_2	PM_{10}	SO_2	Pb	VOC[1]
STATIONARY SOURCES						
Building 10–2 kg/yr (lb/yr)	1.6 (3.5)	0.01 (0.01)	—	—	0.02 (0.04)	—
Zone 11 (8 Buildings) kg/yr (lb/yr)	101.0 (222.7)	503.9 (1,111.0)	10.7 (23.6)	—	—	—
Zone 12 (17 Buildings) kg/yr (lb/yr)	2,881.7 (6,353.0)	3,558.5 (7,845.1)	127.4 (280.9)	—	—	—
Firing Sites kg/yr (lb/yr)	22.6 (49.9)	1.0 (2.1)	0.3 (0.6)	—	—	—
Burning Trays kg/yr (lb/yr)	867.2 (1,911.9)	31,851.4 (70,219)	1,621.6 (3,575.0)	—	—	—
Burning Ground Upgrade kg/yr (lb/yr)	5,005.8 (11,036.0)	1,081.2 (2,383.6)	—	0.1 (0.2)	177.5 (391.4)	—
Buildings 16-7,16-6,16-10,16-12,16-13,16-15 kg/yr (lb/yr)	7,384.0 (16,279.0)	28,916.2 (63,744.3)	1,028.4 (2,267.2)	—	1.9 (4.2)	—
Buildings 9-4, 9-5, 9-6 kg/yr (lb/yr)	7.9 (17.4)	39.5 (87.0)	1.0 (2.2)	—	—	—
Natural Gas Engines kg/yr (lb/yr)	570.6 (1,258.0)	4,421.6 (9,748.0)	—	—	—	—
Gasoline and Diesel Engines kg/yr (lb/yr)	2,671.3 (5,889.3)	8,485.4 (18,707.1)	605.8 (1,335.5)	—	—	—
Welding, Cutting, and Grinding kg/yr (lb/yr)	—	—	86.6 (191.0)	—	—	—
Subtotal kg/yr (lb/yr)	19,013.2 (43,020.7)	78,858.7 (173,847.2)	3,481.8 (7,676.0)	0.1 (0.2)	179.4 (395.6)	1,997.43 (4,403.52)
Subtotal metric tons/yr (tons/yr)	19.01 (21.51)	78.86 (86.92)	3.48 (3.84)	0.00 (0.00)	0.18 (0.20)	2.00 (2.20)
MOBILE SOURCES						
Mobile Sources metric tons/yr (tons/yr)	326.77 (360.20)	73.27 (80.77)	—	—	—	38.34 (42.26)
TOTALS						
Total metric tons/yr (tons/yr)	345.78 (381.71)	152.13 (167.69)	3.48 (3.84)	0.00 (0.00)	0.18 (0.20)	40.34 (44.46)

[1]Based on VOCs in Table 4.7.1.3–3

Note: SO_2 is emitted only from BGU operation; therefore, this pollutant is considered only for 2,000, 1,000 and 500 weapons scenarios.

Source: Pantex 1996; PC 1994

Criteria pollutant emissions resulting from continued operations at Pantex Plant would contribute about 1 percent or less to the overall pollution burden in Carson and Potter Counties (see Table 4.7.1.3–7 for county emissions). Since this represents such a small impact on the two closest counties, emissions from Pantex Plant would be expected to have a negligible impact on the regional air quality.

Radiological Emissions

The radiological emissions that were discussed for the Affected Environment (section 4.7.1.4) were assumed for the 2,000 weapons level. The impacts from these emissions would also be the same as those discussed in the Affected Environment above. The impacts from these emissions are several orders of magnitude below the DCGs and National Emissions Standards for Hazardous Air Pollutants (NESHAP) dose limits. Therefore, the impacts would not be significant. The emissions levels associated with the 1,000 and 500 weapons levels would be less than those for the 2,000 weapons level. Therefore, the impacts for these levels are bounded by the impacts for the 2,000 weapons level and are also not significant.

Pit Storage Activities

Only indirect pollutant emissions would result from pit storage activities. Pollutant exhaust emissions from the Safe Secure Tractor Trailers hauling weapons or pits to Pantex Plant and from the vehicles used by personnel responsible for pit storage would be the principal sources. Onsite pit transfers are accomplished with electric forklifts which do not emit any pollutants.

Pollutant emissions from these indirect sources are a small fraction of the total emissions from Pantex Plant. Therefore, air quality impacts resulting from pit storage activities would be negligible.

Environmental Restoration Activities

In May 1994, Pantex Plant was placed on the National Priorities List by EPA. The primary motivations for cleanup of these sites are to protect the general environment and to protect the health and safety of persons in proximity to the site.

Environmental restoration (ER) activities at Pantex Plant are expected to generate 772.6 cubic meters (1,010 cubic yards) of hazardous solid waste between 1997 and 2000 (see section 4.13), most of which will be in the form of contaminated soil. The majority of ER activities are expected to be completed by 2000.

Remedial actions at Pantex Plant could involve handling of contaminated soil. This handling could result in fugitive dust emissions that can carry inorganic particles and organic constituents that are contained in or are adhering to the dust.

Soil handling can also lead to enhancement of volatile organic emissions due to exposure of the contaminated soil to the atmosphere. Specific activities with emission potential include excavation, transport, dumping, storage, and grading.

Pantex Plant procedures for minimizing fugitive dust emissions would keep the impacts to a minimum. Thus, air quality impacts from ER activities would be reduced to a minimum and would, therefore, be negligible.

Waste Management Activities

The principal sources of pollutant emissions related to waste management activities are as follows:

- Burning Ground.
- Drum sampling.
- Bulk transport.

The emissions from these sources were included in the site-wide dispersion modeling. As indicated previously, the results of the site-wide modeling indicated that the continued operation of Pantex Plant would produce only negligible impacts to the regional and local air quality (see section 4.7.2.1).

4.7.2.2 *Impacts of New Facility Construction Upgrades*

Construction Impacts

During the construction phase of the new facility upgrades, exhaust emissions from construction equipment would consist of CO, VOCs, NO_2, SO_2, and particulate matter. The calculation of emission rates of exhaust pollutants from construction equipment was based on emission factors provided in the EPA document AP–42, *Compilation of Air Pollutant Emission Factors* (EPA 1995b, volume 2, Table II-7.1). For highway vehicles (worker commuting vehicles and delivery vehicles) emission factors were obtained from the EPA Mobile Source Emission Factor Model (MOBILE 5a) (EPA 1994).

Construction equipment composition that was assumed for the peak construction year, 1999, is shown in Table 4.7.2.2–1. (See section 3.1.1 for description of facility upgrade projects.) Fugitive dust generated during the clearing, grading, and other earth-moving operations is dependent on a number of factors, which include silt and moisture content of the soil, wind speed, and area disturbed. A common procedure to estimate fugitive emissions from an entire construction site is to use the EPA emission factor of 1.2 tons per acre per month of construction activity (EPA 1995b, volume 1, Section 13.2.3.3). This emission factor represents particles less than 30 microns in diameter. A multiplication factor of 0.5 was used to correct the emission rate to one for PM_{10} (EPA 1995b, volume 1, Page 13.2.2-3). Also, it was assumed that water would be applied to disturbed areas. This would reduce emission rates by about 50 percent (EPA 1985). It was estimated that construction of the facilities would disturb a total of 3.2 hectares (7.9 acres) over the construction period. It was assumed that the disturbance would occur in the first 2 years, 1998 and 1999, of the construction period.

TABLE 4.7.2.2–1.—*Assumed Equipment Used for Construction of New Facility Upgrades for 1999, the Peak Construction Year*

TYPE OF EQUIPMENT	NUMBER USED DAILY
Bulldozer	3
Grader	1
Front-End Loader	3
Backhoe	2
Roller	2
Crane	1
Portable Generator	3
Off-Highway Truck	3

The estimated annual pollutant emissions resulting from construction activities for the years 1998 through 2004 are presented in Table 4.7.2.2–2. Construction emissions during the peak year, 1999, increase the Pantex Plant annual emissions (see Table 4.7.1.3–7) by about 8 to 13 percent. The emission increases for the other construction years (1998, 2000, and 2001) are less. These temporary increases are too small to result in violations of the NAAQS beyond the Pantex Plant boundary. Therefore, air quality impacts resulting from construction of the new facility upgrades would be negligible.

Operations Impacts

Emissions resulting from the operation of the new or upgraded facilities have been mostly accounted for in the site-wide air quality analysis for continued operations under the

TABLE 4.7.2.2–2.—*Estimated Annual Pollutant Emissions Related to Construction Activities of New Facility Upgrades for the Period 1998 Through 2000 in metric tons (tons) per year*

YEAR	CO	NO_2	VOC	SO_2	PM_{10}
CONSTRUCTION EXHAUST					
1998	5.16 (5.69)	14.11 (15.55)	1.46 (1.61)	1.41 (1.55)	1.06 (1.17)
1999	8.33 (9.18)	22.77 (25.10)	2.34 (2.59)	2.27 (2.50)	1.71 (1.88)
2000	6.63 (7.31)	18.12 (19.97)	1.87 (2.06)	1.81 (1.99)	1.36 (1.50)
CONSTRUCTION WORKER AND DELIVERY VEHICLES					
1998	35.81 (39.47)	8.24 (9.09)	4.06 (4.51)	—	—
1999	58.01 (63.95)	13.84 (15.26)	6.65 (7.33)	—	—
2000	45.92 (50.62)	10.49 (11.56)	5.24 (5.78)	—	—
2001	8.51 (9.38)	2.16 (2.38)	0.98 (1.08)	—	—
FUGITIVE DUST FROM SOIL DISTURBANCE					
1998	—	—	—	—	1.096 (1.20)
1999	—	—	—	—	1.02 (1.12)
TOTAL					
1998	40.97 (45.16)	22.35 (24.64)	5.55 (6.12)	1.41 (1.55)	2.15 (2.37)
1999	66.34 (73.13)	36.61 (40.36)	8.99 (9.92)	2.27 (2.50)	2.73 (3.00)
2000	52.55 (57.93)	28.61 (31.53)	7.11 (7.84)	1.81 (1.99)	1.36 (1.50)
2001	9.73 (10.72)	5.47 (6.03)	1.32 (1.46)	0.33 (0.36)	0.24 (0.27)

Source: Calculated values

Proposed Action (section 4.7.2.1). Emissions from the Materials Compatibility and Assurance Facility, the Metrology and Health Physics Calibration and Acceptance Facility, the Nondestructive Evaluation Facility, and the Gas Analysis Laboratory currently occur at Pantex Plant. The only change in their emissions would be a change in their location.

The HWTPF and Pit Reuse Facility would be new facilities. The HWTPF and Pit Reuse Facility will use high efficiency particulate air (HEPA) filters to reduce particulate emissions. The HEPA filters have a collection efficiency of 99.97 percent. Activated charcoal canisters or equivalent equipment would be used to absorb organic gases at the HWTPF. These filter systems are capable of controlling both radioactive and nonradioactive pollutants. Since the emissions from this facility would be reduced to very low levels, air quality impacts would be negligible.

Overall, the emissions from these new or upgraded facilities would not produce ambient concentrations that would exceed the NAAQS or the Texas ESLs. In addition, no increases in radiological emissions are anticipated. Therefore, the air quality impacts would be negligible.

4.7.2.3 *Summary of Impacts*

An analysis of pollutant emissions and ambient concentrations resulting from Proposed Action activities found that air quality standards or guidelines would not be violated beyond the Pantex Plant boundary. Specifically, maximum ambient concentrations that would occur at the 11 residences near the boundary were found to be below the NAAQS and Texas ESLs. Therefore, air quality impacts resulting from the Proposed Action would be negligible.

4.7.3 Impacts of No Action Alternative

Weapon-Related Activities

The major difference between this alternative and the Proposed Action is that weapons disassembly operations would cease when 12,000 pits have been placed in interim storage at Pantex Plant. However, the requirement to support the weapons stockpile with other operations, including weapons assembly, modification, and surveillance activities will continue. Three weapon levels—2,000, 1,000, and 500—are assumed for analysis. In addition, no upgrade projects would be initiated under the No Action Alternative. Therefore, there would be no emissions from construction under this alternative.

Since the activities related to the assembly of weapons produce chemical and radiological pollutant emissions similar to those produced by disassembly, the ambient concentrations resulting from the three levels of weapons for this alternative would be approximately the same as those described in the Proposed Action (section 4.7.2.1). No operational emissions or air quality impacts above those described in the affected environment would occur because new facility upgrades would not be implemented under this alternative. Therefore, it may be concluded that the air quality impacts resulting from continued operation under the No Action Alternative would be similar to the Proposed Action; i.e., impacts would not be significant.

Pit Storage Activity (12,000 Pits Only)

The emissions resulting from pit storage activity would be the same as those for the Proposed Action (section 4.7.2.1). Indirect emissions from Safe Secure Tractor Trailers hauling weapons or pits to Pantex Plant would be only a small fraction of the total Pantex Plant emission inventory. Also, once the storage limit of 12,000 pits has been reached, the emissions related to this activity would cease. Thus air quality impacts resulting from the storage of 12,000 pits would be negligible.

Environmental Restoration Activities

ER activities under the alternative would proceed in the same manner as under the Proposed Action (section 4.7.2.1). Emissions related to soil disturbance activities would be minimized through the application of water. Particulate emissions would not cause PM_{10} standards to be violated offsite. Air quality impacts would be negligible.

Waste Management Activities

Waste management activities under this alternative would be the same as under the Proposed Action. The emissions from these activities were included in the site-wide dispersion modeling for the Proposed Action. Air quality impacts for waste management activities under this alternative would also be negligible.

4.7.4 Impacts of Pit Storage Relocation Alternative

4.7.4.1 *Impacts of Relocating 20,000 Pits*

The Pit Storage Relocation Alternative includes all operations, upgrades, and modifications of the Proposed Action. Emissions resulting from activities related to the relocation of 20,000 pits would be added to those of the Proposed Action (see section 4.7.2.1). Indirect emissions from exhausts of the vehicles required to haul the pits to the alternative sites would be the only chemical or radiological emissions associated with the Pit Storage Relocation Alternative. These additional pollutant emissions would constitute a small fractional increase in the site-wide emission inventory of the Proposed Action. This small emission increase would not produce any detectable change in the ambient concentrations described in the Proposed

Action. Therefore, as in the case of the Proposed Action, air-quality impacts would not be significant.

4.7.4.2 *Impacts of Relocating 8,000 Pits*

Emissions resulting from the relocation of 8,000 pits would be less than the emissions from the relocation of 20,000 pits. Therefore, as described in the previous section, the air quality impacts of relocating 8,000 pits would not be significant.

4.7.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.7.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

The WM PEIS evaluated alternatives for the construction and operation of LLMW and LLW waste facilities at Pantex Plant. None of the alternatives are expected to cause an exceedance of air quality standards. For a discussion of the atmospheric release effects on human health related to a chemical or radiological accident, see section 4.14.5.1 in this volume.

4.7.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, air quality impacts from operations are expected to be less than current impacts. Air quality would remain within regulatory limits. Under the downsizing alternative, the operations would be consolidated. Air quality impacts would be equivalent to those of the No Action Alternative. Under the Relocation Alternative, air quality impacts from assembly and disassembly operations and HE fabrication would cease.

4.7.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. Increased PM_{10} and total suspended particle concentrations may occur during the peak construction period, particularly during dry and windy conditions. Appropriate control measures would be followed to minimize pollutant concentrations during construction. Concentrations of all pollutants at the site boundary would remain within applicable Federal and State ambient air quality standards. During operation, concentrations of criteria and toxic or hazardous air pollutants are predicted to be in compliance with Federal, State, and local air quality regulations or guidelines (DOE 1996a:chapter 4).

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on choosing the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding Disposition Alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, MOX fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

4.7.6 Potential Mitigation Measures

Although the air emissions do not involve significant impacts, DOE used Best Available Control Technology as defined in TNRCC regulation and will continue to do so, to identify operational areas where improvements can be made in the management practices. An example is the ongoing substitution of newer, more environmentally benign cleaning solvents.

DOE may chose one or more of the following measures to alleviate the temporary dust emissions from construction activities. These measures could include covering, watering, or applying nontoxic solid binders to exposed piles of gravel, sand, dirt; and suspending all excavation and grading operations when wind speeds are exceedingly high.

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4.8 ACOUSTICS (NOISE)

4.8.1 Affected Environment

This section addresses noise issues at Pantex Plant. The characteristics of sound include parameters such as amplitude, frequency, and duration. The decibel (dB), a logarithmic unit that accounts for large variations in amplitude, is the accepted standard unit measurement of sound. Different sounds have different frequency content.

When measuring sound to determine its effects on the human population, A-weighted sound levels (dBA) are typically used to account for the response of the human ear. A-weighted sound levels represent adjusted sound levels. The adjustments are made according to the frequency content of the sound. Examples of typical A-weighted sound levels are shown in Figure 4.8.1–1.

Another sound scale is the C-weighted scale (dBC). In contrast to the A-weighted scale, the C-weighted scale provides no adjustment to the noise signal over most of the audible frequency range. The C-weighted scale is generally used to measure impulsive noise such as airblasts from explosions, sonic booms, and gunfire.

Noise is usually defined as sound that is undesirable because it interferes with speech, communication, or hearing; is intense enough to damage hearing; or is otherwise annoying. Noise levels often change with time. To compare levels over different time periods, several descriptors were developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on man, including land use compatibility, sleep and speech interference, annoyance, hearing loss, and startle effects.

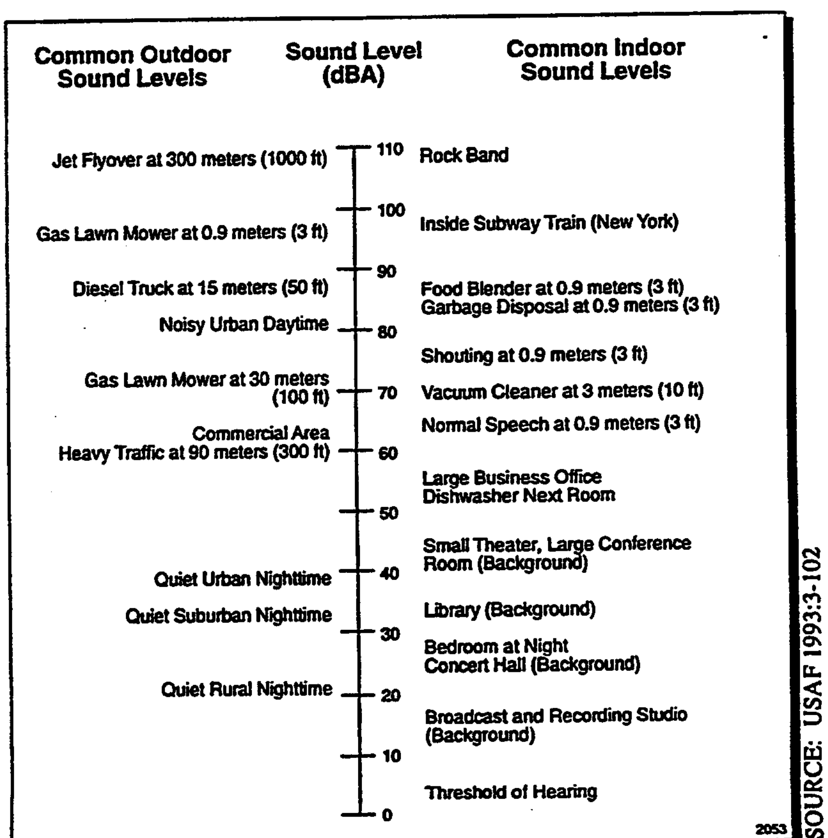

FIGURE 4.8.1–1.—*Comparative A-Weighted Sound Levels.*

The day-night average sound level (DNL) (also written as L_{dn} in equations) was developed to evaluate the total community noise environment. The DNL is the average A-weighted sound level during a 24-hour period with 10 dB added to nighttime levels (between 10:00 p.m. and 7:00 a.m.). This adjustment is added to account for the increased human sensitivity to nighttime noise events. The DNL was endorsed by the Environmental Protection Agency and is mandated by the U.S. Department of Housing and Urban Development, the Federal Aviation Administration, and the Department of Defense for land use assessments.

The DNL is sometimes supplemented with other metrics, primarily the equivalent sound level (L_{eq}). The L_{eq} is the equivalent, steady state level that would contain the same acoustical energy as the time-varying level during the same time interval.

Frequently, statistical values of noise levels are used to describe a time-varying noise measured in dBA. The noise variation is described in terms of the percentage of time a given noise level is exceeded. The L_{eq} values usually used are L_{10}, L_{50}, and L_{90}, the noise levels that are exceeded 10, 50, and 90 percent of the time, respectively. L_{10} gives an indication of the top end of the level range though it can still be substantially less than the occasional peak (L_{max}). L_{90} corresponds to the background noise level in the absence of nearby noise sources. L_{50} is the median noise level.

Table 4.8.1–1 shows how differences in sound magnitudes are perceived. Differences over long timespans, such as before and after a project requiring several years to complete, are more difficult to judge. Consequently, for changes that take place over a long period of time, sound level shifts of 5 dBA or more may be "barely perceptible."

Except for the prohibition of nuisance noise, neither the State of Texas nor its local governments have established specific numerical environmental noise standards applicable to Pantex Plant. However, community annoyance surveys have provided a basis for establishing guidelines for sound levels compatible with various land uses. Table 4.8.1–2 shows land uses that are defined by the Federal Aviation Administration and the Federal Interagency Committee on Urban Noise as normally compatible with various noise exposures. This table is used to ensure compatible planning around airports and is appropriate for evaluating exposures from other noise sources. The guidelines define

TABLE 4.8.1–1.—*Subjective Response to Changes in Sound Level*[1]

CHANGE IN SOUND LEVEL	PERCEIVED CHANGE IN LOUDNESS
±1 dB	Requires close attention to notice
±3 dB	Barely perceptible
±5 dB	Quite noticeable[2]
±10 dB	Dramatic; sounds nearly twice or half as loud
±20 dB	Striking; fourfold change in loudness

[1]Comparative judgments of sounds presented within a short timespan
[2]OSHA considers a 5 dB increase to represent a doubling of acoustic energy effects on hearing.

Source: GSA 1995:3-58

TABLE 4.8.1–2.—*Land Use Compatibility with Yearly Day-Night Average Sound Levels*[A] *(in dB)*

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVEL (DNL)					
	BELOW 65	65–70	70–75	75–80	80–85	OVER 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
PUBLIC USE						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(5)	Y(6)	N	N	N
Livestock farming and breeding	Y	Y(5)	Y(6)	Y(7)	Y(7)	Y(7)
Mining and fishing, resource production, and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y(8)	Y(8)	N	N	N
Outdoor music halls and amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusement parks, resorts, and camps	Y	Y	Y	N	N	N

TABLE 4.8.1–2.—*Land Use Compatibility with Yearly Day-Night Average Sound Levels*[A] *(in dB)*-Continued

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVEL (DNL)					
	BELOW 65	65–70	70–75	75–80	80–85	OVER 85
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

[A]The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local laws. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. The Federal Aviation Administration determinations under Part 150 are not intended to substitute Federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise-compatible land uses.

Y (Yes) - Land use and related structures compatible without restrictions.
N (No) - Land use and related structures are not compatible and should be prohibited.
25, 30, or 35 - Land use and related structures generally compatible; measures to achieve Noise Level Reduction (NLR) of 25, 30, or 35 dB must be incorporated into design and construction of structure.

1 - Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.

2 - Measures to achieve an NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, offices areas, noise-sensitive areas, or where the normal noise level is low.

3 - Measures to achieve an NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, offices areas, noise-sensitive areas, or where the normal noise level is low.

4 -Measures to achieve an NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, offices areas, noise-sensitive areas, or where the normal noise level is low.

5 - Residential buildings require an NLR of 25.

6 - Residential buildings require an NLR of 30.

7 - Residential buildings not permitted.

8 - Land use-compatible, provided special sound reinforcement systems are installed.

Source: 14 CFR 150

compatibility with noise exposure as a function of land use in terms of DNL. For all residential uses, compatibility is considered to exist with sound levels up to 65 dB without qualification and up to 75 dB for certain specific uses with suitable building features. For livestock farming and breeding, compatibility is considered to exist up to 75 dBA. These guidelines are advisory in nature and are not mandatory (14 CFR 150).

Also, the Environmental Protection Agency has determined that no significant effects on public health and welfare occur for the most sensitive portion of the population (within an adequate margin of safety) if the prevailing DNL is less that 55 dB (NAS 1977).

Major noise emission sources within Pantex Plant include various industrial facilities, equipment, and machines. Traffic is the primary source of noise at the site boundary and at residences near roads. Other sources of noise include aircraft, wind, insect activity, and agricultural activity.

4.8.1.1 *Ambient Noise Levels*

A survey of outdoor ambient sound levels at Pantex Plant, both onsite and offsite, was conducted September 8–16, 1994. During this time a total of 11 locations were selected as representative of onsite sound levels and the noise environment of offsite receptors. Figure 4.8.1.1–1 shows the measurement locations that are representative of those adjoining Pantex Plant and the location of points for which acoustic modeling was used to predict noise from blasts at firing sites. The figure also shows those onsite noise sources that have been identified as audible at offsite locations. These sources are the high explosive(s) (HE) firing sites and the target range used by Pantex Plant's Security and Courier sections. The summer-autumn sound survey was augmented with an autumn-winter survey conducted December 1–3, 1994. At this time, four locations (J, K, L, and M) were added, and measurements were made at these and one of the previously monitored locations, location F.

Traffic is the primary source of noise at the site boundary and at residence near roads. As shown in Table 4.8.1.1–1, L_{eq} levels ranged from 38 to 58 dBA. Onsite noise L_{eq} levels generally ranged from 40 to 60 dBA. However, measurements which were C-weighted indicated noise levels at a distance of 366 meters (1,200 feet) from the target ranges of 70 to 103 dBC (Pantex 1996:11.2.1, 11.2.3). A summary of the noise measurements is presented in Table 4.8.1.1–1.

4.8.1.2 *Occupational Noise*

Representative occupational noise levels are summarized in Table 4.8.1.2–1. The noise levels are representative of exposure-monitoring data obtained in the hearing conservation program. In addition to industrial noise exposure, the data include noise exposure of Security and DOE Courier section personnel while maintaining weapons proficiency.

4.8.1.3 *Noise from High Explosive Detonation*

Pantex Plant detonates explosive charges in open air. These charges generally vary in weight from 2 to 21 kilograms (5 to 47 pounds). During 1994, Pantex Plant detonated 60 charges of HE (Pantex 1996:11.2.2). The maximum HE charge exploded was 24.9 kilograms (55 pounds). In October 1995, during an emergency preparedness training exercise, a charge greater than 24.9 kilograms (55 pounds) of HE was detonated. Since the plant does not typically detonate charges larger than 25 kilograms (55 pounds) of HE equivalent, that size charge was modeled for various wind speeds. Should a larger charge be exploded in the future, the plant would perform appropriate NEPA review for that charge.

Airblast noise resulting from the detonation of HE is impulsive in nature and generally lasts less than a second in duration. Although the duration of individual blasts is short, the rapid onset of such sounds could be a source of discomfort to many persons. In addition, the vibration of buildings and other structures induced by the noise impulse could be a source of increased annoyance. This vibration and the rapid onset produce "startle" effects.

The noise produced by airblast results from the generation of shock waves. Figure 4.8.1.3–1 depicts a typical blast impulse, which consists of an abrupt compression (characterized by an extremely short rise time) followed by a gradual pressure reduction to below ambient pressure, and finally a recovery to ambient. The overpressure (and therefore the noise level) is a function of the source strength (charge weight), meteorological conditions, and distance to observer. For explosions aboveground, propagation of the airblast is influenced by wind and temperature gradients, which can create focusing effects.

TABLE 4.8.1.1–1.—*Summary of Noise Measurements (dBA) at and in the Vicinity of Pantex Plant*

LOCATION	MONTH/ DAY	TIME	L_{max}	L_{min}	L_{eq}	L_{90}	L_{50}	L_{10}	TOTAL BAND HERTZ (Hz)	COMMENTS
A	9/9	0945	50	34	42					
		1005	49	47	48					
		1340	45	42	43					
B	9/9	1307							4,000 Hz, 47 dB	Peak at 4,000 Hz, insects
	9/15	0840	49	41	44					
	6/20	1115	81	34	58	45	50	56	Birds and Insects	Jet aircraft take-off
C	9/9	1113	68	38	56					2-engine jet aircraft
		1118	62	49	57					2-engine jet aircraft
		1121	91	50	81					4-engine military jet
		1135	61	36	50					
		1141	37	30	32					
		1255	52	34	35					
	9/14	0740	83	50	70	52	63	76		71 autos, 1 train
		0813	79	58	58	48	50	57	4,000 Hz, 49 dB	
	9/15	0915	77	44	54					
D	9/9	1215	49	30	38					
		1235	56	35	45					Includes train whistle
E	9/12	0934	81	42	58					
		0944	85	43	63					
	9/13	1026								
	9/15	1000	49	40	43				4,000 Hz, 42 dB	
	4/11	1812	81	34	58	42	47	53		Gas-engine irrigation pumps
	4/12	1256	78	34	54	40	47	53		Irrigation pumps, aircraft, truck
F	9/15	1752	65	42	49	44	45	51		Military jet (trainer) 1/4 mile
	12/3	1926	83	32	58	36	41	52		Three aircraft, 1 car, 1 pickup

TABLE 4.8.1.1–1.—*Summary of Noise Measurements (dBA) at and in the Vicinity of Pantex Plant*-Continued

LOCATION	MONTH/ DAY	TIME	L_{max}	L_{min}	L_{eq}	L_{90}	L_{50}	L_{10}	TOTAL BAND HERTZ (Hz)	COMMENTS
F (cont.)	4/12	1356	76	38	51	42	45	51		Irrigation pumps, tractor plowing
	6/20	1410	79	29	56	38	45	53		3 autos, 1 truck, 1 aircraft
	6/21	1150	80	34	53	42	48	56		This and the following two
	6/21	1220	75	32	51	40	45	51		measurements were made during
	6/21	1250	81	31	53	39	45	50		blast noise measurements.
G	9/12	1112	50	35	41					Microphone height 12 inches
		1127	54	35	39					rather than normal 60 inches
	6/20	1314	82	28	55	41	48	54		
I	9/13	0745	77	45	60					23 Autos, 1 truck, 1 train
		0823	73	45	55					One plane, IBP[1] roar, 3 autos
		0845	68	42	52					One truck
	4/11	1610	75	38	61	47	56	66		Aircraft, autos, truck
	6/20	1215	78	34	55	45	50	57		180 autos and light trucks, 8 autos, motorcycle, aircraft
J	12/3	1035	65	29	45	33	35	41		One 30-minute measurement, includes visit by security
K	12/3	0650	72	44	52	46	48	55		Two 30-minute measurements
		0720	73	44	55	47	50	57		12 cars 1st run, 17 cars 2nd
	4/11	0855	68	43	51	46	49	53		Cranes and other construction sounds
	4/12	1450	60	39	40	42	44	47		Same except wind N, not W
L	12/2	0555	79	25	57	27	30	51		Two 30-minute measurements
		0625	83	28	65	35	52	68		Eight cars 1st run, 52 cars 2nd
	4/12	1205	67	27	44	29	37	46		Seven Autos, 4 aircraft
	6/20	0915	84	44	57	50	53	55	Birds and Insects	Three autos, 2 trains, 4 aircraft
M	12/2	1725	59	34	40	33	37	44		Two 30-minute measurements
		1755	70	34	48	34	36	43		Aircraft, trains, migrating birds
	4/11	1812	69	32	50	40	47	53		Commuter traffic on FM 2373

TABLE 4.8.1.1–1.—*Summary of Noise Measurements (dBA) at and in the Vicinity of Pantex Plant*-Continued

LOCATION	MONTH/ DAY	TIME	L_{max}	L_{min}	L_{eq}	L_{90}	L_{50}	L_{10}	TOTAL BAND HERTZ (Hz)	COMMENTS
M (cont.)	6/20	1018	61	42	52	49	52	55	Birds and Insects	Five aircraft, cars and truck
O	4/11	1150	66	32	51	42	48	55		Eleven heavy trucks, 120 cars, 2 jets
	6/21	0614	64	44	54	51	54	57		Maximum per min.: 10 autos, 7 trucks
		0650	71	48	57	52	55	59		Maximum per min.: 15 autos, 7 trucks
		0720	72	42	53	57	51	56		Maximum per min.: 18 autos, 5 trucks
		0750	70	40	51	44	47	54		Maximum per min.: 9 autos, 0 trucks
P[2]	9/16	0905	49	45	46				63 Hz, 53 dB	Pure tone and harmonics audible
R	4/12	0638	75	41	62	53	61	64		19 cars and light trucks/min.
		0708	74	43	61	55	61	64		16.5 vehicles/min., 2 trucks, 2 trains
		0738	71	42	60	49	59	64		Continued commuter traffic
		0820	74	41	54	45	49	58		Lighter traffic, 3 trains
	6/20	1524	72	36	53	43	49	57		Maximum 5 vehicles per minute
		1554	80	39	57	46	53	59		Maximum 8 vehicles per minute
		1624	73	44	58	51	57	61		Maximum 24 vehicles per minute
T	9/16	0815	98							Distance from source to
		–	97							microphone approximately 1,200 feet
		–	94							
		–	102							The first 5 measurements
		0832	103							are peak C-weighted
		0834	70							
W[3]	9/15	1045	70	37	54				125 Hz 47 dB 250 Hz, 36 dB Minimum levels	Pure tone and harmonics are audible

[1]IBP - Iowa Beef Processors plant
[2]P - Persing Drive, on road adjacent to industrial area.
[3]W - Washington Drive, on road adjacent to industrial area.
Source: Pantex 1996:11.2.1.2

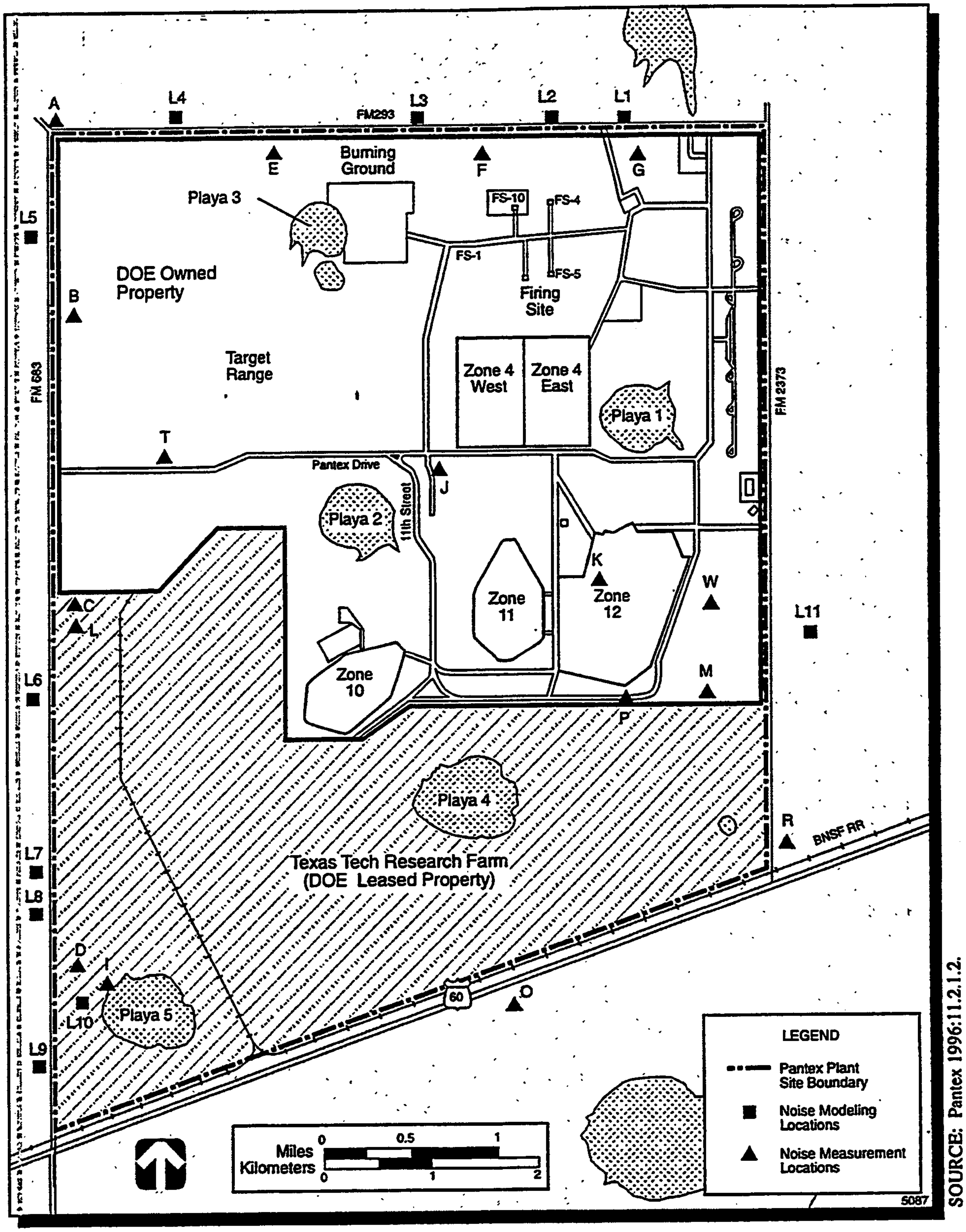

FIGURE 4.8.1.1–1.—*Boundary Roads of Pantex Plant Site, Noise Modeling Locations, and Noise Measurement Locations.*

TABLE 4.8.1.2–1.—*Representative Employee Noise Exposure at Pantex Plant*

TEST LOCATION	TIME WEIGHTED AVERAGE, dB	AVG. LEVEL, dB	MAX LEVEL, dB	PEAK LEVEL, dB
Firing Range	80.7	75.4	116.8	Overload
Firing Range	83.1	89.2	120.1	Overload
Firing Range	84.1	90.0	119.8	Overload
Firing Range	81.7	75.2	117.2	Overload
Firing Range	91.8	100.6	129.0	Overload
Firing Range	94.8	103.7	133.0	Overload
Firing Range	95.7	103.9	130.2	Overload
Firing Range	80.7	75.4	116.8	Overload
Firing Range	84.1	90.1	119.8	Overload
Firing Range	83.1	89.2	120.1	Overload
Firing Range	84.1	90.0	119.8	Overload
Firing Range	81.7	75.2	117.2	Overload
12-98 Cell-2	56.0	58.4	108.6	138.2
12-98 Ramp	69.0	71.4	114.1	140.7
12-98 Cell-1	53.7	55.9	98.0	128.7
12-49	79.0	81.0	118.9	136.1
12-98 Cell-1	78.6	80.6	113.2	133.5
12-64, Bay-11	93.6	95.5	122.2	Overload
12-54, Bay-11	84.4	86.7	117.8	134.7
12-64, Bay 11/W28 Sleeve Removal —1.8 meters (6 ft) from Unit	85.8	87.5	120.3	Overload
12-64, Bay 11/W28 Sleeve removal —1.8 meters (6 ft) from Unit	67.3	86.9	100.2	124.5

Source: Pantex 1996:11.2.6-1

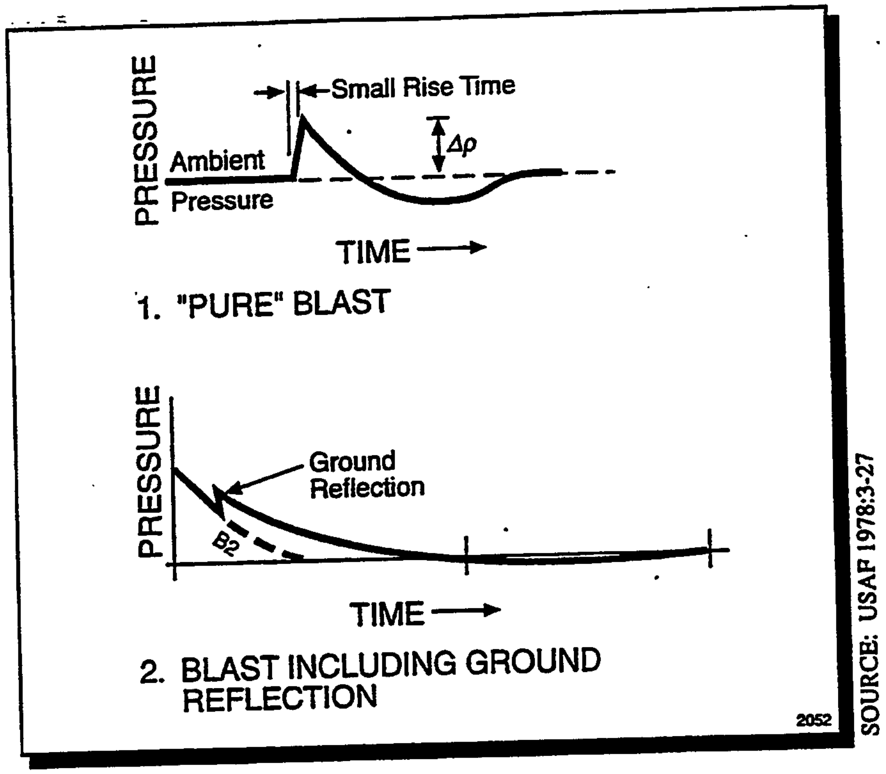

FIGURE 4.8.1.3–1.—*Typical Blast Impulses.*

There is no record of measurements of noise levels or overpressures made in connection with Pantex Plant detonations. Therefore, an airblast prediction model called BLASTO was used to estimate the overpressures resulting from Pantex Plant HE detonations (Reed 1995:1-17). A neutral lapse rate was assumed. Overpressures (dB) and their downwind distances from the source are presented for three wind speeds in Table 4.8.1.3–1. As shown in the table, the maximum size of Pantex Plant HE detonations could be audible out to distances of 5 to 10 kilometers (3 to 6 miles), depending on atmospheric conditions.

TABLE 4.8.1.3–1.—*Summary of Overpressures and Their Distances from the Source at Pantex Plant Predicted by the Airblast Model BLASTO*

WEIGHT OF EXPLOSIVE CHARGE (kg)		WIND SPEED (km/hr)		
24.9 (55 lb)	11.3 (25 lb)	4.28 (6.9 mph)	7.15 (11.5 mph)	11.42 (18.4 mph)
OVERPRESSURE (dB)		DISTANCE FROM SOURCE (meters)		
140	137.7	1,100 (3,608 ft)	1,490 (4,888 ft)	2,200 (7,218 ft)
133	131.7	2,200 (7,218 ft)	2,900 (9,514 ft)	5,200 (17,060 ft)
128	125.7	4,400 (14,436 ft)	6,200 (20,341 ft)	>10,000 (>32,808 ft)

Source: Reed 1995:1-17

4.8.2 Impacts of Proposed Action

4.8.2.1 *Impacts of Continued Operations*

Operations are assumed to continue at any of the three potential annual activity levels for the approximately 10-year period examined in this EIS. The three activity levels are for operations on 2,000, 1,000, and 500 weapons per year.

Noise levels onsite and near the Pantex Plant boundary for operations on 2,000 weapons per year would be about the same as those which currently exist (see section 4.8.1.1). Noise sources would consist of vehicular traffic, industrial facilities, aircraft overflights, and railroad trains. Traffic is the primary source of noise at the site boundary and at residences near the Farm-to-Market (FM) roads adjacent to Pantex Plant boundary. Noise levels (L_{eq}) range from 40 to 60 dBA. Target range noise at 366 meters (1,200 feet) ranged from 70 to 103 dBC. Aircraft overflights can produce maximum noise levels of 90 dBA (Pantex 1996:11.2.1 and 11.2.6).

A reduction to operations on 1,000 and 500 weapons per year would produce some decrease in noise levels because of reduced traffic, resulting from fewer employees commuting to and from work. Noise from HE detonations would continue for all three levels of weapon operations. On the other hand, the frequency of explosive tests would decrease as the level of weapons decreased.

Except for airblast noise, noise levels at the Pantex Plant boundary for all three levels of weapon operations would be below the 65 dBA guideline level (see section 4.8.1). Thus noise impacts from the usual noise sources at Pantex Plant would be negligible. Airblast noise resulting from detonation of HE would continue for the 2,000 weapons level at about the same frequency that is currently used at Pantex Plant.

The reduction of weapons levels to the 1,000 and 500 unit levels would likely result in fewer HE detonations. Since current levels of HE detonations have not generated significant noise impacts at any of the residences near the Pantex Plant boundary, continued operations would, therefore, not produce significant noise impacts at these sensitive receptors.

Pit Storage Activities

The principal noise source from pit storage activities would be the tractor-trailers used to haul the weapons or pits to Pantex Plant. The number of tractor-trailers would be a very small fraction of the total traffic generated by Pantex Plant (less then 0.2 percent). Overall noise level increases resulting from pit storage activities would not be detectable by the human ear (see Table 4.8.1–1). Therefore, noise impacts from pit storage activities would be negligible.

Environmental Restoration Activities

Environmental restoration activities will require various types of construction equipment to cleanup hazardous waste sites on Pantex Plant. Types of equipment would include bulldozers, backhoes, front-end loaders, drill rigs, and dump trucks. Noise levels in the immediate vicinity (15 meters [50 feet]) of the remediation site would range from 80 to 90 dBA.

These noise levels would be reduced to 45 to 55 dBA at 914 meters (3,000 feet) from the remediation area. This is the approximate distance from a remediation site to the nearest residence. These noise levels are about the same as the ambient noise levels existing at the residences near the Pantex Plant boundary. Thus, noise levels generated by restoration activities on Pantex Plant would not be noticeable at the sensitive receptors outside the plant boundary. Noise impacts from environmental restoration activities, therefore, would be negligible.

Waste Management Activities

Sources of noise from waste management activities are trucks which haul waste offsite, a garbage truck, a document incinerator, and two compactors. About one truck per week is used to haul waste offsite. Onsite sources are at sufficient distance from the Pantex Plant boundary that noise originating from these sources would not be detectable at the boundary or at any of the sensitive receptors outside the boundary. Therefore, noise impacts from waste management activities would be negligible.

4.8.2.2 *Impacts of New Facility Construction and Upgrades*

Noise sources during the new facility construction and upgrade would include heavy-construction and increased traffic. Small increases in traffic would occur onsite and along offsite transportation routes used to bring construction material and workers to the site. Small increases in noise levels would occur at the residences located along FM Roads 2373 and 683. Noise levels would be below the 65 dBA level specified as acceptable in the Federal Interagency Committee or Urban Noise guidelines (see section 4.8.1). Due to the size of the site, noise emissions from construction and operation activities of the facilities would not be expected to cause annoyance to the public. Therefore, noise impacts associated with construction and operation of the new facilities would be negligible.

4.8.2.3 *Summary of Impacts*

Noise levels associated with the Proposed Action may be increased slightly during construction activities. Operational noise levels from operations on 2,000 weapons per year would be approximately the same as the noise levels which currently exist onsite and offsite. Airblast noise levels from HE detonations would also continue at current levels. The reduction to the 1,000 and 500 weapons per year levels would reduce noise levels a few decibels. Therefore, noise impacts associated with the Proposed Action would be negligible.

4.8.3 Impacts of No Action Alternative

Noise sources for the No Action Alternative would be similar to those of the Proposed Action. Three levels of activity, operations on 2,000, 1,000, and 500 weapons per year, are assumed for the No Action Alternative. The major difference between this alternative and the Proposed Action is that weapons disassembly operations would cease when 12,000 pits have been placed in storage at Pantex Plant. Construction of new facilities would not take place under the No Action Alternative. Therefore, construction noise levels would be less than those described for the Proposed Action (see section 4.8.2). HE detonations would continue at about the same level as would occur under the Proposed Action.

Noise impacts for this alternative would therefore be approximately the same as the Proposed Action; i.e., they would be negligible.

Pit Storage Activity

Impacts of pit storage activities under this alternative would be the same as the Proposed Action until the 12,000 pits are stored. After this storage level is achieved, transportation of pits to other facilities would occur. Overall, the noise levels resulting from these activities would be about the same as the Proposed Action. Noise impacts for pit storage activities under this alternative would, therefore, be negligible.

Environmental Restoration Activities

Noise sources and resulting noise levels associated with environmental restoration under this alternative would be the same as those described under the Proposed Action. Noise impacts, therefore, would be negligible.

Waste Management Activities

Noise sources and resulting noise levels related to waste management activities would be the same as those under the Proposed Action. Noise impacts would be negligible.

4.8.4 Impacts of Pit Storage Relocation Alternative

4.8.4.1 *Impacts of Relocating 20,000 Pits*

The principal source of noise would be from the tractor-trailer units used to haul the pits to another facility. Over a 10-year period, this would involve no more than one or two shipments per week. The increase in noise levels over general plant activity noise levels would not be detectable. Thus, noise impacts under this alternative would be negligible.

4.8.4.2 *Impacts of Relocating 8,000 Pits*

Noise levels related to this activity would be less than those related to relocating 20,000 pits. Noise impacts, therefore, would be negligible.

4.8.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.8.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

Should the WM PEIS result in a decision to site waste management facilities at Pantex Plant, future NEPA documentation would be prepared for the specific project and specific location proposed in order to assess noise impacts on workers, offsite populations, and other sensitive receptors.

Noise sources during construction of the waste management facilities would include heavy construction equipment and increased traffic. Increased traffic would occur onsite and along major offsite transportation routes used to bring construction material and workers to the site. Most nontraffic noise sources associated with operation of any waste management facilities would be located at sufficient distance from offsite areas that the contribution to offsite noise levels would continue to be small. Due to the size of Pantex Plant Site, noise levels from construction and operation activities would not be expected to cause annoyance to the public (DOE 1995k). Therefore, the cumulative noise impacts of the Proposed Action and the construction and operation of the waste management facilities would be minor and not significant.

4.8.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, noise impacts from operations are expected to be less than current impacts. Under the downsizing alternative, facilities would be consolidated. The noise impacts would be equivalent to the No Action Alternative. Under the relocation alternative, noise from assembly and disassembly operations and HE fabrication would cease.

4.8.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage.. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. Nontraffic operational noise sources associated with the consolidation of plutonium and collocation of plutonium and highly enriched uranium alternatives include additional equipment and machines. These noise sources would be located at sufficient distance from offsite areas that the contribution to offsite noise levels would be small. Due to the size of the site, noise emissions from construction equipment and operations activities would not be expected to cause annoyance to the public.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, mixed oxide fuel fabrication facility, and a light water reactor. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

Nontraffic operational noise sources associated with the Disposition Alternative includes additional equipment and machines. These noise sources would be located at sufficient distance from offsite areas that the contribution to offsite noise levels would be small. Due to the size of the site, noise emissions from construction equipment and operations activities would not be expected to cause annoyance to the public (DOE 1996a:chapter 4). However, should Pantex Plant be selected as the site for such a facility, further NEPA review would be performed to assess the noise impacts on workers, offsite populations, and other sensitive receptors.

4.8.6 Potential Mitigation Measures

DOE currently uses standard silencing packages on construction equipment and provides workers in noisy environments with appropriate hearing protection devices meeting Occupational Health and Safety Administration standards. As required, noise levels are measured in worker areas, and a hearing protection program has been implemented. This program would continue in the future.

While the amount of offsite noise from explosives testing at the plant is not significant and no mitigation measures are required, DOE could chose to implement such measures as limiting the hours of such testing or setting prohibitions on testing during unfavorable atmospheric conditions to further reduce the noise levels.

4.9 BIOTIC RESOURCES

4.9.1 Affected Environment

The biotic resources considered in this section consist of the following components: terrestrial resources, aquatic resources, wetland resources, and protected and sensitive species. Scientific names of threatened and endangered species are presented in Table 4.9.1–1 while those for nonthreatened and nonendangered species are presented in Table 4.9.1–2.

4.9.1.1 *Terrestrial Resources*

Vegetation

Pantex Plant Site is located within the Southern High Plains whose vegetation is characterized as shortgrass prairie (DOE 1993b). The shortgrass prairie is dominated by two grass species: blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*). Other typical, less abundant grass species include sideoats grama (*Bouteloua curtipendula*), western wheatgrass (*Agropyron smithii*), vine mesquite (*Panicum obtusum*), and silver bluestem (*Bothriochloa laguriodes*) (Pantex 1996:7.1). Much of the native shortgrass prairie has been converted and used for agricultural purposes, primarily crop cultivation and cattle grazing (Haukos 1994:85). The current state of the altered shortgrass prairie at Pantex Plant ranges from unvegetated, in the south-central region, to a variety of species elsewhere on the site.

The dominant vegetation on the uplands surrounding Playas 3, 5, and Pantex Lake is buffalograss, while the uplands surrounding Playa 1 support buffalograss, blue grama, and prickly pear (*Opuntia macrorhiza*). The area south of Playa 1 contains a small grove of crabapple (*Malus sylvestris*), Asiatic honeysuckle (*Lonicera tatarica*), and Russian olive (*Elaeagnus angustifolia*). Playa 2 uplands support buffalograss, blue grama, and silver bluestem; and Playa 4 uplands consist of buffalograss and blue grama. The Texas Tech University Farms headquarters area has grass lawns with planted mimosa tree (*Albizia julibrissin*), Siberian elm (*Ulmus pumilia*), and black locust (*Robinia pseudoacacia*). The previously cultivated southeastern portion of Pantex Plant is dominated primarily by silver bluestem and rare individuals of yankee weed (*Eupatorium compositifolium*). The west-central region of Pantex Plant has vegetative composition of predominantly kochia (*Kochia scoparia*) and pigweed (*Amaranthus sp.*), with lesser extents of buffalograss, planted Siberian elm, and cottonwood (*Populus deltoides*) (DOE 1993b:7-31, 7-44).

Pantex Plant has historically monitored radionuclide levels in both onsite and offsite vegetation. The 17 offsite and 5 onsite collecting locations are sampled for uranium and tritium isotope levels in primarily native and domestic grasses. The onsite stations and the offsite control station, at Bushland, Texas, are sampled monthly for comparison; the non-control offsite stations are sampled quarterly. No standards exist for uranium or tritium concentrations in vegetation; however, with few exceptions, concentrations at Pantex Plant in recent years have been comparable to the offsite vegetation monitored at Bushland (MH 1991:67, 75; Battelle 1992:4-38, 4-48; DOE 1994b:9-1, 9-2).

Radiological surveys of beef cattle raised on or near Pantex Plant Site have not been considered necessary based on the results of a study that showed routine operations do not pose a risk to the public from the consumption of these animals (LANL, 1982; 22-23; Pantex 1996:16.1). The study indicated that if beef consumption of 79 kg/yr is assumed, then the 50-yr dose commitment to an adult from ingestion of ground beef at 1.6 x 10^{-4} pCi/g weight would be 0.2 mrem to bone, 0.01 mrem to kidneys, and 0.01 mrem to liver. These values are 500 times below the radiation dose each year from natural background (LANL

TABLE 4.9.1–1.—*Federal and State Listed Threatened, Endangered, and Candidate Species Occurring or Potentially Occurring at Pantex Plant*

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS CODE[1]	STATE STATUS CODE[1]
SPECIES OBSERVED			
Birds			
Bald eagle	*Haliaeetus leucocephalus*	T	E
Western burrowing owl	*Athene cunicularia hypugea*	SOC	NL
Whooping crane	*Grus americana*	E	E
Black tern	*Chlidonias niger*	SOC	NL
Ferruginous hawk	*Buteo regalis*	SOC	NL
Loggerhead shrike	*Lanius ludovicianus*	SOC	NL
White-faced ibis	*Plegadis chihi*	SOC	T
Reptiles			
Texas horned lizard	*Phrynosoma cornutum*	SOC	T
Mammals			
Swift fox[2]	*Vulpes velox*	C	NL
SPECIES POTENTIALLY OCCURRING			
Birds			
American peregrine falcon	*Falco peregrinus anatum*	E	E
Interior least tern	*Sterna antillarum athalassos*	E	E
Mountain plover	*Charadrius montanus*	C	NL
Arctic peregrine falcon	*Falco peregrinus tundris*	E (S/A)	T
Migrant loggerhead shrike	*Lanius ludovicanus migrans*	SOC	NL
Baird's sparrow	*Ammodramus bairdii*	SOC	NL
Reptiles			
Smooth green snake	*Opheodrys vernalis*	NL	E
Texas garter snake	*Thamnophis sirtalis annectens*	SOC	NL
Mammals			
Cave myotis	*Myotis velifer*	SOC	NL
Longlegged myotis	*Myotis volans*	SOC	NL
Occult little brown myotis	*Myotis lucifugus occultus*	SOC	NL
Western small footed myotis	*Myotis ciliolabrum*	SOC	NL
Yuma myotis	*Myotis yumanensis*	SOC	NL
Plains spotted skunk	*Spilogale putorius interrupta*	SOC	NL

[1]Status codes: NL—Not listed; C—Federal candidate (probably appropriate to list); T—Threatened; E—Endangered; SOC—Species of concern (Species that may be of concern to the U.S. Fish and Wildlife Service (FWS) that do not receive *Endangered Species Act* recognition, but FWS encourages agencies to include in NEPA studies); S/A—protected under the similarity of appearances provision of the *Endangered Species Act* (16 U.S.C. 1531).
[2]Sighted in May 1996; tracks, scat, and probable dens located 1995.
Sources: TPW 1992; DOE 1993c; DOE 1994g; DOE 1996d; Pantex 1996:7.4

TABLE 4.9.1–2.—*Common and Scientific Names of Some of the Nonthreatened and Nonendangered Plants and Animals at Pantex Plant*

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
PLANTS		**PLANTS (CONTINUED)**	
blue grama	*Bouteloua gracilis*	snow-on-the-mountain	*Euphorbia marginata*
buffalograss	*Buchloe dactyloides*	vervain (prostrate)	*Verbena bracteata*
sideoats grama	*Bouteloua curtipendula*	hairy water clover	*Marsilea vestita*
western wheatgrass	*Agropyron smithii*	cocklebur	*Xanthium strumarium*
vine-mesquite	*Panicum obtusum*	Suckleya suckleyana	*Suckleya suckleyana*
silver bluestem	*Bothriochloa laguriodes*	goosefoot	*Chenopodium glaucum*
prickly pear (plains)	*Opuntia macrorhiza*	threeawn (purple)	*Aristida purpurea*
crabapple	*Malus sylvestris*	**INSECTS, PROTISTANS AND OTHER INVERTEBRATES**	
Asiatic honeysuckle	*Lonicera tatarica*	grasshoppers	*Orthoptera: Acrididae*
Russian olive	*Elaeagnus angustifolia*	beetles	*Coleoptera*
mimosa tree	*Albizia julibrissin*	true bugs	*Hemiptera*
Siberian elm	*Ulmus pumilia*	flies	*Diptera*
black locust	*Robinia pseudoacacia*	bees	*Hymenoptera*
yankee weed	*Eupatorium compositifolium*	wasps	*Hymenoptera: Vespidae*
kochia	*Kochia scoparia*	ants	*Hymeoptera: Formicidae*
pigweed	*Amaranthus sp.*	moths	*Lepidoptera*
cottonwood (eastern)	*Populus deltoides*	butterflies	*Lepidoptera: Papilionoidea*
cattail	*Typha angustifolia*	dragonflies	*Odonata: Anisoptera*
great bulrush	*Scirpus validus*	mayflies	*Ephemeroptera*
smartweed	*Polygonum pensylvanicum* *P. amphibium* *P. coccineum*	damselflies	*Odonata: Zygoptera*
		crayfish	*Crustacea*
		mollusks	*Mollusca*
pondweed	*Potamogeton nodosus*	leeches	*Annelida*
arrowhead	*Sagittaria montevidensis*	water mites	*Acarina*
spikerush	*Eleocharis macrostachya*	Chlorophyta	*Chlorophyta*
slim aster	*Aster subulatus*	Chrysophyta	*Chrysophyta*
western black willow	*Salix goodingii*	Cyanophyta	*Cyanophyta*
mallow	*Malvella leprosa*	Ciliophora	*Ciliophora*
ragweed	*Ambrosia grayii*	nematode worms	*Nematoda*
sunflower	*Helianthus annuus*	**REPTILES AND AMPHIBIANS**	
tumbleweed	*Salsola iberica*	Barred tiger salamander	*Ambystoma tigrinum mavoritum*
frog fruit	*Phyla cuneifolia*	Great Plains toad	*Bufo cognatus*
wheatgrass	*Agropyron sp.*	Woodhouse's toad	*Bufo woodhousei*

TABLE 4.9.1–2.—*Common and Scientific Names of Some of the Nonthreatened and Nonendangered Plants and Animals at Pantex Plant*-Continued

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
REPTILES AND AMPHIBIANS (CONTINUED)		**MAMMALS (CONTINUED)**	
Plains Spadefoot toad	*Scaphiopus bombifrons*	coyote	*Canis latrans*
Great Plains skink	*Eumeces obsoletus*	bobcat	*Lynx rufus*
Checkered garter snake	*Thamnophis marcianus marcianus*	badger	*Taxidea taxus*
Western coachwhip snake	*Masticophis flagellum testaceus*	**BIRDS**	
bullsnake	*Pituophis melanoleucus sayi*	Western meadowlark	*Sturnella neglecta*
upland chorus frog	*Pseudacris triseriata feriarum*	horned lark	*Eremophila alpestris*
plains leopard frog	*Rana blairi*	mourning dove	*Zenaida macroura*
prairie rattlesnake	*Crotalus viridis viridis*	Bewick's wren	*Thryomanes bewickii*
hognose snake (western)	*Heteredon nasicus*	house finch	*Carpodacus mexicanus*
northern earless lizard	*Holbrookia maculata maculata*	mockingbird (northern)	*Mimus polyglottos*
MAMMALS		nighthawk (common)	*Chordeiles minor*
deer mouse	*Peromyscus maniculatus*	greater roadrunner	*Geococcyx californianus*
plains harvest mouse	*Reithrodontomys montanus*	killdeer	*Charadrius vociferus*
white-footed mouse	*Peromyscus leucopus*	Swainson's hawk	*Buteo swainsoni*
hispid cotton rat	*Sigmodon hispidus*	red-tailed hawk	*Buteo jamaicensis*
Southern Plains wood rat	*Neotoma micropus*	turkey vulture	*Cathartes aura*
thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	**FISH**	
desert cottontail	*Sylvilagus auduboni*	fathead minnows	*Pimephales promelus*
black-tailed prairie dog	*Cynomys ludovicianus*	black bullhead	*Ictalurus melas*
striped skunk	*Mephitis mephitis*		

1982:23). The largest source of uranium in the cattle feed was from commercial mineral supplements typically fed to cattle in the area (Pantex 1996:16.1). An ecological analysis of potential risks to various animals from either direct or indirect ingestion of radiological residues in vegetation in the immediate vicinity of Pantex Plant obtained similar conclusions (PC 1995s).

Agriculture within the Pantex Plant Region of Influence is considered an important asset. A detailed discussion of the ecological and land use resources of the regional agricultural industry is provided in the Pantex Plant *Environmental Information Document* (Pantex 1996).

Wildlife

The uplands of Pantex Plant support a variety of invertebrates, reptiles, amphibians, birds, and mammals. With individuals of the following taxa recorded at Pantex Plant, the insect class is well-represented: grasshoppers, beetles, true bugs, flies, bees, wasps, ants, moths, butterflies, and dragonflies (DOE 1994k:6). The most frequently occurring species of reptiles and amphibians include the following: the Great Plains toad (*Bufo cognatus*), Woodhouse's toad (*Bufo woodhousei*), Plains spadefoot toad (*Scaphiopus bombifrons*), Great Plains skink (*Eumeces obsoletus*), Western coachwhip snake (*Masticophis flagellum testaceus*), bullsnake (*Pituophis melanoleucus sayi*), checkered garter snake (*Thamnophis marcianus marcianus*) and prairie rattlesnake (*Crotalus viridis viridis*) (DOE 1994e:8; DOE 1994k).

Some of the more common species of birds that have been observed at Pantex Plant include the Western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), mourning dove (*Zenaida macroura*), Bewick's wren (*Thryomanes bewickii*), mockingbird (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), common nighthawk (*Chordeiles minor*), greater roadrunner (*Geococcyx californianus*), killdeer (*Charadrius vociferus*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*) (DOE 1994g:2-6; DOE 1993c:A.1, A.2; DOE 1994k:7-10).

Representative mammals that occur at Pantex Plant are the deer mouse (*Peromyscus maniculatus*), plains harvest mouse (*Reithrodontomys montanus*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), Southern Plains wood rat (*Neotoma micropus*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), desert cottontail (*Sylvilagus audoboni*), black-tailed prairie dog (*Cynomys ludovicianus*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*) (DOE 1993c:10, B-1; DOE 1994k:11).

4.9.1.2 *Aquatic Resources*

Aquatic resources at Pantex Plant are not extensive and are comprised of the perennial Playa 1 and several concrete ponds located in the northeast area of Pantex Plant. Since Playas 1 through 4 and Pantex Lake are considered wetlands, they are described in more detail in section 4.9.1.3. Playa 1 is permanently inundated with water, receiving discharge from the Pantex Plant wastewater treatment plant. The aquatic regions of Playa 1 support over six genera of plants. The dominant vegetation is cattail *(Typha anqustifolia)*, great bulrush *(Scirpus validus)*, and three species of smartweed *(Polygonum sp.)* (DOE 1993b:4, B-7). During surveys in 1992, 26 families of macroinvertebrates were collected from Pantex Plant playas. The notable orders of organisms found include the following: beetles, true bugs, flies, and crustaceans (DOE 1993c:12). Vertebrate species recorded at Playa 1 include the Plains leopard frog (*Rana blairi*), the Woodhouse's toad, and the upland chorus frog (*Pseudoacris triseriata feriarum*) (DOE 1994e:7).

The concrete ponds, representing another aquatic habitat at Pantex Plant, are inhabited by six different species of amphibians, including: the barred tiger salamander (*Ambystoma tigrinum mavoritum*), the upland chorus frog, and the Great Plains toad. In May 1996, Pantex Plant personnel resampled the earthen stock tank near Pantex Lake. No specimens of *Notropis* minnows were found, but a number of fathead minnows (*Pimephales promelus*) and one black bullhead (*Ictalurus melas*) were collected (PC 1996d).

4.9.1.3 *Wetlands*

This assessment fulfills the environmental review requirement of *Compliance with Floodplain/Wetlands Environmental Review Requirements* (10 CFR 1022). There are six playas on DOE-owned or leased land at the Pantex Plant Site: Playas 1, 2, and 3 are on the main Pantex Plant; Playas 4 and 5 are on land leased from Texas Tech University; and Pantex Lake is on a separate parcel of DOE-owned property (Pantex 1996:7.2). Playas 1 through 4 and Pantex Lake have been delineated as jurisdictional wetlands using the U.S. Army

Corps of Engineers' *Wetland Delineation Manual* (Pantex 1996:7.2; MH 1995). These delineations are being used for ecosystem management at the Pantex Plant Site wetlands noted above. Wetlands are very important to wildlife, especially in an area having little undisturbed native grassland. They provide stopovers for migrating waterfowl and habitat for countless other species of birds, reptiles, amphibians, and mammals (TTU 1988:5; Bolen 1979:24).

4.9.1.4 *Playa Vegetation*

Playa vegetation on the Southern High Plains varies from one playa to another and throughout the changing conditions of the seasons. When water is prevalent within the basins, playa vegetation is usually composed of emergent and submergent aquatic species; however, as available water subsides, the species shift to semiaquatic annuals. With little moisture present, playa vegetation is commonly made up of characteristic upland species (Haukos 1994:93). Because of the diversity among individual playas, a specific vegetative characterization is presented for each playa at Pantex Plant. Most botanical information about Pantex Plant playas was gathered during a comprehensive floristic survey conducted during May, July, and September of 1993 and updated in June, July, and September 1995.

Playa 1

This playa is continuously inundated with water received from the Pantex Plant Wastewater Treatment Facility. As such, it supports 19 obligate aquatic plant species, the highest number of any playa at Pantex Plant (Pantex 1996:7.2). Like most wet playas, the dominant plants are emergent and submergent species. Cattail and bulrush are present at Playa 1 (DOE 1993b:4). Other notable obligate aquatic species present within the playa were pondweed (*Potamogeton nodosus*), arrowhead (*Sagittaria montevidensis*), spikerush (*Eleocharis macrostachya*), and smartweed (Pantex 1996:7.2). The following facultative aquatic or semiaquatic species are found at Playa 1: several species of smartweed (*Polygonum sp.*), slim aster (*Aster subulatus*), and western black willow (*Salix goodingii*). The uplands surrounding Playa 1 are typical overgrazed High Plains grassland composed of buffalograss, blue grama, and prickly pear (DOE 1993b:5; Haukos 1995:5).

Playa 1 has received some attention relative to the uptake of various chemicals. Pezzolesi, in his Master's Thesis, analyzed nutrient and heavy metal cycling in vegetation (i.e., cattail and smartweed), surface water, and soil of this playa (TTU 1994a:26–30). However, a high degree of variability was noted in nutrient and heavy metal concentrations. Additional information on the Pantex Plant biomonitoring activities is provided in Chapter 16 (Radiation and Hazardous Chemical Environment) of the *Environmental Information Document* (Pantex 1996).

Playa 2

The basin of this playa is dominated by several species of smartweed, primarily *Polygonum pensylvanicum*, *P. amphibium*, and *P. coccineum*. Other significant species within the basin included mallow (*Malvella leprosa*), ragweed (*Ambrosia grayii*), and sunflower (*Helianthus annuus*). One small association of cattails was also noted within the playa. The edge of the playa basin contains tumbleweed and frog fruit, while, slightly above the basin, the major plant species are wheatgrass and snow-on-the-mountain (*Euphorbia marginata*). The plant composition of the uplands surrounding Playa 2 is very similar to that of Playa 1 (DOE 1993b:5).

Playa 3

This playa, adjacent to the Burning Ground, has a basin floral composition of primarily spikerush with little vervain (*Verbena* *bracteata*) and hairy water clover (*Marsilea vestita*). The edge of the basin is dominated by spikerush and cocklebur (*Xanthium strumarium*), and the uplands surrounding Playa 3 have a species composition similar to Playas 1 and 2 (DOE 1993b:6).

Playa 4

The low areas of this playa contain abundant spikerush and ragweed, with some hairy water clover and buffalograss. One of the lowest areas in the basin supports cattails and several species of smartweed. Extensive stands of wheatgrass are present on the slopes leading from the basin to the uplands. The shortgrass prairie immediately adjacent to Playa 4 has a composition similar to other areas at Pantex Plant, but with a greater coverage of buffalograss (DOE 1993b:7).

Playa 5

When mostly dry, this playa exhibits large areas of bare clay. The plant species found within the playa include *Suckleya suckleyana*, goose foot (*Chenopodium glaucum*), and cocklebur. In a small, wet area of the playa, cattails and great bulrush were found to be locally prevalent, and their coverage expands when the playa contains more water from seasonal rains. The lower slopes, which transition into the surrounding grassland, contain buffalograss and wheatgrass. The High Plains grassland surrounding Playa 5 is similar in composition to the remainder of the site, except that three-awn has a more significant presence (DOE 1993b:8).

Pantex Lake

Major plants within the basin of Pantex Lake are spikerush, wheatgrass, and cocklebur. The area at the edge of the basin is dominated by wheatgrass, but there is a transition into High Plains grassland dominated by buffalograss and, to a lesser degree, three-awn and blue grama (DOE 1993b:11). In the past, Pantex Lake received discharge from site activities, but does not now.

4.9.1.5 *Playa Wildlife*

The Southern High Plains of Texas contain relatively little native undisturbed grassland. Land in the Texas Panhandle which is used for agricultural purposes does not support extensive wildlife populations. The remaining, undisturbed playas are "islands" of wildlife habitat, allowing the continued existence of many species (Smith 1994:119, 120; Dierauf 1994:246; Haukos 1994:85). Wildlife surveys conducted at Pantex Plant have characterized wildlife presence and use of the entire site, rather than focusing on each playa specifically. However, organisms and groups of organisms known to be specific to the playas are presented below.

Insects, Protistans, and Other Invertebrates

Insects identified from Pantex Plant playas include the following: mayflies (one family), dragonflies and damselflies (three families), beetles (six families), true bugs (six families), and flies (three families). There were also four families of crustaceans, two families of mollusks, leeches, and water mites (DOE 1993c:E.1). Unicellular organisms (protistans) from the phyla Chlorophyta, Chrysophyta, Cyanophyta, and Ciliophora, as well as two types of nematode worms, have also been collected from Pantex Plant playas (DOE 1994k:3, 4).

Reptiles and Amphibians

Members of the classes Amphibia and Reptilia that have been identified at Pantex Plant playas include: the plains leopard frog, Woodhouse's toad, the upland chorus frog, the prairie rattlesnake, the Great Plains skink, the hognose snake (*Heteredon nascius*), the northen earless lizard (*Holbrookia maculata maculata*), and the bullsnake (DOE 1994e:7).

4.9.1.6 *Protected and Sensitive Species*

Table 4.9.1–1 lists observed and potentially occurring protected and candidate species at the site. The bald eagle (*Haliaeetus leucocephalus*) is the only Federally protected species known to inhabit Pantex Plant for extended periods of time. Currently it is listed as threatened by the U.S. Fish and Wildlife Service (FWS) (Pantex 1996:7.4). It winters in the high plains of Texas, usually from October through February or March (a 4- to 5-month period), and forages near bodies of water (playas), feeding on fish, waterfowl, and small mammals. The bald eagle is sighted yearly at Pantex Plant and is considered a winter resident and a spring and fall migrant.

Additional listed species that may occur on or around Pantex Plant include the following: the American (*Falco peregrinus anatum*) and Arctic peregrine falcon (*Falco peregrinus tundris*), a spring and fall migrant; the interior least tern (*Sterna antillarum athalassos*), a possible spring and fall migrant; and the whooping crane (*Grus americana*), a spring and fall migrant. The whooping crane has been sighted at Pantex Plant in recent years.

No critical habitat for Federally threatened or endangered species exists on or around Pantex Plant (Pantex 1996:7.4). On May 9, 1996, Pantex officials submitted a biological assessment (BA) addressing section 7 (i.e., interagency consultation) *Endangered Species Act* requirements to FWS (Letter 1996). On May 27, 1996, the FWS stated that "We commend Pantex for developing a comprehensive and complete BA, and concur that the proposed action is not likely to adversely affect any Federally listed threatened or endangered species (Letter 1996a)."

The Texas horned lizard (*Phrynosoma cornutum*) is a Pantex Plant resident and has State-threatened status. The State also lists the white-faced ibis (*Plegadis chihi*), a spring and fall migrant and summer resident at Pantex Plant, as threatened.

Species that are Federally proposed or candidates for listing as threatened or endangered species do not receive legal protection under the *Endangered Species Act.* However, FWS encourages the consideration of impacts to these species in project planning since their status can be changed to threatened or endangered in the foreseeable future. The FWS has recently changed the classification of species under review for listing as threatened or endangered (61 FR 7596). Proposed species include those plants and animals for which a proposed rule to list as threatened or endangered has been published. Candidate species include those plants and animals for which the FWS has on file sufficient information on biological vulnerability and threat to support issuance of a proposed rule for listing as threatened or endangered. Candidate species previously included Category 1 (species appropriate for listing as protected) and Category 2 (species possibly appropriate for listing as protected). Due to the recent rule change, candidate species (now) include only those which are appropriate for listing as protected species (i.e., species formerly (classified) as Category 1). The Category 2 designation has been omitted in Table 4.9.1–1. Species typically in Category 2 are now classified as species of concern, a term that describes a broad realm of plants and animals whose conservation status may be of concern to the FWS, but do not have official status. Some of the species previously identified as Federal candidate 2 in the Draft version of this EIS also have State status and continue to be evaluated for potential impacts.

The swift fox (*Vulpes velox*) is the only Federal candidate species known to occur at the Pantex Plant Site. An adult fox was observed south of Playa 2 on Texas Tech land in May 1996 and signs of scat and other signs of activity were observed at a number of sites on the facility in 1995 (WTU 1995; WTU 1996). This mammal has been observed at the Pantex Plant Site since 1971 (CSU 1976). The mountain plover (*Charadrius montanus*) is a Federal candidate species that has not been reported in bird surveys at the Pantex Plant Site, but may potentially occur there based on its presence elsewhere in the state of Texas (DOE 1994g; DOE 1996d).

The ferruginous hawk (*Buteo regalis*), black tern (*Childonias niger*), and loggerhead shrike (*Lanius ludovicianus*) are species of concern that formerly were given Federal candidate status, but not State listed. These species lost candidate status as part of the reclassification of notice of review species (61 FR 7596). To date, two adult ferruginous hawks have been radio-tagged and one remained at Pantex Plant for approximately one month (Pantex 1996:7.4). At Pantex Plant Site, the ferruginous hawk frequents the playas and large prairie dog town near Playa 2. In August 1993, a pair of black terns was identified foraging at Playa 2.

There are no protected plant species known to occur at Pantex Plant or within Carson County (Pantex 1996:7.4). However, two rare cacti have been identified adjacent to Playa 1: *Coryphantha vivipara* and *Echinocereus viridiflorus* var. *viridiflorus*. An additional rare cactus, *Coryphantha missouriensis*, was confirmed in June 1995 at Playa 2. The Playa 1 *Echinocereus viridiflorus* population may be the largest one existing in the world (DOE 1993b:5). A floristic survey was conducted in the summer of 1995 to determine if any additional plant species of concern exist at the Pantex Plant Site. Although no Federal or State protected species were identified during this survey, 35 additional plant species were identified in 1995 for the first time at the Pantex Plant Site (Johnston 1995).

4.9.2 Impacts of Proposed Action

4.9.2.1 *Impacts of Continued Operations*

Weapons-Related Activities

Impacts to biotic resources at Pantex Plant as a result of the weapons-related activities are expected to be minimal. No additional disturbance is required whether operations are conducted at the 2,000, 1,000, or 500 weapons level; therefore, direct impacts to biotic resources are not anticipated. Existing operations generate noise due to human activity and operation of equipment and vehicles, which could have a temporary impact on some terrestrial, aquatic, and threatened and endangered species. Animal and plant surveys conducted for this EIS have not shown any decline in the number of species present. The Ecology chapter of the *Environmental Information Document* describes the measures underway to ensure that continuing operations do not adversely affect wetlands and biotic resources at this Federal facility (Pantex 1996). As stated earlier, a biological assessment was prepared to address section 7 *Endangered Species Act* requirements, and obtained FWS concurrence that the proposed action is not likely to adversely affect any Federally listed threatened or endangered species at the Pantex Plant (DOE 1996d; Letter 1996a).

The trace level of radionuclides in vegetation due to Pantex Plant activities and biouptake of heavy metals in playa vegetation has not been found to cause adverse impacts in plants and animals on or around this Federal facility (Pantex 1996:16.1; TTU 1994a:26-30). In fact, wetland resources would benefit from continued operations since Pantex Plant officials are taking steps to further increase the beneficial use of Pantex Plant playas by various species (Pantex 1996:7.5). In summary, continued operations would not create any significantly adverse impact to biotic resources, and existing natural resource programs are attempting to manage the portions of the property for the benefit of native resident and migratory wildlife species.

Pit Storage Activities

Section 3.1.1 discusses increasing interim storage of pits at Pantex Plant from 12,000 to 20,000 as part of the Proposed Action. This storage would use existing facilities and would not pose adverse impacts to biotic resources.

Environmental Restoration Activities

The environmental restoration activities will have a long-term beneficial impact on plant and animal species at Pantex Plant as contamination from past activities is removed from soils and water at Pantex Plant Site. Some remediation activities (e.g., soil removal) may have a temporary impact on some species, through the loss of some vegetation and some of the less mobile animals such as reptiles and small mammals, but these impacts would not be considered significant.

Waste Management Activities

Waste management activities are not anticipated to have any significant adverse impacts to animal and plant species at Pantex Plant. The facility's compliance with the *Resource Conservation and Recovery Act* and implementing TNRCC regulations are intended to minimize, if not preclude, direct impacts to threatened or endangered species or wetlands.

4.9.2.2 *Impacts of New Facility Construction and Upgrades*

Under the Proposed Action, the following facilities would either be constructed or upgraded at Pantex Plant between 1996 and 2001: Hazardous Waste Treatment and Processing Facility; Pit Reuse Facility; Gas Analysis Laboratory; Materials Compatibility Assurance Facility; Nondestructive Evaluation Facility; and Metrology and Health Physics Calibration and Acceptance Facility. Facility construction would be in or adjacent to Zones 11 and 12 (as shown Figure 3.1.1–1) and could result in the loss of some vegetation and some of the less mobile animals, such as reptiles and small mammals. However, since the construction would occur in previously disturbed areas and the disturbance would involve less than 1 percent of the DOE-owned land at Pantex Plant Site, the potential for impacts to biotic resources is anticipated to be minimal.

Playas 1 through 4 have been declared as jurisdictional wetlands under section 404 of the *Clean Water Act* by the U.S. Army Corps of Engineers. Although the proposed facilities do not threaten these playas, the potential impact of soil runoff to wetlands can be minimized by applying the standard soil erosion and sedimentation control measures during the land disturbance phase of new projects.

The bald eagle, a Federally listed species, forages at the playas during winter. Since the playas are more than 1 kilometer (0.6 miles) from the nearest construction site, no impacts to bald eagles are expected. Impacts to black tern, white faced ibis, and swift fox would also be negligible because these species are not resident at the proposed construction sites. Prior to clearing operations, it may be necessary to conduct preactivity surveys to identify nests of migratory birds as well as the presence of Federal and State protected and/or sensitive species. This would allow measures to be taken to protect these species and avoid clearing operations during the breeding season of migratory birds. The impacts of new facility construction and upgrades to biotic resources are not anticipated to be significant.

4.9.2.3 *Summary of Impacts*

The continued operations at Pantex Plant at any of the weapons activity levels would be minimal. Land disturbed by new facility construction would be confined to Zones 11 and 12, which are already substantially altered. The impacts to biotic resources are, therefore, considered to be negligible. Environmental protection activities currently ongoing at the plant meet all regulatory requirements of FWS.

4.9.3 Impacts of No Action Alternative

Impacts to biotic resources at Pantex Plant as a result of the No Action Alternative are expected to be minimal. Since the weapons activity levels under the No Action Alternative would remain the same as described for the Proposed Action, the impacts on terrestrial, aquatic, and threatened and endangered species would remain negligible.

4.9.4 Impacts of Pit Storage Relocation Alternative

As discussed in section 3.1.3, the Pit Storage Relocation Alternative would involve the relocation of stored pits at Pantex Plant to one or more alternate sites. Two Pit Storage Relocation Alternative options are proposed; the first involves the storage of 20,000 pits at an alternative site, and the second involves the storage of 8,000 pits.

4.9.4.1 Impacts of Relocating 20,000 Pits

Under this Pit Storage Relocation Alternative option, up to 20,000 pits would be relocated from Pantex Plant to other DOE or Department of Defense sites. Impacts to biotic resources are not expected.

4.9.4.2 Impacts of Relocating 8,000 Pits

Under this Pit Storage Relocation Alternative option, up to 8,000 pits would be relocated from Pantex Plant to other DOE or Department of Defense sites. Impacts to biotic resources are not expected.

4.9.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.9.5.1 Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement

The location of waste management facilities at Pantex Plant would increase the impacts to biotic resources. However, no specific sites have been identified in the WM PEIS. Therefore, no cumulative impacts can be identified at this stage.

4.9.5.2 Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize

Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Impacts to biological resources from operations would be expected to remain the same as current impacts. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Consequently, no potential impacts to biota would occur. Under the relocation alternative, decontamination and decommissioning activities of the existing facilities would not impact biotic resources.

4.9.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. The collocated storage alternative would disturb 94 hectares (232 acres) of habitat. Construction would adversely affect some animal populations. Vegetation within the proposed site would be lost during land-clearing activities.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, MOX fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

Construction and operation of the evolutionary Light Water Reactor would adversely affect some animal populations and would result in the disturbance of terrestrial resources on about 7.9 percent of the site. Land on which the facility would be built is presently used for agricultural purposes. Two Federal candidate species may be affected by construction activities. The bald eagle is the only consistently occurring Federal-listed species at Pantex Plant that has the potential to be affected by construction (DOE 1996a:4.0).

4.9.6 Potential Mitigation Measures

Since no significant impacts on biotic resources are identified from the Proposed Action, No Action, or the Pit Storage Relocation Alternatives, no mitigation measures are needed.

4.10 CULTURAL RESOURCES

4.10.1 Affected Environment

This section addresses the cultural resources associated with Pantex Plant. Because of the sensitive locational nature of cultural resources, the Region of Influence for this resource is the area inside the Pantex Plant boundaries. Cultural resources identified at Pantex Plant include prehistoric sites, consisting primarily of lithic scatters; historic sites that are mostly farmsteads; World War II Era buildings and structures that were once part of Pantex Ordnance Plant (1942–1945); and structures and features representing Cold War Era (1951–1991) resources (USCOE 1994b:167-168; Pantex 1996:12.0, 12.1). In addition, Pantex Plant also houses valuable historic documents, records, and artifacts pertinent to interpretation of the prehistoric and historic human activities conducted on Pantex Plant Site.

In an ongoing effort to manage and protect these resources and comply with applicable cultural resource management (CRM) laws and regulations at Pantex Plant, DOE is currently developing a CRM Plan (CRMP) that is scheduled for completion by calendar year (CY) 1998 (Pantex 1996:12.0). DOE will complete an Impact Mitigation Plan as part of the CRMP.

The CRM laws and regulations pertinent to Pantex Plant are described in chapter 6.0, Environmental Compliance Requirements for Implementing the Proposed Action and the Alternatives. Until the CRMP is implemented in CY 1998, cultural resources at Pantex Plant will be managed according to sections 106 and 110 of the *National Historic Preservation Act* (NHPA) (36 CFR 800).

4.10.1.1 *Prehistoric and Historic Resources*

Prehistoric Resources

Included in the general chronology developed for the Texas Panhandle, covering the period from 10,000 B.C. to A.D. 1750, are prehistoric sites identified at Pantex Plant. Tests conducted on 23 prehistoric sites at Pantex Plant suggest that a majority of the sites were occupied during either the Late Archaic (1,000 B.C.–A.D. 0) or the Late Prehistoric (A.D. 0–A.D. 1541) periods. These prehistoric sites are generally associated with local playas and contain cultural materials consisting mainly of lithic scatters of stone tools and flakes with varying amounts of fire-cracked rock. One tested site produced several stone artifacts in stratigraphic association with bison bone. To date, 57 prehistoric sites have been identified on Pantex Plant land, including Texas Tech University (TTU) property leased to DOE (USCOE 1994b:14, 167-168; Pantex 1996:12.1; Battelle 1996b:1).

Historic Resources

Historic sites also follow the period chronology developed for the Texas Panhandle, covering the period from A.D. 1541 to A.D. 1942 (USCOE 1994b:14). Historic sites include foundations of demolished buildings such as homes and agricultural support structures (e.g., barns, windmills), and surface scatters of metal, ceramic, or glass artifacts. To date, 12 pre-1942 historic sites have been identified on Pantex Plant land, including TTU property leased to DOE (Pantex 1996:12.1; Battelle 1996b:1). Three of these sites (41CZ45, 41CZ46, and 41CZ47) have been identified on the main DOE-owned plant site. The remaining five sites (41CZ52, 41CZ68, PP–2, PP–3, and PP–8) are located on the TTU property leased to DOE.

Historical resources representing the World War II (1942–1945) and Cold War (1951–1991) Eras include standing structures, building foundations, and features reflecting these periods (Pantex 1996:12.1). Brief histories of Pantex Plant covering the period 1942–1992 have been prepared by B.H. Carr (Carr 1992), N.A. Stricker and R.M. Poet (Legacy 1994 and 1994a). Pantex Plant began as Pantex Ordnance Plant in 1942, with its primary mission being the production of military ordnance. Since 1951, Pantex Plant has had Cold War and post-Cold War missions, including the fabrication of high explosives for nuclear weapons, nuclear weapons assembly and disassembly, and repair and modification of existing nuclear weapons (Pantex 1996:12.2).

Surveys/Inventories

Surveys of archaeological resources have been conducted at Pantex Plant since the first professional archaeological study conducted by West Texas State University during the spring of 1981 (MH 1981). This initial effort was a non-systematic survey of areas surrounding the playas on the main Pantex Plant Site and Pantex Lake (Pantex 1996:12.1). Other field investigations included the following: a 1992 Ditches and Playas *Resource Conservation and Recovery Act* Facility Investigation study by Mariah Associates; Phase II test excavations of 23 archaeological sites on Pantex Plant from 1993 through 1994 by Geo-Marine, Inc.; and a 1994 cultural resources survey of 1,700 hectares (4,200 acres) of previously unsurveyed land at Pantex Plant conducted by Geo-Marine, Inc. (Battelle 1993; USCOE 1994; USCOE 1994b). The 1994 study involved land owned by TTU and leased to DOE. In addition, 971 hectares (2,400 acres) of DOE land were systematically resurveyed in 1994 by Geo-Marine, Inc. (MH 1995b:1, 25).

During the 1981 survey, remains of 42 prehistoric Native American campsites and three pre-World War II farmsteads were identified. Except for one historic site (farmstead), all sites were found near Pantex Lake and Playas 1, 2, and 3 on the main plant site. None of the sites appear to be potentially eligible for inclusion in the National Register of Historic Places (NRHP), but the researchers felt that 17 sites had "medium" to "high" significance and recommended preservation or additional investigation (MH 1981:65-66). The 1992 survey of ditches and playas identified 5 new sites and 39 isolated occurrences (IOs). Three of the sites and 14 IOs were located along the perimeter of Playa 2, and 2 sites and 25 IOs were located along the perimeter of Playa 4. The 1994 survey on TTU land identified 6 Native American sites, 2 historic sites, and 17 IOs. The 1994 resurvey of DOE land identified 4 new prehistoric Native American sites and 22 IOs (MH 1995b:79).

A comprehensive survey of the World War II historical resources at Pantex Plant was conducted from 1992 to 1994, when DOE authorized an inventory of buildings constructed between 1942 and 1945 (Pantex 1996:12.2; Legacy 1994 and 1994a). Initially, survey work focused on World War II standing structures, such as buildings used for magazine storage and bomb-loading lines, in the active zones of Pantex Plant. Through 1993 and 1994, survey efforts expanded to other World War II Era standing structures that had not been previously surveyed, and World War II Era foundations and ruins inside historical boundaries of Pantex Ordnance Plant. This effort inventoried an additional 29 World War II standing structures and documented 82 foundations and ruins (Pantex 1996:12.2). Historical resources still exist in the general area of Pantex Plant and include structures such as guard tower foundations, the Dunnage Mill Complex ruins, standing and in-use water towers, and a control lab foundation.

Cold War operations at Pantex Plant date from 1951 to 1991. Although historical resource surveys for this period of Pantex Plant operations have not yet been conducted, plans are currently being developed to begin such a survey. Completion of this work, combined with the surveys and evaluations of archaeological and World War II resources, will lead to the implementation of a comprehensive CRMP scheduled for completion by late 1998. The CRM staff at Pantex Plant considers resources from the Cold War period to be among the most important historical resources at Pantex Plant (Pantex 1996:12.2).

As part of the comprehensive CRMP, an Impact Mitigation Plan will be developed for preservation of cultural resources on Pantex Plant Site. Many of these resources have remained relatively undisturbed because of the security maintained by Pantex Plant during the past 50 years. Until a CRMP can be completed in CY 1998, cultural resources will be managed and protected by DOE. A programmatic agreement for the continued interim management of NRHP-eligible archaeological and historical resources at Pantex Plant will be implemented by DOE in 1996. The PA will be produced in consultation with the State Historic Preservation Office (SHPO) and the Advisory Council on Historic Preservation, and will contain procedures that DOE will follow to ensure that plant operations comply with Section 106 and Section 110 requirements.

Cultural Resources Eligible for National Register Listing

Eligibility criteria for listing cultural resources on the NRHP are contained in Code of Federal Regulations, Title 36, Part 60 (36 CFR 60.4). Cultural resource studies and eligibility determinations have been and are being coordinated with the Texas SHPO in accordance with Sections 106 and 110 of NHPA. Eligibility criteria are met if a cultural resource has integrity and exhibits any of the following characteristics:

- Association with events that have made a significant contribution to the broad patterns of our history.
- Association with the lives of persons significant in our past.
- Illustration of a type, period, or method of construction; for its aesthetic values or for its representation of the work of a master; or if it represents a significant and distinguishable entity whose components may lack individual distinction.
- It has yielded, or may be likely to yield, information important in prehistory or history.

Earlier survey work on prehistoric sites at Pantex Plant did not result in a consensus on prehistoric sites eligible for the NRHP (MH 1981; Mariah 1992). However, test excavations conducted from 1993 to 1994 on 23 prehistoric sites did result in a recommendation that 22 out of the 23 sites may be ineligible for listing. No determinations of NRHP eligibility for Native American archaeological sites at Pantex Plant have been made (USCOE 1994b; Pantex 1996:12.1).

To date, no historic sites at Pantex Plant have been recommended as potentially eligible for NRHP listing; however, numerous World War II historical resources at Pantex Plant are potentially eligible for listing under the criteria discussed above (USCOE 1994b:174; Mariah 1992:3; Pantex 1996:12.1, 12.2, 12.4).

4.10.1.2 *Native American Groups*

In 1994, 10 Native American tribes with possible traditional interests in the Pantex Plant area were notified by Pantex Plant regarding their potential interest in proposed activities to be addressed in the Pantex EIS; these included the following: the Comanche Tribe of Oklahoma; the Kiowa Tribe of Oklahoma; the Apache Tribe of Oklahoma; the Mescalero Apache Tribe; the Jicarilla Apache Tribe; the Cheyenne-Arapaho Tribe of Oklahoma; the Wichita and Affiliated Tribes; the Caddo Tribe of Oklahoma; the Delaware Tribe of Western Oklahoma; and the Fort Sill Apache Tribe. The Jicarilla and Mescalero Apache Tribes stated that they did not have concerns in the Central Texas Panhandle.

The eight remaining tribes were provided detailed information on EIS/NEPA and NHPA activities. Appendix J contains this documentation. These tribes expressed an interest in acquiring further information on future activities at Pantex Plant. In response, the Pantex Plant Cultural Resource Management staff visited each of the eight tribal offices during June, 1994. Each tribe was given a Pantex Plant EIS/NEPA information packet, an opportunity to view an informational video on the Pantex Plant EIS process, and CRMP/ NHPA information packets. Only the Kiowa and Apache Tribes of Oklahoma have been in contact with the plant since these 1994 visits.

The U.S. Indian Claims Commission has found that the Kiowa Tribe of Oklahoma, the Comanche Tribe of Oklahoma, and the Apache Tribe of Oklahoma have legally recognized traditional interests in the Texas Panhandle. These 3 tribes have been contacted and encouraged to participate in the EIS, NEPA, CRMP, and NHPA processes at Pantex Plant (Pantex 1996:12.4).

Inventory of Traditional Sites

Native American sites, traditional cultural properties (TCPs), or mortuary remains have not been discovered at Pantex Plant. If these are located during future activities they will be managed in compliance with relevant cultural and historical resource management regulations and statutes. DOE recognizes that its management of Pantex Plant may have cultural implications for concerned Native American tribes. To address these concerns, the DOE asked the tribes during their consultations in 1994 if any of Pantex Plant's mission plans impacted their traditional interests. No TCP's within the plant boundaries were identified by the tribes. The tribes are encouraged to notify the plant regarding potential future concerns of a cultural nature. This process will allow the DOE to address concerns on a government-to-government basis. No Native American mortuary remains have been located at Pantex Plant; however, if any such remains are uncovered, they will be managed in compliance with the *Native American Graves Protection and Repatriation Act* (25 U.S.C. 3001) (Pantex 1996:12.4).

Treaty Considerations

To ensure that the rights and interests of Native Americans are protected, DOE is performing a historic treaties search and a public outreach program to involve Native American stakeholders in decision making related to the use of plant land and the protection of cultural resources (Pantex 1996:12.4).

4.10.1.3 *Paleontological Resources*

The surficial geology of the Pantex Plant area consists of silts, clays, and sands of the Blackwater Draw Formation. In other areas of the High Plains, this formation contains Late Pleistocene vertebrate remains, including bison, camel, horse, mammoth, and mastodon, with occasional and important evidence of their use by early humans. A recent archaeological testing program at the plant recovered bison bones associated stratigraphically with stone artifacts along an active drainage that flows south into Pantex Lake (USCOE 1994b:140, 154; DOE1995k:4-300).

4.10.2 Impacts of the Proposed Action

4.10.2.1 *Impacts of Continued Operations*

Weapons-Related Activities

Impacts to cultural and paleontological resources at Pantex Plant as a result of the weapons-related activities under the Proposed

Action are expected to be negligible. No land disturbance is proposed for these activities. Impacts of construction of new facilities under the Proposed Action are discussed separately in section 4.10.2.2.

Pit Storage Activities

The storage of up to 20,000 pits would utilize existing facilities and would not pose adverse impacts to cultural resources.

Environmental Restoration Activities

Although no cultural resources have been identified in the contaminated areas identified for environmental restoration, a cultural resources monitor would be present to identify any subsurface cultural resources during the land disturbance phase. Land disturbance for environmental restoration activities is a small fraction (less than 1 percent) of the total DOE-owned land at Pantex Plant Site. Cultural resource impacts, if any, would not be significant.

Waste Management Activities

The waste management activities will not disturb any new lands; hence no cultural resource impacts are anticipated.

4.10.2.2 *Impacts of New Facility Construction and Upgrades*

The six new facilities constructed under the Proposed Action will be located in or adjacent to Zones 11 and 12 (as shown in Figure 3.1.1–1). Some soil disturbance would be associated with these construction and facility upgrade projects. Although no cultural resources have been identified on the surface, subsurface cultural resources may be discovered during construction, remodeling, or land altering activities. If that occurs, the work would be stopped until an evaluation can be conducted to determine the significance of the resource. Mitigation, documentation, and/or preservation measures would be conducted as necessary.

The Hazardous Waste Treatment and Processing Facility would be constructed in an area that has previously been surveyed for cultural resources. No sites were located in the area to be affected by the proposed construction of this facility.

Modifications and building upgrades are proposed to convert bays 2, 4, 6, and 8 at Building 12–104 into a Pit Reuse Facility. Building 12–104 is of recent construction, and its eligibility to the NRHP has not been determined. Further, no prehistoric or historic sites are known to exist in this area.

The activities proposed for the Gas Analysis Laboratory are currently being conducted in Building 12–21. This was originally the location of the third Cooling and Top-off Building at the Pantex Ordnance Plant. This structure was demolished and replaced with a new building in 1951. The building was included in Legacy's 1994 historic building survey. Based on that evaluation, Building 12–21 was not recommended by the Texas SHPO as potentially eligible to the NRHP (Legacy 1994:107, 109, 111, 125). No cultural resources are known to exist in the proposed construction area.

The proposed construction of the Materials Compatibility Assurance Facility is within an area that has been inventoried for historic structures (Legacy 1994:167-168). The foundations of Ramp 11–R–23 are located adjacent to and immediately south of the proposed Materials Compatibility Assurance Facility. The remains of another structure, Building 11–13, adjacent to the south end of Ramp 11–R–23, are not considered eligible to the NRHP, and would not require avoidance. The remains of Ramp 11–R–23 will need to be monitored for avoidance during construction, and/or mitigated prior to construction.

Construction of the Nondestructive Evaluation Facility and the Metrology and Health Physics Calibration and Acceptance Facility is planned within Zone 12. These areas have been extensively disturbed by the growth and building activities within Zone 12 and are not adjacent to any buildings thought to be eligible to the NRHP. Further, no prehistoric sites are known to exist in this area.

4.10.2.3 *Summary of Impacts*

No impacts to cultural resources are anticipated from the continued operations at Pantex Plant. No surface remains or historical structures potentially eligible for the NRHP have been identified at the six new project sites. If subsurface cultural features or artifacts are identified during land disturbance for construction, appropriate mitigation measures would be taken in consultation with the SHPO.

4.10.3 Impacts of No Action Alternative

Impacts to cultural resources at Pantex Plant as a result of the No Action Alternative are expected to be negligible. Plant operations will not impact known cultural resources at Pantex Plant Site. No new projects would be constructed under this alternative. Impacts, therefore, are considered negligible.

4.10.4 Impacts of Pit Storage Relocation Alternative

As discussed in section 3.1.3, the Pit Storage Relocation Alternative would involve relocation of pits from storage at Pantex Plant to storage at one or more alternate sites.

4.10.4.1 *Impacts of Relocating 20,000 Pits*

Even if 20,000 pits are relocated from Pantex Plant to any other site, Pantex Plant activities would remain as identified for the Proposed Action, including the construction of six new projects. The only exception would be the availability of current storage magazines for other uses when pits are relocated to another site. Impacts on cultural resources would, therefore, be similar to those identified for the Proposed Action.

4.10.4.2 *Impacts of Relocating 8,000 Pits*

The impacts of relocating 8,000 pits would be similar to those identified for the Proposed Action and relocation of 20,000 pits, except that fewer magazines would become available for other uses once the pits are transferred. The alternative uses of these magazines would not affect their historic structure status; thus no impacts are anticipated.

4.10.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.10.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

The actual location of waste management facilities would likely disturb additional DOE-owned land at Pantex Plant. However, no specific locations have been identified in the WM PEIS. Therefore, cumulative impacts to cultural resources cannot be identified at this stage. In general, given that specific projects would likely undergo their own NEPA review, it is unlikely that the eventual siting would impact cultural resources.

4.10.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Impacts to cultural resources from operations are expected to remain the same as current impacts. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Consequently, no potential impacts to cultural resources would occur.

4.10.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. No prehistoric or historic resources were identified in the project area. Impacts to prehistoric or historic resources are not anticipated.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, MOX fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

Some NRHP-eligible resources may be affected by the construction of the disposition facilities. Any resources would be identified during Section 106 of the NHPA compliance process. There would be no operational impacts to archaeological remains because no additional ground disturbance is involved. Construction and operation of these facilities may affect some Native American resources. Native American resources would be identified through project-specific consultation with potentially affected groups. Some paleontological resources may occur in the area to be affected by construction. These operations would not have an additional impact (DOE 1996a:4.0).

4.10.6 Potential Mitigation Measures

No long-term adverse impacts to cultural resources have been identified relative to the Proposed Action, No Action, or Pit Storage Relocation Alternative; hence, no mitigation measures are needed. A Programmatic Agreement (PA) for the continued interim management of the NRHP-eligible archaeological and historical resources at Pantex Plant is being developed for implementation in 1996. The PA will be superseded by the CRMP, which is scheduled for implementation in 1998 (Pantex 1996).

If subsurface remains are identified during project construction, mitigation measures would be taken in consultation with the SHPO. These may include: groundwork monitoring, stopping work upon discovery, and mitigation or avoidance of cultural resources to minimize the potential for adverse effects.

If Native American traditional use resources are identified, but cannot be avoided through project design or location, than acceptable mitigation measures to lessen the effect on the resources would be determined in consultation with the appropriate Tribal organizations or governments. Mitigation measures may include; reconfiguration of project plan designs, appropriate relocation of human remains and associated funerary items in compliance with the *Native American Graves Protection and Repatriation Act* (25 U.S.C. 3001), reducing visual intrusion, or transplanting/harvesting traditional or secular plant resources to minimize the potential of adverse effects.

4.11 SOCIOECONOMIC RESOURCES

4.11.1 Affected Environment

This section addresses the population, housing, labor force, income, and public finance characteristics in the Pantex Plant region.

Pantex Plant is located in Carson County in the central Panhandle of Texas, 27 kilometers (17 miles) northeast of Amarillo on U.S. Highway 60. The western boundary of the site nearly coincides with the border between Potter and Carson Counties. The Amarillo metropolitan area extends between Potter County and its neighbor to the south, Randall County. A few miles south of Pantex Plant is Armstrong County, which shares its western border with Randall County and its northern border with Carson County. More than 96 percent of the employees at Pantex Plant reside within the rectangle formed by these four counties, and this area is accordingly defined as the Region of Influence (ROI) for this socioeconomic analysis. The area is depicted in Figure 4.11.1–1.

4.11.1.1 *Regional Population*

According to the 1990 Census, there were 196,144 persons and 75,067 households in the ROI. More than 95 percent of the persons and households were found in the Amarillo metropolitan area. In 1990, almost four-fifths (79.7 percent) of the ROI's population was White, 13.1 percent was Hispanic, and 4.9 percent was Black. Virtually all of the non-White population in the ROI is concentrated in the Amarillo Metropolitan Statistical Area (MSA), as shown in Table 4.11.1.1–1. More detailed information on the racial/ethnic composition of Amarillo's population is presented in section 4.17, Environmental Justice.

Outside of the Amarillo urbanized area are several small towns scattered across the ROI. Canyon, with a 1990 population of 11,365, is located south of Amarillo in central Randall County. Panhandle, with a 1990 population of 2,353, is situated approximately 16 kilometers (10 miles) east of Pantex Plant in south-central Carson County. The community of White Deer, with 1,125 persons, is situated northeast of Pantex Plant and the town of Panhandle, in east-central Carson County.

In north-central Armstrong County, southeast of Pantex Plant, is the town of Claude, with a 1990 population count of 1,199. The remainder of the 1990 population in the ROI—22,487 persons, or 11.5 percent of the ROI's total population—lived in communities with populations under 1,000 and on farms and ranches found throughout the four-county area. Table 4.11.1.1–2 presents the racial/ethnic characteristics of the small town and rural populations in the ROI.

The estimated population in the four-county ROI on July 1, 1995 was 209,762, an increase of nearly 13,700 persons from the time of the 1990 Census enumeration in April 1990. Thus, the overall rate of population growth in the ROI during this period was 6.9 percent or 1.4 percent per year (Pantex 1996:8.1).

According to the Texas State Data Center, the projected population in the ROI in 2005 ranges between 214,353 and 246,464, depending on specific economic development scenarios (TSDC 1994). The low-end projection represents a 0.6 percent average annual rate of growth in the ROI during the 15 years following the 1990 census, while the high-end figure represents a 1.7 percent average annual rate of growth in the ROI during this period.

The Amarillo Metropolitan Statistical Area (MSA), which consists of Potter and Randall Counties, accounted for 96 percent of the ROI population in 1995. Table 4.11.1.1–3 presents the history of population growth in the ROI and in the MSA during the period 1960–1995. As shown in this table, the Amarillo MSA

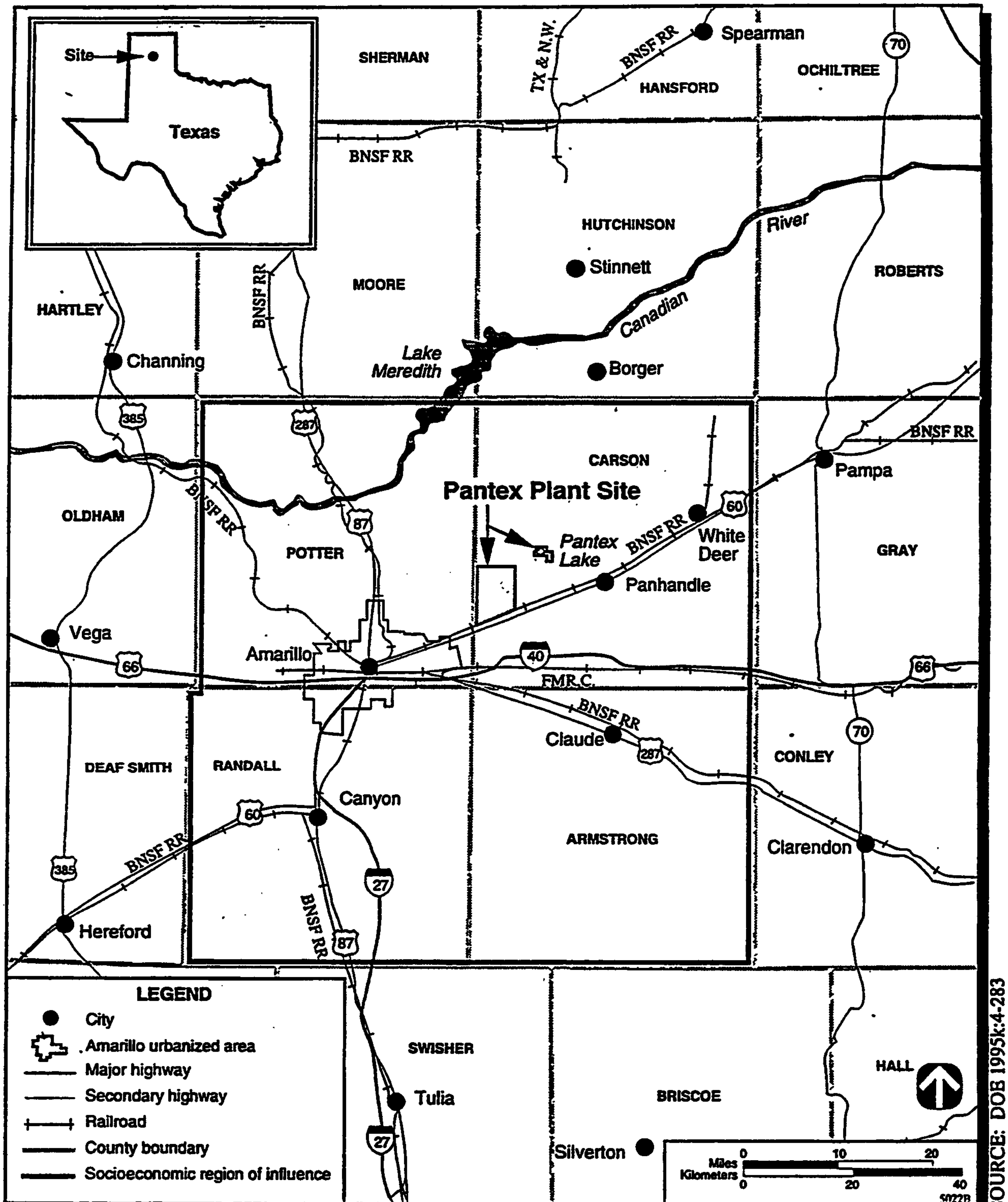

FIGURE 4.11.1–1.—*Pantex Plant, Texas, and Its Socioeconomic Region of Influence.*

TABLE 4.11.1.1–1.—*Population Distribution by Race and Ethnicity in the Pantex Plant Region of Influence, 1990*

CHARACTERISTIC	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI	TOTAL ROI %	AMARILLO MSA[1]	AMARILLO MSA % OF TOTAL ROI
Persons by Race/Ethnicity								
Whites	1,951	6,158	66,877	81,364	156,350	79.7	148,241	94.8
Hispanics	55	354	19,246	6,144	25,799	13.1	25,390	98.4
Blacks	0	11	8,460	1,082	9,553	4.9	9,542	99.9
American Indians	9	41	709	414	1,173	0.6	1,123	95.7
Asian/Pacific Islanders	5	9	2,431	626	3,071	1.6	3,057	99.5
Others	1	3	151	43	198	0.1	194	98.0
Total 1990 Population	2,021	6,576	97,874	89,673	196,144	100.0	187,547	95.6
Total Number of Households	768	2,402	37,344	34,553	75,067		71,897	95.8

[1]MSA - Includes the Counties of Potter and Randall.

Sources: TX Cen 1992a:2, 5; Census 1992:2, 5

TABLE 4.11.1.1–2.—*Population by Race and Ethnicity in Communities of the Pantex Plant Region of Influence, 1990*

CHARACTERISTIC	CITY OF AMARILLO	CANYON	CLAUDE	PANHANDLE	WHITE DEER	TOWNS < 1,000 & RURAL AREAS	TOTAL ROI
Whites	121,229	9,785	1,147	2,151	1,047	20,991	156,350
Hispanics	23,231	1,048	40	183	63	1,234	25,799
Blacks	9,203	278	0	10	0	62	9,553
American Indians	961	38	6	5	13	150	1,173
Asian/Pacific Islanders	2,811	205	5	1	2	47	3,071
Others	180	11	1	3	0	3	198
Total Population	157,615	11,365	1,199	2,353	1,125	22,487	196,144

Sources: Census 1992:5; TX Cen 1992a:6

TABLE 4.11.1.1–3—*Population Growth by County in Pantex Region of Influence*

COUNTY	1960	1970	% CHANGE 1960-1970	1980	% CHANGE 1970-1980	1990	% CHANGE 1980-1990	1995	% CHANGE 1990-1995
Armstrong	1,966	1,895	-3.6	1,994	5.2	2,021	1.4	2,111	4.5.
Carson	7,781	6,358	-18.3	6,672	4.9	6,576	-1.4	6,639	1.0
Potter	115,580	90,511	-21.7	98,637	9.0	97,874	-0.7	104,574	6.8
Randall	33,913	53,885	58.9	75,062	39.3	89,673	19.5	96,438	7.5
Total ROI	159,240	152,649	-4.1	182,365	19.4	196,144	7.6	209,762	6.9
Amarillo MSA	149,493	144,396	-3.4	173,699	20.3	187,547	8.0	201,012	7.2

Sources: City 1989; TX Cen 1961:6; TX Cen 1973:9; TX Cen 1982:14; TX Cen 1992a:1; TX Cen 1996; TX Cen 1996a

experienced a 3.4 percent decline in population between 1960 and 1970. This was largely attributable to the closing of the Amarillo Air Force Base in 1968. Amarillo MSA quickly recovered from this population loss by the mid 1970's. Between 1970 and 1980, it increased its population at an average annual rate of 2.0 percent. The growth rate slowed down to 0.8 percent per year in the 1980's but increased again to 1.4 percent per year during the 1990's (1990-1995).

4.11.1.2 *Regional Income and Poverty*

In 1989, the median household income in the ROI was $25,763, compared to the median of $27,016 for Texas as a whole. Per capita income in the ROI was $12,639 in 1989, compared to the State-wide per capita income of $12,904. A total of 30,253 persons in the ROI were below the poverty level based on their 1989 incomes, representing 15.4 percent of all persons in the ROI. Over 97 percent of these persons were residents of the Amarillo metropolitan area. Across Texas, 18.1 percent of all persons were below the poverty level based on their incomes in 1989. Table 4.11.1.2–1 summarizes the information on income and poverty levels in the ROI.

4.11.1.3 *Regional Housing*

Throughout the four-county area, a total of 84,506 housing units were counted in 1990. Slightly more than 11 percent, or 9,439 of these units were vacant, while just over 75,000 were occupied by an average of 2.56 persons per unit. Nearly 65 percent of the units were owner-occupied dwellings, while the remainder were occupied by renters. Less than 5 percent of the occupied units were overcrowded, with more than one person per room. Less than 1 percent of all housing units in the ROI lacked either complete plumbing or kitchen facilities. Table 4.11.1.3–1 presents the housing characteristics for the ROI as a whole and the four counties that comprise the ROI.

4.11.1.4 *Regional Labor Force*

In 1990, two-thirds of the ROI's population 16 years of age and older, or 97,713 persons, were in the civilian labor force. Of this total, 91,412 were employed, with 71,134 working at least 35 hours per week. Unemployed persons totaled 6,301, or 6.5 percent of the civilian labor force.

TABLE 4.11.1.2–1.—*Income and Poverty Statistics by County in the Pantex Plant Region of Influence*

CHARACTERISTIC	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI	AMARILLO MSA
1989 Income						
Median Household Income	$23,081	$26,765	$20,472	$31,472	$25,763	$25,425
Per Capita Income	$11,212	$11,710	$10,230	$15,369	$12,639	$12,687
Number of Persons Below Poverty Level Income	232	583	21,619	7,819	30,253	29,438
Percent of Persons Below Poverty Level Income	11.5	8.9	22.1	8.7	15.4	15.7

Sources: TX Cen 1993:3, 148, 149; Census 1993:3, 37, 38; TX Cen 1992a:1, 2

TABLE 4.11.1.3–1.—*Housing Characteristics by County in the Pantex Plant Region of Influence*

CHARACTERISTIC	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI
Total Housing Units	916	2,856	42,927	37,807	84,506
Occupied Housing Units	768	2,402	37,344	34,553	75,067
Persons in Occupied Units	1,966	6,474	95,961	88,130	192,531
Persons per Occupied Unit	2.56	2.70	2.57	2.55	2.56
Owner-occupied Units	620	1,950	22,490	23,642	48,702
Renter-occupied Units	148	452	14,854	10,911	26,365
Vacant Housing Units	148	454	5,583	3,254	9,439
Vacancy Rate (%)	16.2	15.9	13.0	8.6	11.2
Occupied Units with 1.01+ Persons per Room	23	72	2,654	809	3,558
Percent of Occupied Units with 1.01+ Persons per Room	3.0	3.0	7.1	2.3	4.7
Total Units Lacking Complete Plumbing Facilities	0	59	203	167	429
Total Units Lacking Complete Kitchen Facilities	4	82	536	220	842

Sources: TX Cen 1992:49, 50; TX Cen 1993b:66

One-third of the persons in the ROI 16 years of age and older were not in the labor force, i.e., they were neither working nor seeking work. Characteristics of the ROI's labor force are summarized in Table 4.11.1.4–1.

Slightly more than two-thirds of employed persons in the ROI in 1990 were wage or salaried workers in private for-profit business enterprises. Exactly 15 percent of the employed, or 13,686 persons, were government workers at the local, State, or Federal levels. Slightly more than 9 percent, or 8,373 persons, were self-employed, with 1,091 persons in this group being self-employed in agriculture. Seven percent of employed persons were wage and salaried workers in private non-profit work environments. Table 4.11.1.4–2 presents information on the various classes of workers in the ROI.

Table 4.11.1.4–3 shows the distribution of the ROI's employed workforce across the major industrial sectors. One-third of the employed, or 30,623 persons, in the ROI in 1990 worked in the service industry. The next largest group, 23,602, or 25.8 percent of employed persons, worked in the retail or wholesale trade industry. Those employed in manufacturing, which includes the operations at Pantex Plant, numbered 10,441, or 11.4 percent of the employed workforce. The remaining industrial sectors each employed less than 10 percent of the ROI's working population, with agriculture providing work for 2.8 percent of working persons in the four-county area.

Nearly one-third of the ROI's employed persons worked in technical and administrative support occupations in 1990, while just less than one-fourth of the workforce had managerial and professional positions. Approximately 14,000 of the 91,412 employed persons, or 15 percent, had service jobs, while another 12,600, or 14 percent, worked as operators, fabricators or laborers. Precision production, craft and repair jobs were held by another 13 percent of the workforce, and 2,243 persons, or 2.4 percent of the employed, worked in farming occupations. It should be noted that the Bureau of the Census

TABLE 4.11.1.4–1.—*Labor Force Characteristics by County in the Pantex Plant Region of Influence*

CHARACTERISTIC	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI
Persons 16+ years	1,517	4,781	72,204	67,608	146,110
In Labor Force	868	2,884	45,867	48,275	97,894
Employed Persons 16+ (%)	57.2	60.3	63.5	71.4	67.0
Armed Forces	0	0	107	74	181
Civilian Labor Force	868	2,884	45,760	48,201	97,713
Employed	842	2,775	41,895	45,900	91,412
Employed 35+ Hours	644	2,199	32,315	35,976	71,134
Unemployed	26	109	3,865	2,301	6,301
Unemployed (%)	3.0	3.8	8.4	4.8	6.5
Not in Labor Force	649	1,897	26,337	19,333	48,216
Institutionalized	59	69	1,413	385	1,926

Source: TX Cen 1993:144

TABLE 4.11.1.4-2.—*Class of Workers in the Pantex Plant Region of Influence*

SECTOR OF EMPLOYMENT PERSONS 16+ YEARS OLD	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI
Private For-profit Wage and Salary Workers	429	1,625	30,343	30,073	62,470
Employees of Own Corporation	20	69	673	1,404	2,166
Private Not-for-profit Wage and Salary Workers	48	134	2,885	3,322	6,389
Local Government Workers	73	332	2,177	3,106	5,688
State Government Workers	58	141	1,696	3,027	4,922
Federal Government Workers	45	117	1,285	1,629	3,076
Self-employed Workers	184	412	3,299	4,478	8,373
In Agriculture	111	164	293	523	1,091
Unpaid Family Workers	5	14	210	265	494
Totals	842	2,775	41,895	45,900	91,412

Source: TX Cen 1993:147

TABLE 4.11.1.4-3.—*Employment by Industry and by County in Pantex Plant Region of Influence*

INDUSTRY	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI
Agriculture	188	348	679	1,301	2,516
Forestry and Fisheries	0	0	7	31	38
Mining	0	129	368	485	982
Construction	78	330	3,026	2,719	6,153
Manufacturing	46	334	5,897	4,164	10,441
Transportation, Communications, and Other Public Utilities	48	162	3,242	3,951	7,403
Wholesale Trade	33	110	2,819	2,874	5,836
Retail Trade	100	383	8,722	8,561	17,766
Finance, Insurance, and Real Estate	47	109	1,838	3,654	5,648
Services	251	751	13,621	16,000	30,623
Public Administration	51	119	1,676	2,160	4,006
Totals	842	2,775	41,895	45,900	91,412

Source: TX Cen 1993:146

utilizes the broad Farming, Fishing, and Forestry occupational category to classify persons with these types of jobs. However, in the Texas Panhandle, this category includes only farm workers, since there are no fishing or forestry business operations in the area (PC 1995o). As shown in Table 4.11.1.4–4, at least 96 percent of the employed persons in the ROI lived in the Amarillo MSA, with the exception of those in farming jobs, of whom 79 percent resided in the Amarillo metropolitan area.

Of the persons in the ROI with work experience but who were unemployed in 1990, more than one-fourth, or 1,624, had held technical and administrative support positions. Nearly 1,200, or one out of five experienced unemployed persons, had been operators, fabricators, or laborers. Slightly more than 1,000, or 17 percent, had been precision production, craft, or repair persons, and nearly 600, or 10 percent of the experienced unemployed, had held managerial or professional positions (Table 4.11.1.4–5).

According to the Texas Employment Commission, the labor force in 1994 in the Amarillo MSA, consisting of Potter and Randall Counties, averaged 107,545 persons. Of this total, 103,116 were employed and 4,429 were unemployed and seeking work. Thus, the average unemployment rate in 1994 for the Amarillo MSA stood at 4.1 percent (TEC 1995).

4.11.1.5 *Regional Economy*

According to the Census Bureau's report on 1992 business patterns, there were more than 5,300 business establishments in the four-county ROI. Services, retail, and wholesale businesses constituted 70 percent of the establishments in the ROI, employed two-thirds of the employed persons covered in the survey, and accounted for a total annual payroll in excess of $800 million. Construction firms represented 7.8 percent of the businesses in the ROI, but they employed less than 5 percent of the covered workforce, with an annual payroll

TABLE 4.11.1.4–4.—*Occupation of Employed Persons 16 Years and Over in the Pantex Plant Region of Influence*

OCCUPATIONAL GROUPS BY DESIGNATED AREA	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI	% OF TOTAL ROI	AMARILLO MSA	% OF TOTAL ROI
Managerial and Professional	137	519	7,604	13,312	21,572	23.6	20,916	97.0
Technical and Administrative Support	207	647	11,764	16,708	29,326	32.1	28,472	97.1
Service	141	423	7,895	5,427	13,886	15.2	13,322	95.9
Farming, Forestry and Fishing	171	304	684	1,084	2,243	2.4	1,768	78.8
Precision Production, Craft, and Repair	87	447	6,567	4,658	11,759	12.9	11,225	95.4
Operators, Fabricators, and Laborers	99	435	7,381	4,711	12,626	13.8	12,092	95.8
Total Employed Persons	842	2,775	41,895	45,900	91,412	100.0	87,795	96.0

Sources: TX Cen 1993:145; Census 1993:34

TABLE 4.11.1.4-5.—*Last Occupation of the Experienced Unemployed in the Pantex Plant Region of Influence*

OCCUPATIONAL GROUPS BY DESIGNATED AREA	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI	% OF TOTAL
Managerial and Professional	0	5	229	350	584	9.7
Technical and Administrative Support	7	29	925	663	1,624	27.1
Service	7	17	817	417	1,258	21.0
Farming, Forestry, and Fishing	0	8	37	59	104	1.7
Precision Production, Craft, and Repair	4	17	647	361	1,029	17.2
Operators, Fabricators, and Laborers	6	22	861	306	1,195	19.9
Last Worked in 1984 or Earlier, or Unique Military Occupation	0	8	154	45	207	3.4
Total Experienced Unemployed Persons	24	106	3,670	2,201	6,001	100

Source: TX Cen 1993:147

of $77 million. Nearly 10 percent of area businesses were finance, insurance, and real estate firms, which employed slightly more than 5 percent of the workforce, with a total annual payroll of $86 million.

There were 200 manufacturing establishments in the ROI that comprised less than 4 percent of area businesses yet employed 10,590 people, or 15.5 percent of the covered workforce, with an annual payroll of $281 million. Activities at Pantex Plant were included in the manufacturing category. The 3,800 employees at Pantex Plant constituted 36 percent of the ROI's workforce employed in manufacturing. Table 4.11.1.5-1 provides more detail about businesses in the ROI.

According to the 1992 Census of Agriculture, farming and ranching contributed nearly $300 million to the economy of the ROI. Nearly 1,300 farms and ranches operated in the four-county area, with an average of 1,560 acres, covering more than 86 percent of the total land area in the four counties (TX Cen 1994:1; TX Cen 1993d:4). Nearly two-thirds of these operations reported cattle and calves in their inventory, with a total of 281,551 cattle and calves counted in the ROI in 1992. The value of the cattle and calves sold by area ranches in 1992 was in excess of $254 million (TX Cen 1994:14). Livestock raised within the four-county ROI includes dairy operations and beef cattle in feedlots and open range. Dairy operations and milk production consist of approximately 3,000 cows that produce up to 64,000 pounds of milk per day.

The number of beef cattle is difficult to obtain because of inherent characteristics of the industry. The beef cattle industry in the Texas panhandle has the following four distinct aspects:

- Cow-calf operations on open range.
- Grazing of cattle on wheat and native pasture.
- Feedlot operations.
- Slaughter and meat packaging operations.

TABLE 4.11.1.5–1.—*1992 County Business Patterns in the Pantex Plant Region of Influence*

INDUSTRY	TOTAL # OF ESTABLISHMENTS	%	TOTAL # OF EMPLOYEES[1]	%	TOTAL ANNUAL PAYROLL[2] ($1000)
Agricultural Services, Forestry, Fishing	74	1.4	420	0.6	$7,656
Mining	102	1.9	610	0.9	$25,802
Construction	418	7.8	3,318	4.9	$77,053
Manufacturing	200	3.7	10,590	15.5	$281,265
Transportation, Public Utilities	241	4.5	4,422	6.5	$125,991
Wholesale Trade	451	8.4	6,091	8.9	$144,492
Retail Trade	1,410	26.3	16,651	24.4	$205,565
Finance, Insurance, Real Estate	498	9.3	3,674	5.4	$86,014
Services	1,896	35.4	22,475	32.9	$454,345
Unclassified	69	1.3	33	0.0	$1,021
Totals	5,359	100.0	68,284	100.0	$1,409,204

[1]Figures exclude self-employed persons, most government employees, railroad workers, agricultural production workers, domestic service workers, and employees of organizations totally exempt from FICA coverage. Total excludes 223 workers in Armstrong County who were not subdivided by industrial sector due to confidentiality considerations.
[2]Total payroll amount excludes $5.636 million in Armstrong County, which was not reported by industrial sector due to confidentiality considerations.
Source: TX Cen 1994a:Table 2

Each of these aspects is affected by precipitation levels and local and future agricultural meat prices for beef.

One step in beef cattle operations is slaughter and processing. The destination of beef cattle depends on market levels and transportation costs. Large meat processing operations often slaughter and ship carcasses to meat-cutting and meat-packaging operations, possibly in other states. Thus, the possibility that packaged beef is returned to the area of origin is very remote. It is likely that more than 95 percent of the beef cattle processed in large meat operations is distributed and consumed out of state. Conversely, more than 95 percent of the beef cattle processed by small-meat processors is distributed and consumed locally.

The number of cow-calf pairs and beef cows has been compiled by the Texas Agricultural Statistics Service for all Texas counties. As of the January 1, 1994 inventory, Armstrong County had 63,000 cow-calf pairs and 5,000 beef cows. Corresponding numbers for Carson County were 73,000 and 9,000. Potter had 51,000 and 6,000, and Randall had 170,000 and 9,000 (Pantex 1996:10.2).

Crops grown in the ROI during 1992 were sold for a total of $43.8 million (TX Cen 1994:1). Of the four counties, Carson County is an important agricultural county in the State of Texas. In 1993, Carson County was eighth among all Texas counties for production of wheat and grain sorghum, and was 28th for production of corn (Pantex 1996:10.1).

Since 1950, shortly before the nuclear weapons activities at Pantex Plant began, the value of crops grown and sold in the ROI has increased by 151 percent, relative to the 142 percent increase in the Producer Price Index for Crude Foodstuffs and Feedstuffs during this period. Cattle and calf sales in the ROI have increased by 2,007 percent since 1950, relative to a 153-percent increase in the Producer Price Index for Slaughter Livestock during this period. Details of the growth of the agriculture industry in the ROI are presented in Table 4.11.1.5–2.

Corn and sorghum grown for grain or seed and wheat grown for grain are the major cash crops of the four-county ROI. The number of bushels of each of the crops harvested in 1992 is depicted in Table 4.11.1.5–3. Corn production is significantly less than sorgham or wheat because extensive irrigation is needed for corn maturation. About half of the crops grown in the local area are strictly dryland because of the high cost of pumping water from the Ogallala aquifer (Pantex 1996:10.2).

In addition to agriculture, the economic activity in the ROI has historically depended on mining (oil and gas). Growth in manufacturing, distribution, food processing, and medical services has provided further diversification to the economy. In the 1960's, Amarillo Air Force Base, with a direct employment of approximately 4,000 military and civilian employees, was a dominant force in the Amarillo economy. With the closing of the Base in 1968, approximately 9,000 persons left the Amarillo area within a two-year period. The City of Amarillo, however, took immediate

TABLE 4.11.1.5–2.—*Characteristics of Farms in the Pantex Plant Region of Influence*

CHARACTERISTIC	1950	1959	1969	1978	1987	1992
Number of Farms	1,864	1,607	1,619	1,313	1,353	1,296
Acres in Farms (1,000's)	2,534.9	2,746.7	2,229.8	2,218.6	2,124.2	2,021.9
Average Acreage per Farm	1,359.0	1,709.0	1,377.0	1,690.0	1,570.0	1,560.1
Market Value All Crops Sold ($1,000's)[1]	$17,431.0	$14,456.9	$15,127.0	$26,078.0	$32,317.0	$43,801.0
Average Crops Sold Market Value per Farm	$9,351.3	$8,996.0	$9,343.0	$19,861	$23,885	$33,797.0
Number of Farms Reporting Cattle/Calves	1,475	1,115	1,163	915	868	804
Number of Cattle/Calves	125,693	100,390	329,867	290,213	293,850	281,551
Value of Cattle/Calves Sold ($1,000's)[2]	$12,057.2	$16,798.2	$79,521.9	$185,019.0	$233,268.0	$254,033.0
Total Value of Crops Plus Cattle ($1,000's)	$29,488.2	$31,255.1	$94,648.9	$211,097.0	$265,585.0	$297,834.0

[1]The total market value of all crops sold in 1992 was 151 percent over the total for 1950, not adjusted for inflation (see note 3 below).
[2]The total market value for all cattle and calves sold in 1992 was 2,007 percent over the total for 1950, not adjusted for inflation (see note 4 below).
[3]From 1950 through 1992, the Producer Price Index for Crude Foodstuffs and Feedstuffs increased by 142 percent, relative to the 151-percent increase in sales in the ROI during this time period.
[4]From 1950 through 1992, the Producer Price Index for Slaughter Livestock increased by 153 percent, relative to the 2,007-percent increase in cattle sales in the ROI during this time period.
Sources: DOL nd.; TX Cen 1952, 1967, 1972, 1981, 1989, 1994

TABLE 4.11.1.5–3.—*1992 Crop Production in the Pantex Plant Region of Influence (Bushels Harvested)*

CHARACTERISTIC	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	TOTAL ROI
Corn for Grain or Seed	266,156	1,535,723	D	269,204	2,071,083
Sorghum for Grain or Seed	1,284,593	4,165,729	162,989	1,483,308	7,096,619
Wheat for Grain	1,347,074	3,172,483	301,852	1,873,135	6,694,544

D - Withheld to avoid disclosing data for individual farms.
Source: TX Cen 1994:1

action to recover the airport portion of the airfield for civilian aviation and initiated plans for the development of the airport.

In February 1968, Bell Helicopter started operating a military helicopter modification and repair facility on part of the Air Force Base land. The non-airport land was acquired by the State of Texas for use as a technical vocational training site by the Texas State Technical Institute. The air carrier terminal building was completed in 1971 and the City was well on its way to recovery from the population loss resulting from the Air Force Base closure. In the 1970's, Amarillo maintained a healthy economy providing major medical, financial, professional, governmental, transportation, and retail services to the entire Texas Panhandle and beyond (City 1989; Cress 1980).

The 1980's saw two major events which had a substantial impact on Amarillo area economy. In 1986, the Department of Energy announced that a 60-acre site in Deaf Smith County, adjacent to the Amarillo MSA, would be tested as one of the three potential sites for the disposal of spent nuclear fuel and high-level radioactive waste in geologic repositories. Activities at the Deaf Smith site in 1987, employed approximately 300 engineers and scientists (AGT 1986). In December 1987, the Congress enacted the Nuclear Waste Policy Amendments Act of 1987, which directed the DOE to characterize only one site, the Yucca Mountain Site in Nevada, as a candidate for the first repository (DOE 1988a). This resulted in the closure of activities in Deaf Smith County with a loss of 300 direct jobs, mainly in the Amarillo metropolitan area. In 1989, Bell Helicopter announced it was closing the Amarillo facility. It eventually closed in March 1990 with a loss of 350 jobs. At its peak in early 1980's, Bell Helicopter employed between 800 and 1,000 workers (PC 1996t).

The U.S. Department of the Interior, Bureau of Mines, has been operating a Helium Plant in Amarillo area since the early 1940's. The facility presently employs approximately 175 workers. The U.S. Congress is currently considering downsizing or eventually closing the plant. The U.S. House of Representatives voted in May 1996 to downsize the plant. However, the U.S. Senate has not voted on it yet. If downsizing were to occur, the employment at the Helium Plant would be reduced to about 30 to 40 workers within 18 months of the decision (PC 1996s).

In spite of the employment and population loss represented by the activities described above, the decennial population growth presented in Table 4.11.1.1–3 clearly demonstrates that the Amarillo metropolitan area economy has remained vibrant. Because of the visionary approach of the local leaders in diversifying the economy of the metropolitan area, Amarillo has withstood adversities in the past and has remained the center of finance and business for the Texas Panhandle.

4.11.1.6 *Public Finance*

The local governments most likely to be affected by the Proposed Action are the City of Amarillo and the counties of Armstrong, Carson, Potter, and Randall. Tables 4.11.1.6–1 and 4.11.1.6–2 present the 1994 revenues and expenditures for these units of government, subdivided by major revenue and expenditure categories. Income from taxes constitutes the major single source of funding for each of the governmental units, ranging from 35 percent of Armstrong County's 1994 total revenue to 66 percent of Potter County's 1994 total revenue.

The City of Amarillo received 63 percent of its 1994 revenue from taxes. The City also obtained 15 percent of its 1994 income from licenses, fees, and charges for services such as solid waste collection and auditorium and coliseum rentals. Most of local government spending is for roads, bridges, and law enforcement. Expenditures for 1994 were below total revenues, except for Carson County, which had a deficit of less than $1,000.

The long-term outstanding debts of the various local governments at the end of their 1994 budget year are shown in Table 4.11.1.6–3. Each of the governments has a schedule for the elimination of its long-term debt. (County 1994d; County 1994a; County 1994b; County 1994c; City 1994).

4.11.1.7 *Pantex Plant Workforce*

As of January 1995, approximately 3,530 persons were employed at Pantex Plant. Of this total, 3,310 were Mason & Hanger-Silas Mason Company, Inc. and Battelle Memorial Institute employees, 75 were DOE Amarillo Area Office employees, 130 were DOE Transportation Safeguards Division employees, and 15 were Sandia and other National Laboratories employees. In addition to the 3,530 plant employees, approximately 250 employees associated with consultants, subcontractors, and oversight agencies worked at the plant site for a total of 3,780 employees onsite in early 1995. Including outside consultants, subcontractors, and oversight agencies, a total of 3,800 employees are expected onsite (DOE 1995j). This is equivalent to 3.7 percent of the total employment of 103,116 workers in the Pantex Plant ROI in 1994 (TEC 1995).

TABLE 4.11.1.6–1.—*Revenues of Governing Bodies Within the Pantex Plant Region of Influence*

SOURCE OF REVENUE	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	CITY OF AMARILLO
Taxes	$258,807	$1,659,395	$14,267,472	$7,191,713	$45,228,109
Licenses, Fees, Charges for Services	$195,151	$437,354	$3,607,042	$3,077,463	$11,088,927
Intergovernmental	$126,991	$818,791	$1,994,799	$1,730,788	$7,179,176
Fines and Forfeitures	$146,727	$397,209	$603,676	$759,971	$2,062,474
Other	$22,319	$518,705	$1,043,639	$305,746	$6,511,651
Total	$749,995	$3,831,454	$21,516,628	$13,065,681	$72,070,337
End of Year Balance	$593,463	$24,361	$20,960,491	$5,011,059	$27,874,596

Sources: County 1994d; County 1994a; County 1994b; County 1994c; City 1994

TABLE 4.11.1.6–2.—*Expenditures of Governing Bodies Within the Pantex Plant Region of Influence*

AREA OF EXPENDITURE	ARMSTRONG COUNTY	CARSON COUNTY	POTTER COUNTY	RANDALL COUNTY	CITY OF AMARILLO
Administrative/General Government	$132,547	$1,045,330	$919,664	$1,624,050	$4,132,407
Public Service, Agricultural, Health, Welfare	$54,896	$303,141	$500,046	$123,029	$6,992,525
Road and Bridge, Building Maintenance	$226,576	$1,246,913	$1,600,207	$1,126,876	$7,144,174
Tax and Recording Offices	$97,401	$228,084	$2,155,502	$832,557	$822,357
Judicial, Prosecution, Corrections, Law Enforcement	$188,546	$775,958	$11,127,778	$6,989,887	$23,456,147
Other	$0	$12,513	$1,036,781	$126,596	$16,914,296
Capital Outlay	$21,088	$220,329	$1,017,782	$619,279	$1,372,378
Debt Service	$25,929	$0	$1,320,746	$525,849	$1,145,380
Total	$746,983	$3,832,268	$19,678,506	$11,968,123	$61,979,664

Sources: County 1994d; County 1994a; County 1994b; County 1994c; City 1994

TABLE 4.11.1.6–3.—*Long-Term Outstanding Debts at End of 1994 Budget Year*

LOCAL GOVERNMENT	OUTSTANDING DEBT
Armstrong County	$66,093
Carson County	0
Potter County	$18,974,528
Randall County	$1,904,980
City of Amarillo	$55,793,763

Sources: County 1994d; County 1994a; County 1994b; County 1994c; City 1994

4.11.2 Impacts of Proposed Action

4.11.2.1 *Impacts of Continued Operations*

Analysis of socioeconomic effects utilizes total output, employment, and earnings multipliers for the Pantex Plant ROI from the U.S. Bureau of Economic Analysis Regional Input-Output Modeling System. The current employment of 3,800 direct (onsite) workers is considered to be sufficient for the continuation of operations at the 2,000 weapons activity level per year. The results from the Input-Output Modeling System indicate that, as a result of this level of operations, a total of 6,257 secondary jobs would be created throughout the ROI from regional spending by direct workers as well as from procurement of equipment, materials, and supplies by Pantex Plant. Most of the secondary jobs in the local economy are in the retail trade and service sectors, resulting from the first-round spending by direct workers and secondary impacts induced from business activity dispersed throughout the ROI economy.

Aggregated annual earnings (salary and wages paid to employees) for direct employees total $222 million in 1994 dollars (PC 1995v). An additional $176 million (in 1994 dollars) of earnings is generated annually through secondary employment in the ROI. Thus, total annual earnings in the ROI as a result of this level of continued Pantex Plant operations is estimated at approximately $398 million. Total personal income (income received by persons from all sources including wages, interest, dividends, and other transfer payments) generated by Pantex Plant operations at the 2,000 weapons activity level adds approximately $564 million (in 1994 dollars) to the ROI economy each year.

If Pantex Plant operations are reduced to the 1,000 weapons activity level per year, direct employment would decrease to approximately 3,000 workers. This would result in a decrease of secondary jobs in the ROI to 4,925. The combined (direct and secondary) decrease of 2,132 workers from the 2,000 weapons activity level could increase the unemployment rate in the ROI from 4.1 percent to approximately 6.0 percent. Aggregated annual earnings would total $175 million for direct employees (in 1994 dollars) and $138 million for secondary workers in the ROI. The total annual earnings and personal income in the ROI would be reduced to approximately $314 million and $445 million, respectively, as a result of reduction in activity level to 1,000 weapons operations per year. This would amount to approximately 79 percent of the earnings and personal income generated by the 2,000 weapons activity level.

If Pantex Plant operations are reduced to the 500 weapons activity level per year, employment would decrease to about 2,400 direct workers, and secondary jobs throughout the ROI would decrease to about 3,950. The combined reduction of 3,715 direct and secondary jobs from the 2,000 weapons activity level would increase the unemployment rate in the ROI from 4.1 percent to approximately 6.2 percent. This could trigger some out-migration of workers from the ROI. Aggregated annual earnings would total $140 million (in 1994 dollars) for direct employees and $111 million for secondary workers in the ROI. The total annual earnings and personal income in the ROI would be reduced to $251 million and $356 million, respectively, as a result of reducing Pantex Plant operations to the 500 weapons activity level. This would amount to approximately 63 percent of the earnings and personal income generated by the 2,000 weapons activity level.

Dr. Perryman's analysis reported in Amarillo Economic Development Corporation release dated August 3, 1993 and an undated press release by Perryman Consultants "Analysis Shows Pantex Plant Adds a Billion in Revenues and Thousands of Jobs to Amarillo Economy," have provided different projections for changes in Pantex related jobs. Dr. Perryman, in one place, mentions that Pantex Plant employs

3,100 persons and estimates that the total employment resulting from Pantex Plant operations is 11,688, thus implying a total job multiplier of 3.77 and a ratio of 2.77 indirect jobs for each direct job.

In the same article, however, Dr. Perryman states that Pantex Plant expansion by 2,400 jobs would result in 5,312 total additional jobs. This implies a total job multiplier of 2.21 (Perryman 1993). Although DOE believes that a total job multiplier of 2.65 is more realistic, this alternative perspective has been provided in the interest of full disclosure of differing viewpoints.

Assuming that all 1,400 direct workers and 50 percent of the 2,315 indirect workers (1158 workers) and their families decide to leave the Pantex ROI in search of jobs elsewhere, the maximum decrease in population would amount to 5,756 persons (2,558 workers x 2.25 persons per household = 5,756 persons). This would represent a loss of 2.7 percent of the total ROI population of 209,762 in 1995. It should be noted that if this reduction takes place it would not occur instantaneously. Most people do not leave town soon after the loss of a job.

More importantly, the reduction of jobs at Pantex would not be abrupt or instantaneous. Work would be phased out over several years. Even when the weapons activity level is being reduced to 500 weapons per year, work relating to decontamination and decommissioning of facilities would employ many of the same people performing other activities at Pantex Plant. While there is reduction of employment in one activity at the plant, there would be a simultaneous increase in another activity. Therefore, the outmigration of unemployed workers is not likely to be as large as 2,558 as shown above.

The reduction of ROI population by 5,756 persons would impact the tax revenues of the local governments under whose jurisdiction Pantex-related employees (both direct and indirect employees) live. Property values would also be temporarily reduced. For making a quantitative assessment of the loss of tax revenues, the following assumptions are made to identify the maximum impacts:

- All 2,558 worker households live in the City of Amarillo (since City of Amarillo has the highest per capita tax rate in the ROI, tax revenues would be maximally impacted with this assumption).
- All workers and their families leave the city within one year (this would have the maximum impact on property value and property taxes).

Applying the 1994 per capita tax rate of $457 in Amarillo to the 5,756 persons leaving town, the reduction in tax revenue can be estimated at $2.8 million or 3.6 percent of the total tax revenues of $72.1 million in Amarillo. Since many of the Pantex employees live in other parts of the ROI where tax rates are generally lower than the City of Amarillo and because all workers would not leave town within a year, the annual losses in tax revenues in the ROI would be substantially smaller than presented above. Moreover, while it is acknowledged that the property values would decline, it is inconceivable that they would go down to zero, which is what the reduction of $2,630,492 in tax revenue represents.

In summary, the impacts of reduction in jobs with a reduction in weapons activity level to 500 weapons per year is not likely to have a significant impact on population, property values, or tax revenues of local governments. A temporary decline in population and tax revenues could possibly lead to reduced income for charitable organizations that rely on contributions of the employees at the plant and elsewhere in the community at a time when their services may be needed by more people who lose their jobs due to downsizing.

Impacts of Pit Storage Activities

Only 30 employees are directly involved in pit storage activity at Pantex Plant. Since they are part of the total employment of 3,800 workers at Pantex Plant, the socioeconomic effects are included in the foregoing discussion of continued operations.

Impacts of Environmental Restoration and Waste Management Activities

Personnel required for the environmental management and waste management activities are included in the workforce numbers presented in the foregoing discussion of continued operations. Thus, there are no significant additional socioeconomic impacts associated with the environmental management activities.

4.11.2.2 *Impacts of New Facility Construction and Upgrade*

Hazardous Waste Treatment and Processing Facility

During the peak year of its construction, the Hazardous Waste Treatment and Processing Facility would generate approximately 129 construction jobs. After construction is completed, 20 workers would be needed to operate the facility. Of these workers, 15 are already employed at the plant; only 5 new persons would be added when operations start. With the creation of 129 construction jobs in the peak year, an additional 211 secondary jobs would be created in the ROI, bringing the total jobs to 340. Additional earnings in the ROI, during the peak construction year of this facility, are estimated at $2.76 million. Additional personal income in the ROI is estimated at $3.91 million. After the construction is completed, operations at this facility would not add significantly to the socioeconomic effects described for the continued operations at Pantex Plant.

Pit Reuse Facility

During the peak year of its construction, the Pit Reuse Facility would generate about 50 construction jobs. After construction is completed, 7 workers would be needed annually for ongoing operations. During the peak construction year, 82 secondary jobs would be created in the ROI as a result of the construction of this project, bringing the total to 132 jobs in the peak year. Additional earnings in the ROI during the peak construction year are estimated at $4.54 million and additional personal income at $6.44 million. After the construction is completed, only 7 workers would be needed to operate the facility. This would not add significantly to the existing workforce of 3,800 employees at Pantex Plant. Socioeconomic impacts of this facility are, therefore, considered negligible, except for the short-term beneficial impacts during the construction phase.

Gas Analysis Laboratory

During the peak year of its construction, the Gas Analysis Laboratory would generate approximately 60 construction jobs. An additional 101 jobs would be created in the ROI as a result of the facility construction, bringing the total jobs to 161 in the peak construction year. Additional earnings in the ROI during the peak construction year are estimated at $5.14 million and additional personal income at $7.22 million. After construction is completed, 20 workers would be needed to operate the new facility. These workers would be transferred from the existing facilities at the plant and would not generate additional socioeconomic impacts.

Materials Compatibility Assurance Facility

During the peak year of its construction, the Materials Compatibility Assurance Facility would generate about 104 construction jobs (PC 1995g:Table 1). An additional 172 secondary jobs would be created in the ROI as a result of the facility construction, bringing the total jobs to 276. Additional earnings in the ROI during the peak year of construction are estimated at $3.20 million and additional personal income at $4.55 million. After the construction is completed, 40 workers would be needed to operate the new facility. These workers would be transferred from existing facilities at the plant and would not generate additional socioeconomic impacts.

Nondestructive Evaluation Facility

During the peak year of construction, the Nondestructive Evaluation Facility would generate about 224 construction jobs. An additional 370 secondary jobs would be created in the ROI as a result of the facility construction, bringing the total jobs to 594 in the peak construction year. Additional earnings in the ROI during the peak construction year are estimated at $18.83 million and additional personal income at $26.71 million. After construction is completed, 42 workers would be needed to operate this facility. These workers would be transferred from the existing facilities at the plant and would not generate additional socioeconomic impacts.

Metrology Health Physics Calibration and Acceptance Facility

During the peak year of its construction, the Metrology and Health Physics Calibration and Acceptance Facility would generate an estimated 60 construction jobs. An additional 99 secondary jobs would be created in the ROI as a result of the facility construction, bringing the total jobs to 159 in the peak construction year. Additional earnings in the ROI during the peak year of construction are estimated at $5.04 million and additional personal income at $7.15 million. After construction is completed, 48 workers would be needed to operate the new facility. These workers would be transferred from existing facilities at the plant and would not generate additional socioeconomic impacts.

4.11.2.3 *Summary of Impacts*

At the 2,000 weapons per year level, a total of 10,057 jobs would be generated in the ROI as a result of the activities at Pantex Plant Site. With weapons level reduced to 1,000 or 500 weapons per year, the employment at Pantex Plant would be reduced by 2,132 workers or 3,714 workers, respectively. Corresponding decreases in earnings and personal income would also occur as described in section 4.11.2.1. Construction and associated secondary jobs generated by the new projects in the peak construction year are estimated at 1,227 workers. This amounts to an increase of approximately 12 percent over the plant's permanent workforce.

However, this increase would provide only short-term benefits to the local economy. Because almost all construction workers can be locally hired, the benefits would generally accrue to the ROI population. Earnings in the ROI would temporarily increase to $437 million from $398 million generated by the continued operations at the 2,000 weapons activity level. Personal income would correspondingly increase from $564 million to $620 million. After the construction phase, the socioeconomic impacts would remain as described for the continued operations.

For the 1,000 and 500 weapons levels, the increase in employment, earnings, and personal income associated with new projects would be the same as described for the 2,000 weapons level scenario.

4.11.3 Impacts of the No Action Alternative

Under the No Action Alternative, the disassembly of weapons would cease when the pit storage at Pantex Plant reaches 12,000 pits. However, for purposes of analysis, it is assumed that the weapons levels would remain at 2,000, 1,000, and 500 as described under the Proposed Action. The activities associated with the disassembly would cease but would be substituted by an increase in activities associated with the assembly, modification, and surveillance of weapons to meet the stockpile requirements. With such a substitution, the workforce requirements at the plant and the expenditures that the plant would incur in Pantex Plant ROI would remain at the levels described under the Proposed Action. Therefore, socioeconomic impacts of the No Action Alternative would be similar to those described for the Proposed Action, with the exception that the impacts generated by the new projects planned under the Proposed Action would not occur.

4.11.4 Impacts of Pit Storage Relocation Alternative

4.11.4.1 *Impacts of Relocating 20,000 Pits*

Under this scenario, the activities at Pantex Plant would be similar to those described under the Proposed Action with 2,000 weapons per year activity level because the plant would continue to dismantle weapons until disassembly of 20,000 weapons is accomplished. The activities related to interim pit storage in Zone 4 of Pantex Plant would remain until pits are shipped to other site(s). As a result, the socioeconomic impacts of this Pit Relocation Alternative would be similar to those identified for the Proposed Action with 2,000 weapons per year activity level.

4.11.4.2 *Impacts of Relocating 8,000 Pits*

Even if only 8,000 pits are relocated to the other site(s), the assumption remains that Pantex Plant would continue to store 12,000 pits and weapons disassembly would continue until 20,000 weapons are disassembled. Socioeconomic impacts of this alternative scenario would, therefore, be similar to those identified for the Proposed Action with 2,000 weapons activity level per year.

4.11.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2. In addition, the cumulative impacts include impacts from the closure of the U.S. Department of Interior Helium Plant.

4.11.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

The location of waste management facilities at Pantex Plant could increase employment at Pantex Plant by an additional 654 workers as projected in the WM PEIS. It should, however, be noted that the WM PEIS is projecting employment for both treatment and disposal facilities. The Proposed Action in this EIS already includes the construction and operation of a hazardous waste treatment and processing facility. The remaining disposal facility, if developed at Pantex Plant, would not generate the entire workforce as projected in the WM PEIS, and the cumulative impacts would more likely be lower than described above.

4.11.5.2 Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, the most significant change at Pantex Plant would involve the number of workers associated with the assembly and disassembly mission, which would be expected to decrease from approximately 2,365 to approximately 915 for one-shift operations. The number of direct workers associated with HE fabrication would decrease from 365 to approximately 105.

Under the downsizing alternative, assembly and disassembly operations at Pantex Plant would proceed more efficiently and require approximately 800 workers for one-shift operations, 115 workers less than under the No Action Alternative. For three-shift operations, the bounding-case, approximately 1,266 workers would be required. All construction activities would be modifications to existing facilities. Consequently, socioeconomic impacts from the construction would be minimal.

Under the relocation alternative, approximately 1,644 direct and 1,905 indirect jobs would be lost in the regional economic area. The loss of approximately 3,549 total jobs would cause the regional economic area unemployment rate to increase from 4.8 to 6.2 percent. Housing and rental vacancies and public finance expenditures and revenue would change by less than 1 percent.

4.11.5.3 Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The Collocation Alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. Construction and operation of new storage facilities would require 1,524 and 676 workers, respectively.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on choosing the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, mixed oxide fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

The Pantex EIS Proposed Action with 2,000 weapons activity level per year combined with the bounding disposition alternative at Pantex Plant could increase employment at Pantex Plant from its current 3,800 workers to 10,220 workers if the workforce increase of 1,298 workers and 5,122 workers (125 pit disassembly and conversion, 1,022 workers plutonium conversion facility, 475 workers mixed oxide facility, and 3,500 workers evolutionary Light Water Reactor) projected in the S&D PEIS, respectively, are fully realized.

It should be noted that preconstruction activities for disposition would require about 5 years to perform the tiered NEPA analyses and to obtain necessary permits and designs. About another 5 years would be required for construction, startup, preoperational testing, and operational readiness review. Construction of completely new reactors could take longer (DOE 1996a:4.0). By the time these facilities become operational, the workforce associated with the assembly/disassembly functions would be reduced to approximately 800 to 1,266 workers as shown in the SSM PEIS. Hence, the total workforce is not likely to reach the 10,220 worker level as shown above for the bounding case.

4.11.5.4 *Impacts from Other Potential Actions*

Information on other Federal, State, or local projects including private developments was sought through contacts with Federal and State regulatory agencies, the Amarillo Economic Development Corporation, the Panhandle Municipal Water Authority, and the City of Amarillo. This effort yielded only one project (downsizing or closure of the Helium Plant) that would contribute to the cumulative impacts in the Pantex Plant ROI.

The U.S. Department of the Interior, Bureau of Mines, has been operating a Helium Plant in the Amarillo area since the early 1940s. The facility presently employs approximately 175 workers. On October 9, 1996, the President signed the *Helium Privatization Act of 1996*, directing helium operations to discontinue production and sale of refined helium by no later than 18 months from the date of enactment (i.e., by April 1998).

The employment at the Helium Plant will be reduced to about 30 to 40 workers within 18 months. Reduction in employment and population at the Helium Plant will occur well before assembly and disassembly activities at Pantex Plant result in the downsizing of the Pantex Plant workforce. Nevertheless, the ROI will experience the cumulative effects of downsizing the Pantex Plant and Helium Plant operations.

4.11.6 Potential Mitigation Measures

Since the socioeconomic impacts of the continued operations of Pantex Plant are beneficial to the regional economy, no mitigation measures are needed.

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4.12 INTRASITE TRANSPORTATION

4.12.1 Affected Environment

This section describes the intrasite transportation and handling of hazardous materials at Pantex Plant. Within Pantex Plant Site, approximately 30,000 transfers of nuclear and explosive materials take place each year, many of which are transported between zones, particularly Zones 4, 11, and 12, and between buildings in these zones. These materials include nuclear explosives, nuclear components, tritium, radioisotopic thermoelectric generators (RTGs), depleted uranium, high explosive(s) (HE) components and materials, chemicals, and other hazardous materials. The materials involved in these latter transfers do not involve an external radiation hazard as do weapons, pits, or to a lesser extent canned subassemblies (CSAs).

In addition, low-level waste, low-level mixed waste, and other hazardous wastes are transported onsite for storage, treatment, and disposal. Interzonal transfers between Zones 4, 11, and 12 are carried out on paved roads. Transportation between buildings in Zones 11 and 12 is frequently carried out via enclosed ramps. Typical vehicles and equipment used for transportation on roads include hardened trailers, Safe Secure Tractor Trailers (SSTs), flatbed trailers, vans, trucks, and tow motors. Transfer of materials via ramps is carried out by forklifts and pallet jacks.

The following subsections further describe the intrasite hazardous materials transportation activities at Pantex Plant. Worker doses resulting from transportation activities are also provided in these subsections to determine human health risks analyzed in section 4.14, Human Health.

4.12.1.1 *Onsite Transfers of Radioactive Material*

Onsite transfer of radioactive material is governed by DOE orders and Pantex-specific standards. The Transportation and Staging Department is responsible for transfers of nuclear explosives and nuclear explosive components between zones. The inventory control section of the Production Stores Department is responsible for transfers of nuclear explosives and nuclear explosive components between bays and cells within buildings in Zone 12. The Waste Operations Department is responsible for transportation of radioactive wastes onsite.

Nuclear Explosives

Within zones, nuclear explosives are transported on paved roads and covered walkways (ramps) using an electric forklift. During onsite transfers, nuclear explosives are retained in weapons-specific handling gear (H-gear) containers. Nuclear explosives within H-gear containers produce weapons system-specific external radiation hazards. Certain types of nuclear explosives are transported as a complete unit and are attached to their H-gear; this type of nuclear explosive has a bounding dose rate of 8 millirem per hour at 1 meter. Nuclear warheads, however, are contained within system-specific H-gear packages; this type of nuclear explosive has a bounding dose rate of 50 millirem per hour at the surface of the package. H-gear containers are towed between locations or lifted by the forklift and driven to locations. The speed limit for nuclear explosive transfers within ramps is 8 kilometers (5 miles) per hour.

Nuclear explosives are transported between zones within either hardened trailers or SSTs. SSTs are similar in appearance to commercial tractor trailers but are equipped with unique safety and safeguards features that prevent unauthorized cargo removal and minimize the likelihood of an accidental radioactive material release. Hardened trailers are similar in design to SSTs but have fewer security features than SSTs, which are designed for offsite transport. Table 4.12.1.1–1 shows the number of nuclear explosive and nuclear explosive component interzone transfers for 1993.

Pits

At the point of removal from a weapon, pits are swipe-tested to ensure that there is no surface radioactive contamination. Pits are then placed in AL–R8 containers and sealed with a tamper-indicating device. A pit within a container presents an external radiological hazard that is weapons system-specific. A typical dose rate is 3 millirem per hour at 1 meter for the AL–R8 container. Within Zone 12, pit transfers related to component testing, weapon assembly, or weapon modifications are accomplished with electric forklifts and special nuclear material (SNM) tie-down pallets.

All pits are expected to be staged using Stage Right techniques and equipment by December 1996. Stage Right techniques and equipment would enable the stacking of pit containers with the container's long axis oriented horizontally within a steel pallet. Figure 4.12.1.1–1 is an artist's rendition of a Stage Right magazine. These staging techniques and equipment have simplified pit transfers and reduced the need for entrance into magazines by personnel and their exposure to radiation. Pits being transferred to Zone 4 West for staging are placed at the disassembly point within a Stage Right pallet (either four or six containers per pallet) and, using an electric forklift, loaded into a pallet trailer, which can carry 24 pit containers. The pallet trailer is driven to Zone 4 West and parked at the storage magazine. In the past, hardened trailers and SSTs have been used to move pits between zones, and they could be used in the future.

Prior to the placement of pit pallets into a magazine, a temporary staging ramp with a pallet turner is installed. This ramp ensures that the Stage Right forklift is properly positioned to place the pit pallets within the storage magazine. Once the ramp installation is complete, a standard forklift removes the pallet from the pallet trailer and places it on the pallet turner with the pit containers in the vertical position (Figure 4.12.1.1–2). The pallet turner is then rotated 90 degrees so that the pit containers are in the horizontal position. A shielded Stage Right forklift (shown in Figure 4.12.1.1–1), or an automated guided vehicle, is then driven onto the staging ramp to the pit turner, where the forklift boom lifts the pallet off the turner. The forklift is then driven between the permanently installed guiderails inside the magazine to the desired location. Pits are retrieved from a storage magazine in a similar manner.

Canned Subassemblies

At the point of removal from a weapon, canned subassemblies (CSAs) which may contain

TABLE 4.12.1.1–1.—*1993 Interzone Transfers Of Nuclear Explosives and Nuclear Explosive Components*

	NUCLEAR EXPLOSIVES	PIT COMPONENTS	CSAs
Zone 4 to Zone 12	2,739	98	59
Zone 12 to Zone 4	492	1,830	283

CSA - Canned Subassembly
Source: PC 1995h:1

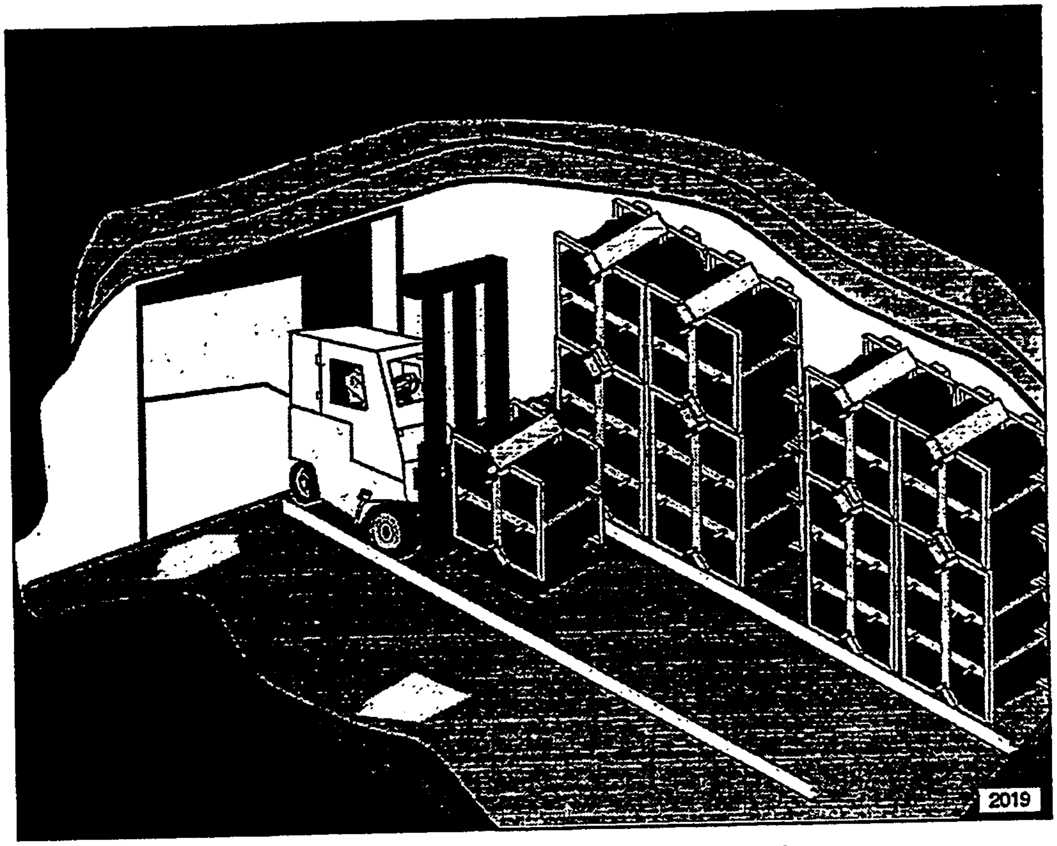

FIGURE 4.12.1.1–1.—*Stage Right Magazine.*

FIGURE 4.12.1.1–2.—*Placement of Stage Right Pallet on Pallet Turner.*

highly enriched uranium, are either packaged in sealed steel containers, fastened onto metal frames, or staged in plywood boxes. A packaged CSA produces a weapons system-specific external radiation hazard. A packaged CSA has a bounding dose rate of 0.2 millirem per hour at 1 meter. These components are loaded onto SNM tie-down pallets and transferred by electric forklift to an approved storage facility to await transfer to either the Y–12 Plant (at Oak Ridge Reservation) for final disassembly or Zone 4 for temporary staging. CSA transfers related to component testing, weapon assembly, or weapon modifications within Zone 12 are accomplished using either SNM tie-down pallets or special pallets and electric forklifts.

CSAs ready for transfer to Zone 4 are moved by electric forklift to a loading dock within Zone 12, where they are loaded into a hardened trailer or SST, tied down within the trailer, and driven to a storage magazine within Zone 4 West. Upon arrival at the magazine, CSAs are placed on a pallet and driven into the magazine using an electric forklift. CSAs are placed on the floor using the forklift, a manual hand truck, or a small hydraulic truck. CSAs are retrieved from a storage magazine in the same manner.

Radioisotopic Thermoelectric Generators

At the point of removal from a weapon, RTGs are placed in an approved container. The containers are then transported to an approved storage facility to await transfer to Los Alamos National Laboratory. RTGs within containers do not present a radiological hazard. RTG transfers related to component testing, weapon assembly, or weapon modifications within Zone 12 are accomplished with electric forklifts or carts using SNM tie-down pallets or wire baskets.

Tritium Reservoirs

At the point of removal from a weapon, tritium reservoirs are placed in either Kennedy Kits, metal suitcases, or H1616 containers. The reservoirs within the container do not present a radiological hazard. The container is transported to the Tritium Staging Facility to await transfer to the Savannah River Site. Some reservoirs are processed through a separate facility prior to delivery to the Tritium Staging Facility. Reservoir transfers occur in a wire basket secured to either a forklift or the bed of an electric cart. Tritium reservoir transfers related to component testing, weapon assembly, limited-life component replacements, or weapon modifications within Zone 12 are accomplished in a similar manner.

Low-Level and Mixed Radioactive Wastes

Both low-level and mixed radioactive wastes are transported from the generation point to the central collection area in Building 12–42. Upon approval for shipment to Building 12–42, the waste is loaded onto a flatbed or stakebed truck, secured with tie-downs, and relocated to the storage facility truck dock. At the truck dock, the waste package is checked for damage and proper paperwork and added to the facility inventory. From Building 12–42, radioactive wastes are transferred to an onsite storage facility using a flatbed or stakebed truck. These storage facilities include Building 11–9N, Building 11–7N Pad, Zone 4 East Magazines 50 and 56, and 25 Conex Boxes.

Transportation Management

Movements of nuclear explosives and nuclear components are coordinated with and tracked by the SNM control center via a secure telephone system. A custodian is assigned to oversee transfer operations. For Zone 12 transfers, a walker-spotter walks in front and directs all traffic, including foot traffic, to stop until the vehicle safely passes. Signs and corridor mirrors help alert drivers to any approaching hazards during transfers. The amount of combustible material allowed in ramps used for nuclear material transfers is strictly limited. The speed limit for vehicles carrying nuclear materials within and between buildings in Zone 12 is 8 kilometers (5 miles) per hour. The speed limit for SNM transfers between Zones 4 and 12 is 32 kilometers (20 miles) per hour. All personnel involved in these transfers are required to wear dosimeters. All Transportation and Staging Department personnel handling pit containers are required to wear lead aprons and lead-lined gloves.

4.12.1.2 *Zone 4 West Nuclear Material Staging Operations*

The Transportation and Staging Department is responsible for Zone 4 operations involving nuclear explosives and nuclear explosive components. The bulk of the activity associated with the Zone 4 West staging magazines involves material movements to and from the production areas in Zone 12, as discussed in section 4.12.1.1. Other activities that take place in Zone 4 West include:

- The performance of inventories and inspections of the SNM contents of the magazines.
- The documentation of the arrival or departure of each SNM item with the SNM control room.
- The unloading of weapons and nuclear components from arriving SSTs.
- The loading of weapons and nuclear components into departing SSTs.
- The loading of CSAs into departing SSTs.

Arriving weapons, Joint Test Assemblies, and Test Beds are driven to Zone 4 West, where they are unloaded in front of a storage magazine. Weapons contained in SSTs are unloaded as follows:

- A flatbed trailer with an electric forklift on the bed is backed up to the open SST trailer—the flatbed trailer is a 12-meter (40-foot) commercial trailer with the same bed height as the SST and side-boards to prevent objects on the bed from falling off.
- The tie-downs securing the nuclear explosive within the SST are removed.
- The forklift on the flatbed trailer drives into the SST, removes the H-gear containing the weapon, and places it on the flatbed trailer.
- An electric forklift on the ground removes the H-gear containing the weapon from the flatbed trailer and drives it into the magazine for storage.

The unloading of nuclear explosives using H-gear containers with rollers or casters is an exception to the above description. In this case, the H-gear containing the weapon is rolled to the edge of the SST, where it is placed on the ground by an electric forklift and rolled into the magazine. In addition, certain weapon systems are too heavy to be unloaded by either of the above methods. In such cases, a loading dock within Zone 4 is used.

DOE requires safeguards and security programs at facilities handling SNM. At Pantex Plant, this program requires the periodic inventory of magazines containing nuclear explosives and nuclear explosive components. The frequency of inventory for pit staging magazines is dictated by the staging class of the magazine. Pit staging magazines are divided into two classes, normal and exempt magazines. Normal staging magazines contain reserve components for existing weapon systems. For these magazines the maximum time between inventories would be 12 months and 1 week. Exempt magazines contain components that are not expected to be reused. For these magazines the maximum time between inventories would be 21 months and 1 week.

Inventories in the magazines when pit containers are placed in Stage Right configuration are performed with automatic bar code readers and video cameras attached to an inventory pallet. This pallet is moved inside the magazine by either the shielded Stage Right forklift or an automated guided vehicle. As the pallet is moved, the bar code reader and video camera verify the presence of each pit container within the magazine and the integrity of both the container and the tamper-indicating device. Only the driver using the shielded forklift is required to be in the magazine during the inventory. The use of an automated guided vehicle is currently being implemented. No personnel are required in the magazine with the automated guided vehicle. No pit movement is required for the inventory. All other inventories of magazines not in Stage Right configuration (weapons, weapons components, etc.) are inventoried by hand.

Random pit evaluations are required to meet component reliability requirements. Less than 30 pits (approximately) are selected each year for these evaluation activities. The pallets containing the pits chosen for evaluation are removed from the magazine either manually or using Stage Right techniques and equipment. These pits are transferred to Zone 12 for evaluation activities.

The shielded cab on the Stage Right forklift protects the driver from ionizing radiation while inside storage magazines. Stage Right forklifts are equipped with a special boom that prevents penetration of plutonium containers during handling operations. This boom is equipped with a limit switch that stops the forklift if the boom accidentally touches a pit container. Stage Right forklifts are operated within guide rails that prevent movement of the forklift outside a clearly defined path. Zone 4 personnel involved in pit movements are required to wear lead aprons.

4.12.1.3 *Radiological Exposures from Onsite Radioactive Material Shipments and Zone 4 West Nuclear Material Staging Activities*

Radiological exposures incurred by workers in the Transportation and Staging Department during the performance of both transportation and staging activities for the years 1993 through 1995 are provided in Table 4.12.1.3–1. Onsite transfers of SNM within buildings and between bays and cells are performed by the production technicians or Production Stores personnel. Exposures related to these activities are considered as part of production operations, not transportation. The doses incurred by workers in the Waste Operations Department are also provided in Table 4.12.1.3–1. These doses were incurred in the performance of all activities involving radioactive waste, not just transportation.

TABLE 4.12.1.3–1.—*Dosimetry Records for Transportation Staging and Waste Operations Department*

YEAR	CUMULATIVE DOSE (PERSON-REM)		NUMBER OF PERSONS MONITORED		MAXIMUM INDIVIDUAL DOSE (MREM)	
	Transportation and Staging Department	Waste Operations Department	Transportation and Staging Department	Waste Operations Department	Transportation and Staging Department	Waste Operations Department
1993	3.338	0.00	45	48	284	0.00
1994	2.150	1×10^{-2}	49	62	200	0.10
1995	3.642	2×10^{-2}	46	56	320	21.00

Source: PC 1995k:1

4.12.1.4 *Onsite Transfers of High Explosive Material*

Pantex Plant operations involve the onsite movement of HE. These explosives include Department of Transportation (DOT) Hazard Class/Division 1.1, DOT Hazard Class/Division 1.3, and DOT Hazard Class/Division 1.4. DOT Hazard Class/Division 1.1 explosives include, but are not limited to, RDX, HMX, and TNT.

These explosives are used as the primary HE component in nuclear explosives. DOT Hazard Class/Division 1.3 explosives include TATB. This explosive is also used as a primary HE component in nuclear explosives. TATB is considered an insensitive high explosive, because it is extremely stable and resistant to heat, shock, and impact. DOT Hazard Class/ Division 1.4 includes detonators, ignitors, timers, and switches.

HE is transferred at Pantex Plant Site to support assembly and disassembly operations. The HE is placed in an approved container prior to any transfer being performed. All transfers are conducted using Pantex Plant approved procedures. Routes for HE transport are restricted to paved roads. Vehicles used for the transport of HE must be equipped with a flashing amber light, which is operated at all times when explosives are being transported. The detonation of HE within an onsite trailer is considered an extremely unlikely event (10^{-4} to 10^{-6} per year) (Pantex 1994:3-71). In addition, the consequences of an HE detonation would not result in hazardous offsite consequences (Pantex 1993:3-15).

4.12.2 Impacts of Proposed Action

4.12.2.1 *Impacts of Continued Operations*

Under the Proposed Action, the following onsite transportation and staging activities will continue at Pantex Plant:

- Dismantlement activities with accompanying onsite hazardous material transfers (e.g., weapons, pits).
- Stockpile management activities with accompanying onsite hazardous material transfers (e.g., weapons, tritium reservoirs).
- Zone 4 staging of weapons, CSAs, and RTGs with accompanying inspection, inventory, and surveillance activities.
- Onsite transportation activities for other materials (e.g., wastes, chemicals).
- Storage of up to 20,000 pits with accompanying inspection, inventory, and surveillance activities at Zone 4, and pit transfers between Zone 12 and Zone 4.
- The transportation associated with the repackaging of pits from AL–R8 containers into other DOT-criteria containers (i.e., onsite pit transfers of up to 20,000 pits between Zone 4 and Zone 12).

Onsite Transfers of Radioactive Material

Nuclear explosives from both dismantlement and stockpile management activities would continue to be transported and handled within the Pantex Plant boundary. Transfers would be performed as described in sections 4.12.1 and 4.16.1 (Intersite Transportation of Nuclear and Hazardous Materials). No public exposure to radiation is expected from onsite, incident-free transport of nuclear explosives.

Pit components from both dismantlement and stockpile management activities would continue to be transported and handled within the Pantex Plant boundary. These transfers are described in sections 4.12.1 and 4.16.1. In addition to dismantlement and stockpile management activities, pit transfers would occur as part of the pit repackaging effort. The pit repackaging effort would require the transfer of pits in AL–R8 containers from Zone 4 West storage magazines to Zone 12, where they would be repackaged into DOT-criteria containers. The DOT-criteria containers would be returned to

Zone 4 West for interim storage. All container transfers would be performed using Stage Right techniques and equipment. Current schedules indicate an average repackage rate of approximately 1,000 pits per year starting in 1997. No public exposure to radiation is expected from onsite, incident-free transport of pits.

CSAs from both dismantlement and stockpile management activities would continue to be transported and handled within the Pantex Plant boundary. No public exposure to radiation is expected from onsite, incident-free movements of CSAs.

RTGs from both dismantlement and stockpile management activities would continue to be transported and handled within the Pantex Plant boundary. The twin pack currently used for onsite transport and handling of RTGs is being phased out in favor of a newer mode of the currently approved DOT–6M, Type B package for all onsite transfers. Onsite transfers of RTGs do not have the potential for significant environmental impacts because an RTG within a transfer container does not present an external radiological hazard and RTGs are constructed in such a way that an accidental release of plutonium is not reasonably foreseeable in the onsite transportation environment. RTGs are able to withstand an exposure of 1,000 °C (1,832 °F) for 1 hour or an impact of 571 kilometers (355 miles) per hour on a steel surface with no plutonium release (GE 1975).

Tritium reservoirs from both dismantlement and stockpile management activities would continue to be transported and handled within Pantex Plant boundary. No worker or public exposure to radiation occurs from onsite incident-free movements of tritium reservoirs.

Onsite transfers of depleted uranium (DU) would continue, but transfers of DU do not result in significant environmental impacts. DU does not present an external radiological hazard in the transportation environment. The radiological hazard of uranium depends upon its degree of enrichment. With increased enrichment, there is a corresponding increase in the radiological hazard from the uranium (DOE 1988).

DOE is using the safety analysis process as defined in DOE Order 5480.23 to identify and control threats to the safety of onsite shipments of radioactive material. Safety issues related to onsite transportation activities are currently evaluated in the Onsite Transportation Safety Risk Assessment (Pantex 1994). However, DOE is planning to issue a complete Safety Analysis Report for onsite transportation activities.

The bounding onsite transportation accident (low probability/high consequence), in terms of offsite consequences, would be an accident involving the detonation of HE contained within weapons during transit. An HE detonation within a weapon would lead to the dispersal of plutonium and other radioactive material into the environment. (Weapons are designed so that in the event of an accidental HE detonation, there would be no significant nuclear reactions.) An accidental HE detonation is only possible for those weapon systems containing conventional HE. The insensitive HE contained in some weapon systems does not have the potential to accidentally detonate. It has been determined that the following scenarios may lead to an accidental HE detonation within an in-transit weapon: a long-lasting fire supplied with fuel by a crashed aircraft; or a mechanical impact to a weapon from a tornado, a wind-generated missile, a direct hit by a crashing aircraft, or a bullet striking the HE.

Because of speed limits and protective handling gear, no onsite vehicle accident can create the impact conditions necessary for an HE detonation within a nuclear explosive. In addition, no onsite nuclear explosive movements are allowed in severe weather that may threaten the safety of the transport (e.g., tornado, severe wind). Nuclear explosives that are sensitive to bullet impacts (those containing conventional HE) are protected by a bullet resistant covering when not inside a hardened trailer or SST.

The likelihood of an aircraft crashing into a critical area at Pantex Plant is extremely remote. The probability of this event occurring is evaluated in section 4.15, Aircraft Accidents. The likelihood of an aircraft crashing into a critical area at Pantex Plant and affecting (by fire or direct hit) an intransit weapon is considered not reasonably foreseeable (frequency of occurrence is less than 10^{-6} per year) and at least several orders of magnitude less likely than an aircraft impact to a Pantex Plant facility (because of the limited target area of the trailer compared with facilities and the limited time that weapons are contained in a trailer).

In terms of risk (the product of probability and consequence), the potential environmental impacts from an airplane crash into a Zone 4 weapons magazine, as discussed in section 4.14 (Human Health), are much more significant than those associated with a crash into a hardened trailer. However, if this event were to occur, it would have the potential to cause environmental impacts. It is estimated that an HE detonation of numerous nuclear weapons within a hardened trailer would lead to a cumulative population dose of 4,820 person-rem with a corresponding public health risk of less than 2×10^{-7} excess cancer fatalities per year.

Other potential onsite transportation accidents are much more likely to occur but have less potential for environmental impacts. A characteristic high probability/low consequence accident involving radioactive material is a forklift puncture causing a release of plutonium from a pit container in the onsite transportation environment. This event is discussed in section 4.14, Human Health.

Zone 4 West Staging Activities

Under the Proposed Action, as many as 20,000 pits could be stored in Zone 4. Approximately 60 storage magazines would be required to store that number of pits. This total includes 18 Modified Richmond magazines and 42 Steel Arch Construction magazines. Pit magazine activities would include inspections, inventory, surveillance pit removals, and repackaging pit removals. All of these activities would be performed using the Stage Right equipment and techniques.

In addition to the surveillance pit removals, DOE plans to sample a number of sealed storage containers from Zone 4 magazines. The purpose of this evaluation is to verify the integrity of the storage containers. It is expected that 20 to 22 containers would be removed from the magazines annually and taken to Zone 12 for evaluation. The containers selected for evaluation will be removed from a storage magazine and transported to Zone 12 using Stage Right equipment and techniques.

Other magazine activities that may occur within the timeframe evaluated in this EIS include the restacking of pits in a limited number of magazines to comply with design laboratory pit temperature limits and pit movements and instrumentation placements in a limited number of magazines to facilitate third-party verifications. In addition, to allow for operational flexibility, DOE may choose to store a small number of pits in a non-Stage Right configuration. All storage magazine operations will be performed in a manner that minimizes worker radiological exposure.

Radiological Impacts From Onsite Transfers of Radioactive Material and Zone 4 West Staging Activities

Because future stockpile management requirements cannot be accurately predicted, this EIS examines impacts associated with operations on 2,000, 1,000, and 500 weapons per year (and associated interzone transfers) in

TABLE 4.12.2.1–1.—*Estimated Transportation and Staging Worker Exposures for the Proposed Action (Includes Transfers Associated with Pit Repackaging for 20,000 Pits)*

NUMBER OF WEAPONS LEVEL	10-YEAR WORKER EXPOSURE (PERSON-REM)	YEARLY AVERAGE EXPOSURE (PERSON-REM)	EXCESS CANCER FATALITIES FOR 10-YEAR EXPOSURE
2,000	61	6	0.024
1,000	48	5	0.019
500	41	4	0.016

addition to the pit movements described above. Table 4.12.2.1–1 presents the estimated exposures to the 50 people (based on current operation levels) who are directly involved with transportation and staging operations. Workers who are not directly involved are not allowed in the vicinity of material transfer operations. These exposures were estimated using historical dosimetry information from the Transportation and Staging Department. No public exposure to radiation is expected from non-incident onsite material transfers and Zone 4 staging operations (Pantex 1996c; Battelle 1994).

Excess cancer fatality risks were calculated using a dose-to-risk conversion factor of 4×10^{-4} excess cancer fatalities per person-rem (NAP 1990). Assuming an operations on 2,000 weapons activity level and assuming that the same 50 people remain involved in material handling for the 10 years under evaluation in this EIS, there would be an additional 0.024 excess cancer fatalities in this group due to this exposure. The probability of cancer fatalities from all causes in the general population is estimated at approximately 20 percent, which implies that 10 of 50 workers who are not exposed to radioactivity from Pantex Plant will develop a fatal cancer anyway.

Assuming that a maximum exposed worker receives less than 300 millirem per year (which is consistent with historical doses [see Table 4.12.1.3–1]) over the timeframe evaluated in this EIS, the incremental increase in lifetime fatal cancer probability from the projected exposure period of 10 years is approximately 1.2×10^{-3} (1 chance in 833). The estimated probability of an average member of the public developing a fatal cancer from causes not related to this radiation exposure is 0.2 (1 chance in 5).

4.12.3 Impacts of No Action Alternative

Under the No Action Alternative, DOE will perform the following onsite transportation and staging activities at Pantex Plant:

- Dismantlement activities with accompanying onsite hazardous material transfers until the 12,000 pit storage limit is reached (e.g., weapons, pits).
- Stockpile management activities with accompanying onsite hazardous material transfers (e.g., weapons, tritium reservoirs).
- The transportation associated with the repackaging of pits from AL–R8 containers into other DOT-criteria containers (i.e., onsite pit transfers of up to 12,000 pits between Zone 4 and Zone 12).
- Storage of 12,000 pits with accompanying inspection, inventory, and surveillance activities at Zone 4.
- Continuation of Zone 4 staging of weapons, CSAs, and RTGs with accompany-

TABLE 4.12.3–1.—*Estimated Transportation and Staging Worker Exposures for the No Action Alternative (Includes Transfers Associated with Pit Repackaging for 12,000 Pits)*

NUMBER OF WEAPONS LEVEL	10-YEAR WORKER EXPOSURE (PERSON-REM)	YEARLY AVERAGE EXPOSURE (PERSON-REM)	EXCESS CANCER FATALITIES FOR 10-YEAR EXPOSURE
2,000	44	4	0.018
1,000	31	3	0.012
500	25	2	0.01

ing inspection, inventory, and surveillance activities.

- Continuation of other onsite transportation activities (e.g., waste, chemicals).

Table 4.12.3–1 presents the estimated exposures to the 50 people who are in transportation and staging activities. No public exposure to radiation occurs from non-incident onsite material transfers. All other impacts would be similar to those described for the Proposed Action. The difference between the Proposed Action (Table 4.12.2.1–1) and the No Action Alternative (Table 4.12.3–1) is due to a reduction in the number of pits being repackaged and the number of weapons being dismantled.

4.12.4 Impacts of Pit Storage Relocation Alternative

4.12.4.1 *Impacts of Relocating 20,000 Pits*

Under this option, DOE would conduct the following onsite transportation and staging activities at Pantex Plant:

- Dismantlement activities with accompanying onsite hazardous material transfers (e.g., weapons, pits).
- Stockpile management activities with accompanying onsite hazardous material transfers (e.g., weapons, tritium reservoirs).
- Zone 4 staging of weapons, CSAs, and RTGs with accompanying inspection, inventory, and surveillance activities.
- Onsite pit transfers (of up to 20,000 pits) between Zone 4 and Zone 12 associated with repackaging of pits from AL–R8 containers into other DOT-criteria containers.
- Movement of pits to prepare for offsite shipment of up to 20,000 pits.
- Continuation of other onsite transportation activities (e.g., wastes, chemicals).

IMPACTS FROM PIT STORAGE RELOCATION ALTERNATIVES

- *Because of the addition of a large number of SST Loading Operations, Transportation and Staging worker doses will increase for the Pit Storage Relocation Alternatives.*
- *At a 2,000 weapons level, the Transportation and Staging Department worker dose is estimated to be 61 person-rem for 10 years of operation.*
- *At a 2,000 weapons level, and with the relocation of 20,000 pits, the Transportation and Staging Department worker dose is estimated to be 344 person-rem for 10 years of operation.*

Onsite movements of nuclear explosives, non-pit nuclear explosive components (excluding pits), and other hazardous material would be identical to those occurring under the Proposed Action including the repackaging of pits. Movements of pits would differ from the Proposed Action in that pits stored in Zone 4 would be shipped offsite. Impacts related to the offsite shipments of pits, including loading of pits into offsite shipment vehicles at Pantex Plant, are described below.

The loading and securing of pit containers within an SST will result in additional radiological exposures to onsite transportation workers. The over-the-road shipment of pits requires that the pit containers be restrained within the SST. Because of the complexity of the tiedown within a trailer, 10 to 15 minutes are required per container to perform the placement and tie-down operation. Transportation workers must be in proximity of the pit container during the placement and tie-down operation. Additionally, since an offsite pit shipment will contain more than one pit container, transportation workers will be in the proximity of numerous pit containers while operating within a trailer.

Because of the unavailability of historical dosimetry information specifically related to pit loading and unloading activities, conservative dose estimates have been made for this operation. Using estimates for time spent and position within a trailer during placement and tie-down operations and a dose rate of 1.5 millirem per hour at 1 meter from a pit package, the loading of pits into SSTs will result in an additional exposure of less than 27 person-rem per year (for 2,000 pits per year) or less than 270 person rem for 20,000 pits. Furthermore, the transfer of pits from magazines to SSTs would result in an additional 13 person-rem for the relocation of 20,000 pits. Further details of the assumptions used in these estimates are available in section F.7.

Onsite material movements for the 2,000 weapons level and the loading of 20,000 pits into SSTs is estimated to result in a 10-year cumulative dose of 344 person-rem (270 person-rem plus 13 person-rem for pit transfer loading activities plus 61 person-rem for normal operations) to transportation and staging workers. Using a dose-to-risk conversion factor of 4×10^{-4} excess cancer fatalities per person-rem and, assuming that the same 50 people remain involved in material handling and pit loading operations, there would be an additional 0.14 excess cancer fatalities in this group due to this exposure.

4.12.4.2 *Impacts of Relocating 8,000 Pits*

Under this option, DOE would relocate only 8,000 pits to other site(s). Pantex Plant would continue to store up to 12,000 pits onsite. All other activities would remain as described under the Proposed Action including the repackaging of pits.

Onsite material movements for the 2,000 weapons level and the loading of 8,000 pits into SSTs is estimated to result in a 10-year cumulative dose of 174 person-rem (113 person-rem for pit transfer and loading activities plus 61 person-rem for normal operations) to transportation and staging workers. Using a dose-to-risk conversion factor of 4×10^{-4} excess cancer fatalities per person-rem and assuming that the same 50 people remain involved in material handling and pit loading operations, there would be an additional 0.07 excess cancer fatalities in this group due to this exposure.

4.12.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant

EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

Cumulative impacts of radiological exposure of workers and the public in the Pantex Plant vicinity are described in section 4.14, Human Health.

4.12.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

Intrasite transportation is not addressed in detail in the WM PEIS, but is included in parts of the intersite transportation analysis. Future project-specific NEPA reviews would be expected to assess this issue, if one or more waste disposal facilities are to be constructed at Pantex Plant as a result of the WM PEIS.

4.12.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, impacts from intrasite transportation activities are expected to be less than current impacts. Under the downsizing alternative, the facilities would be consolidated. This could further reduce the amount of intrasite transportation impacts. Under the relocation alternative, intrasite transportation associated with assembly and disassembly operations and HE fabrication would cease.

4.12.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

As discussed in sections 1.4 and 1.7.3 of this volume, the final S&D PEIS will include an alternative under which plutonium pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. Impacts related to intrasite transportation and additional pit handling will be described in appendix Q of the S&D PEIS. Adding RFETS pits to pits from Pantex Plant dismantlement operations would not exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Furthermore, RFETS pits have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant.

Placing RFETS pits in Zone 4 storage would, however, require repackaging RFETS pits from FL-type containers into AL-R8 containers in Zone 12 prior to placement into Stage Right configuration. Additionally, once repackaged, the pits would be transferred from Zone 12 to Zone 4. The total exposure to workers from both the transfer of pit containers and the repackaging of pits arriving from RFETS would result in less than 10^{-2} additional latent cancer fatalities for involved workers, as reported in appendix Q of the S&D PEIS. No exposure to the public is expected from these operations.

4.12.6 Potential Mitigation Measures

Onsite shipments of radioactive material have been performed for many years at Pantex Plant without a significant accident involving radioactive material. Radiological exposures incurred from future onsite transportation activities would continue to be controlled and minimized by Pantex Plant procedures, administrative controls, and an active As Low As Reasonably Achievable program that promotes work practices that minimize worker exposures. The Pantex Plant *Radiological Control Manual*, and ultimately, the Federal regulations for occupational radiation protection dictate the magnitude of radiological exposure to workers and safe radiological work practices (Pantex 1995d; 10 CFR 835).

4.13 WASTE MANAGEMENT

4.13.1 Affected Environment

This section covers the ongoing waste management practices relating to generation, storage, treatment, and disposal of waste at Pantex Plant. It includes an overview of the regulatory framework and provides a summary of historic, current, and projected waste generation and waste management practices, including the quantities of wastes generated and managed under specified activities. Waste at Pantex Plant is primarily generated from ongoing assembly and dismantlement operations of nuclear weapons and high explosive(s) (HE) production. Waste is also generated from support operations at Pantex Plant, such as medical services, vehicle maintenance activities, general office work, construction activities, environmental monitoring, laboratory activities, and environmental restoration (ER) activities.

4.13.1.1 *Existing Waste Management Practices*

Regulatory Framework

The Pantex Plant waste management program operates under a number of Federal and State regulations and permits obtained under these regulations that are primarily under the authority of the Environmental Protection Agency (EPA) and TNRCC. Details on these laws and regulations are provided in chapter 6.0, Environmental Compliance Requirements for Implementing the Proposed Action and the Alternatives.

Regulatory agencies charged with enforcing regulations and statutes use the permit process as a primary tool. Table 4.13.1.1–1 lists Pantex Plant permits, the registration numbers, the issuing agency, the effective date, and the expiration date for each permit.

Pantex Plant is a large-quantity *Resource Conservation and Recovery Act* (RCRA) hazardous waste generator, an industrial solid waste generator, and a nonhazardous nonradioactive waste disposal facility. Pantex Plant operates under a RCRA Part B Permit as a hazardous waste treatment and storage facility (TNRCC 1996). Table 4.13.1.1–2 presents current waste management facilities.

The *Federal Facility Compliance Act of 1992* (FFCA) includes provisions for mixed waste compliance with RCRA and required DOE to have approved, site-specific low-level mixed waste treatment plans in place by October 1995. A draft Proposed Site Treatment Plan was submitted to TNRCC in March 1995 for its approval. The Final Site Treatment Plan–Compliance Plan was approved by TNRCC in September 1995 and an Agreed Order was issued October 2, 1995 (DOE 1995x).

The purposes of this Agreed Order and approved Site Treatment Plan-Compliance Plan include: fulfilling the requirements of FFCA; establishing regulatory milestones requiring DOE to develop treatment capacities and technologies and treat, ship to commercial treatment facilities, or otherwise meet RCRA land disposal restrictions (LDR) for all current inventory and projected inventories of all covered LDR mixed wastes; and allowing storage of current and projected LDR mixed wastes at Pantex Plant during the implementation and term of this Compliance Plan and Agreed Order (Pantex 1996f).

In the March 1996 version of the Pantex Plant EIS, the proposed construction of the Hazardous Waste Treatment and Processing Facility (HWTPF) was considered necessary for enhanced efficiency and safety and meeting regulatory requirements established in the Agreed Order. With offsite disposal shipments of mixed waste in 1994 and two shipments in 1996, as noted in section 4.13.2.3, and changes contained in the August 1996 FFCA

TABLE 4.13.1.1–1.—*Permits Issued to Pantex Plant*

PERMIT	PERMIT NUMBER	ISSUING AGENCY	EFFECTIVE DATE	EXPIRATION DATE
Written Grant of Authority[1]		TNRCC	Reissued 5/29/91	None
Building 16–13 Steam Plant	C-18379	TNRCC	7/21/88	7/21/03
Burning Ground	Written Grant of Authority	TNRCC	Reissued 5/29/91	None
Building 11–36	21233	TNRCC	3/11/93	3/11/98
Building 12–19	21233	TNRCC	3/11/93	3/11/98
High Explosives Synthesis Building (11–55)	21233	TNRCC	3/11/93	3/11/98
Solid Waste Registration No.[2]	30459	EPA/ TNRCC	10/30/80	None
Hazardous Waste Permit[2 4]	HW-50284/ TX-4890110527	EPA/ TNRCC	4/25/91	4/25/01
Modification 1	Class 1 modification	TNRCC	1/26/93	4/25/01
Modification 2	Class 1 modification	TNRCC	7/28/93	4/25/01
Modification 3	Class 3 modification	EPA/ TNRCC	2/16/96	4/25/01
Wastewater No Discharge[3]	02296	TNRCC	5/19/80	5/03/93
Wastewater Discharge[3 5]	02296	TNRCC	6/14/96	6/14/01
NPDES Permit[3]	TX-0107107	EPA	6/1/96	5/31/01
NPDES General Permit for Stormwater Discharge Associated with Non-Construction Industrial Activity[3]	TXR00G138	EPA	2/15/95	10/1/97
NPDES General Permit for Stormwater Discharge Associated with Construction Activity	TX10L777	EPA	9/13/94	
Clean Water Act Section 404 Dredge and Fill Permit	Nationwide Permit for Survey Activities	Corps of Engineers	6/16/94	6/16/96

[1]Air.
[2]Solid Waste.
[3]Water.
[4]RCRA Part B Permit.
[5]New permit pending approval.
NPDES - National Pollutant Discharge Elimination System.
Sources: DOE 1996f:15; TNRCC 1996; TNRCC 1996b; EPA 1996

TABLE 4.13.1.1–2.—*Solid Waste Management Facilities, 1996*

FACILITY	FUNCTION	WASTE TYPES	WASTE FORMS	LISTED CAPACITY[1]
4–46, 4–50, 4–56, 4–72, 4–74	S	LLMW, HW, LLW	Liquid/Solid	1,029,920 liters (272,100 gal)
20 LLW Conex Boxes	S	LLW	Solid	1,438 m^3 (50,760 ft^3)
13 HW Conex Boxes	S	LLMW, HW	Solid	934 m^3 (32,988 ft^3)
11–7N, A, B	S	LLMW, HW, LLW, NHW	Liquid/Solid	527,099 liters (139,260 gal)
11–9N	S	LLMW, HW, LLW, NHW	Liquid/Solid	378,500 liters (100,000 gal)
12–42	A	LLW	Liquid/Solid	Variable
Burning Ground	T	LLMW, HW	Solid	181,818 kg (400,000 lb) total
9 Trays				680 kg (1,500 lb) per burn
3 Pads				153 m^3 (5,400 ft^3) per burn
3 Pans				680 kg (1,500 lb) per burn
11–50	F	Wastewater and HE particulates	Liquid	57,000 liters (15,000 gal) per month
12–43	T	HW	Liquid	15,000 liters (4,000 gal) per month
16–16RHWSF	S	LLMW, HW, LLW, NHW	Liquid/Solid	1,040,000 liters (275,000 gallons)
Construction Debris Landfill	D	NHW	Solid	Not Applicable
HWTPF	T	LLMW, LLW, HW, NHW	Liquid/Solid	500 m^3 (654 yd^3) per year—Proposed
11–9, 11–15A	T	LLMW, HW	Liquid/Solid	757 liters (200 gal) per treatment
12–19E	R	NHW	Liquid	Not Applicable
11–36	TS	HW	Liquid/Solid	1,000 kg (2,200 lb)/Study
11–29	R	HW	Liquid	Not Applicable

[1]Due to conversion rounding, listed capacities may differ from permitted capacities.
A - Accumulations, D - Disposal, F - Filtration, R - Recycle, RHWSF - RCRA Hazardous Waste Staging Facility,
S - Storage, T - Treatment, TS - Treatability Study.
Sources: DOE 1994c:Table 7-1; Pantex 1996:14.0; PC 1995d:1; TNRCC 1996; PC 1996d; MH 1995d

Compliance Plan Annual Update document, construction of the HWTPF is no longer considered a regulatory requirement. DOE's purpose and need for enhanced efficiency and safety of its current mixed waste, low-level radioactive waste and hazardous waste operations remain and are discussed in greater detail in appendix H. Without the HWTPF, waste treatment and processing capabilities are greatly reduced.

In terms of overall operational waste management, the RCRA Part B Permit is the most significant regulatory instrument. The State of Texas and EPA jointly issued Pantex Plant a Hazardous Waste Permit in April 1991 to address the processing and storage of hazardous waste. The permit was modified in January 1993 to allow treatment in tanks and containers in Building 11–9 and 11–15A. In July 1994, the permit was modified to increase permitted storage capacity for hazardous waste in Buildings 11–9N, 11–7A, and 11–7B by 780,700 liters (206,260 gallons) (TNRCC 1995a:9; PC 1995).

Pantex Plant requested a Class 3 modification to the Hazardous Waste Permit issued in April 1991 by TNRCC and EPA. The initial request for modification, made in November 1991 and revised in October 1992, asked for the addition of 17 RCRA units at the Burning Ground, which were excluded from the April 1991 permit but continued to operate under RCRA Interim Status, and 10 additional storage units. On February 16, 1996, the Class 3 permit modification was approved by TNRCC. As a result, permitted storage increased (5 Conexes and 3 magazines), 5 Burning Ground units (3 flash pits, 2 cages) were closed, and 15 Burning Ground units received permit status (DOE 1994b:2-6, 2-7; TNRCC 1996).

Air emissions from the ongoing Burning Ground activities are subject to general air quality conditions established in the Hazardous Waste Permit. The permit states that this facility shall be operated in accordance with and subject to the applicable provisions of the *Texas Solid Waste Disposal Act* and the *Texas Clean Air Act* as amended, Chapter 382 of the Texas Health and Safety Code, and all applicable rules, regulations, and orders of the TNRCC. The resulting ash shall be managed so as to not cause or contribute to a condition of "air pollution" as defined in subchapter 382.003 of the Texas Health and Safety Code (TNRCC 1996:20-22).

In 1984, RCRA was amended by the Hazardous and Solid Waste Amendments, which imposed waste minimization requirements on hazardous waste generators and treatment, storage, and disposal facilities. To comply with the waste minimization requirements, Pantex Plant established a Pollution Prevention and Waste Minimization program. Volume II, appendix G, Pollution Prevention and Waste Minimization, provides detailed information regarding pollution prevention and waste minimization at Pantex Plant. This program has been distinguished with the White House Closing the Circle Award and the Vice President's Hammer Award in 1996 (MH 1996b).

Pantex Plant is also active in the Clean Texas 2000 pollution prevention program. The organizations involved in this program commit to reduce chemical releases and hazardous waste generation by 50 percent by the year 2000, using the 1987 Toxic Release Inventory Report as a baseline. Current and planned studies examining alternative treatment methods to open burning-open detonation of high explosives are discussed in volume II, appendix G.

Waste Management Practices

The major categories of wastes generated at Pantex Plant are described below. The discussion covers waste characteristics, activities, locations, quantities, and general waste management practices. Activities at Pantex Plant generate wastes that are categorized as low-level radioactive waste (LLW), low-level mixed waste (LLMW), hazardous waste (HW), and nonhazardous nonradioactive waste (NHW). NHW has three categories—Class 1, 2, and 3 (see Table 4.13.1.1–3). Other wastes include sanitary and industrial wastewater, stormwater, polychlorinated biphenyls (PCBs), asbestos, and medical wastes.

Transuranic (TRU) and mixed TRU wastes are not normally generated, and no high-level radioactive wastes are currently generated at Pantex Plant. Three drums of TRU waste were generated in 1993 as a result of an incident during weapon dismantlement. The TRU waste is stored at Pantex Plant in an appropriately monitored facility awaiting approval of transfer to an offsite management facility (Pantex 1996:14.5). Pantex Plant uses trained personnel and approved program procedures to control waste from the point of generation through

TABLE 4.13.1.1–3.—*Nonhazardous (Nonradioactive) Waste Classification*

WASTE CLASS	REGULATION	CRITERIA	EXAMPLES	ONSITE S/T/D	ONSITE S/T/D
Class 1	30 TAC 335.505	Is not hazardous waste. Contains constituents in excess of levels specified in 30 TAC 335.506.	Empty containers, rags, wipes, protective clothing, wastewater, and soils.	S/T/D[1]	T/D
Class 2	30 TAC 335.506	Is not hazardous waste. Contains constituents in excess of levels specified in 30 TAC 335.506. Is not a Class 3 waste.	Paper, plastics, plant wastewater, and soils refuse.	S/T/D[1 2]	T/D
Class 3	30 TAC 335.507	Is not hazardous waste. Is inert, essentially insoluble, and poses no threat to human health and/or the environment.	Rock, brick, glass, dirt, and certain plastics and rubber.	D[2]	None

S/T/D - Storage/Treatment/Disposal
[1]Onsite treatment and disposal is limited to wastewater treatment and disposal.
[2]Onsite disposal is in a Construction Debris Landfill located in Zone 10.
Source: Pantex 1996:14.5

storage, treatment, and disposal (TNRCC 1996).

4.13.1.2 *Waste Categories and Operations*

Table 4.13.1.2–1 shows the annual waste generation from 1992 through 1995 for LLW, LLMW, HW, and NHW. Table 4.13.1.2–2 shows ER program projected annual waste generation from 1997 to 2000 for LLW, LLMW, HW, and NHW. Table 4.13.1.2–3 shows projected waste generation from 1997 to 2007. As of September 1995, waste in storage included 474 m^3 (616 yd^3) of LLW, 147 m^3 (191 yd^3) of LLMW, 153 m^3 (199 yd^3) of HW, and 311 m^3 (404 yd^3) of NHW. Each of these waste types is discussed below. Additionally, Chapter 14 of the Pantex Plant Environmental Information Document provides detailed waste stream and waste management facility information.

Low-Level Radioactive Waste

LLW contains radioactivity not classified as high-level waste, TRU waste, spent nuclear fuel, or special by-product material as defined by DOE Order 5820.2A (DOE Order 5820.2A:Attachment 2, page 3). Pantex Plant's LLW wastestreams include materials contaminated during weapons assembly, disassembly, maintenance, or quality assurance testing. Other wastestreams include protective clothing, filters, wipes, plastic, foam, rubber, desiccant, and debris (PC 1995f).

LLW is stored onsite and shipped to the Nevada Test Site (NTS) for disposition. Pantex Plant must accumulate and store LLW in a manner that does not create a nuisance or endanger the public health or environment. Pantex Plant's LLW operating storage capacity is of at least 2,380 containers (Pantex 1996:14.8). To ensure that LLW does not pose a danger to the public or the environment, Pantex Plant manages LLW in accordance with the NTS Defense Waste

TABLE 4.13.1.2–1.—*Industrial Operation-Related Waste Volumes (in cubic meters [cubic yards]) 1992–1995*[1]

WASTE TYPE	1992	1993	1994	1995
LLW[3]	266 (346)	287 (373)	232 (302)	187 (241)
LLMW	51 (67)	38 (50)	25 (33)	29 (38)
HW	589 (770)	370 (484)	193 (252)	460 (598)
NHW[2]	7,078 (9,201)	11,610 (15, 093)	5,507 (7,159)	5,136 (6,677)
Total	7,984 (10,384)	12,305 (16,002)	5,957 (7,746)	5,810 (7,554)

[1]Conversion of different waste types from weight to volume were made using 0.72 kg per liter (6 pounds waste per gallon).
[2]NHW includes industrial Class 1 (includes Toxic Substances Control Act (15 U.S.C. 2601) wastes), Class 2, and Class 3 wastes.
[3]Volumes include non-production waste.
Source: DOE 1996f:18

TABLE 4.13.1.2–2.—*Environmental Restoration Waste Projections, 1997–2000*[1]

WASTE TYPE	FY 1997	FY 1998	FY 1999	FY[2] 2000
SOLID WASTE, m^3 (yd^3)				
LLW	237 (310)	0 (0)	0 (0)	0 (0)
LLMW	0 (0)	0 (0)	0 (0)	0 (0)
HW	765 (1,000)	7.6 (10)	0 (0)	0 (0)
NHW	8,659 (11,325)	772 (1,010)	0 (0)	0 (0)
LIQUID WASTE, L (gal)				
LLW	0 (0)	0 (0)	0 (0)	0 (0)
LLMW	0 (0)	0 (0)	0 (0)	0 (0)
HW	749 (198)	3,039 (803)	16,156 (4,268)	749 (198)
NHW	116,049 (30,757)	354,261 (96,492)	72,536 (19,162)	72,536 (19,162)
Total[3 4]	9,778 (12,711)	1,137 (1,478)	89 (116)	73 (95)

[1]Table includes a 10 percent margin to provide conservative estimates.
[2]Nonhazardous liquid waste and hazardous liquid waste would continue to be produced at this level beyond FY 2000.
[3]Assumed 1,000 liters equals one cubic meter.
[4]Totals (solid waste and liquid waste) are reported in m^3 (yd^3).
Source: Pantex 1996:14.5

TABLE 4.13.1.2–3.—*Annual Total Industry Related Waste Projections Excluding Environmental Restoration Waste at Pantex Plant, 1997–2007 (in cubic meters [cubic yards])*[1 2]

WASTE TYPE	WEAPONS LEVEL PER YEAR		
	2,000 WEAPONS/YEAR (3,800 EMPLOYEES)	1,000 WEAPONS/YEAR (3,000 EMPLOYEES)	500 WEAPONS/YEAR (2,400 EMPLOYEES)
LLW	249 (326)	131.5 (172)	71.6 (93.7)
LLMW	183.2 (239.6)	118.3 (154.7)	81.0 (105.9)
HW	191.6 (250.5)	107.9 (141)	63.8 (83.5)
NHW (Class1)	741.6 (970)	524.6 (686.2)	388.2 (507.8)
NHW (Class 2)	574 (751)	453 (593)	363 (475)
Total	1,939.4 (2239.1)	1,335.3 (1,746.9)	967.6 (1,265.9)

[1]Table excludes PCB, asbestos, and medical. Environmental restoration and wastewater discharge to playas and the wastewater treatment facility are covered in Table 4.13.1.2–2 and Table 4.3.2.1–1. NHW (Class 3) is not reported since the waste is inert, essentially insoluble, and poses no threat to human health or the environment (Pantex 1996:14.5). Transuranic wastes are not normally generated. No high-level radioactive wastes are currently generated at Pantex Plant.
[2]Table includes a 10 percent margin to provide conservative estimates.
Source: Pantex 1996:14.5

Acceptance Criteria Certification and Transfer Requirement Program (NVO–325). Under NVO–325, Pantex Plant is required to characterize wastes using process knowledge or sampling and analysis based on NTS-established analysis requirements and standardized reporting. In addition, each shipment of waste must be certified. Certification is the process of determining, verifying, and attesting in writing to compliance with the Waste Acceptance Criteria. Pantex Plant ensures compliance by conducting internal quality assurance and quality control audits. Furthermore, NTS conducts an annual program review and approval inspection of the plant's practices and quality controls (DOE 1992a:8, 17-20, 96-106).

Pantex Plant materials managed under NVO–325 for shipment to NTS for disposal include: demilitarized and sanitized weapon debris, desiccant, support materials, and packaging materials. Radioactively contaminated classified weapon components that cannot be demilitarized and sanitized are sent to the NTS classified repository. Pantex Plant is presently approved to ship nine LLW streams to NTS for disposal. Five more wastestreams have been through the NTS review process and have approval pending, waiting for sampling and verification. Pantex Plant has also identified 14 other potential streams for inclusion at a later date, and more may be added later. These wastes are currently stored onsite (Pantex 1996:14.5).

Low-Level Mixed Waste

LLMW contains both radioactive and hazardous constituents as defined by the *Atomic Energy Act* (42 U.S.C. 2011) and RCRA (DOE Order 5820.2A:Attachment 2, page 3). Pantex Plant's primary LLMW wastestreams are composed of debris from demilitarization and sanitization of weapons components contaminated during weapons assembly, disassembly, maintenance, and quality assurance testing. Other LLMW wastestreams include HE-contaminated support material, organic liquids, aqueous liquids, organic solids, inorganic solids, lab packs, liquid mercury, batteries, and compressed gas (PC 1995f).

Pantex Plant stores all of its LLMW onsite. LLMW is managed in accordance with the Agreed Order and Site Treatment Plan–Compliance Plan (Pantex 1996f), 30 TAC 335, the RCRA Part B Permit, and 40 CFR 260–280. The Permit's Waste Analysis Plan requires Pantex Plant to characterize wastes using process knowledge and test methods. The Waste Analysis Plan contains the methodologies and analyses used to properly characterize the LLMW (TNRCC 1996).

Pantex Plant treats LLMW and HW in three areas: the Burning Ground, Building 11–9, and Building 11-15A (Figure 4.13.1.2–1). The Burning Ground, an open air thermal treatment facility, operating under RCRA Permit Status, is located in the northern part of Pantex Plant. The Burning Ground is designed to handle waste HE and explosive-contaminated wastes from HE research and production activities. HE is treated in 15 thermal treatment units (nine trays, three pads, and three pans) (TNRCC 1996). Building 11–9, located in Zone 11, is permitted to allow treatment and processing of HW and LLMW in tanks and containers (TNRCC 1996).

While not part of the current operations, Pantex Plant plans to use the Hazardous Waste Treatment and Processing Facility (HWTPF) for LLMW, LLW, and HW treatment and processing. DOE is in the process of examining DOE developed technologies for enhancing HWTPF LLMW treatment and processing capabilities (Battelle 1995). Pantex Plant is also pursuing commercial LLMW treatment and disposal. A detailed discussion of the HWTPF can be found in appendix H. A detailed discussion of waste stream treatability groups can be found in the FFCA Agreed Order and the approved Site Treatment Plan-Compliance Plan.

Hazardous Waste

Under 40 CFR 261, HW is defined as a solid waste that meets any of these four conditions: is listed as a HW; exhibits a characteristic of a HW; is a mixture of a HW and a nonhazardous solid waste; or is derived from treatment, storage, or disposal of a HW. The term "solid" in this context does not specify physical form (i.e., HW may be solid, liquid, or gas) (40 CFR 261.3). The regulations exempt or exclude certain materials from its definition of hazardous wastes, and these exclusions and exemptions are not considered in this discussion. Pantex Plant generates HW during weapons assembly, disassembly, maintenance, and quality assurance testing; HE research and production; ER; and facility operations. Wastestreams include HE, solvents, protective clothing, filters, wipes, oils, soils, paint waste, desiccant, tools, wastewater, and debris (PC 1995f).

Pantex Plant stores HW onsite and treats it onsite and offsite. HW is disposed of offsite. Pantex Plant uses commercial facilities for offsite treatment and disposal. HW is managed in compliance with RCRA regulations from the point of generation to storage and disposal (Pantex 1996:14.5).

Nonhazardous Nonradioactive Waste

NHW is defined as a municipal solid waste or industrial solid waste that is not a listed or characteristic hazardous waste as defined in 40 CFR 261 and 30 TAC 335. Pantex Plant generates industrial solid NHW during weapons assembly, disassembly, maintenance, quality assurance testing; HE research and production; ER; and facility operations. Wastestreams include nonhazardous solvents, protective clothing, filters, wipes, nonhazardous oils, soils, nonhazardous paint waste, desiccant, tools, wastewater, and debris (PC 1995f).

Pantex Plant accumulates and stores NHW onsite, and the treatment of NHW occurs both

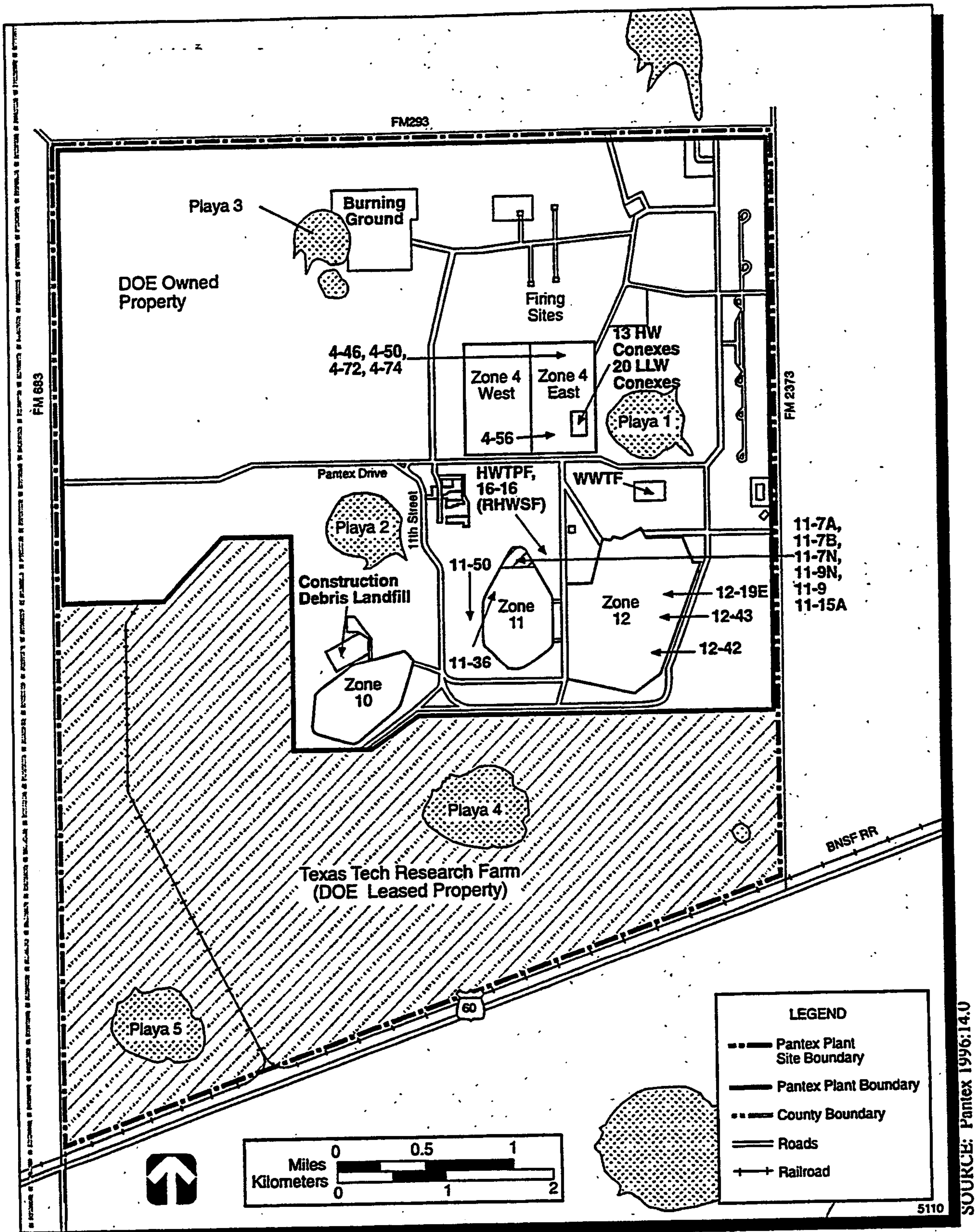

FIGURE 4.13.1.2–1.—*Waste Management Facility Locations at Pantex Plant.*

onsite and offsite. Onsite disposal of NHW includes construction debris in an onsite construction debris landfill. All other NHW wastestreams are disposed of offsite by commercial contractors. State regulation 30 TAC 335.4 allows Pantex Plant to accumulate and store NHW in any manner that does not create a nuisance or endanger public health or the environment. TNRCC requires Pantex Plant to characterize NHW as a Class 1, Class 2, or Class 3 waste. Table 4.13.1.1–3 lists the regulations where the waste class is defined; the criteria defining each waste class; examples of each type of waste; and the storage, treatment, and disposal that is conducted on each class both onsite and offsite (Pantex 1996:14.5). Pantex Plant expects to generate approximately 522 metric tons (576 tons) per year of Class 2 waste (trash). The trash is disposed of through commercial vendors and the Amarillo Landfill (Pantex 1996:14.5). The Amarillo Landfill has more than 25 years of capacity (Pantex 1996:9.4, 14.5). Class 3 (construction debris) waste volumes are not reported (Pantex 1996:14.5).

Other Waste Types

Sanitary and industrial wastewater is discharged into the Wastewater Treatment Facility. Stormwater drains to the playas onsite. Treated effluent from the Wastewater Treatment Facility is discharged into Playa 1.

The State of Texas defines medical waste as solid waste generated during the diagnosis, treatment, or immunization of human beings or animals during research, biological production, or biological testing. The Pantex Plant Medical Department generates medical waste during diagnosis, treatment, and immunization of plant personnel, and includes urine cups, medical gloves, cotton balls, blood samples, sharps containers, contaminated sharps, bandage material contaminated with body fluids, and scintillation vials with urine samples. The Pantex Plant Medical Department follows internal procedures for waste collection and management. Medical waste is disposed of offsite by a commercial contractor (Pantex 1996:14.5).

As of December 31, 1993, all PCB-contaminated parts and equipment used at Pantex Plant contained concentrations of less than 50 parts per million and are managed in accordance with the *Toxic Substances Control Act* (15 U.S.C. 2601) regulations (Pantex 1996:14.5). These PCB and asbestos wastes are transported to offsite permitted facilities for treatment and disposal (DOE 1995b:2-10). Transuranic wastes are not normally generated. No high-level radioactive wastes are currently generated at Pantex Plant.

Environmental Restoration Waste

EPA placed Pantex Plant on the National Priorities List as a Superfund cleanup site, effective June 30, 1994 (59 FR 27989). Superfund cleanup sites are regulated under the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (42 U.S.C. 9601), as amended by the *Superfund Amendments and Reauthorization Act* (42 U.S.C. 9608). Superfund sites are prioritized for cleanup of hazardous substance releases that pose threats to human health or the environment.

The ER program at Pantex Plant is now regulated both by the State of Texas and EPA under both the RCRA and CERCLA requirements. A tri-party Federal Facility Agreement is currently being negotiated to outline the reporting requirements, schedules, and funding. It is unknown at this time what impact any additional conditions and requirements specified in the Federal Facility Agreement will have on the Pantex Plant ER program (Pantex 1996:15.0).

Since CERCLA requirements are being negotiated, Pantex Plant is following the RCRA Part B Permit, which requires Pantex Plant to investigate and manage its 144 identified solid waste management units (SWMUs) as described in section 4.5, Geology and Soils. The permit also includes extensive investigation requirements and management criteria for SWMUs (TNRCC 1996:Attachments E–G).

While 144 SWMUs were identified as sites of potential concern and the early waste calculations were very high, subsequent investigations have determined that many of the sites are less contaminated and have smaller cleanup volumes (DOE 1995e:4-28). Table 4.13.1.2–2 provides the best available information on waste projections from ER activities. The ER program generates waste through investigation and remediation activities. Pantex Plant ER wastes are expected to include LLW, HW and NHW. The ER wastestreams include contaminated soils, HE-contaminated materials, protective clothing, wipes, tools, wastewater, and debris (PC 1995f). Starting in 1999, the ER wastes are expected to be primarily liquid wastes resulting from monitoring systems and restoration management of contaminated water from the perched aquifer (Pantex 1996:14.5, 15.5).

4.13.1.3 *Solid Waste Management Facilities*

Table 4.13.1.1–2 identifies the facilities where waste management activities are currently carried out. Wastes are collected from various generator sites in Zone 12 South at Pantex Plant and staged at Building 12–42 for sorting and segregating before they are transferred to various waste management facilities. Other generator sites throughout Pantex Plant move waste directly to the 11–7N storage pad or Building 11–9N (Pantex 1996:14.6, 14.7). Given below is a brief summary of the current and proposed management facilities for Pantex Plant waste. See Figure 4.13.1.2–1 for the location of these facilities.

Four facilities (11–7N Pad, 11–7A, 11–7B, and 11–9N) are used for storing waste in Zone 11. The 11–7N Pad is an above-grade permitted storage pad with two sheds. This facility is used to store LLMW, HW, LLW, and other wastes and materials. Units 11–7A and B are permitted storage pads adjacent to the 11–7N Pad and are used for storage of wastes on a single, above-grade concrete pad. Building 11–9 is used for the storage of HW, LLMW, LLW, and other wastes and materials. The north portion of this building is also used to repackage and stage waste for shipment (Pantex 1996:14.8).

In Zone 4, four HW magazines, one LLW magazine, thirteen HW Conex boxes, and 20 LLW Conex boxes are available for storage of wastes. The four HW magazines are used for storage of liquid and solid LLMW and HW. Containers of LLW are periodically moved from storage areas and transported to NTS for disposal. The Conex boxes are large steel containers with a capacity of about 72 cubic meters (94 cubic yards). The 13 HW Conex boxes have a permitted storage capacity of 4,467 drums and a total operating capacity of 946 containers. Twenty Conex boxes are used for storage of LLW until it is shipped offsite (Pantex 1996:14.8).

During 1996, three burn pits and two burn cages under went RCRA closure (TNRCC 1996). Closure plans for all RCRA permitted facilities are part of the existing permit; however, approved work plans are not in place. The plant has successfully completed several other RCRA closures and partial closures in recent years (TNRCC 1995a).

For wastewater treatment capabilities, also see sections 4.3, Plant Facilities and Infrastructure, and 4.6, Water Resources. Pantex Plant thermally treats HE and HE-contaminated wastes. Buildings 11–9 & 11–15A provide onsite LLMW treatment capabilities. Additionally, Pantex Plant is capable of treating and processing (such as compaction and repackaging) hazardous waste, including LLMW in tanks and containers.

4.13.2 Impacts of Proposed Action

This section discusses impacts of the Proposed Action on the regulatory status and waste management operations at Pantex Plant for an approximately 10-year period. This includes impacts on Pantex Plant's permit status, required RCRA closures, treatment methods, storage limits, disposal capacities, and the volume of waste transported offsite. Impacts are evaluated for continued operations, pit storage, ER, and new facility construction and upgrades. These activities would generate LLW, LLMW, HW, NHW, and other wastes. Since waste management impacts are dependent on total waste volume and waste category, impacts concentrate on LLW, LLMW, HW, and NHW (Class 1). Medical, PCB, and asbestos wastestreams are small at Pantex Plant and are not discussed further. Impacts from NHW (Class 2 and 3) are discussed to a lesser degree due to reduced risk to human health and the environment.

4.13.2.1 *Impacts of Continued Operations*

Weapons-Related Activities

Under the Proposed Action, three levels of operations on 2,000, 1,000, and 500 weapons per year are evaluated. Table 4.13.1.2–3 provides annual waste generation projections by waste type and activity level for the 10-year period for all site activities except ER.

If operations on 2,000 weapons are performed annually, approximately 249 cubic meters (326 cubic yards) of LLW would be generated per year. The volume of LLMW generated per year is expected to be 183.2 cubic meters (239.6 cubic yards), while the volume of HW and NHW (Class 1) generated per year would be 191.6 cubic meters (250.5 cubic yards) and 741.6 cubic meters (970 cubic yards), respectively.

If operations on 1,000 weapons are performed annually, annual LLW generation would decrease by approximately 47 percent compared to operations on 2,000 weapons; annual LLMW generation would decrease by approximately 35 percent. The volume of HW and NHW (Class 1) generated per year would decrease by approximately 44 and 29 percent, respectively.

If operations on 500 weapons are performed, annual generation of LLW would decrease by approximately 71 percent compared to operations on 2,000 weapons; annual LLMW generation would also decrease by 56 percent. The volume of HW and NHW (Class 1) generated per year would decrease by approximately 67 and 48 percent, respectively.

Pit Storage Activities

Pit storage activities generate LLW, LLMW, HW, and NHW. The amount of waste generated (less than 1 cubic meter [1.3 cubic yards] per year) for each waste category is small compared to the volume of waste routinely handled at the plant, and would not affect waste management activities (PC 1995j). The activities generating waste include Radiation Safety operations, (e.g., labels, security seals, and personnel protective equipment) and minor maintenance.

Pit Repackaging Operations

The repackaging of pits from AL-R8 containers into AT-400A containers is expected to begin in late 1996 or early 1997. At this point, empty AL-R8 containers resulting from the AT-400A repackaging effort will either be reused for other purposes at Pantex Plant or be turned over to the DOE's normal excess materials disposition program. Other wastes that would be generated would be routine and also well within the total waste generation described for the Proposed Action. The pit repackaging operations would result in additional worker radiological exposures. These impacts are discussed in section 4.14.

Environmental Restoration Activities

ER activities are expected to generate LLW, HW, and NHW, but the volume of waste generated from these activities would be independent of the number of weapon operations. When the majority of the remediation is completed, expected by the year 2000, a small amount of waste would continue to be generated (e.g., from monitoring and treatment). Table 4.13.1.2–2 provides estimates of waste generation from ER. Current waste volume projections are considered small when compared to pre-1994 conservative estimates.

Comparing ER waste projections in Table 4.13.1.2–2 and plant industrial waste projections from operations on 2,000 weapons per year shown in Table 4.13.1.2–3 shows that ER wastes would represent less than 3.8 percent of the industrial waste after 1999. In 1997 and 1998, the total volumes of ER projected waste and the projected wastes volumes for the 2,000 weapons level are 2,356 cubic meters (2,781 cubic yards) and 2,946 cubic meters (3,548 cubic yards), respectively. These volumes are below the historic high level managed in 1993. ER projected wastes are not considered to pose a major impact to waste management operations at Pantex Plant. Furthermore, no additional waste management facilities or modifications of existing waste management facilities are planned to support ER wastes. Current waste management facilities are planned to be used to support the ER activities. Current waste management facilities are expected to handle the projections in 4.13.1.2–2.

4.13.2.2 *Impacts of New Facility Construction and Upgrades*

Six new facilities would be constructed under the Proposed Action. Debris generated by construction or modification of the new facilities would be disposed of in the onsite landfill; trash would be disposed of in the Amarillo landfill. Generation of this waste would not affect Pantex Plant's waste management activities.

The Pit Reuse Facility is expected to generate 1.5 cubic meters (1.9 cubic yards) of LLW, 0.5 cubic meter (0.6 cubic yard) of LLMW, 0.6 cubic meter (0.8 cubic yard) of HW, and 6.0 cubic meters (7.8 cubic yards) of NHW (Class 1) annually. This relatively small increase in waste generated would not increase the impacts resulting from current waste management practices (PC 1995g:Table 3).

The Gas Analysis Laboratory, Material Compatibility Facility, Nondestructive Evaluation Facility, and the Metrology and Health Physics Calibration and Acceptance Facility are expected to generate the same types and quantities of waste as the existing facilities they would replace, and thus their operational impacts would not change from current waste management practices (PC 1995g:Table 3).

HWTPF is being designed to treat and process LLMW, LLW, and HW. Pantex Plant would need up to two years to obtain new permits or modify existing permits (Battelle 1995). DOE developed technologies are being considered for treatment of LLMW to meet RCRA land disposal restrictions in compliance with the FFCA Agreed Order and approved site treatment plan and waste acceptance criteria for potential disposal sites. The large volume treatment process (e.g., Macroencapsulation) may increase the volume of waste by a factor of 1.45, depending upon the process used. This increased waste volume is taken into account when determining the overall impacts on waste management operations (see section 4.13.2.3) (PC 1995g:Table 4). An expanded discussion regarding the HWTPF is presented in volume II, appendix H.

A discussion of energy conservation design criteria is provided in volume II, appendixes G and H for the new facilities and upgrades.

4.13.2.3 *Summary of Impacts*

As shown in Table 4.13.1.2–3, the volume of all waste types generated at Pantex Plant excluding ER wastes would decrease with the decrease in operations on weapons levels.

If the site continues to ship HW offsite on a monthly basis, no additional storage capacity would be required. Annual HW projections in Table 4.13.1.2–3 are equal to or below HW generated annually in 1992–1995 (DOE 1996f:18). The number of HW shipments is expected to be at or below historic levels. If HW is treated at the HWTPF, the number of shipments would begin to increase in the year 2002 because treatment is expected to increase waste volume.

The Pantex Plant permitted operating storage capacity is 7,044 containers of LLMW (TNRCC 1996). In July 1996, 482 containers of LLMW were stored (PC 1996f). If no offsite disposal is provided, for annual operations on 2,000 weapons, 879 containers containing 183.2 cubic meters (239.6 cubic yards) of LLMW would be placed into storage starting in 1997. As a result, additional waste storage capacity would be required in 2004, regardless of whether the waste is treated or not. Similarly, for annual operations on 1,000 and 500 weapons, 568 and 389 containers containing 118.3 cubic meters (154.7 cubic yards) and 81 cubic meters (105.9 cubic yards) of LLMW, respectively, would be placed in storage starting in 1997. As a result, additional waste storage capacity would not be needed for the 1,000 weapons level and the 500 weapons level. For operations on 2,000, 1,000, and 500 weapons, Pantex Plant would be annually required to provide storage for 1,275, 824, and 564 containers, respectively, for the treatment of LLMW. For operations on 2,000 and 1,000 weapons, Pantex Plant would need to provide additional waste storage for 6,405 and 1,895 containers, respectively, by 2007. For operations on 500 weapons, no additional waste storage facilities would be required by 2007.

In 1994, a shipment of LLMW totalling 33 cubic meters (43 cubic yards) was disposed at a commercial facility in Utah. A second shipment in June 1996 totalled 70 cubic meters (91 cubic yards) of LLMW. The June 1996 shipment reduced the LLMW inventory by 31.6 percent. A third shipment in September 1996 further reduced LLMW inventories by a total of 50 percent. Additional future offsite disposal would further reduce waste operation impacts including waste inventories (PC 1996e, PC 1995n).

To obtain additional storage for LLMW, Pantex Plant has two options. The first is to convert or expand an existing building. The second is to build a new facility. Both require permit changes, but the first option is more desirable. The first option was previously completed at Pantex Plant in July 1994 when Buildings 11–9N, 11–7A, and 11–7B were added. If additional storage is not approved, shutdown is possible with impacts to all Pantex Plant operations and employees.

If the site continues to ship LLW routinely throughout the year, no additional storage capacity would be required. From 1992–1994, the plant shipped 990.9 cubic meters (1,296.1 cubic yards) of LLW in 4,760 drums (PC 1995n). The plant has a storage capacity of at least 2,380 containers (495.82 cubic meters [648.53 cubic yards]). For operations on 2,000, 1,000, and 500 weapons, 1,195, 631, and 343 drums, respectively, would be generated annually. With an average of 1,587 drums shipped annually, the shipment capacity exceeds the generation projections for all weapons levels. If the shipments cease and the estimated storage capacity of 2,380 containers is exceeded, storage facilities would be added, as appropriate, to avoid impacting Pantex Plant principal operations.

Treatment and processing of LLMW, LLW and HW at the HWTPF is scheduled to begin in the year 2001. Depending on the treatment and processing techniques, the volume of waste could either increase or decrease, which would affect the number of offsite shipments. However, minimal impacts are expected since historical capacities are greater than the expected generation rates.

Minimal impacts to NHW management are expected. The amount of NHW projected would be below historic numbers generated during 1992–1995 (DOE 1996f:18). The Amarillo landfill has more than 25 years of capacity (Pantex 1996:9.4, 14.5). Onsite disposal of NHW Class 2 and NHW Class 3 wastes is currently allowed. Minimal impacts from ER wastes are expected as they represent less than 3.8 percent of waste generated from industrial operations after 1999.

Any additional storage, treatment, and disposal facilities required beyond existing and currently planned activities will be covered in future NEPA documentation.

4.13.3 Impacts of No Action Alternative

Under the No Action Alternative, the operations on 2,000, 1,000, and 500 weapons per year are the same as those evaluated under the Proposed Action except that disassembly of weapons would cease once pit storage reached the authorized level of 12,000.

Under the three levels of activity, LLMW, LLW, HW, and NHW operations would continue as described in the Proposed Action with minimal impacts. However, without the HWTPF, waste treatment and processing capabilities are greatly reduced. If Building 11–9, 11–7 Pad, or offsite capacities do not compensate for the lack of a HWTPF, the plant would pursue possible options to avoid adverse regulatory and operational impacts. One option is to expand Building 11–9 or 11–7 Pad, and a second is to continue to reduce waste generation through reduced workloads or a combination of the options. Additional information regarding the HWTPF is available in volume II, appendix H.

4.13.4 Impact of Pit Storage Relocation Alternative

This section discusses the impacts of the Pit Relocation Alternative on waste management operations and regulatory status at Pantex Plant that would result during the 10-year period. The operations at Pantex Plant would be the same as those discussed under the Proposed Action, section 4.13.2.1.

4.13.4.1 *Impacts of Relocating 20,000 Pits*

Pit storage activities generate minimal waste (less than 1 cubic meter [1.3 cubic yards] per year of LLW, LLMW, HW, and NHW); therefore, relocation of pit storage to another site would not affect waste management at Pantex Plant. Impacts to the relocation alternative sites are addressed in chapter 5.

4.13.4.2 *Impacts of Relocating 8,000 Pits*

Pit storage activities generate minimal waste (less than 1 cubic meter [1.3 cubic yards] per year of LLW, LLMW, HW, and NHW); therefore, relocation of pit storage to another site would not affect waste management at Pantex Plant. Impacts to the relocation alternative sites are addressed in chapter 5.

4.13.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No

Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

The final S&D PEIS will include an alternative that is a refinement of these storage alternatives. As discussed in sections 1.4 and 1.7.3 of this volume, the final S&D PEIS will include an alternative under which pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. The impacts of this alternative are fully accounted for in this EIS because the pits from RFETS could not cause the total number of pits stored in Zone 4 to exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Furthermore, RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant.

4.13.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

The WM PEIS examines the environmental impacts of alternative configurations for the management of radioactive and hazardous wastes at DOE sites throughout the U.S. Pantex Plant routinely manages three of the five waste types (LLMW, LLW, and HW) addressed in the WM PEIS. For the purpose of analyses, the WM PEIS considered a baseline inventory and a projected inventory after 20 years. Pantex LLMW represented only 0.3 percent of the entire DOE complex projected LLMW. Similarly, the analyses considered Pantex Plant LLW and HW projected waste inventory at 0.2 percent and 14 percent of the DOE Complex, respectively.

In most alternatives, LLMW and LLW wastes would be shipped offsite for treatment and disposal. Under all alternatives, HW would be shipped offsite for treatment and disposal.

Little or no cumulative waste management operational impacts from WM PEIS alternatives are expected. Current Pantex Plant waste management operational impacts are bounded by the Pantex Plant EIS. Additional and bounding impacts from HW operations are presented in the WM PEIS. Impacts of alternatives, including those noted above, are covered in the WM PEIS.

The WM PEIS provides environmental information to be used in deciding where to locate waste management activities on a national basis. Subsequent site- or project-level NEPA review would be conducted prior to implementing these decisions.

4.13.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, waste management impacts from operations are expected to be less than current impacts. Generated wastes would be adequately managed with existing waste management facilities. Under the downsizing alternative, Pantex Plant has adequate waste management facilities to treat, store, and dispose of its wastes—although waste treatment, storage, and disposal alternatives are contingent upon programmatic decisions of the WM PEIS. Under the relocation alternative, the amount of decontamination and decommissioning activities and wastes would eventually increase.

4.13.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. Construction and operation would have an impact on existing Pantex Plant waste management activities by increasing the generation of TRU, LLW, LLMW, HW, and NHW. Not including the Proposed Action or the Waste Management program, approximately 10 cubic meters (13 cubic yards) of TRU waste and 4 cubic meters (5 cubic yards) of mixed TRU waste would be processed and packaged to meet the offsite waste acceptance criteria. Approximately 1,300 cubic meters (1,700 cubic yards) of LLW contaminated with plutonium and uranium would require disposal. The 0.2 cubic meters (55 gallons) of liquid LLMW and 66 cubic meters (86 cubic yards) of solid LLMW would be treated and disposed of through the use of existing and planned facilities according to the *Pantex Site Treatment Plan* (Pantex 1996f). The 2 cubic meters (528 gallons) of liquid and 2 cubic meters (3 cubic yards) of solid HW would have a negligible impact on waste management activities at Pantex Plant. The 129,500 cubic meters (34,200,000 gallons) of liquid NHW may require construction of sanitary, utility, and process wastewater treatment systems. The 1,840 cubic meters (3,400 cubic yards) of solid NHW would require disposal at the offsite landfill.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, mixed oxide fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

For disposition (not including the Proposed Action or the Waste Management program), approximately 52 metric tons (57 short tons) of spent fuel, 4 cubic meters (1,056 gallons) of liquid, and 651 cubic meters (846 cubic yards) of solid TRU, and approximately 204 cubic meters (265 cubic yards) of solid mixed TRU would be generated. Approximately 18,964 cubic meters (5.017 million gallons) of liquid and 2,498 cubic meters (3,247 cubic yards) of solid LLW and 1.24 cubic meters (177 gallons) of liquid and 235 cubic meters (308 cubic yards) of solid LLMW would also be generated. Liquid and solid HW generation would be 8 cubic meters (1,112 gallons) and 192 cubic meters (250 cubic yards), respectively. Liquid and solid NHW generation would be 485,300 cubic meters (128 million gallons) and 7,516 cubic meters (9,771 cubic yards), respectively (DOE 1996a:Summary).

Waste treatment, storage, and disposal alternatives are contingent upon programmatic decisions resulting from the WM PEIS.

4.13.6 Potential Mitigation Measures

Pantex Plant has an active waste minimization and pollution prevention awareness program. This program is an organized, comprehensive, continuing effort to prevent pollution and reduce waste generation at the plant. It includes specific waste reduction goals for major categories of waste. Program details are provided in volume II, appendix G.

4.14 HUMAN HEALTH

4.14.1 Affected Environment

This section addresses the sources of radioactivity and toxic chemicals at Pantex Plant and their effects on human health and the environment. The section also addresses the plant's vulnerability to accidents associated with these sources. Appendix D, Human Health Analysis, in volume II contains additional information.

The potential release of radioactivity and toxic chemicals to the environment from a DOE facility is an important issue for onsite workers and the public. Since the human environment contains many sources of radioactivity and toxic chemicals, it is essential to understand the sources of these substances and how effectively they are controlled.

Beyond radiation, chemical, and explosive hazards, workers involved with facility operations are exposed to common industrial workplace hazards (e.g., mechanical or electrical hazards). Adequate worker safety from these common industrial workplace hazards is furnished through compliance with the *Occupational Safety and Health Act of 1990* (5 U.S.C. 5108); and 29 CFR 1910, "Occupational Safety and Health Standards." As discussed in section 4.14.1.4, incidence rates at Pantex Plant are below national averages for general and manufacturing industries.

Exposure from inhalation is the overwhelmingly risk-significant pathway for public exposure. It bounds the risk in the assessment of chemical and radiological airborne hazards from normal operations. For accident scenarios involving the release of tritium, skin absorption of tritium oxide is accounted for since it represents about 50 percent of the dose of inhalation (DOE 1991). Inhalation remains the dominant pathway for all other releases.

In the case of a radioactive materials release, radiation doses to individuals result from immediate exposure to the passing radioactive material plume and from long-term exposure to radioactive material deposited in the environment during the plume passage. The dominant exposure pathway for cloud passage for plutonium accidents is inhalation. Plutonium does not readily absorb through the skin, and any ingestion of plutonium from the passing plume is minimal when compared with inhalation.

The long-term accumulation of doses to individuals affected by a radioactive material release could occur from (1) direct doses from groundshine and resuspension inhalation (inhalation dose from inhaling resuspended particles from the ground), (2) ingestion of food crops and milk produced from contaminated ground, and (3) ingestion of contaminated water. Independent of mitigative actions, both the magnitude of long-term doses and the relative importance between pathways is dependent on both the chemical and radiological behavior of the material released to the environment. The chemical nature of plutonium oxide decreases the importance of the ingestion pathways relative to inhalation. Plutonium oxide does not readily absorb into the body when ingested (PNL 1988). As such, the main health risk from plutonium oxide occurs when very small particles are inhaled and become lodged in the lungs.

Historical pathway analysis and dose reconstruction have clearly shown that inhalation is the dominant pathway for plutonium risk. The 1983 Pantex EIS (DOE 1983a) found that after a dispersal accident, over 95 percent of the total plutonium exposure is from inhalation, assuming no remediation or cleanup. With cleanup, over 99 percent of the estimated total plutonium exposure is from inhalation. The Rocky Flats dose reconstruction project analyzed the health impact of historical plutonium emissions from the Rocky Flats Plant and concluded that the only significant pathway, again without remediation or cleanup, for plutonium exposure is inhalation (ChemRisk 1994). Thus, the dominant risk pathway for plutonium dispersal accidents at Pantex Plant is the inhalation pathway.

The Federal government is required under the Federal Radiological Emergency Response Plan (61 FR 20944) to respond to a radiological emergency and provide resources to assist in the evaluation and mitigation of potential long-term exposure pathways to humans. Specifically, the agencies listed below will provide resources to perform specific functions following an accidental release. The Environmental Protection Agency (EPA) will assume responsibility from DOE for long-term monitoring and remediation following an accident. EPA will assist in the preparation of area restoration plans and will recommend cleanup criteria.

The Department of Agriculture (USDA) will inspect meat and meat products, poultry and poultry products, and egg products to assure that they are safe for human consumption. In addition, USDA, in conjunction with the Department of Health and Human Services (HHS), will assist in monitoring the production, processing, storage, and distribution of food through the wholesale level to eliminate contaminated product and in reducing the contamination in the product to a safe level. HHS will assist with the assessment, preservation, and protection of human health, and will assist State and local government officials in making evacuation and relocation decisions.

Figure 4.14.1–1 depicts the offsite population within an 80-kilometer (50-mile) radius of Pantex Plant, known as the Region of Influence (ROI) (UN 1995). The highest population density occurs southwest of Pantex Plant. Wind speeds and directions in the Pantex Plant vicinity are presented in Figure 4.7.1.1–1. The wind blows predominately from the south from May to September and from the southwest for the remainder of the year.

4.14.1.1 *Radiation Environment*

Table 4.14.1.1–1 summarizes the major sources of radiation exposure in the vicinity of Pantex Plant (NCRP 1987). Releases from Pantex Plant operations constitute a very small fraction of the total exposure to the public in the vicinity of the plant. Cancer statistics for the State of Texas indicate that annually, a person in the Pantex Plant vicinity has a 1.7 x 10^{-3} probability of contracting a fatal cancer. From examining nominal fatal cancer risk factors for the public and Table 4.14.1.1–1 data, it can be seen that fatal cancers attributable to environmental radioactivity released from Pantex Plant constitute an extremely small fraction (less than 0.01 percent) of the average yearly fatal cancer probability in the vicinity of Pantex Plant (DOE 1994l:4-20).

The majority of Pantex Plant workers receive no detectable radiation exposures (i.e., zero dose) during normal operations as a result of their work and are considered non-involved workers. Of those workers that received non-zero doses (involved workers total 329) over the last 5 years, the average annual dose was 111 millirem with a maximum individual dose of 0.905 rem (Pantex 1996a). These exposures were in addition to exposures received from background sources described in Table 4.14.1.1–1. DOE Order 5480.11 and 10 CFR 835 specify a limit of 5 rem per year for occupational workers. In addition, as of 1996, the Pantex Plant administrative control level is 500 millirem per year for most workers and 900 millirem per year for production (weapons operations) workers.

The plant plans to continue to reduce the control level for production workers to the 500 millirem per year level. Using fatal cancer risk factors for workers, the average annual probability of a Pantex Plant worker contracting a fatal cancer due to occupational radiation exposure is

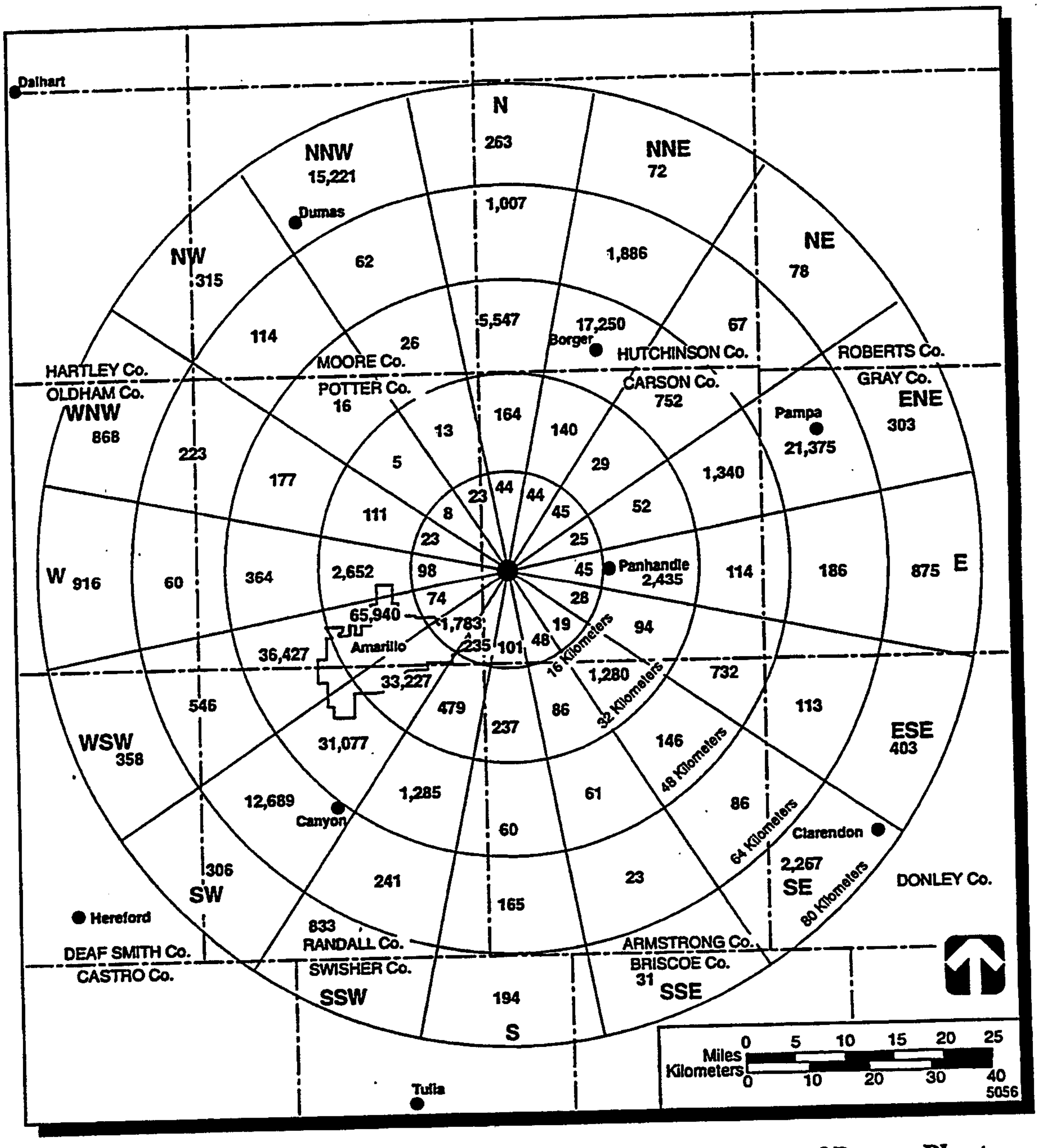

FIGURE 4.14.1–1.—*Population Within 80 kilometers (50 miles) of Pantex Plant.*

TABLE 4.14.1.1–1.—*Major Sources of Radiation Exposure in the Vicinity of Pantex Plant*

SOURCE OF EXPOSURE	AVERAGE DOSE TO AN INDIVIDUAL (mrem/yr)[1]	TOTAL EXPOSURE (PERCENT)
NATURAL BACKGROUND RADIATION		
Cosmic and external terrestrial radiation	95	
Internal terrestrial	39	
Radon in home	200	
Total natural	334	83.9
MEDICAL RADIATION		
Diagnostic x-rays	39	
Nuclear medicine	14	
Total medical	53	13.3
OTHER SOURCES		
Fallout from past weapons testing	<1	
Consumer and industrial products	10	
Air travel	1	
Nuclear facilities (other than Pantex and transportation of radioactive materials)	<1	
Pantex - environmental radioactivity	<<1 (4.98×10^{-7})	
Total other	11	2.8
Total - all sources	398	100

< - less than
<< - much less than
[1] Effective Dose Equivalent
Sources: NCRP 1987:15, 53; DOE 1995b:7-5

4.4×10^{-5}. For those Pantex Plant workers that receive radiation doses, this 4.4×10^{-5} value is essentially in addition to the average annual fatal cancer risk of 1.7×10^{-3} for the regional population.

The largest contributors to worker radiological doses at Pantex Plant are external exposures (i.e., those received from radiation-emitting sources). The largest potential for external doses occurs from weapon operations and pit repackaging. Worker population dose, from an external exposure viewpoint, has been significantly reduced at Pantex Plant due to improvements in work practices and changes in work scope. In 1980, Pantex Plant operations resulted in a cumulative worker dose of 148 person-rem over 719 personnel. In 1994, Pantex Plant operations resulted in a cumulative worker dose of 29 person-rem over 329 personnel (Pantex 1996a).

Internal exposures, received when radioactive materials are deposited through inhalation, ingestion, or absorption, are only minor contributors to worker doses. During normal operations, engineering controls (e.g., confinement and ventilation) are the primary methods of controlling airborne concentrations of radionuclides and minimizing internal exposure. Administrative controls (e.g., exposure limits and procedural requirements) and personnel protective equipment (e.g., respirators) are used as supplemental methods to control internal radiation exposure. The largest single source of internal exposures was from the contamination of Building 12–44 Cell 1 with tritium in 1989; the result was a total worker dose of approximately 1.5 person-rem, with a maximum individual dose of 1.3 rem.

The Pantex *Radiological Control Manual* (Pantex 1996d) establishes site-specific guidelines and procedures to minimize or eliminate radiological exposure and risk to workers while performing work involving radioactive materials and radiation–generating devices. The Pantex Plant manual is based on the requirements contained in the DOE *Radiological Control Manual* (DOE 1992); 10 CFR 835, *Occupational Radiation Protection*; and DOE Order 5480.11, *Radiation Protection for Occupational Workers.*

The "As Low As Reasonably Achievable" (ALARA) program at Pantex Plant is another control to help limit the number of personnel occupational exposures and public/ environmental exposures to radioactive material. This program applies to all plant facilities, equipment, processes, and operations involving a potential or actual exposure of personnel to ionizing radiation, and is based on the regulations discussed above.

4.14.1.2 *Chemical Environment*

Hazardous chemicals are used in the performance of certain Pantex Plant operations. A full listing of hazardous chemicals used at Pantex Plant is provided in the *Pantex Plant Safety Information Document* (Pantex 1996a). Pantex Plant operations that require the use of hazardous chemicals are performed in full compliance with Occupational Safety and Health Administration (OSHA) regulations and American Conference of Government Industrial Hygienists guidelines.

Under normal operations, various chemicals are released to the air that have the potential to impact the public. Table 4.14.1.2–1 lists the hazardous air pollutants released to the air and their calculated maximum potential concentrations at the plant fence line (see section 4.7, Air Quality). The concentrations were calculated with the EPA-approved ISCST2 and ISCLT2 codes (see volume II, appendix B) using existing Pantex Plant sources (PC 1994). Emission inventories used here also apply for the 2,000 weapons activity level. Effects screening levels (ESLs) from TNRCC are also listed in the table and used for comparison.

A useful measure of potential human health effects resulting from exposure to non-carcinogenic chemicals is the hazard index. In its most general form, a hazard index is a ratio of the actual exposure of a human receptor to an established exposure limit. If this ratio is appreciably less than unity, no adverse human health effects are expected. If the hazard index is close to unity, some adverse human health effects may occur; and if the hazard index is substantially greater than unity, severe health effects can results. Table 4.14.1.2–2 presents the individual hazard quotients, which summed together make up the hazard index. The hazard index for chemicals released from Pantex Plant is 0.0909. That is an order of magnitude less than 1.0, and no adverse health effects are expected.

Within the plant boundary, calculated concentrations are somewhat higher. They are, however, below exposure limits established by OSHA and considered safe from adverse noncancer effects. Table 4.14.1.2–3 shows a comparison between maximum onsite concentrations and allowable exposure limits.

Some toxic chemicals are also carcinogenic. Table 4.14.1.2–4 gives the available chemical risk factors for those pollutants that are carcinogens (except for lead, which does not have an available risk factor). When combined

TABLE 4.14.1.2–1.—*Maximum Estimated[a] Fence Line Concentration of Air Pollutants Resulting from Existing Pantex Plant Sources*

POLLUTANT	AVERAGING TIME	ESL ($\mu g/m^3$)	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)	MAX. POTENTIAL CONCENTRATION AS A % OF ESL
CLEAN AIR ACT LISTED AIR POLLUTANTS[b]				
1,1,2-trichloroethane	Annual 30-minute	5.50×10^1 5.50×10^2	8.07×10^{-2} 1.73×10^1	0.2 3.1
1,3-butadiene	Annual 30-minute	1.10×10^1 1.10×10^2	9.09×10^{-3} 3.76	0.1 3.4
2-nitropropane	Annual 30-minute	5.00 5.00×10^1	3.56×10^{-2} 8.55	0.7 17
Alcohols[c]	Annual 30-minute	NA 1.00×10^2	7.01×10^{-1} 1.95×10^2	— 195
Benzene	Annual 30-minute	3.00 7.5×10^1	5.47×10^{-2} 1.94×10^1	1.8 26
Carbon Disulfide	Annual 30-minute	3.00 3.00×10^1	9.39×10^{-2} 2.26×10^1	3.1 75
Carbon Tetrachloride	Annual 30-minute	1.30×10^1 1.26×10^2	8.19×10^{-2} 1.97×10^1	0.6 16
Chlorobenzene	Annual 30-minute	4.60×10^1 4.60×10^2	8.13×10^{-2} 1.95×10^1	0.2 4.2
Chromium	Annual 30-minute	1.00×10^{-1} 1.00	1.91×10^{-3} 9.72×10^{-2}	1.9 9.7
Cresols	Annual 30-minute	NA 5.00	1.72×10^{-3} 4.13×10^{-1}	— 8.3
Cresylic Acid	Annual 30-minute	NA 5.0	2.14×10^{-3} 5.13×10^{-1}	— 10
Dibenzofurans	Annual 30-minute	NA NA	2.00×10^{-5} 9.60×10^{-4}	— —
Dimethylformamide	Annual 30-minute	3.00×10^1 3.00×10^2	6.19×10^{-2} 2.80×10^1	0.2 9.3
Ester Glycol Ethers	Annual 30-minute	NA NA	1.50×10^{-1} 3.59×10^1	— —
Ethyl Acetate	Annual 30-minute	1.44×10^3 1.44×10^4	6.93 1.99×10^3	0.5 14
Ethyl Benzene	Annual 30-minute	4.34×10^2 2.00×10^3	1.29×10^{-1} 3.11×10^1	0.0 1.6
Ethylene Dichloride	Annual 30-minute	4.00 1.60×10^2	3.99×10^{-2} 9.58	1.0 6.0
Formaldehyde	Annual 30-minute	1.50 1.50×10^1	4.30×10^{-3} 3.66×10^{-1}	0.3 2.4
Hydrogen Chloride	Annual 30-minute	1.00×10^{-1} 7.50×10^1	8.76×10^{-2} 5.98	88 8.0
Hydrogen Fluoride	3-hour 12-hour 24-hour	4.90 3.68 2.86	1.52 3.81×10^{-1} 2.70×10^{-1}	31 10 9.4

TABLE 4.14.1.2–1.—*Maximum Estimated[a] Fence Line Concentration of Air Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	AVERAGING TIME	ESL (μg/m³)	MAXIMUM FENCE LINE CONCENTRATION (μg/m³)	MAX. POTENTIAL CONCENTRATION AS A % OF ESL
Lead	Quarter	1.50	9.50×10^{-3}	0.6
Mercury	Annual 30-minute	5.00×10^{-2} 5.00×10^{-1}	0.00[e] 0.00[e]	0.0 0.0
Methanol	Annual 30-minute	2.62×10^{2} 2.62×10^{3}	5.75×10^{-1} 2.45×10^{2}	0.2 9.4
Methyl Cyanide	Annual 30-minute	NA NA	0.00[e] 0.00[e]	— —
Methyl Ethyl Ketone	Annual 30-minute	5.90×10^{2} 3.92×10^{3}	5.10 1.40×10^{3}	0.9 36
Methyl Isobutyl Ketone	Annual 30-minute	2.05×10^{2} 2.05×10^{3}	1.85×10^{-2} 4.45	0.0 0.2
Methylene Chloride	Annual 30-minute	2.60×10^{1} 2.60×10^{2}	7.37×10^{-1} 1.80×10^{2}	2.8 69
Naphthalene	Annual 30-minute	5.00×10^{1} 4.40×10^{2}	1.10×10^{-4} 5.48×10^{-3}	0.0 0.0
Nitrobenzene	Annual 30-minute	5.00 2.40×10^{1}	2.14×10^{-3} 5.13×10^{-1}	0.4 2.1
Phenol	Annual 30-minute	1.90×10^{1} 1.54×10^{2}	5.70×10^{-4} 2.92×10^{-2}	0.0 0.0
Tetrachloroethylene	Annual 30-minute	3.40×10^{1} 3.40×10^{2}	7.33×10^{-2} 1.76×10^{1}	0.2 5.2
Toluene	Annual 30-minute	1.88×10^{2} 1.88×10^{3}	1.73 5.68×10^{2}	0.9 30
Trichloroethylene	Annual 30-minute	1.35×10^{2} 1.35×10^{3}	2.12×10^{-1} 5.11×10^{1}	0.2 3.8
Triethylamine	Annual 30-minute	4.00 4.00×10^{1}	2.38×10^{-3} 1.08	0.1 2.7
Xylene	Annual 30-minute	4.34×10^{2} 3.70×10^{3}	4.74×10^{-1} 1.45×10^{2}	0.1 3.9
TNRCC LISTED AIR POLLUTANTS[d]				
1,1,1-chloroethane	Annual 30-minute	5.00×10^{1} 5.00×10^{2}	5.28×10^{-1} 1.27×10^{2}	1.1 2.5
1,3,5-trinitrobenzene	Annual 30-minute	NA 2.00	0.00[e] 3.00×10^{-5}	— 0.0
1-butanol	Annual 30-minute	7.60×10^{1} 7.60×10^{2}	1.99×10^{-2} 4.79	0.0 0.6
2,4,6-trinitrotoluene	Annual 30-minute	NA 5.00	0.00[e] 3.30×10^{-4}	— 0.0
2,4-dinitrotoluene	Annual 30-minute	1.50×10^{-1} 1.50×10^{1}	0.00[e] 5.00×10^{-5}	0.0 0.0

TABLE 4.14.1.2–1.—*Maximum Estimated[a] Fence Line Concentration of Air Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	AVERAGING TIME	ESL ($\mu g/m^3$)	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)	MAX. POTENTIAL CONCENTRATION AS A % OF ESL
2,6-dinitrotoluene	Annual 30-minute	NA 1.50×10^1	0.00[c] 5.00×10^{-4}	— 0.0
2-ethoxyethonol	Annual 30-minute	NA 1.80×10^2	3.91×10^{-1} 9.42	— 5.2
2-nitronaphthalene	Annual 30-minute	NA 5.00×10^2	1.00×10^{-5} 4.20×10^{-4}	— 0.0
Acetone	Annual 30-minute	5.90×10^2 5.90×10^3	3.39 5.19×10^2	0.6 8.8
Acetylene	Annual 30-minute	2.66×10^3 2.66×10^4	3.33×10^{-3} 1.11	0.0 0.0
Aluminum	Annual 30-minute	5.00 5.00×10^1	1.28×10^{-3} 5.22×10^{-2}	0.0 0.1
Ammonia	Annual 30-minute	1.70×10^1 1.70×10^2	2.89×10^{-2} 1.31×10^1	0.2 7.7
Barium	Annual 30-minute	5.00×10^{-1} 5.00	1.25×10^{-3} 2.93×10^{-3}	0.3 0.1
Benzo(a)anthracene	Annual 30-minute	NA 5.00×10^{-1}	1.00×10^{-5} 5.00×10^{-4}	— 0.1
Benzo(a)pyrene	Annual 30-minute	3.00×10^{-3} 3.00×10^{-2}	1.00×10^{-5} 4.10×10^{-4}	0.3 1.4
Bismuth	Annual 30-minute	5.00 5.00×10^2	3.00×10^{-5} 1.13×10^{-3}	0.0 0.0
Butane	Annual 30-minute	1.90×10^3 1.90×10^4	2.98×10^{-2} 1.12×10^1	0.0 0.1
Butene	Annual 30-minute	NA 1.60×10^2	2.81×10^{-1} 1.18×10^1	— 7.4
Calcium	Annual 30-minute	5.00 5.00×10^1	5.00×10^{-5} 1.90×10^{-3}	0.0 0.0
Chlorinated Fluorocarbon	Annual 30-minute	NA 1.80×10^4	2.90×10^{-1} 6.93×10^1	— 0.4
Copper	Annual 30-minute	1.00 1.00×10^1	3.08×10^{-3} 1.25×10^{-1}	0.3 1.3
Cyanogen	Annual 30-minute	2.10×10^1 2.10×10^2	1.00×10^{-5} 2.00×10^{-4}	0.0 0.0
Cyclohexane	Annual 30-minute	3.40×10^2 1.44×10^3	3.68×10^{-1} 9.41×10^1	0.1 6.5
Cyclohexanone	Annual 30-minute	1.00×10^2 4.81×10^2	6.09×10^{-2} 1.44	0.1 0.3
Dioxane	Annual 30-minute	9.00×10^1 9.00×10^2	7.88×10^{-1} 3.57×10^1	0.9 4.0
Ethyl Ether	Annual 30-minute	NA 9.27×10^2	3.33×10^{-1} 7.96×10^1	— 8.6

TABLE 4.14.1.2–1.—*Maximum Estimated[a] Fence Line Concentration of Air Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	AVERAGING TIME	ESL ($\mu g/m^3$)	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)	MAX. POTENTIAL CONCENTRATION AS A % OF ESL
Ethylene	Annual 30-minute	NA 1.17×10^3	6.04×10^{-1} 2.53×10^2	— 22
Formic Acid	Annual 30-minute	9.40 9.40×10^1	0.00[e] 8.00×10^{-5}	0.0 0.0
Iron	Annual 30-minute	NA 5.00×10^1	4.99×10^{-2} 1.82	— 3.6
Isobutane	Annual 30-minute	1.90×10^3 4.85×10^3	4.01×10^{-2} 1.39×10^1	0.0 0.3
Isobutanol	Annual 30-minute	1.52×10^2 1.52×10^3	2.27×10^{-2} 5.46	0.0 0.4
Ketene	Annual 30-minute	9.00×10^{-1} 9.00	0.00[e] 0.00[e]	0.0 0.0
Ketone	Annual 30-minute	NA 1.00×10^2	1.39×10^{-1} 3.34×10^1	— 33
Lithium	Annual 30-minute	NA 1.00×10^1	4.00×10^{-5} 1.84×10^{-3}	— 0.0
Magnesium	Annual 30-minute	NA 5.00×10^1	1.05×10^{-3} 4.41×10^{-2}	— 0.1
Methane	Annual 30-minute	NA 3.00×10^4	7.16×10^{-1} 2.64×10^1	— 0.1
N-butyl Alcohol	Annual 30-minute	7.60×10^1 7.60×10^2	1.35×10^{-1} 3.25	0.2 0.4
Non-F Listed Solvents[f]	Annual 30-minute	NA 1.00×10^1	9.40×10^{-4} 2.26×10^{-1}	— 2.3
Ortho-dichlorobenzene	Annual 30-minute	NA 1.50×10^3	6.36×10^{-1} 1.53×10^2	— 10
Propane	Annual 30-minute	1.80×10^3 1.80×10^4	4.21×10^{-2} 1.32×10^1	0.0 0.1
Propene	Annual 30-minute	NA 3.00×10^4	3.71×10^{-1} 1.56×10^2	— 0.5
Pyrene	Annual 30-minute	5.00×10^{-2} 5.00×10^{-1}	5.00×10^{-4} 1.57×10^{-3}	1.0 0.3
Pyridine	Annual 30-minute	1.50×10^1 6.90×10^1	3.78×10^{-1} 9.08	2.5 13
Silicon	Annual 30-minute	5.00 5.00×10^2	0.00[e] 2.90×10^{-4}	0.0 0.0
Silver	Annual 30-minute	1.00×10^{-2} 1.00×10^{-1}	1.45×10^{-3} 6.22×10^{-2}	15 62
Tetrahydrofuran	Annual 30-minute	5.90×10^2 5.90×10^3	7.55×10^{-1} 3.42×10^2	0.1 5.8
Trichlorofluoromethane	Annual 30-minute	5.62×10^3 2.80×10^4	4.21×10^{-1} 1.01×10^2	0.0 0.4

TABLE 4.14.1.2–1.—*Maximum Estimated[a] Fence Line Concentration of Air Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	AVERAGING TIME	ESL ($\mu g/m^3$)	MAXIMUM FENCE LINE CONCENTRATION ($\mu g/m^3$)	MAX. POTENTIAL CONCENTRATION AS A % OF ESL
Trichlorotrifluoroethane	Annual 30-minute	NA 7.60×10^4	1.77 4.73×10^2	— 0.6
Zinc	Annual 30-minute	5.00 5.00×10^1	1.32×10^{-3} 5.58×10^{-2}	0.0 0.1

NA= An ESL has not been established by the TNRCC.
[a]EPA Model ISCST2 was used to calculate results.
[b]Hours of operations were taken into account for emissions from open burning and engine emissions.
[c]The group of alcohols, while not listed in CAA, were estimated to exceed the conservative ESL used by the TNRCC. Therefore, alcohols were included here for more complete presentation of results.
[d]Hours of operation were not taken into account and emissions were modeled for an entire year of meteorological data.
[e]The ISCST2 air quality model returns a value of 0.00 for any concentration equal to or less than 1.00×10^{-5} $\mu g/m^3$ (i.e., less than one ten millionth of a part per billion or less than ten parts per quadrillion).
[f]Solvents that are not listed in 40 CFR 261.33 (Hazardous Waste from Non-Specific Sources).
Source: TNRCC 1996a (for averaging Time and ESL).

TABLE 4.14.1.2–2.—*Hazard Quotient for Concentrations Resulting from Existing Pantex Plant Sources*

POLLUTANT	MAX. FENCE LINE CONCENTRATION ($\mu g/m^3$)	REFERENCE CONCENTRATION (mg/m^3)	HAZARD QUOTIENT ANNUAL AVERAGE (%)
1,1-chloroethane	5.28×10^{-1}	10.0000	0.0
1,1,2-trichloroethane	8.07×10^{-2}	1.1020	0.0
1,3,5-trinitrobenzene	0.00[b]	No Standard	NA
1,3-butadiene	9.09×10^{-3}	53.9000	0.0
1-butanol	1.99×10^{-2}	0.3500	0.0
2,4,6-trinitrotoluene	0.00[b]	No Standard	NA
2,4-dinitrotoluene	0.00[b]	0.0069	0.0
2,6-dinitrotoluene	0.00[b]	No Standard	NA
2-ethoxyethanol	3.91×10^{-1}	0.2000	0.2
2-nitronapthalene	1.00×10^{-5}	No Standard	NA
2-nitropropane	3.56×10^{-2}	0.0200	0.2
Acetone	3.39	0.3500	1.0
Acetylene	3.33×10^{-3}	65.2200	0.0
Alcohols[a]	7.01×10^{-1}	24.1500	0.0
Aluminum	1.28×10^{-3}	0.3680	0.0
Ammonia	2.89×10^{-2}	0.1000	0.0
Barium	1.25×10^{-3}	0.0005	0.3
Benzo(a)anthracene	1.00×10^{-5}	No Standard	NA
Benzo(a)pyrene	1.00×10^{-5}	0.0044	0.0

TABLE 4.14.1.2–2.—*Hazard Quotient for Concentrations Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	MAX. FENCE LINE CONCENTRATION (µg/m³)	REFERENCE CONCENTRATION (mg/m³)	HAZARD QUOTIENT ANNUAL AVERAGE (%)
Benzene	5.47×10^{-2}	0.0796	0.1
Bismuth	3.00×10^{-5}	No Standard	NA
Butane	2.98×10^{-2}	46.5500	0.0
Butene	2.81×10^{-1}	No Standard	NA
Calcium	5.00×10^{-5}	No Standard	NA
Carbon Disulfide	9.39×10^{-2}	0.7000	0.0
Carbon Tetrachloride	8.19×10^{-2}	0.0025	3.3
Chlorinated Fluorocarbon	2.90×10^{-1}	50.0000	0.0
Chlorobenzene	8.13×10^{-2}	0.0200	0.4
Chromium	1.91×10^{-3}	0.0175	0.0
Copper	3.08×10^{-3}	0.0245	0.0
Cresols (All Isomers)	1.72×10^{-3}	0.5390	0.0
Cresylic Acid	2.14×10^{-3}	0.5390	0.0
Cyanogen	1.00×10^{-5}	0.1400	0.0
Cyclohexane	3.68×10^{-1}	25.7250	0.0
Cyclohexanone	6.09×10^{-2}	17.5000	0.0
Dibenzofurans	2.00×10^{-5}	No Standard	NA
Dimethylformamide	6.19×10^{-2}	0.0300	0.2
Dioxane	7.88×10^{-1}	8.8200	0.0
Ester Glycol Ethers*	1.50×10^{-1}	0.2000	0.1
Ethyl Acetate	6.93	3.1500	0.2
Ethyl Benzene	1.29×10^{-1}	1.0000	0.0
Ethyl Ether	3.33×10^{-1}	0.7000	0.1
Ethylene	6.04×10^{-1}	No Standard	NA
Ethylene Dichloride	3.99×10^{-2}	10.0690	0.0
Formaldehyde	4.03×10^{-3}	0.7000	0.0
Formic Acid	0.00	6.9940	0.0
Hydrogen Chloride	8.76×10^{-2}	0.0200	0.4
Hydrogen Fluoride	2.70×10^{-1}	0.2100	0.1
Iron	4.99×10^{-2}	0.0245	0.2
Isobutane	4.01×10^{-2}	35.0350	0.0
Isobutanol	2.27×10^{-2}	1.0500	0.0
Ketene	0.00	No Standard	NA
Ketone	1.39×10^{-1}	No Specific	0.0
Lead	9.50×10^{-3}	0.0012	0.8

TABLE 4.14.1.2–2.—*Hazard Quotient for Concentrations Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	MAX. FENCE LINE CONCENTRATION ($\mu g/m^3$)	REFERENCE CONCENTRATION (mg/m^3)	HAZARD QUOTIENT ANNUAL AVERAGE (%)
Lithium	4.00×10^{-5}	No Standard	NA
Magnesium	1.05×10^{-3}	0.3680	0.0
Mercury	0.00	0.0003	0.0
Methane	7.16×10^{-1}	No Standard	NA
Methyl Alcohol (Methanol)	5.75×10^{-1}	1.7500	0.0
Methyl Cyanide	0.00	0.0500	0.0
Methyl Ethyl Ketone	5.10	1.0000	0.5
Methyl Isobutyl Ketone	1.85×10^{-2}	0.0800	0.0
Methylene Chloride	7.37×10^{-1}	3.0000	0.0
N-butyl Alcohol	1.35×10^{-1}	0.3500	0.0
Naphthalene	1.10×10^{-4}	0.0140	0.0
Nitrobenzene	2.14×10^{-3}	0.0020	0.1
Non-F Listed Solvents[c]	9.40×10^{-4}	Non Specific	0.0
Ortho-dichlorobenzene	6.36×10^{-1}	10.0690	0.0
Phenol	5.70×10^{-4}	2.1000	0.0
Propane	4.21×10^{-2}	44.1000	0.0
Propene	3.71×10^{-1}	No Standard	NA
Pyrene	5.00×10^{-4}	0.1050	0.0
Pyridine	3.78×10^{-1}	No Standard	NA
Silicon	0.00	0.1225	0.0
Silver	1.45×10^{-3}	0.0175	0.0
Tetrachloroethylene	7.33×10^{-2}	0.0350	0.2
Tetrahydrofuran	7.55×10^{-1}	14.4550	0.0
Toluene	1.73	0.4000	0.4
Trichloroethylene	2.12×10^{-1}	13.3770	0.0
Trichlorofluoromethane	4.21×10^{-1}	No Standard	NA
Trichlorotrifluoroethane	1.77	30.0000	0.0
Triethylamine	2.38×10^{-3}	0.0070	0.0
Xylene	4.74×10^{-1}	7.0000	0.0
Zinc	1.32×10^{-3}	0.0110	0.0
		Hazard Index	**9.09%**

NA - not applicable
[a]Group of alcohols without individual emission rates.
[b]Hours of operations were taken into account for emissions from open burning and engine emissions.
[c]Solvents that are not listed in 40 CFR 261.33 (Hazardous Waste from Non-Specific Sources).
Sources: EPA 1996a; EPA 1994a; DOE 1995k; DOE 1996b; Calculated values.

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
1,1,2-trichloroethane	1ppm = 5.55 mg/m^3	30-minute		3.12×10^{-3}	1.73×10^{-2}
		Annual	10 ppm [N,O]	4.86×10^{-5}	2.70×10^{-4}
1,3-butadiene	1ppm = 2.25 mg/m^3	30-minute		1.32×10^{-2}	2.96×10^{-2}
		Annual	1000 ppm [O]; 10 ppm [ACGIH]	4.36×10^{-4}	9.80×10^{-4}
2-nitropropane	1ppm = 3.70 mg/m^3	30-minute		2.31×10^{-3}	8.55×10^{-3}
		Annual	25 ppm [O]	3.51×10^{-5}	1.30×10^{-4}
Alcohol (Isopropyl)	1ppm = 2.50 mg/m^3	30-minute	500 ppm (ST) [N,O]	1.15	2.87
		Annual	400 ppm (ST) [N,O]	4.70×10^{-2}	1.17×10^{-1}
Benzene	1ppm = 3.25 mg/m^3	30-minute	5 ppm (ST) [O]; 1 ppm (ST) [N]	1.04×10^{-2}	3.38×10^{-2}
		Annual	1 ppm [O]; 0.1 ppm [N]	3.48×10^{-4}	1.13×10^{-3}
Carbon Disulfide	1ppm = 3.16 mg/m^3	30-minute	10 ppm (ST) [N]	7.15×10^{-3}	2.26×10^{-2}
		Annual	20 ppm [O]; 1 ppm [N]	1.11×10^{-4}	3.51×10^{-4}
Carbon Tetrachloride	1ppm = 6.39 mg/m^3	30-minute	2 ppm (ST) [N]	3.08×10^{-3}	1.97×10^{-2}
		Annual	10 ppm [O]	4.79×10^{-5}	3.06×10^{-4}
Chlorobenzene	1ppm = 4.68 mg/m^3	30-minute		4.17×10^{-3}	1.95×10^{-2}
		Annual	75 ppm [O]	6.50×10^{-5}	3.04×10^{-4}
Chromium	NA	30-minute			4.44×10^{-4}
		Annual	0.5 mg/m^3 [N,O]		8.44×10^{-6}
Cresols (all isomers)	1ppm = 4.50 mg/m^3	30-minute		1.14×10^{-4}	5.13×10^{-4}
		Annual	5 ppm [O]; 2.3 ppm [N]	1.77×10^{-6}	7.98×10^{-6}
Cresylic Acid	1ppm = 4.50 mg/m^3	30-minute		1.14×10^{-4}	5.13×10^{-4}
		Annual	2.3 ppm [N]; 5 ppm [O]	1.77×10^{-6}	7.98×10^{-6}
Dibenzofurans	NA	30-minute			4.39×10^{-6}
		Annual			8.00×10^{-8}

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
Dimethylformamide	1ppm = 3.04 mg/m^3	30-minute		8.49×10^{-1}	2.58
		Annual	10 ppm [N,O]	7.55×10^{-3}	2.30×10^{-2}
Ester Glycol Ethers	NA	30-minute			3.59×10^{-2}
		Annual			5.59×10^{-4}
Ethyl Acetate	1ppm=3.36 mg/m^3	30-minute		5.27	1.77×10^{1}
		Annual	400 ppm [N,O]	3.35×10^{-1}	1.12
Ethyl Benzene	1ppm = 4.41 mg/m^3	30-minute	125 ppm (ST) [N]	7.05×10^{-3}	3.11×10^{-2}
		Annual	100 ppm [O]	1.10×10^{-4}	4.84×10^{-4}
Ethylene Dichloride	1ppm = 4.11 mg/m^3	30-minute	2 ppm (ST) [N]	2.33×10^{-3}	9.58×10^{-3}
		Annual	50 ppm O; 1 ppm [N]	3.63×10^{-5}	1.49×10^{-4}
Formaldehyde	1ppm = 1.25 mg/m^3	30-minute	2 ppm (ST) [O]	6.18×10^{-4}	7.72×10^{-4}
		Annual	0.75 ppm [O]; 0.016 ppm [N]	2.14×10^{-5}	2.67×10^{-5}
Hydrogen Chloride	1ppm = 1.52 mg/m^3	30-minute		3.93×10^{-2}	5.98×10^{-2}
		Annual	5 ppm (C) [N,O]	4.01×10^{-4}	6.10×10^{-4}
Hydrogen Fluoride	1ppm = 0.83 mg/m^3	3 hours		7.83×10^{-3}	6.50×10^{-3}
		12 hours		1.95×10^{-3}	1.62×10^{-3}
		24 hours			1.27×10^{-3}
Lead	NA	Calendar Quarter	0.100 mg/m^3 [N]		3.46×10^{-4}
			0.050 mg/m^3 [O]		0.00
Mercury	1ppm = 8.34 mg/m^3	30-minute	Hg Vapor 0.05 mg/m^3 [O]	0.00	0.00
		Annual	0.01 mg/m^3 (C) [O]	0.00	0.00

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
Methane, Dichloro (Methylene Chloride)	1ppm = 3.53 mg/m^3	30-minute	1000 ppm (C) [O]	4.54×10^{-1}	1.60
		Annual	500 ppm [O]	2.89×10^{-2}	1.02×10^{-1}
Methanol (Methyl Alcohol)	1ppm = 1.33 mg/m^3	30-minute	250 ppm (ST) [N]	1.70×10^{1}	2.26×10^{1}
		Annual	200 ppm [N,O]	1.51×10^{-1}	2.01×10^{-1}
Methyl Cyanide	NA	30-minute			0.00
		Annual			0.00
Methyl Ethyl Ketone (2-Butanone)	1ppm = 3.00 mg/m^3	30-minute	300 ppm (ST) [N]	4.23	1.27×10^{1}
		Annual	200 ppm [N,O]	2.65×10^{-1}	7.95×10^{-1}
Methyl Isobutyl Ketone (Hexone)	1ppm = 4.17 mg/m^3	30-minute	75 ppm (ST) [N]	1.07×10^{-3}	4.45×10^{-3}
		Annual	100 ppm [O]; 50 ppm [N]	1.66×10^{-5}	6.91×10^{-5}
Naphthalene	1ppm = 5.33 mg/m^3	30-minute	15 ppm (ST) [N]	4.69×10^{-6}	2.50×10^{-5}
		Annual	10 ppm [N, O]	9.01×10^{-8}	4.80×10^{-7}
Nitrobenzene	1ppm = 5.12 mg/m^3	30-minute		1.00×10^{-4}	5.13×10^{-4}
		Annual	1 ppm [N, O]	1.52×10^{-6}	7.80×10^{-6}
Phenol	1ppm = 3.91 mg/m^3	30-minute	15.6 ppm (C) [N]	3.40×10^{-5}	1.33×10^{-4}
		Annual	5 ppm [N, O]	6.50×10^{-7}	2.54×10^{-6}
Tetrachloroethylene (Perchloroethylene)	1ppm = 6.89 mg/m^3	30-minute	200 ppm (C) [O]	2.55×10^{-3}	1.76×10^{-2}
		Annual	100 ppm [O]	3.98×10^{-5}	2.74×10^{-4}
Toluene	1ppm = 3.83 mg/m^3	30-minute	150 ppm (ST) [N]	1.13×10^{1}	4.33×10^{1}
		Annual	200 ppm [O]; 100 ppm [N]	1.32×10^{-1}	5.07×10^{-1}

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
Trichloroethylene	1ppm = 5.46 mg/m^3	30-minute	200 ppm[O]	1.86×10^{-2}	1.01×10^{-1}
		Annual	50 ppm[O]	2.89×10^{-4}	1.58×10^{-3}
Triethylamine	1ppm = 4.21 mg/m^3	30-minute	15 ppm (ST)[N]	2.35×10^{-2}	9.91×10^{-2}
		Annual	25 ppm[O]; 10 ppm[N]	2.09×10^{-4}	8.81×10^{-4}
Xylene (all isomers)	1ppm = 4.41 mg/m^3	30-minute	150 ppm (ST)[N]	8.88×10^{-1}	3.92
		Annual	100 ppm[N,O]	3.48×10^{-2}	1.54×10^{-1}
TNRCC LISTED AIR POLLUTANTS[d]					
1,1,1-chloroethane (ethyl chloride)	1ppm = 2.68 mg/m^3	30-minute		4.74×10^{-4}	1.27×10^{-3}
		Annual	1000ppm[O]	7.35×10^{-4}	1.97×10^{-3}
1,3,5-trinitrobenzene	N/A	30-minute			9.00×10^{-8}
		Annual			0.00
1-butanol	1 ppm = 3.08 mg/m^3	30-minute		1.56×10^{-3}	4.79×10^{-3}
		Annual	50 ppm[N,O]	2.40×10^{-5}	7.40×10^{-5}
2,4,6-trinitrotoluene	N/A	30-minute			1.58×10^{-6}
		Annual	0.5 mg/m^3		0.00
2,4-dinitrotoluene	N/A	30-minute			2.72×10^{-6}
		Annual	1.5 mg/m^3 [N,O]		8.00×10^{-8}
2,6-dinitrotoluene	N/A	30-minute			2.30×10^{-5}
		Annual	1.5 mg/m^3 [N,O]		0.00
2-ethoxyethonol	1ppm = 3.75 mg/m^3	30-minute		2.51×10^{-3}	9.42×10^{-3}
		Annual	200 ppm[O]	3.89×10^{-5}	1.46×10^{-4}

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
2-nitronaphthalene	N/A	30-minute			1.40×10^{-6}
		Annual			9.00×10^{-8}
Acetone	1ppm = 2.42 mg/m^3	30-minute	1000 ppm (ST) [O]	2.74×10^{1}	6.62×10^{1}
		Annual	250 ppm[N]; 750 ppm[O]	2.44×10^{-1}	5.91×10^{-1}
Acetylene	N/A	30-minute			1.76×10^{-2}
		Annual			1.04×10^{-3}
Aluminum (metal dust)	N/A	30-minute			3.80×10^{-4}
		Annual	10 ppm [ACGIH]		9.50×10^{-6}
Ammonia	1 ppm = 0.71 mg/m^3	30-minute	35 ppm (ST) [N,O]	1.70	1.21
		Annual	25 ppm[N]	1.51×10^{-2}	1.07×10^{-2}
Barium (soluble compounds)	N/A	30-minute			5.90×10^{-5}
		Annual	0.5 mg/m^3 [N,O]		1.60×10^{-4}
Benzo(a)anthracene	N/A	30-minute			1.20×10^{-6}
		Annual			7.00×10^{-8}
Benzo(a)pyrene	N/A	30-minute			1.36×10^{-6}
		Annual	0.1 mg/m^3; 0.2 mg/m^3 [O]		8.00×10^{-8}
Bismuth	N/A	30-minute			1.40×10^{-6}
		Annual			5.00×10^{-8}
Butane	N/A	30-minute			1.94×10^{-2}
		Annual	800 ppm [ACGIH]		6.30×10^{-4}
Butene	N/A	30-minute			2.03×10^{-1}
		Annual			6.56×10^{-3}

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
Calcium	N/A	30-minute			4.80×10^{-4}
		Annual			1.30×10^{-5}
Chlorinated Fluorocarbon	N/A	30-minute			6.99×10^{-2}
		Annual			1.09×10^{-3}
Copper (Dust)	N/A	30-minute			1.91×10^{-3}
		Annual	1 mg/m^3 [N,O]		5.20×10^{-5}
Cyanogen	N/A	30-minute			9.30×10^{-7}
		Annual	10 ppm [ACGIH]		0.00
Cyclohexane	1 ppm = 3.50 mg/m^3	30-minute		2.39×10^{-1}	8.38×10^{-1}
		Annual	300 ppm [N,O]	1.52×10^{-2}	5.33×10^{-2}
Cyclohexanone	1 ppm = 4.08 mg/m^3	30-minute		1.43×10^{-2}	5.85×10^{-2}
		Annual	25 ppm [N,O]	1.57×10^{-4}	6.40×10^{-4}
Dioxane	1 ppm = 3.36 mg/m^3	30-minute		9.78×10^{-1}	3.29
		Annual	1 ppm[N]; 25 ppm[O]	8.70×10^{-3}	2.92×10^{-2}
Ethyl Ether	1 ppm = 3.28 mg/m^3	30-minute	500 ppm (ST) [O]	2.43×10^{-2}	7.96×10^{-2}
		Annual	400 ppm[O]	3.78×10^{-4}	1.24×10^{-3}
Ethylene	N/A	30-minute			4.37×10^{-1}
		Annual			1.41×10^{-2}
Formic Acid	1 ppm = 1.91 mg/m^3	30-minute		1.41×10^{-7}	2.70×10^{-7}
		Annual	5 ppm [N,O]	0.00	0.00
Iron (oxide dust & fumes)	N/A	30-minute			3.04×10^{-3}
		Annual	5 mg/m^3 [N]; 10 mg/m^3 [O]		1.20×10^{-4}
Isobutane	N/A	30-minute			2.56×10^{-1}
		Annual			2.96×10^{-3}

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
Isobutanol	1 ppm = 3.08 mg/m^3	30-minute		1.78×10^{-3}	5.47×10^{-3}
		Annual	50 ppm N,O	2.40×10^{-4}	7.40×10^{-4}
Ketene	1 ppm = 1.75 mg/m^3	30-minute	1.5 ppm (ST) N,O	0.00	0.00
		Annual	0.5 ppm N,O	0.00	0.00
Ketone	N/A	30-minute			3.35×10^{-2}
		Annual			5.20×10^{-4}
Lithium (Hydride)	N/A	30-minute			2.30×10^{-6}
		Annual	0.25 mg/m^3 N,O		9.00×10^{-8}
Magnesium (Oxide)	N/A	30-minute			5.70×10^{-5}
		Annual	10 mg/m^3 O		2.00×10^{-6}
Methane	N/A	30-minute			1.41
		Annual			2.72×10^{-2}
N-butyl Alcohol	1 ppm = 3.08 mg/m^3	30-minute		1.06×10^{-3}	3.25×10^{-3}
		Annual	50 ppm N,O	1.66×10^{-5}	5.10×10^{-5}
Non-F Listed Solvents	N/A	30-minute			2.30×10^{-4}
		Annual			3.50×10^{-6}
Ortho-dichlorobenzene	1 ppm = 6.11 mg/m^3	30-minute		2.50×10^{-2}	1.53×10^{-1}
		Annual	50 ppm N,O	3.90×10^{-4}	2.38×10^{-3}
Propane	1 ppm =1.83 mg/m^3	30-minute		1.31×10^{-1}	2.40×10^{-1}
		Annual	1000 ppm N,O	1.52×10^{-3}	2.78×10^{-3}
Propene	N/A	30-minute			2.69×10^{-1}
		Annual			8.68×10^{-3}

TABLE 4.14.1.2–3.—*Maximum Potential Onsite Ambient Concentration of Pollutants Resulting from Existing Pantex Plant Sources*-Continued

POLLUTANT	CONVERSION FACTOR	AVERAGING TIME	EXPOSURE LIMITS time weighted average (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (ppm)	PANTEX PLANT MAXIMUM POTENTIAL CONCENTRATION (mg/m^3)
Pyrene	N/A	30-minute			5.20×10^{-6}
		Annual			1.50×10^{-7}
Pyridine	1 ppm = 3.29 mg/m^3	30-minute		2.76×10^{-3}	9.09×10^{-3}
		Annual	5 ppm [N,O]	4.26×10^{-5}	1.40×10^{-4}
Silicone	N/A	30-minute			3.90×10^{-6}
		Annual	10 mg/m^3 [ACGIH]		3.00×10^{-8}
Silver (Dust)	N/A	30-minute			7.90×10^{-5}
		Annual			2.90×10^{-6}
Tetrahydrofuran	1 ppm = 3.00 mg/m^3	30-minute	250 ppm (ST)[N,O]	1.05×10^{1}	3.15×10^{1}
		Annual	200 ppm[N,O]	9.34×10^{-2}	2.80×10^{-1}
Trichlorofluoromethane	N/A	30-minute			1.01×10^{-1}
		Annual	1000 ppm [ACGIH]		1.58×10^{-3}
Trichlorotrifluoroethane	1 ppm = 7.79 mg/m^3	30-minute	1250 ppm (ST) [N,O]	6.08×10^{-2}	4.74×10^{-1}
		Annual	1000 ppm [N,O]	8.38×10^{-4}	6.53×10^{-3}
Zinc (Oxide fumes)	N/A	30-minute	10 mg/m^3 (ST) [N,O]		2.90×10^{-4}
		Annual	5 mg/m^3 [N,O]		8.00×10^{-6}

ACGIH - American Conference of Governmental Industrial Hygienists
C - Ceiling: Concentration should not be exceeded at any time during workplace exposure.
N - National Institute of Occupational Safety and Health
NA - No conversion factor
O - Occupational Safety and Health Administration
ST - STEL: 15-minute time weighted average exposure which should not be exceeded at any time during the workday, even if the 8-hour weighted average is within the threshold limit.
Sources: NIOSH 1994, ACGIH 1994; Calculated values.

TABLE 4.14.1.2–4.—*Chemical Risk Factors (Air Pathway)*[1]

CHEMICAL	RISK FACTOR[2] $(mg/kg\text{-}day)^{-1}$	WEIGHT-OF-EVIDENCE CLASSIFICATION	TYPE OF CANCER
INHALATION ROUTE			
1,1,2-trichloroethane	5.6×10^{-2}	C	Hepatocellular carcinoma
Benzene	2.9×10^{-2}	A	Leukemia
Carbon Tetrachloride	5.2×10^{-2}	B2	Hepatocellular carcinoma
Chlorobenzene		D	
Chromium	42	A	Lung
Dibenzofuran		D	
Ethyl Benzene		D	
Ethylene Dichloride	9.1×10^{-2}	B2	Hemangiosarcomas
Formaldehyde	4.6×10^{-2}	B1	Squamous cell carcinoma
Lead	(Not available)	B2	
Mercury		D	
Methane, Dichloro(Methylene Chloride)	1.6×10^{-3}	B2	Hepatocellular carcinoma
Methyl Ethyl Ketone(2-Butanone)		D	
Naphthalene		D	
Nitrobenzene		D	
Phenol		D	
Toluene		D	
Xylene (all isomers)		D	

A – Human carcinogen
B1 – Probable human carcinogen, based on limited human data
B2 – Probable human carcinogen, based primarily on animal data
C – Possible human carcinogen
D – Not classifiable
[1]U.S. Environmental Protection Agency. Integrated Risk Information System. March 1995.
[2]The risk factor is also referred to as a slope factor.
Source: EPA 1995

with chemical concentrations and human exposures (e.g. the amount of time an individual is in contact with the chemical), it is possible to calculate a latent cancer probability. It was assumed that exposure to the public was entirely from inhalation, since airborne transport is the only viable pathway to the public. Using the calculated concentrations in Table 4.14.1.2–1, toxic chemical emissions would result in a probability of 1.2×10^{-5} that a hypothetical individual living at the plant boundary would contract a latent cancer.

4.14.1.3 *Health Effects Studies*

A June 1994 study by the Texas Cancer Registry, Texas Department of Health, showed significant increases in prostate cancer mortality among males in Potter and Randall Counties and leukemia mortality among Carson County males during the period 1981–1992. There were no statistically significant increases observed in site-specific cancer mortality among females during this period. For cancer incidence during the period 1986–1992, no statistically significant excesses in males were seen; however, cancer of the prostate was slightly elevated in males in Potter and Randall Counties. Analysis of the four major cell-specific types of leukemia showed a significant excess in the incidence of chronic lymphocytic leukemia among Potter and Randall Counties females. This cursory study was conducted in Carson, Potter, and Randall Counties, which are located near Pantex Plant. This study focused only on cancers of the breast, prostate, brain, thyroid, and leukemia, which were of specific concern to citizens in the area. Other radiation-associated cancers, such as bone and lung, were not included in this study. Although prostate cancer and chronic lymphocytic leukemia have not been linked to radiation exposure, further followup to this study was recommended.

An epidemiologic study of past and present Pantex Plant workers was done and published in the *Health Physics Journal* (Acquavella 1985). This study compared total and cause-specific mortality for Pantex Plant workers employed between 1951 and December 31, 1978, with expected cause-specific mortalities based on U.S. death rates. Significantly fewer deaths were observed in the workforce than would be expected from projections based on U.S. death rates for the following causes of death: all cancers, arteriosclerotic heart disease, and digestive diseases. Furthermore, no specific causes of death occurred significantly more frequently than expected. Slightly elevated mortality ratios were observed for brain cancer and leukemia; neither excess was statistically significant. The four deaths from brain cancer all occurred among those who had worked at the plant less than 5 years. The four deaths from leukemia occurred with equal frequency among those who had worked at the plant a short time and those who had worked over 15 years.

DOE Headquarters' Office of Epidemiological Studies initiated an epidemiologic surveillance program at Pantex Plant in 1993 in order to address the current health status of the workforce. This program tracks and analyzes the occurrence of illness and injury on a continuing basis. Monthly data collection began on January 1, 1994; data and reports will be issued on a semiannual basis. These reports provide an ongoing assessment of any health problems that may be associated with Pantex Plant operations. The Pantex 1994 annual report is available.

A followup of the 1985 mortality study of the Pantex Plant workforce is planned. The update will be conducted by the National Institute for Occupational Safety and Health as part of a research program funded by DOE under a Memorandum of Understanding with the Department of Health and Human Services. The followup study by the National Institute for Occupational Safety and Health is scheduled to commence either in late 1996 or early 1997. The study will provide additional years of data on the mortality experience of Pantex Plant workers.

4.14.1.4 *Accident Mitigation*

Yearly incidence rates provide an objective performance measure of Pantex Plant safety programs. The data in Table 4.14.1.4–1 can be used to compare the performance of Pantex Plant operations to that of the general, manufacturing, and chemical industries nationally; the table demonstrates that Pantex Plant safety programs tend to be more effective. For both total recordable cases and lost workday

TABLE 4.14.1.4–1.—*Comparison of Incidence Rates for Pantex Plant and Industry (National Averages)*[1]

OPERATION	INCIDENCE RATE (PER 100 FULL-TIME WORKERS PER YEAR)		
	TOTAL RECORDABLE CASES	LOST WORKDAY CASES	LOST WORKDAYS
Pantex Plant	5.1	2.2	74.3
General Industry	8.4	3.9	86.5
Manufacturing Industry	12.7	5.6	121.5
Chemical Industry	6.4	3.1	62.4

[1]Incidence rates refer to workplace injuries that may or may not result in lost work time.
Sources: DOE 19941; Pantex 1995e

cases, incidence rates at Pantex Plant are below industrial averages, with the exception of lost workdays, where Pantex Plant exceeds chemical industry incidence rates.

To minimize worker radiation and chemical exposures, a number of mitigation measures are in place at Pantex Plant. These measures reflect an overall defense-in-depth safety philosophy to prevent or minimize potential releases from internal or external initiating events. Essentially, this philosophy imposes multiple barriers between sources of radiation and the public. Typically at Pantex Plant, three separate types of barriers are imposed: cladding, packaging, and plant facilities. Cladding refers to the actual material covering radionuclides. Metallic pit cladding is used for the plutonium in pits. For tritium, the effective cladding is the reservoir. Though not completely passive, the only active component found on some tritium reservoirs is a small explosive squib that operates the valve mechanism used to release the tritium from the reservoir. Protective covers are installed over the squibs which include shorting plugs and/or shunts. These plugs and shunts provide protection against accidental firing of the squib.

The plutonium in radioisotopic thermoelectric generators has an exceptionally robust cladding designed to withstand high pressures and temperatures. Tests of radioisotopic thermoelectric generators have demonstrated their ability to withstand an exposure of 1,000 °C (1,832 °F) for 1 hour.

Packaging refers to the containers used for transporting and staging the clad radionuclides. The use of these qualified protective containers, when special operations are not being performed, is an important aspect of minimizing the frequency of operational accidents that could result in the release of radioactive materials.

In the unlikely event that cladding and packaging should be breached, the facilities themselves serve as the final barrier for the defense-in-depth philosophy. Regarding releases of radionuclides from the cells, where a large part of the operations take place, steel blast doors protect the equipment passageway and are expected to remain intact and closed. The blast valves in the intake and exhaust air supply ducts, as well as the contaminated waste isolation valve system, prevent radioactive particles from escaping through these pathways.

Within the bays, any accident involving a breach of cladding integrity will shut down the heating, ventilating, and air conditioning through the Radiation Alarm Monitoring System interlock upon detection of alpha radiation, thus limiting the potential contamination to the bay of occurrence. Building 12–64 is an exception because it does not have the interlock. The impact of this exception is accounted for in the evaluation of potential accident scenarios. Upon detection of tritium (beta radiation), an exhaust will ventilate the tritium to the atmosphere. The design features of buildings provide other barriers that prevent the dispersal of plutonium during accidents. The building features also reduce the probability of damage to the facility from natural phenomena and external events (e.g., earthquakes and tornadoes).

Structural analysis performed on buildings representative of Pantex Plant construction types shows that heavily reinforced structures are not vulnerable to damage from large scale tornadoes. Fire was identified as a possible release scenario. However, a fire limited to the interior of the facility by the fire suppression system or the fire fighters would only cause internal releases in the room of the fire. Where applicable, the high efficiency particulate air filters could prevent release to the exterior atmosphere.

Besides the systems and structures noted above, numerous other features serve to enhance facility safety. These features include:

- Rad-safe systems (radiation detection and alarm systems) and continuous air monitors to protect personnel from radiological exposure.
- Fire protection systems.
- Grounding and lightning protection systems.
- Electrical power stability, including an uninterruptible power supply and emergency lighting.
- An emergency communication system to notify personnel and provide quick response to accidents, adverse weather, or natural disaster.

The defense-in-depth philosophy summarized above emphasizes physical barriers. In addition to these physical barriers, Pantex Plant also employs numerous administrative controls that minimize the likelihood of operator errors.

Pantex Plant has numerous integrated programs that work together to establish and maintain "barriers" to protect the public, the workers, and the environment. Programs of this type include the SAR (Safety Analysis Report) Program that defines the safety envelope for each facility, establishes the required and allowable facility configurations, and formally authorizes facility operations. Similarly, the HAR (Hazards Assessment Report) Program serves to evaluate and authorize individual operations which are conducted within the aforementioned facilities.

Once facility configurations and operational procedures are established by the SARs and HARs, programs such as Configuration Management, Conduct of Operations, Maintenance Management, USQ (Unreviewed Safety Question) Program, and the Change Control Board serve to continually ensure that facilities are maintained and operations are conducted as authorized. In the event that any facility or operation is found to be out of compliance with the authorized safety basis, immediate steps are taken to correct the deficiency. A determination is made whether or not to continue operations. Facilities or procedures may be modified to allow continued operations while the deficiency is being corrected. Additional programs, which work together to establish and maintain safety at Pantex Plant, include the following:

- Nuclear Safety Management
- Operational Readiness Reviews
- Radiation Safety
- Nuclear Explosives Safety

Information on these programs is presented in the Program Information Document and the Safety Information Document.

4.14.1.5 *Compliance with Occupational Safety and Health Requirements*

The health and safety of all workers associated with Pantex Plant operations is a primary consideration in the decision resulting from this EIS. A comprehensive nuclear and occupational safety and health initiative was announced by the Secretary on May 5, 1993, entailing closer consultation with OSHA regarding regulation of worker safety and health at DOE contractor-operated facilities. Regulation of worker health and safety at DOE contractor-operated facilities will gradually shift from DOE to OSHA.

The *Occupational Safety and Health Act of 1970* (Public Law 91-596) establishes Federal requirements for assuring occupational safety and health protection for employees. DOE and OSHA have agreed to a temporary pilot project to facilitate the shift of worker protection to OSHA. Under this temporary pilot project, OSHA will regulate and oversee worker health and safety at the Argonne National Laboratory in DuPage, Illinois. During the pilot, OSHA will evaluate the current safety and health program at Argonne and respond to employee complaints.

Information obtained during the Argonne pilot project is expected to help the two agencies determine the resource needs of OSHA if it is to ultimately assume responsibility for worker safety and health at DOE facilities. While OSHA regulates and enforces worker health and safety at industrial and some government workplaces, current law exempts most DOE facilities from external regulation and enforcement. DOE internal regulations do, however, require all facilities to meet current OSHA standards.

DOE facilities also comply with the *Emergency Planning and Community Right-to-Know Act* (42 U.S.C. 11001), which requires facilities to report the release of extremely hazardous substances and other specified chemicals; provide material safety data sheets or lists thereof; and provide estimates of the amounts of hazardous chemicals onsite. The reporting and emergency preparedness requirements are designed to protect both individuals and communities.

Workplace Safety and Accidents

Operations at Pantex Plant expose workers to occupational hazards during the normal conduct of their work activities. Occupational safety and health training that includes specialized job safety and health training appropriate to the work performed is provided for all employees at Pantex Plant. This training also includes informing employees of their rights and responsibilities under the *Occupational Safety and Health Act of 1970*; Executive Order 12196, which established OSHA Federal Agency Standards; 29 CFR 1960—The OSHA Federal Agency Standards—which describes the safety and health programs that Federal agencies must establish and implement under Executive Order 12196; and DOE Order 440.1—Federal Employee Occupational Safety and Health Program. DOE provides implementation guidance in DOE Order 440.1, including the requirements and guidelines for the DOE Federal Employee Industrial Hygiene Program. DOE policy is to:

- Provide places and conditions of employment that are as free as possible from recognized hazards that cause or are likely to cause illness or physical harm.
- Assure that employees and employee representatives have the opportunity to participate in the Federal Employee Occupational Safety and Health Program.
- Establish programs in safety and health training for all levels of Federal employees.

- Consider the 29 CFR 1960 (OSHA Standards for Federal Agencies) requirements to be the minimum standards for DOE employees.

DOE contractor operations at Pantex Plant expose workers to hazardous constituents. DOE orders require that site operations have programs for protection of workers. DOE Orders 5480.11, Radiation Protection for Occupational Workers, and 440.1, Federal Employee Occupational Safety and Health Appraisal Program, establish procedures for protection of workers against radiological and hazardous materials, respectively. DOE Order 232.1, Occurrence Reporting and Processing of Operations Information, provides for reporting and guides appropriate corrective action(s) and follow-up should an exposure occur.

DOE Order 451.1, National Environmental Policy Act Compliance Program; DOE Order 5482.1B, Environment Safety and Health Appraisal Program for Department of Energy Operations; and DOE Order 5480.23, Nuclear Safety Analysis Reports provide the basis for review of all planned and existing construction and operation to determine the potential for accidents and the assessment of the associated human health and environmental consequences, should an accident occur. The results of these reviews are used as the basis for determining the need for controls or other mitigative actions to eliminate or greatly reduce the potential for and consequences of an accident. These reviews are required before authorization of construction or start of operation. These reviews also involve the identification of hazards and an analysis of normal, abnormal, and accident conditions. This analysis includes consideration of natural and man-made external events, including fires, floods, tornadoes, earthquakes, other severe weather events, human errors, and explosions.

In accordance with DOE Order 151.1, Emergency Management System, emergency response planning and training are provided to mitigate the consequences of potential accidents. Additionally, should an accident occur, the incident would be reported in accordance with DOE Orders 232.1, Occurrence Reporting and Processing of Operations Information. The reports would also include appropriate corrective action(s) and followup.

4.14.2 Impacts of Proposed Action

Under the Proposed Action, the following activities would occur at Pantex Plant:

- Assembly, disassembly, repair, retrofit, and evaluation of nuclear weapons in support of the national security policy.
- Development, fabrication, and testing of chemical high explosive(s) (HE) and HE components.
- Nuclear material staging as defined in section 3.1. Normal operational impacts associated with Zone 4 staging, and associated material movement are discussed in section 4.12, Intrasite Transportation.
- Construction and operation of new facilities. These are discussed in section 3.1.

This section describes the human health impacts from these activities.

4.14.2.1 *Impacts of Continued Operations*

The continuation of weapons-related operations at Pantex Plant would result in the continuation of radiological exposures to plant workers. Table 4.14.2.1–1 presents the expected radiological impact from future weapons operations based on historical exposures.

The combined involved worker dose from 10 years of operation at the 2,000 weapons activity level is estimated at 330 person-rem based on historical doses. Assuming that only 330 radiation workers (based on 1994 operations) are involved in weapon operations over a period

TABLE 4.14.2.1–1.—*Radiological Exposures to Workers from Normal Weapons Operations*

WEAPONS LEVEL	CUMULATIVE DOSE (10 YEARS OF OPERATIONS) (PERSON-REM)	EXPECTED EXCESS CANCER FATALITIES (10 YEARS OF OPERATIONS)
2,000	330	0.13
1,000	165	0.07
500	82	0.03

of 10 years (i.e., these people receive the entire plant dose), they would receive an average of 0.1 rem per person per year. The maximum dose an individual involved worker is allowed to receive annually is administratively limited to 900 mrem during normal operations. These involved workers include support personnel (e.g., auditors, inspectors) that participate in weapon operations.

Using a normal operations dose-to-risk conversion factor of 4×10^{-4} excess cancer fatalities per person-rem, there would be an additional 0.13 excess cancer fatalities experienced by this group in their lifetime. The probability of fatal cancer from all causes in the general population is estimated at 20 percent (NAP 1990:174), which implies that, on average, 66 of 330 people would develop a fatal cancer from all causes in their lifetime. As the weapon activity level decreases, so would the number of workers. The total person-rem and excess cancer fatalities would also decrease.

Non-involved personnel are not allowed in the vicinity of weapon operations and do not receive doses from weapons operations. The average dose to an individual member of the public or a non-involved worker results primarily from the small amounts of tritium offgassing from Cell 1, the small amounts from the Burning Ground, and the very small amounts that may escape during removal of tritium reservoirs. The total amount of tritium emissions are at the limit of detection. As a result, it is not possible to calculate doses and consequences to the non-involved workers and the public with high confidence levels. To the extent practicable, the dose to the public has been estimated to be less than 1.20×10^{-4} person-rem per year, resulting in 6.00×10^{-8} excess cancer fatalities. Practically speaking, the maximum dose to an individual non-involved worker or member of the public would be effectively zero.

The pit repackaging process is expected to begin operation in late 1996 or early 1997. It is planned that up to 20,000 pits will eventually be repackaged into AT–400A containers. This process will require the transfer of pits between Zone 4 and Zone 12. Impacts related to these transfers are described in section 4.12.

The pit repackaging will occur within existing facilities within Zone 12. Operations occurring as part of the pit repackaging process include:

1) Pit Leak Check—to verify the integrity of the pit encapsulation, pits will be leak checked prior to repackagement.
2) Pit Cleaning—pits with surface contamination that may initiate corrosion of the pit clad during storage will be cleaned prior to repackagement.
3) Placement of pits within inner containment vessel, inner containment vessel welding, inert gas introduction into inner containment vessel—pits will be placed within the inner containment vessel of

the AT–400A container. These vessels will be welded shut and filled with an inert gas mixture. The inner containment vessel will be leak checked to ensure the integrity of both the pit and the inner containment vessel.

4) Placement of inner containment vessel into outer containment vessel—once the integrity of the inner containment vessel is verified, the vessel will be placed in the AT–400A outer containment vessel. Further description of the AT–400A outer containment vessel is provided in volume II, appendix F.

All operations involving pits will be performed in a manner that minimizes radiological exposures to facility workers. However, the pit repackaging process will result in additional exposures at Pantex Plant. Because pit repackaging has not been done with this type container, there is no historical dosimetry information available. Therefore, conservative dose estimates have been made for this operation. For 2,000-pit repackage operations per year, it is estimated that an additional worker exposure of less than 30 person-rem will be incurred. Similarly, an additional worker exposure of less than 300 person-rem for the repackaging of 20,000 pits will be incurred. Using a normal operations dose-to-risk conversion factor of 4×10^{-4} excess cancer fatalities per rem, less than 0.12 excess cancer fatalities would be incurred in the workforce from this operation.

The dose estimates provided for the pit repackaging process are based on initial scoping studies performed prior to operation of the process. DOE expects that the actual worker doses will be less than the presented estimates. Additionally, as the pit repackaging effort proceeds, DOE will utilize the experience gained from initial operations to further reduce worker exposures.

Impacts of Potential Facility Accidents

For the purpose of this discussion an accident is defined as an unexpected or undesirable event that leads to a release of hazardous material within a facility or into the environment. Events that could result in an accidental release of hazardous material fall into three broad categories: external events, internal events, and natural phenomena events. External events (e.g., aircraft crashes and resulting explosions or fires) originate outside a facility. Internal events (e.g., equipment failures or human errors) originate within a facility. Natural phenomena events include weather-related occurrences (e.g., tornadoes and severe winds) and earthquakes. All of these events could lead to a release of hazardous material from a facility.

Identification of Risk Significant Accident Scenarios

Assessing the threat to public and worker health from potential accidents at Pantex Plant involved a screening process. The first step of this process was to identify a broad spectrum of potential accident scenarios that could occur during continued operations.

Facilities and operations at Pantex Plant have been analyzed to identify all hazards and potential accidents associated with the facilities and process systems, components, equipment, or structures and to establish design and operational means to mitigate these hazards to prevent potential accidents. The results of these analyses are contained in safety analysis reports and other safety basis documents including:

- *Basis for Interim Operations for the Pantex Plant*—Amarillo, Texas, Pantex Plant, June 1995 (Pantex 1995j).
- *Basis for Interim Operations for the Non-Nuclear Facilities*—Amarillo, Texas, Pantex Plant, September 1995 (Pantex 1995).

- *Chemical High Explosives Hazards Assessment for the Pantex Plant*, Jacobs Engineering, October 1993 (Jacobs 1993a).
- *Natural Phenomena Hazards Assessment for the Pantex Plant*—Amarillo, Texas, Jacobs Engineering, October 1993 (Jacobs 1993).
- *Recalculation of Potential Deposition Levels and Dose Exposure Levels for the Pantex Radiological Hazards Assessment*, Jacobs Engineering, October 1993 Jacobs 1993b).
- Pantex Plant, *Safety Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1996 (Pantex 1996a).

For each facility and operation at Pantex Plant, DOE has developed or is in the process of developing a safety analysis report. In addition, other facility-specific safety analyses have been performed and documented (e.g., process hazards reviews, hazards analysis documents, and justifications for continued operations). These documents were also utilized for the identification of potential accidents at Pantex Plant.

DOE Order 5480.23, Nuclear Safety Analysis Reports, provides the most recent guidance to determine the safety basis for facilities at Pantex Plant. However, safety analyses have been conducted at Pantex Plant for more than a decade using a gradually evolving chain of guidance documentation. Therefore, the safety documents used as a basis for the identification of potential accidents at Pantex Plant in this EIS represent a continuum of safety assessments. Appendix A in the *Safety Information Document* provides a list of DOE orders, statutory and regulatory requirements, codes, and other applicable standards relevant to the design and safe operation of Pantex Plant (Pantex 1996a).

The next step of the screening process involved the identification of representative accidents that contribute to the risk to public and worker health from continued Pantex Plant operations. Ideally, a complete evaluation of Pantex Plant Site risks would include all potential accident scenarios. However, this type of an approach is impractical. Therefore, the purpose of this step in the screening process was to identify a subset of accident scenarios that contribute a large fraction of the total risk from Pantex Plant operations. This step of the screening process involved the grouping of potential accidents based on both the magnitude of the frequency of occurrence and the magnitude of the expected consequence. Once the accidents were grouped, the accidents corresponding to the highest risk in each group were chosen for further analysis. (Further information on the accident scenario identification is available in volume II, appendix D, Human Health Analysis.)

Table 4.14.2.1–2 lists the scenarios that were identified as risk significant for Pantex Plant. This table includes both high-frequency low-consequence scenarios (such as those occurring during normal operations) and unlikely (low-frequency) scenarios that have potentially high consequences (i.e., scenarios initiated by natural phenomena or external hazards). Societal risk (listed in the column heading of that table) is the number of adverse events (in this case, excess cancer fatality risk) per year for a specified population. The frequency categories shown in Table 4.14.2.1–2 are explained below:

- *Anticipated* events have a frequency greater than or equal to 10^{-2} per year. Most anticipated events would be expected to occur at least once within a human lifetime (conservatively assumed to be 100 years).
- *Unlikely* events have a frequency between 10^{-2} per year and 10^{-4} per year. Unlikely events are not expected to occur within a human lifetime. The chances of

TABLE 4.14.2.1–2.—*Summary of Consequences to the Public from Risk Significant Accidents at Pantex Plant: Configuration 1*

SCENARIO	DESCRIPTION	FREQUENCY OF SCENARIO	POPULATION DOSE[1] (excess fatal cancer)	ANNUAL SOCIETAL RISK[2] (excess fatal cancers per year)
1	Explosive driven plutonium dispersal from internal event	Extremely Unlikely	1,200 Person-Rem (5.9×10^{-1} excess fatal cancers) Worker Fatalities	6.3×10^{-6}
2	Accidental high explosives detonation from internal event	Anticipated	No Public Impact, Worker Fatalities	NA
3	Explosive driven plutonium dispersal from external event/ natural phenomena	Not Reasonably Foreseeable	16,000 Person-Rem (8.0 excess fatal cancers), Worker Fatalities	7.2×10^{-6}
4	Accidental high explosives detonation from external event/ natural phenomena	Unlikely	Worker Fatalities, No Public Impact	NA
5	Tritium reservoir failure from internal event	Anticipated	0.080 Person-Rem (4.0×10^{-5} excess fatal cancers)	9.5×10^{-7}
6	Pit breach from internal event	Unlikely	0.00037 Person-Rem (1.9×10^{-7} excess fatal cancers)	1.5×10^{-9}
7	Multiple tritium reservoir failure from external event/natural phenomena	Not Reasonably Foreseeable	110 Person-Rem (0.055 excess fatal cancers)	2.2×10^{-8}
8	Fire driven plutonium release from external event/natural phenomena	Not Reasonably Foreseeable	1,100 Person-Rem (0.55 excess fatal cancers)	2.9×10^{-7}
9	Tritium or plutonium release caused by seismic event or aircraft accident	Unlikely	0.40 Person-Rem (2.0×10^{-4} excess fatal cancers)	6.8×10^{-8}
10	Chlorine release due to failure of system piping and valves or cylinder from natural phenomena	Unlikely	No adverse public impacts	NA
11	Chlorine release due to failure of system piping and valves or cylinder from internal event	Unlikely	No adverse public impacts	NA

[1]Appendix D presents details of the dose and excess fatal cancer consequence assessment methodology. No prompt fatalities in members of the general public from these scenarios are anticipated.
[2]Obtained by multiplying the scenario frequency by the excess cancer fatalities due to that scenario.

an unlikely event occurring within a human lifetime range from approximately 50 percent to less than 1 percent. Most unlikely events would not be expected to occur over a time span equal to the 200-year history of the U.S.

- *Extremely unlikely* events have a frequency between 10^{-4} per year and 10^{-6} per year. Extremely unlikely events are so rare that the chances of one occurring within a human lifetime range from less than 1 in 100 to less than 1 in 10,000. Extremely unlikely events would not be expected to occur over a timespan equal to the history of human civilization.
- *Not reasonably foreseeable* events have a frequency below 10^{-6} per year. The chances of such an event occurring within a human lifetime (100 years) are fewer than 1 in 10,000 (10^{-6} x 100 = 1 in 10,000). Examples of not reasonably foreseeable events are catastrophic natural phenomena. One such example is the impact of a meteorite in the U.S. severe enough to cause thousands of fatalities.

For all scenarios, the frequency and consequence assessments are performed on a site-wide, rather than a facility-specific basis.

For the accidents identified as risk significant, detailed consequence assessments were performed. The consequence assessment focused on exposures to involved and non-involved workers and the public. Radiological consequences to the public were evaluated using site-specific meteorological data, local demographic data, and either the Melcor Accident Consequence Computer Code System (MACCS) or the Explosive Release Atmospheric Dispersion (ERAD) computer code system. MACCS was principally used to model health impacts from scenarios that did not involve explosions, while the ERAD computer code system was used primarily to model the health impacts from releases initiated by explosions (see volume II, appendix D for additional information on MACCS and ERAD). Human health impacts were evaluated in terms of cumulative radiological exposure from an accident and the societal risks (subsequent number of expected excess LCFs). This process is summarized in Figure 4.14.2.1–1.

Expected Change in Societal Risks from Potential Pantex Accidents

During preparation of the Draft EIS, Pantex Plant personnel discovered that particular assembly/disassembly cells had larger gaps between the edges of personnel and/or equipment doors and their frames than had been analyzed in prior studies. The cumulative gaps around the personnel and equipment doors of individual cells varied, but the worst case resulted in a total gap area greater than the 42 square inches that had been analyzed in previous Safety Analysis Reports. Since the gap area affects the amount of radioactive material that can be forced out of a cell by the air pressure of an explosive accident, plant personnel immediately reported the variance and initiated an Unreviewed Safety Question.

To resolve the issue, the plant immediately implemented measures to reduce the amount of high explosives and plutonium allowed in the cell and then modified the doors to close the total gap area of each cell to less than 42 square inches. Additional modifications have been designed to further close the gap area of each cell to less than 5 square inches. These modifications have been approved and funded for implementation in Fiscal Year 1997. The Final EIS includes health risk analysis of cell accidents that portray a bounding gap area (42 square inches) and the future gap area (5 square inches).

In the interim period until modifications are completed, Pantex Plant is operating the cells under a Justification for Continued Operation (JCO) (MH 1996d). This JCO establishes administrative controls to minimize the consequences of a potential accident until the

How are Radiation Risks from Pantex Plant Operations Evaluated in the EIS? The discussion of risk in this EIS provides two relative comparisons:

- Between the risks from Pantex Plant operations and the risks from other causes.
- Between the alternatives under consideration in this EIS.

Baseline Cancer Incidence:

- Cancer incidence is defined as the probability of contracting a fatal cancer among individuals or groups of individuals. Approximately 20 percent of all deaths in the U.S. are from cancer (NAP 1990). Consequently an individual has, on average, a lifetime fatal cancer probability of approximately 0.2 (20 percent) from all causes. This probability varies from group to group and from individual to individual. Thus, this EIS uses the 20 percent figure solely to provide a relative comparison between baseline cancer incidence and the increase in fatal cancer probability from exposures related to Pantex Plant operations.
- Cancer incidence can also be described in terms of individual or societal risk. For the purpose of making comparisons between different contributors to risk, the risk associated with a specified event is defined as the "Consequence" of the event per unit of time. For example, there are approximately 25,090 deaths from cancer per year in the State of Texas. The total societal risk from cancer can therefore be defined as 25,090 deaths per year. Because the State of Texas contains approximately 17 million residents, the average individual risk is defined as:

$$\frac{\text{25,090 fatal cancers/year}}{\text{16,986,510 residents}} = 1.5 \times 10^{-3}\ \frac{\text{LCF for an individual}}{\text{year}}$$

Similarly, a person in the vicinity of Pantex Plant has an annual fatal cancer risk of 1.7×10^{-3} excess cancer fatalities/year. With 267,107 residents in the Pantex Plant Region of Influence, the societal risk from cancer can be calculated as:

$$\left[\frac{1.7 \times 10^{-3}\ \text{fatal cancers}}{\text{year individual}}\right][\text{267,107 residents}] = \text{454 fatal cancers per year}$$

The annual fatal cancer risk varies from group to group and from individual to individual. Thus, these calculations are used in the EIS solely to provide a relative comparison between baseline cancer risk and any increase in cancer risk from Pantex Plant operations.

Risk Factors for Radiological Exposures

- Exposure to ionizing radiation increases a person's likelihood of experiencing a latent cancer fatality. It is referred to as "latent" because the cancer may take many years to develop and for death to occur.
- Radiation exposure can cause other health effects, including non-fatal cancers and genetic effects. This EIS uses the risk of excess cancer fatality as the basis for comparison of impacts among alternatives. The International Commission on Radiological Protection conservatively estimates the total detriment (fatal cancers, non-fatal cancers, and genetic effects) by multiplying the estimates of excess cancer fatalities by 1.46.

FIGURE 4.14.2.1–1.—*Evaluation of Risk.*

Risk Factors for Radiological Exposures (Continued)

- DOE uses risk factors that are recommended by both National and International radiological protection organizations. The public and occupational health risk from radiological exposures analyzed in the EIS uses dose-to-risk conversion factors established in the National Research Council's Committee on the Biological Effects of Ionizing Radiation BEIR V Report, 1990 (NAP 1990). These risk factors have also been endorsed by the International Commission on Radiological Protection, U.S. Environmental Protection Agency, Nuclear Regulatory Commission, and National Council on Radiation Protection and Measurements. These risk factors are 0.0005 death per rem to the general public and 0.0004 deaths per rem for workers (the lower number for workers accounts for the absence of children in the workforce).

DOE's Position on Societal Risks from Accidents

- The number of cancer fatalities from accidents should be less than one-tenth of one percent of the number of cancer fatalities from all causes in the population at risk (Nuclear Safety Policy Notice, SEN-35-91, U.S. Department of Energy, Washington, DC, Secretary of Energy, September 9, 1991).
- This position implies a limit to the societal risk from accidents resulting from DOE activities at Pantex Plant to approximately 0.45 cancer fatalities per year in the Region of Influence (i.e., 0.001 x 454 cancer fatalities/year).

How is the Societal Risk from Potential Pantex Plant-related Accidents Evaluated for the Public Surrounding Pantex Plant?

- Risk is defined as Frequency x Consequences, or more specifically, the expected number of excess fatal cancers per year due to accidents at Pantex Plant. Where:

  Frequency = The number of expected occurrences per year of specific accident scenarios.

  Consequences = The expected number of excess fatal cancers given the occurrence of specific accident scenarios.

- For example, Accident Scenario 1-configuration 2 is expected to occur with a frequency of 1.1×10^{-5} per year. The consequences given the occurrence of this scenario would be 3.3×10^{-1} excess fatal cancers. Therefore, the societal risk from this potential accident is 3.5×10^{-6} excess fatal cancers per year. The average individual risk in the ROI from this potential accident is defined as:

$$\frac{3.5 \times 10^{-6}}{267{,}107} = 1.3 \times 10^{-11} \text{ excess fatal cancers/year}$$

- The societal risk from the risk-significant accidents for configuration 1 listed in Table 4.14.2.1–2 is approximately 1.5×10^{-5} excess fatal cancers per year. The average individual risk from the risk significant accidents is approximately 5.6×10^{-11}.

FIGURE 4.14.2.1–1.—*Evaluation of Risk*-Continued.

How are Cancer Risks Estimated for Exposures Received from Pantex Plant Normal Operations?

- The risk from exposures received from Pantex Plant operations is calculated as frequency x consequence.

  For exposures received during normal operations, frequency = 1.0.

  For a 10-year worker population exposure of 330 person-rem:

  $$\text{Risk} = (1) \times (330 \text{ person-rem}) \times \left(4 \times 10^{-4} \ \frac{\text{excess cancer fatalities}}{\text{rem}}\right) = 0.13 \text{ cancer fatalities}$$

  The value 0.13 cancer fatalities is the average number of excess cancer deaths that would result if a total dose of 330 person-rem were applied to many different groups of 330 people. The most likely outcome is zero excess cancer fatalities.

FIGURE 4.14.2.1–1.—*Evaluation of Risk*-Continued.

end objective of reducing the door gap area to 5 square inches is reached.

Currently, nuclear explosive cells (gravel gerties) have a bounding overall leak area of 42 square inches. Pantex Plant will reduce these leak areas such that the total leak area will be less than 5 square inches. For the purpose of analysis, Scenario 1, Configuration 1 assumes a 42-square inch leak area for the gravel gerties. The societal and individual risks from this configuration are presented in Table 4.14.2.1–2 and in the text in the following section.

Scenario 1, Configuration 2 is representative of the plant configuration when a leak area of less than 5 square inches is achieved. Table 4.14.2.1–3 presents the changing risks for Scenario 1 and for the overall societal risk. Individual exposure and risks for both the 5-square inch and 42-square inch configuration are discussed in the following section.

The societal risk in the Pantex Plant ROI from potential plant accidents is also dependent on the storage configuration of the Zone 4 West magazines. Two configurations are analyzed that describe the changes in storage configuration expected in the future. The changes in storage configuration expected in the next 10 years involves the increase in pit storage and corresponding decrease in weapon storage within Zone 4 West. Configuration 1 involves the storage of 12,000 pits within Zone 4 West in 36 total magazines. The remaining 24 magazines are in use for weapons storage. The societal and individual risks from this configuration are presented both in Table 4.14.2.1–2 (Scenarios 3 and 8) and in the following section. This configuration presents the highest risk for Pantex Plant operations.

Configuration 2 is representative of the plant configuration as fewer weapons and more pits are stored within Zone 4 West. Configuration 2 includes 60 magazines for pit storage and no weapons storage within Zone 4 West. The overall societal risks from potential accidents decrease as the storage configuration evolves. Table 4.14.2.1–3 presents the changing risks for those scenarios affected (Scenarios 3 and 8) by the storage configuration evolution as well as the change in overall societal risks.

Discussion of Risk Significant Accident Scenarios

The description of Scenario 1 includes explicit calculations for deriving the value discussed. These calculations are included to provide an example of how the values in the rest of the scenarios were derived. Unless otherwise noted, accident frequencies are based on the 2,000 weapons operational level.

Scenario 1: Explosive Driven Plutonium Dispersal from an Internal Event. Nuclear weapons may be made with either conventional or insensitive HE, depending upon weapon design. Scenario 1 represents the accidental detonation of conventional HE in the presence of plutonium due to an internally initiated event. HE is present with radioactive materials in facilities where nuclear explosives work occurs. Initiators for this scenario include accidental actuation of an electro-explosive device during disassembly and handling accidents. Insensitive HE is a negligible risk contributor because it is not susceptible to ignition under the conditions existing during assembly or disassembly operations. Insensitive HE is, thus, not a credible explosive source for this scenario.

Scenario 1 is comprised of three individual cases in which an accidental HE detonation is postulated to be initiated by an internal event. These cases differ in where the accidental detonation occurs; i.e., in a nuclear weapons assembly and disassembly cell, a bay, or a special purpose building. An HE detonation during assembly or disassembly would lead to the dispersal of radioactive material. Weapons are designed so that, in the event of an accidental detonation, there will be no significant nuclear reactions. Positive measures are engineered into nuclear explosives to preclude a nuclear yield from an accidental HE detonation.

For operation on 2,000 weapons annually, the frequency of Scenario 1 is 1.1×10^{-5} per year. It is, thus, *extremely unlikely* (frequency of occurrence is less than 10^{-4} per year but greater or equal to 10^{-6} per year). The derivation of this frequency involves summing of probabilities of different initiating events in different facilities (see appendix D, section D.4.1). Explosive driven plutonium dispersal from an internal event can result from operations conducted in bays, cells, or special purpose facilities. The probability per operation that an operational error could cause an explosive driven plutonium release was estimated for each facility using data from available safety analyses (see references mentioned in section 4.14.2.1 as well

TABLE 4.14.2.1–3.—*Societal Risk Evolution*

SCENARIO	CONFIGURATION 1	CONFIGURATION 2
Scenario 1 (Explosive Dispersal)	6.3×10^{-6} excess fatal cancers per year	3.5×10^{-6}excess fatal cancers per year
Scenario 3 (Explosive Dispersal)	7.2×10^{-6} excess fatal cancers per year	4.9×10^{-7}excess fatal cancers per year
Scenario 8 (Fire Dispersal)	2.9×10^{-7} excess fatal cancers per year	6.6×10^{-7} excess fatal cancers per year
Overall Risk	1.5×10^{-5} excess fatal cancers per year	5.7×10^{-6} excess fatal cancers per year

Configuration 1: Cell leak area = 42 square inches, Zone 4 storage configuration of 36 magazines with pits, 24 magazines with weapons.
Configuration 2: Cell leak area = 5 square inches, Zone 4 storage configuration of 60 magazines with pits.

as those cited in individual scenario descriptions). The frequency per year was then quantified by multiplying the probability per operation by the annual number of operations in each facility and summing the results.

Should this scenario occur, the public dose impact is estimated to be 1,200 person-rem for a cell leak area of 42 square inches and 660 person-rem for a cell leak area of 5 square inches. The consequence of Scenario 1 would be 5.9 x 10^{-1} excess fatal cancers in the population within 80 kilometers (50 miles) of Pantex Plant for a cell leak area of 42 square inches and 3.3 x 10^{-1} excess fatal cancers for a cell leak area of 5 square inches.

The derivation of this consequence involves calculating a weighted average of the consequence from the event occurring in bays, cells, and special purpose facilities. The consequences are calculated separately for the Scenario 1 accident occurring in a cell, bay, or special purpose facility. A weighted average is then obtained by multiplying the consequence related to each facility by the frequency of the event occurring in that facility and then summing the results. This result, which represents the overall risk, is divided by the frequency of Scenario 1 to obtain the frequency weighted consequence for the scenario. This process is illustrated in Figure 4.14.2.1–2.

λ_S = Frequency that Scenario 1 occurs in a Special Purpose Facility

C_S = Consequence if Scenario 1 occurs in a Special Purpose Facility

λ_B = Frequency that Scenario 1 occurs in a Bay

C_B = Consequence if Scenario 1 occurs in a Bay

λ_C = Frequency that Scenario 1 occurs in a Cell

C_C = Consequence if Scenario 1 occurs in a Cell

$$\text{Frequency of Scenario 1} = \lambda_S + \lambda_B + \lambda_C$$

$$\text{Risk from Scenario 1} = \lambda_S C_S + \lambda_B C_B + \lambda_C C_C$$

$$\text{Consequence if Scenario 1 occurs} = \frac{\lambda_S C_S + \lambda_B C_B + \lambda_C C_C}{\lambda_S + \lambda_B + \lambda_C}$$

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FIGURE 4.14.2.1–2.—*Consequence Calculation for Scenario 1.*

The bounding public dose impact to an individual is represented by a hypothetical person is located at the site boundary closest to the radiological release. The wind is assumed to blow the radiological release directly towards this individual. The bounding dose impact to a non-involved worker is represented by a hypothetical person located 100 meters (328 feet) downwind of release point. The exposures to the MEOI and to the non-involved worker for each of the cases is presented in Table 4.14.2.1–4.

The MEOI exposure is dominated by the case in which the accidental explosion occurs in a cell using a cell leak area of 42 square inches (i.e., for Configuration 1). The MEOI exposure is dominated by the case in which the accidental explosion occurs in either a bay or a special purpose facility using a cell leak area of 5 square inches (i.e., for Configuration 2). The doses for all accident scenarios are given as committed effective dose equivalents, which mean a 50-year committed dose, not an acute exposure.

The exposure to the maximally exposed non-involved worker is dominated by the case in which the accidental explosion occurs in a cell. The non-involved worker would be expected to receive an exposure of 2300 rem using a cell leak area of 42 square inches and exposure of 600 rem using a cell leak area of 5 square inches. This exposure to the non-involved worker is greater for the cell case because the plume of plutonium exits the cell at ground level and over a longer period of time through the very small gaps under the cell doors. Alternatively, the plume for the bay case or special purpose building case would exit very quickly through the roof. In addition, the cell case plume is less energetic, which would result in higher nearby concentrations. Public risk issues are discussed in detail later in this section as well as in Figure 4.14.1.1–1.

Note that the dose to the MEOI presented here is the bounding consequence for this accident scenario. As illustrated in Table 4.14.2.1–4, this scenario covers the consequences from three facilities, cell, bay, and special purpose buildings. Each facility has a slightly different consequence. Likewise, within each facility, operations on differing weapon systems occur. Each of these different weapon systems would have a different consequence at the site boundary. For example, in the Bay Safety Analysis Report (DOE 1996i), a dose range of 3 to 30 rem is estimated. This difference is dependent on the HE/Pu ratios from different weapon systems. However, the dose estimates in this document are point estimates that bound all weapons related operations at Pantex Plant.

The MEOI dose is a consequence measure, not a risk estimate. The reason for this is because the MEOI is an entirely hypothetical receptor. A reasonable estimate of the frequency that such a receptor is exposed to the scenario requires

TABLE 4.14.2.1–4.—*Representative Doses (REM CEDE) to Maximally Exposed Offsite Individuals and Non-Involved Workers for Individual Cases in Scenario 1*

SCENARIO 1 CASES	MEOI DOSE	NON-INVOLVED WORKER DOSE
Cell Case	49(11)[1]	2,300 (600)[1]
Bay Case	34	34
Special Purpose Building Case	34	34

[1]For 5-square inch cell leak area
Source: Calculations using MACCS model and ERAD model

multiplying the scenario frequency by the probability that a receptor is actually located at the nearest point on the site boundary when the accident occurs, and further multiplying by the probability that the wind is blowing toward the receptor. Although available data are too limited to permit quantifying the probability that a receptor is actually located at the nearest point on the site boundary, the probability that the wind is blowing towards that point is approximately 0.05 for Scenario 1.

No prompt fatalities would be expected among members of the public. However, workers within the cell at the time of an accidental explosion would not be expected to survive. With 267,107 people in the ROI, the average risk to a person in the ROI is on the order of 2.4×10^{-11} excess fatal cancers per year with a cell leak area of 42 square inches and 1.3×10^{-11} excess fatal cancers per year with a cell leak area of 5 square inches. The increased annual risk to a person is calculated by multiplying the frequency of the accident by the public consequences which have been averaged over the population in the ROI (i.e., 1.1×10^{-5} per year x 5.9×10^{-1} excess fatal cancers spread over 267,107 people). Cancer statistics indicate that the fatal cancer risk from all causes to a person in the vicinity of Pantex Plant is 1.7×10^{-3} fatal cancers per year.

The societal risk (annual expected number of excess cancer fatalities) is 6.3×10^{-6} excess fatal cancers per year (see Table 4.14.2.1–3) for a cell leak area of 42 square inches and 3.5×10^{-6} excess fatal cancers per year for a cell leak area of 5 square inches. This number is calculated by multiplying the excess fatal cancers resulting from the accident by the frequency of the accident (i.e., 5.9×10^{-1} excess fatal cancers x 1.1×10^{-5} per year).

Scenario 2: Accidental High Explosives Detonation from an Internal Event. This scenario represents the accidental detonation of HE, but without radioactive material present, due to an internally initiated event. This includes accidents associated with HE development, manufacturing, testing, evaluation, and treatment. Initiators that contribute to this scenario include handling accidents and mechanical failures resulting in HE detonation during HE machining (Pantex 1993).

The likelihood of this event is *anticipated* (frequency of occurrence greater than or equal to 10^{-2} per year). A fatal accident of this type has occurred once at Pantex Plant (in 1977) in over 40 years of operation. The specific circumstances that led to the prior occurrence no longer exist. The manually operated HE machining process was replaced by a robotic process.

This scenario poses a risk to worker safety. There is a possibility of a fatal injury resulting directly from the HE explosion, not from radionuclide exposure. Members of the public and non-involved workers are not at risk from this scenario.

Scenario 2 has a higher frequency than Scenario 1 because HE development, manufacturing, testing, evaluation, and treatment routinely expose bare HE to external stresses (e.g., stresses associated with HE machining) greater than the stresses associated with routine assembly/disassembly operations. If these stresses exceed allowable limits, an inadvertent HE detonation is possible. Although accidental HE detonations of the type included in Scenario 2 have occurred at Pantex Plant, none of the accidents included in Scenario 1 have been experienced.

Scenario 3: Explosive Driven Plutonium Dispersal from an External Event or Natural Phenomena. This scenario represents the accidental detonation of HE, in the presence of plutonium and tritium, due to an aircraft crash. HE is present with radioactive materials within nuclear explosives and in facilities where nuclear explosives work occurs. Initiators that contribute to this scenario include an aircraft impact initiated HE detonation in a Zone 12 facility containing nuclear material and an aircraft impact initiated HE detonation in a Zone 4 nuclear weapon storage magazine (DOE 1992f).

This scenario is dominated by an aircraft impact into a Zone 4 weapons magazine resulting in the HE detonation of numerous weapons with a small contribution from aircraft impacts into nuclear explosive bays. The overall likelihood of this scenario occurring is *not reasonably foreseeable* (frequency of occurrence is less than 10^{-6} per year). The public dose impact from this event is estimated to be 16,000 person-rem. No prompt fatalities would be expected in members of the public. The MEOI would be expected to receive an exposure of 60 rem. This corresponds to an incremental increase in lifetime fatal cancer probability of 3×10^{-2}. The 100-meter (328-foot) non-involved worker is not expected to survive the aircraft crash and explosion. If the individual did survive, the maximum expected dose would be 40 rem corresponding to an increase in lifetime fatal cancer probability of 1.6×10^{-2}. The non-involved worker is closer to the postulated release than the MEOI, yet receives a lower dose. This is due to the initial buoyancy of the released material as a result of the explosively driven dispersal event.

Considering the likelihood and consequence of this scenario, on the average, a member of the public will have an increased risk of developing a fatal cancer from this potential accident of 2.7×10^{-11} excess fatal cancers per year. The annual fatal cancer risk to a person in the vicinity of Pantex Plant from all causes is 1.7×10^{-3} fatal cancers per year.

Scenario 4: Accidental High Explosives Detonation from an External Event or Natural Phenomena. This scenario represents the accidental detonation of HE, with no radioactive material present, due to a seismic event or an aircraft crash. The scenario could occur in staging facilities and facilities involved with HE development, production, and disposal. The main initiator of this scenario is the seismic collapse of an HE development or manufacturing facility (Pantex 1993). These facilities tend to have lower structural strength than nuclear facilities.

The overall likelihood of this scenario occurring is *unlikely* (frequency of occurrence is less than 10^{-2} per year but greater than or equal to 10^{-4} per year). The blast resulting from the explosion could fatally injure a worker in the vicinity. Members of the public and non-involved workers are not at risk from this scenario.

Scenario 5: Tritium Reservoir Failure from an Internal Event. This scenario represents the release of tritium due to a reservoir failure during normal operations. Initiators for this scenario include an inadvertent squib valve actuation during weapon operations.

This type of event has occurred at Pantex Plant, and the frequency of this event is strongly dependent on the number of weapon operations being performed. For the 2,000 weapons activity level, this scenario is *anticipated* (frequency greater than or equal to 10^{-2} per year). For the 500 weapons activity level, this event is *unlikely* (frequency of occurrence is less than 10^{-2} per year but greater than or equal to 10^{-4} per year) (Pantex 1996a, DOE 1995g). This scenario is dominated by handling accidents during weapon operations. The public dose impact from this event is estimated at 8.0×10^{-2} person-rem. The MEOI would be expected to receive an exposure of 1.1×10^{-2} rem. This corresponds to an increase in lifetime fatal cancer probability of 5.5×10^{-6}.

Based upon the tritium exposure in 12–44 Cell 1, cited in section 4.14.1.1, a maximum worker exposure of between 1 and 2 rem is expected. This corresponds to an increase in fatal cancer probability of 8×10^{-4} or less, if the accident occurs. The non-involved worker (i.e., 100 meters [328 feet] downwind) would be expected to receive an exposure of 3×10^{-1} rem. This corresponds to an increase in lifetime fatal cancer probability of 1.1×10^{-4} (see appendix D, Table D.4.2.2–2).

Considering the likelihood and consequence of this scenario, a member of the public would have, on the average, an increase in the risk of developing a fatal cancer from this potential accident of 3.6×10^{-12} excess fatal cancers per year. The fatal cancer risk to a person in the vicinity of Pantex Plant from all causes is 1.7×10^{-3} fatal cancers per year.

Scenario 6: Pit Breach from an Internal Event. This scenario represents a pit breach, with resultant plutonium release, during normal operations. Initiators that contribute to this scenario include a pit drop due to a handling accident and a pit breach due to a forklift accident (Pantex 1996a, DOE 1994w).

This scenario is dominated by handling accidents in bays and special purpose facilities. The overall likelihood of this scenario occurring is *unlikely* (frequency of occurrence is less than 10^{-2} per year but greater than or equal to 10^{-4} per year). The public dose impact from this event is estimated to be 3.7×10^{-4} person-rem. The MEOI would be expected to receive an exposure of 1.0×10^{-4} rem. This corresponds to an increase in lifetime fatal cancer probability of 5.0×10^{-8}.

An individual worker would be expected to receive no more than a 7 rem exposure from Scenario 6 (DOE 1992f:7-40). This corresponds to an upper bound increase in fatal cancer probability of 2.8×10^{-3}, given that the release occurs. The non-involved worker would be expected to receive an exposure of 4×10^{-3} rem. This corresponds to an increase in lifetime fatal cancer probability of 1.6×10^{-6}.

Considering the likelihood and consequence of this scenario, a member of the public would have, on the average, an increase in the risk of developing a fatal cancer from this potential accident of 5.7×10^{-15} excess fatal cancers per year. The fatal cancer risk to a person in the vicinity of Pantex Plant from all causes is 1.7×10^{-3} fatal cancers per year.

Scenario 7: Multiple Tritium Reservoir Failure from an External Event or Natural Phenomena. This scenario represents the release of tritium from reservoir failures caused by a fire in the tritium storage vault. The fire could be initiated by a seismic event or aircraft crash.

The dominant event in this scenario is a seismic event initiated fire in the warehouse surrounding the tritium storage vault. For a release to occur, the protective vault fire door would have to be open and the fire protection system disabled by the seismic initiator. The overall likelihood of this scenario occurring is *not reasonably foreseeable* (frequency of occurrence is less than 10^{-6} per year) (Pantex 1994b, Pantex 1995i). The public dose impact from this event is estimated to be 110 person-rem. The MEOI would be expected to receive an exposure of 7.4×10^{-1} rem. This corresponds to an increase in fatal cancer probability of 3.7×10^{-4}.

A worker inside the vault when the fire started would normally evacuate the area. Should a worker be trapped inside the vault, the expected consequence is a fatality due to heat and smoke inhalation. The non-involved worker would be expected to receive an exposure of 50 rem. This corresponds to an increase in lifetime fatal cancer probability of 2.0×10^{-2}.

Considering the likelihood and consequence of this scenario, a member of the public would, on the average, have an increase in the risk of developing a fatal cancer from this potential accident of 8×10^{-14} excess fatal cancers per year. The fatal cancer risk to a person in the vicinity of Pantex Plant from all causes is 1.7×10^{-3} fatal cancers per year.

Scenario 8: Fire Driven Dispersal Involving Stored Pits from an External Event or Natural Phenomena. This scenario represents a pit breach, resulting in a plutonium release, initiated by a seismic event or aircraft accident. The main initiator for this scenario is an aircraft impact initiated fire in a Zone 4 pit storage magazine (DOE 1994w; DOE 1992f).

This scenario is dominated by a heavy aircraft impact into a Zone 4 pit storage magazine resulting in a fire driven dispersal from numerous pit containers. The overall likelihood of this scenario occurring is *extremely unlikely* (frequency of occurrence is less than 10^{-4} per year but greater or equal to 10^{-6} per year) with 20,000 pits in Zone 4 storage. It is not reasonably foreseeable with 12,000 pits in Zone 4 West. The public dose impact from this event is estimated to be 1,100 person-rem. No prompt fatalities would be expected in members of the public. The MEOI would be expected to receive an exposure of 34 rem. This corresponds to an incremental increase in lifetime fatal cancer probability of 1.7×10^{-2}.

Workers in the vicinity of the crash and explosion would not be expected to survive. The non-involved worker would be expected to receive an exposure of 3,000 rem. This corresponds to an increase in lifetime fatal cancer probability of 1.0. This is a 50-year committed dose equivalent, which means that the radiological exposure is not acute, but occurs over a 50-year time period. Consequently, no actute radiological fatalities are expected (LLNL 1995).

Considering the likelihood and consequence of this scenario, a member of the public would, on the average, have an increase in the risk of developing a fatal cancer from this potential accident of 2×10^{-12} excess fatal cancers per year (with 20,000 pits in Zone 4 West). The fatal cancer risk, from all causes, to a person in the vicinity of Pantex Plant is 1.7×10^{-3} fatal cancers per year.

Scenario 9: Plutonium Dispersal from an External Event or Natural Phenomena. This scenario represents a tritium or plutonium release, without an explosion, caused by a seismic event or aircraft crash. Initiators include an aircraft impact initiated fire in a Zone 12 nuclear explosive facility and a seismic collapse of a special purpose facility (Pantex 1993a).

This scenario is dominated by seismic events resulting in structural failure of special purpose buildings containing nuclear explosives. Many stockpile support activities (e.g., testing and maintenance) are performed in older facilities without the structural strength of the storage magazines. Thus, these facilities are more vulnerable to external events and natural phenomena. The overall likelihood of this scenario occurring is *unlikely* (frequency of occurrence is less than 10^{-2} per year but greater than or equal to 10^{-4} per year). The public dose impact from this event is estimated to be 0.40 person-rem. The MEOI would be expected to receive an exposure of 2.0 rem. This corresponds to an increase in lifetime fatal cancer probability of 1.0×10^{-3}.

A worker in the vicinity of the fire or facility collapse would not be expected to survive. The non-involved worker would be expected to receive an exposure of 3.7 rem. This corresponds to an increase in lifetime fatal cancer probability of 1.5×10^{-3}.

Considering the likelihood and consequence of this scenario, a member of the public would, on the average, have an increase in the risk of developing a fatal cancer from this potential accident of 2.5×10^{-13} excess fatal cancers per year. The fatal cancer risk to a person in the vicinity of Pantex Plant from all causes is 1.7×10^{-3} fatal cancers per year.

Scenarios 10 and 11: Chlorine Releases. All potential accidental chemical releases were evaluated using the risk screening methodology. Chlorine was the risk dominant chemical accident. Chlorine is the only chemical with the potential for significant adverse offsite consequences.

ERPG DEFINITIONS

ERPG–1 is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor.

ERPG–2 is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action.

ERPG–3 is the maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects.

Table 4.14.2.1–3 identifies chlorine as the hazardous chemical dominating the risk from nonradiological releases (predicated upon the screening methodology described in appendix D). Since chlorine is not carcinogenic, the consequences of exposure to chlorine (primarily acute effects) differ from the consequences of exposure to radionuclides (potential latent cancers). This difference precludes a direct comparison between the risk and consequences associated with hazardous chemical releases and radionuclide releases.

A useful measure of potential human health effects resulting from exposure to non-carcinogenic chemicals is the hazard index. In its most general form, a hazard index is a ratio of the actual exposure of a human receptor to an established exposure limit. If this ratio is appreciably less than unity, no adverse human health effects are expected. If the hazard index is close to unity, some adverse human health effects may occur; and if the hazard index is substantially greater than unity, severe health effects can result.

Numerous exposure limits are available to form a hazard index. Since exposure to an accidental chlorine release is an unlikely, short-duration event, chronic exposure limits are inapplicable. Instead, Emergency Response Planning Guidelines (ERPG) values will serve to develop hazard indices for chlorine exposure.

Scenarios 10 and 11 both involve chlorine releases. The impact of these scenarios represents a residual risk at Pantex Plant and is independent of the alternatives. The rooms in which chlorine gas is used are equipped with a chlorine sensor alarm system that consists of an alarm siren and flashing light located outside the building. The sensor system is set to activate this alarm at a chlorine concentration of 1.0 part per million in the air. The rooms are also ventilated with a floor-level exhaust fan and contain an elevated fresh air inlet.

Scenario 10 is a chlorine release due to failure of system piping and valves or cylinder caused by a seismic event. Scenario 11 is a similar accident initiated by an internal event, such as operator error. Chlorine is used in two facilities, 15–29 and 13–47. A release of chlorine to the environment due to an earthquake is an unlikely event.

Should an earthquake occur with sufficient magnitude to damage one of the facilities that uses chlorine, there is a reasonable chance that the second facility would also be damaged. In each of the two facilities, two chlorine cylinders are in use. Thus, an earthquake that damages both facilities could release the contents from the four chlorine cylinders in use. Other chlorine cylinders in the facilities are not ordinarily expected to contribute to a release initiated by an earthquake. However, in the unlikely event that a chlorine cylinder is stored without its valve cap in place or is substandard structurally when delivered, it is conservatively postulated that Scenario 10 could involve a release from up to six chlorine cylinders. The magnitude of this chlorine release could be as high as 408 kilograms (900 pounds) (Pantex

1996a). For Scenario 11, the expected release to the environment is no more than the contents of one chlorine cylinder, 68 kilograms (150 pounds), and the frequency classification for this release is also unlikely.

Prior assessments disclose that, if Scenario 11 were to occur, an ERPG–1 concentration of 1 part per million is exceeded out to approximately 10.5 kilometers (6.5 miles), an ERPG–2 concentration of 3 parts per million is exceeded out to 6.5 kilometers (4 miles), and an ERPG–3 concentration of 20 parts per million is exceeded out to almost 3.0 kilometers (2 miles) (Pantex 1996a). Using Pantex-specific demographic and meteorological data, it is estimated that less than 1 percent of the downwind population would be exposed to a concentration exceeding ERPG–1 levels, and that even fewer members of the public would be exposed to higher concentrations. Moreover, since ERPG–1 and higher concentrations are perceptible by humans, persons experiencing ERPG–1 or higher concentrations can move away from the chlorine plume, thus minimizing their exposure duration.

Releasing 408 kilograms (900 pounds) of chlorine to the environment would result in approximately 10 percent of the public downwind from the release being exposed to ERPG–1 or higher concentrations, but less than 1 percent would be exposed to concentrations exceeding ERPG–2. Because of the likelihood that people exposed to concentrations in excess of ERPG–1 would evacuate the area of the chlorine plume, no long-term adverse public health impacts are anticipated for Scenario 10.

No adverse health impacts are expected from Scenario 11 for persons capable of evacuating the area of the chlorine plume.

Workers in the vicinity of a chlorine release (either Scenario 10 or 11) could be exposed to chlorine concentrations in excess of EPRG–3 and threshold levels. No long-term adverse health effects are expected for workers who promptly evacuate the area. For any persons incapable of evacuating the area of the chlorine plume, no serious or irreversible health impacts are expected from EPRG–1 or EPRG–2 exposures since the exposure duration is less than 1 hour. Persons incapable of evacuating an area with EPRG–3 concentrations may experience adverse health impacts depending upon the actual chlorine concentrations encountered and the exposure duration. However, chronic lung disease, electrocardiographic changes, and death have occurred in humans exposed to high concentrations of chlorine as a consequence of industrial accidents (Calabrese 1991).

Ultimate Fate of Radionuclides from Accidental Releases

Potential consequences to the Ogallala aquifer from an accidental plutonium release were investigated in conjunction with a Safety Analysis Report and an Environmental Assessment by Los Alamos National Laboratory (LANL) (LANL 1992:1, 2, 10). The hypothetical accident leading to dispersal of plutonium to the environment around Pantex Plant was assumed to be a high-temperature fire caused by a jet plane impact into a Zone 4 storage magazine containing nuclear weapons components, and subsequent ignition of jet fuel.

LANL envisioned that the hypothetical jet fuel fire could disperse fine particulate plutonium downwind of Pantex Plant for a maximum distance of 80 kilometers (50 miles). Prompt decontamination efforts could reduce radiation levels to 0.2 microcuries per square meter, but surface runoff and wind transport could concentrate contamination at playa lakes, where surface soil radiation levels could be as high as 2.0 microcuries per square meter. Surface water infiltrating through this contaminated soil could carry plutonium and decay products down toward the Ogallala aquifer. The model assumed an average recharge rate of 3 centimeters (1 inch) per year (10 times the High Plains average), and that recharge water would reach the Ogallala aquifer at a depth of 20 to 100 meters (50 to 400 feet).

With these conservative assumptions in place, LANL performed two analyses. The first, an ultra-conservative non-dispersive piston-flow model, assumed that a contaminated layer of 3 centimeters (1 inch) of water moves downward through a 1-dimensional column in the unsaturated zone to the water table completely intact (i.e., without interacting with any other water or soils). The results of the non-dispersive piston-flow model indicated that plutonium levels would exceed calculated Environmental Protection Agency drinking water limits (1.3 picocuries per liter) in a 20-meter (50-foot) deep aquifer after approximately 76,000 years at an approximate maximum level of 7,700 picocuries per liter.

The second, more realistic analysis accounted for the processes of dispersion (i.e., mixing processes) that effectively change the composition of water as it would move downward through the soil column. The results showed that when the processes of dispersion were taken into account, peak plutonium levels in the 20-meter (50-foot) aquifer would never exceed the most restrictive drinking water dose limits. Additional factors were also qualitatively analyzed. These included colloidal plutonium transport, preferential flow, the effects of perched aquifers, opportunities for "short-circuit" flow through abandoned wells or other conduits, and fate of daughter products.

Of these factors, the one that would appear to produce the greatest effect would be short-circuit recharge paths to the Ogallala aquifer via unintentional flow through improperly constructed or abandoned water wells or intentional flow to the Ogallala aquifer as part of an artificial recharge project. The risk of short-circuiting along improperly constructed or abandoned wells could be mitigated by identification and sealing of these wells. In the event of a plutonium dispersal accident, active groundwater recharge projects should be monitored and, if necessary, shut down (LANL 1992:1, 11-15, 17-18, 31-32).

The final conclusion of these analyses is that the hypothetical plutonium dispersal accident does not pose a significant threat to the Ogallala aquifer. The assumptions of the analyses are extremely conservative because the scenarios were based on a depth to the water table of 20 meters (50 feet) whereas, at Pantex Plant, the typical depth to the top of perched groundwater is approximately 82 meters (270 feet), and the depth to the main Ogallala aquifer ranges from 104 to 140 meters (340 to 460 feet).

For water table depths of 60 and 100 meters (200 and 400 feet), LANL calculated plutonium travel times of 305,000 and 610,000 years, respectively. Interactions with both surficial materials and the unsaturated portion of the Ogallala Formation would be expected to retard the movement of plutonium relative to the infiltrating water (i.e., plutonium would move at a rate slower than the infiltrating water). During the transport time, radioactive decay would be expected to further reduce plutonium concentrations (LANL 1992:10,12). Where the perched aquifer is present, the downward movement of plutonium would be further reduced, because the low-permeability fine-grained zone would impede downward flow and potential contamination would be more likely to move horizontally and follow the course of buried channel sands and gravels, as discussed in section 4.6.1.2.

Conservatisms

The sequence of analyses performed to generate the radiological impact estimates from normal operation and facility accidents include: (1) selection of normal operational modes and accident sequences, (2) estimation of source terms, (3) estimation of environmental transport and uptake of radionuclides, (4) calculation of radiation doses to exposed individuals, and (5) estimation of health effects. There are uncertainties associated with each of these steps. Uncertainties exist in the way the physical systems being analyzed are represented by computational models and in the data required to exercise the models (due to measurement errors, sampling errors, or natural variability).

In principle, one can estimate the uncertainty associated with each source and predict the remaining uncertainty in the results of each set of calculations. Thus, one can propagate the uncertainties from one set of calculations to the next and estimate the uncertainties in the final results. However, conducting such a full-scale quantitative uncertainty analysis is neither practical nor a standard practice for a study of this type. Instead, the analysis is designed to ensure—through judicious selection of release scenarios, models, and parameters—that the results bound the potential risks. This is accomplished by making conservative assumptions in the calculations at each step.

The models, parameters, and release scenarios used in calculations are selected in such a way that most intermediate results and consequently, the final estimates of impacts are greater than what would be expected. As a result, even though the range of uncertainty in a quantity might be large, the value calculated for the quantity is close to one of the extremes in the range of possible values, so that the chance of the actual quantity being greater than the calculated value is low (or the chance of the quantity being less that the calculated value if the criteria are such that the quantity has to be maximized). This has been the goal of the radiological assessment for normal operation and facility accidents in this study (i.e., to produce results that are conservative).

4.14.2.2 *Impacts of New Facility Construction and Upgrades*

Radiological exposure related to activities associated with new projects and facilities, as described in section 3.1.1, will be small. Additional radiological exposures related to the new projects and facilities are bounded by the Table 4.14.2.1–1 estimates.

The construction of three planned facilities—the Gas Analysis Laboratory, the Materials Compatibility Assurance Facility, and the Nondestructive Evaluation Facility—would reduce risks from operations in current facilities. These facilities would have a reduced risk because they would replace existing facilities used for HE that are susceptible to seismic events.

The Pit Reuse Facility's contribution to risk is expected to be small. As discussed in appendix H, it will introduce a process that breaches the pit tube as part of normal operations, which is not currently undertaken at Pantex Plant. Due to the limited number and nature of pit reuse operations planned, preliminary assessments indicate that incremental risk impacts from the Pit Reuse Facility would be barely perceptible. Further safety assessment would be conducted prior to the pit reuse facility becoming operational.

The human health impacts from the Hazardous Waste Treatment and Processing Facility and the Metrology and Health Physics Calibration and Acceptance Facility are not expected to be significant.

4.14.2.3 *Impacts of Environmental Restoration and Waste Management Activities*

The scope and mission of the Environmental Restoration (ER) program is to assess all inactive solid waste management units, determine the nature and extent of contamination, and perform remediation to eliminate any substantial present or future threat to human health and the environment (Pantex 1995a:15-1 to 15-11). The program is conducted in compliance with all regulatory requirements. All *Resource Conservation and*

Recovery Act Facility Investigation workplans have been approved, and field investigations have been initiated at all sites. Adequate data have been collected on many of the solid waste management units to recommend either no further action or interim corrective action.

The scope and mission of the ER program would not change under any of the alternatives to the Proposed Action. As currently active waste management sites become inactive, they will undergo environmental remediation as required by the *Resource Conservation and Recovery Act* permit (issued jointly by the Environmental Protection Agency and TNRCC) authorizing Pantex Plant to store and process hazardous wastes. Since the purpose of the ER program is to eliminate any substantial present or future threat to human health and the environment, its net impact on human health is to reduce risk.

4.14.3 Impacts from No Action Alternative

Under the No Action Alternative, weapons operations would continue at Pantex Plant to meet the stockpile management requirements. Dismantlement activities would, however, cease when the 12,000 pit storage limit is reached.

The total number of weapons operations under both the Proposed Action and the No Action Alternative are assumed to be similar. Consequently, the frequencies of potential accident scenarios caused by internally initiated events are the same for the Proposed Action and No Action Alternatives. In addition, the impacts from normal operations would be similar.

The main difference between the Proposed Action and No Action Alternatives in terms of potential human health impacts is the number of pits stored in Zone 4 and the effect of this change on the likelihood of an aircraft impact into a storage magazine. The likelihood of an aircraft impact into a pit storage magazine depends on the number of storage magazines in use. The storage of the 12,000 pits associated with the No Action Alternative would require the use of fewer storage magazines than would be required for the 20,000 pit storage level associated with the Proposed Action. The actual number of storage magazines required for 12,000 pits would be dependent on the storage configuration used by the plant. The use of fewer magazines for pit storage reduces the likelihood that an aircraft impact would breach a storage magazine that had pits inside.

An important difference in the impacts of the No Action Alternative is that the following facilities will not be replaced: the Gas Analysis Laboratory, the Materials Compatibility Assurance Facility, and the Nondestructive Evaluation Facility. Without replacing these facilities with upgraded facilities, the existing facilities would remain more susceptible to seismic events.

4.14.4 Impacts of Pit Storage Relocation Alternative

4.14.4.1 *Impacts of Relocating 20,000 Pits*

Relocating 20,000 pits from Pantex Plant would eliminate the risk posed by aircraft crash into pit storage magazines at the plant. Impacts relating to offsite pit shipments are discussed in section 4.12, Intrasite Transportation, and section 4.16, Intersite Transportation of Nuclear and Hazardous Materials.

With the storage of no pits in Zone 4, the societal risk from risk significant accidents is dependent on the level of weapons storage within the 24 SAC magazines: the societal risk from risk dominant accidents is 1.5×10^{-5} excess fatal cancers per year. With no weapon storage within Zone 4, the plant risk is dominated by Zone 12: the societal risk from risk dominant accidents is 7.8×10^{-6} excess fatal cancers per year. Both societal risk estimates presuppose a 42-square-inch release area for cell explosions.

4.14.4.2 *Impacts of Relocating 8,000 Pits*

The significance of relocating 8,000 pits in terms of impacts from potential accidents is similar to the No Action Alternative described above.

With the storage of 12,000 pits, the societal risk is dependent on the level of weapons storage within Zone 4. With the storage of weapons within 24 SAC magazines, the societal risk from risk dominant accidents is 1.5×10^{-5} excess fatal cancers per year. With no weapon storage within Zone 4, the plant risk is dominated by Zone 12, the societal risk from risk dominant accidents is 8.1×10^{-6} excess fatal cancers per year. Societal risk estimates include 42 sq in release areas for cells.

4.14.4.3 *Summary of Human Health Impacts*

Table 4.14.4.3–1 presents a summary of Pantex Plant-related human health impacts from normal operations. Table 4.14.4.3–2 summarizes the impacts of radiological accidents at Pantex Plant.

4.14.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are generally combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

4.14.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

Pantex Plant is a potential site for location of the waste management facilities as described in the WM PEIS. If these facilities are located at Pantex Plant, they could result in additional impacts to workers and the public surrounding the plant. However, the WM PEIS has estimated human health impacts from waste management activities to be low; potential fatalities to the offsite population and to workers are essentially zero for treatment and disposal of low-level waste and low-level mixed waste under every alternative (DOE 1996).

The chemical environment for the Maximally Exposed Individual (due to an atmospheric release) is expected to result in chemical-related fatal cancer incidences ranging from 3×10^{-14} to 2.9×10^{-13}. This is essentially zero risk of fatal cancers from exposure to chemicals.

4.14.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability.

TABLE 4.14.4.3–1.—*Comparison of Human Health Impacts from Pantex Plant Activities for 10 Years of Incident Free Operation at 2,000 Weapons Activity Level*

ACTIVITY	AFFECTED POPULATION	PROPOSED ACTION	NO ACTION	20,000 PIT STORAGE RELOCATION	8,000 PIT STORAGE RELOCATION
Intrasite Transportation and Zone 4 Staging Operations	Public Dose (person-rem)	(3)	(3)	(3)	(3)
	Public Risk from Incident Free Operations (Number of Excess Cancer Fatalities)	NA	NA	NA	NA
	Worker[1] Dose (person-rem)	61	44	344	174
	Worker[1] Risk from Incident Free Operations (Number of Excess Cancer Fatalities)	2.4×10^{-2}	1.8×10^{-2}	1.3×10^{-1}	6.6×10^{-2}
Pit Repackaging	Public Dose	(3)	(3)	(3)	(3)
	Public Risk from Incident Free Operations (number of excess cancer fatalities)	NA	NA	NA	NA
	Worker Dose (person-rem)	300[(4)]	180[(5)]	300	300
	Worker Risk from Incident Free Operations (number of excess cancer fatalities)	1.2×10^{-1}	7.2×10^{-2}	1.2×10^{-1}	1.2×10^{-1}
Weapons Operations	Public Dose (person-rem)	1.37×10^{-3}	1.37×10^{-3}	1.37×10^{-3}	1.37×10^{-3}
	Public Risk from Incident Free Operations (Number of Excess Cancer Fatalities)	6.85×10^{-7}	6.85×10^{-7}	6.85×10^{-7}	6.85×10^{-7}
	Worker[1] Dose (person-rem)	330	330	330	330
	Worker[1] Risk from Incident Free Operations (Number of Excess Cancer Fatalities)	1.3×10^{-1}	1.3×10^{-1}	1.3×10^{-1}	1.3×10^{-1}
Intersite Transportation[2]	Public Dose (person-rem)	4.0	4.0	7.0	5.2
	Public Risk from Incident Free Operations (Number of Excess Cancer Fatalities)	1.8×10^{-3}	1.8×10^{-3}	3.3×10^{-3}	2.4×10^{-3}
	Worker[1] Dose (person-rem)	3.2	3.2	16.5	8.2
	Worker[1] Risk from Incident Free Operations (Number of Excess Cancer Fatalities)	1.2×10^{-3}	1.2×10^{-3}	6.6×10^{-3}	3.3×10^{-3}

[1]Worker—Involved workers who receive radiation exposures as a result of their work. Non-involved workers have the same risks as the public.
[2]To provide a bounding case, calculations assumed a 100 percent increase in current shipment schedule.
[3]No impacts to the public are expected from these operations.
[4]Includes the repackaging of 20,000 pits.
[5]Includes the repackaging of 12,000 pits.
NA - Not applicable.

TABLE 4.14.4.3–2—*Representative Impacts from Pantex Plant Radiological Accidents*

SCENARIO	DESCRIPTION	INVOLVED WORKER (rem—50-year CEDE)	MAXIMALLY EXPOSED OFFSITE INDIVIDUAL (rem—50 year CEDE)	NON-INVOLVED WORKER (rem—50 year CEDE)	PUBLIC DOSE (person-rem)	ANNUAL SOCIETAL RISK (excess cancer fatalities per year)
1	Explosive driven plutonium dispersal from internal event	Fatalities	Cell: 49 (11)[a] Bay: 34	Cell: 2300 (600)[a] Bay: 34	1,200 (660)[a]	6.3×10^{-6}) (3.5×10^{-6})[a]
3	Explosive driven plutonium dispersal from external event/natural phenomena	Possible fatalities*	60	40	16,000	7.2×10^{-6}
5	Tritium reservoir failure from internal event	2 rem	1.1×10^{-2}	0.30	0.030	9.5×10^{-7}
6	Pit breach from internal even	7 rem	1×10^{-4}	4×10^{-3}	0.00037	1.5×10^{-9}
7	Multiple tritium reservoir failure from external event/ natural phenomena	Possible fatalities*	0.74	50	110	2.2×10^{-8}
8	Fire driven release from external event/natural phenomena	Possible fatalities*	34	3,000	1,100	2.9×10^{-7}
9	Tritium or plutonium release caused by seismic event or aircraft accident	Possible fatalities*	2.0	3.7	0.40	6.8×10^{-8}

[a]For cell leak area of 5 square inches.

*Fatalities are possible if personnel are present in the vicinity of the facility.

Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, human health impacts from operations are expected to be less than current impacts. The average radiological dose to workers would not be expected to change. The total worker dose, however, would change due to the reduced number of workers associated with a reduction in workload. Potential impacts from accidents, which are essentially independent of the level of operation, would not be expected to change.

Under the downsizing alternative, the average worker dose at Pantex Plant would be approximately 10 mrem per year. This would result in a total worker dose of 3.0 person-rem year, statistically equating to approximately 1 fatal cancer every 833 years. The incremental dose to the population within 80 kilometers (50 miles) would be 4.0×10^{-4} person-rem per year. The probability of a member of the public dying from cancer would be 2.0×10^{-7} year. Potential impacts from accidents were determined using computer modeling. For the composite accident, less than one fatal cancer would be expected for the population within 80 kilometers (50 miles).

4.14.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. The annual dose to the public from the collocated facility would be 5.3×10^{-5} person-rem. This would cause an estimated 1.3×10^{-6} fatal cancers during 50 years of operation. The alternative of storing surplus pits from RFETS at Pantex Plant in the near-term could cause less than 10^{-2} fatal cancers for affected workers due to repackaging operations. There would be no effect to the public.

The final S&D PEIS will include an alternative that is a refinement of these storage alternatives. As discussed in sections 1.4 and 1.7.3 of this volume, the final S&D PEIS will include an alternative under which pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. The impacts of this alternative are fully accounted for in this EIS because the pits from RFETS could not cause the total number of pits stored in Zone 4 to exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Furthermore, RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, mixed oxide (MOX) fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

During normal reactor operation, there would be both radiological and hazardous chemical releases to the environment and also direct in-plant exposures. All doses would be within radiological limits and well below levels of natural background radiation (DOE 1996a:4.0).

4.14.6 Potential Mitigation Measures

DOE will continue to strive to reduce radiological exposures to plant workers. Radiological exposures incurred from future weapons operations will be controlled and minimized by Pantex Plant procedures, administrative controls, and an active ALARA program that promotes work practices that minimize worker exposures. The magnitude of radiological exposures to workers and safe radiological worker practices are dictated by the Pantex Radiological Control Manual, and ultimately, by 10 CFR 835.

Section 4.14.1.4 contains detailed information about accident mitigation.

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4.15 AIRCRAFT ACCIDENTS

4.15.1 Affected Environment

Aircraft accidents are a concern at Pantex Plant because of the volume of local air traffic, the proximity of Pantex Plant to flight paths into and from the Amarillo International Airport, and overflights. Even though the likelihood of an aircraft crash at Pantex Plant is small, a crash has the potential of releasing radioactive material from Pantex Plant facilities.

The number of annual air operations in the immediate vicinity of Pantex Plant is influenced by several factors. There is a regional air navigational aid, known as a Very High Frequency Omni-Directional Radio Range with Tactical Air Navigation (VORTAC), located within 8 kilometers (5 miles) of Pantex Plant. Because the air traffic in low-altitude and high-altitude air corridors is serviced by the VORTAC, it contributes to the air traffic in the vicinity of Pantex Plant. A significant number of military (primarily Air Force) aircraft conduct instrument approach and landing practice at the Amarillo International Airport. Furthermore, aerial application activities, such as crop dusting for several farm plots near Pantex Plant Site, add to the air traffic volume in the immediate vicinity of Pantex Plant.

4.15.1.1 *Principal Features of Pantex Plant*

The principal features of Pantex Plant are illustrated in Figure 4.3.1.2–1. With respect to aircraft accidents, the primary concern is with the 42 Steel Arch Construction (SAC) magazines and the 18 Modified Richmond magazines in Zone 4 West, and certain buildings in Zone 12. Figure 4.15.1.1–1 shows the layout of the 60 magazines in Zone 4 West (Pantex 1996a:3.1). Typically, no more than four persons work in a Zone 4 magazine. The Zone 4 Safety Analysis Report limits operations to seven personnel inside the magazine. Moreover, no more than five magazines (counting the A and B sides of the Modified Richmond magazines as separate magazines) can be open at any one time (DOE 1992b:8-21). The buildings of concern in Zone 12 are facilities containing nuclear weapons and nuclear weapon components. These include the bays and cells that represent nuclear explosive facilities, the special purpose buildings, and the Zone 12 staging facilities. A layout of Zone 12 South is shown in Figure 4.15.1.1–2.

4.15.1.2 *Current Aircraft Approaches to the Amarillo Airport*

The current VORTAC location relative to Pantex Plant is illustrated on Figure 4.15.1.2–1 (DOE 1995h:16). Because this location is nearly centered on a line between Pantex Plant and Runway 22, aircraft using the VORTAC intercept the final approach course from the beacon in the vicinity of Pantex Plant and pass over it in a straight line toward the runway. Aircraft using the airport's Instrument Landing System (ILS) utilize the signals from the Back Course Localizer (BCL). This system guides the aircraft such that they fly over the northern portion of Zone 4. The BCL approach to Runway 22 is illustrated in Figure 4.15.1.2–2 (DOE 1995h:15).

4.15.1.3 *Comparison with Previous Aircraft Crash Analyses*

There have been several previous assessments of the risk posed to Pantex Plant due to an aircraft crash. These analyses date back to a 1976 study conducted by Sandia National Laboratories. It should be noted that with the exception of the current analysis, all of the past studies conducted for Pantex Plant aircraft crash risk analyses have used the Solomon model with different data sets. A Safety Analysis Report (SAR) for Zone 4 was completed in 1993. The aircraft crash analysis from the Zone 4 SAR was incorporated into the Environmental Assessment for Zone 4, which was released in

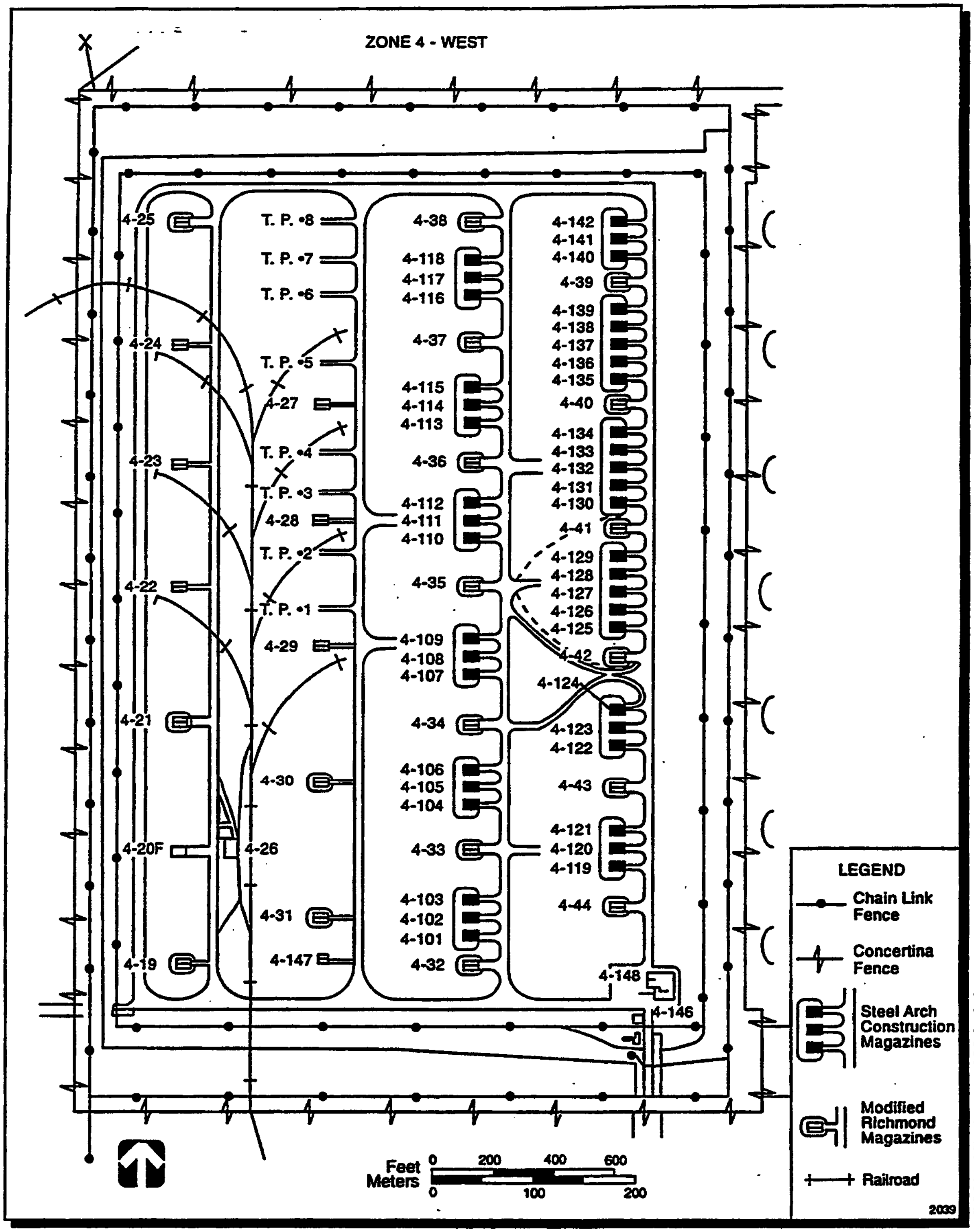
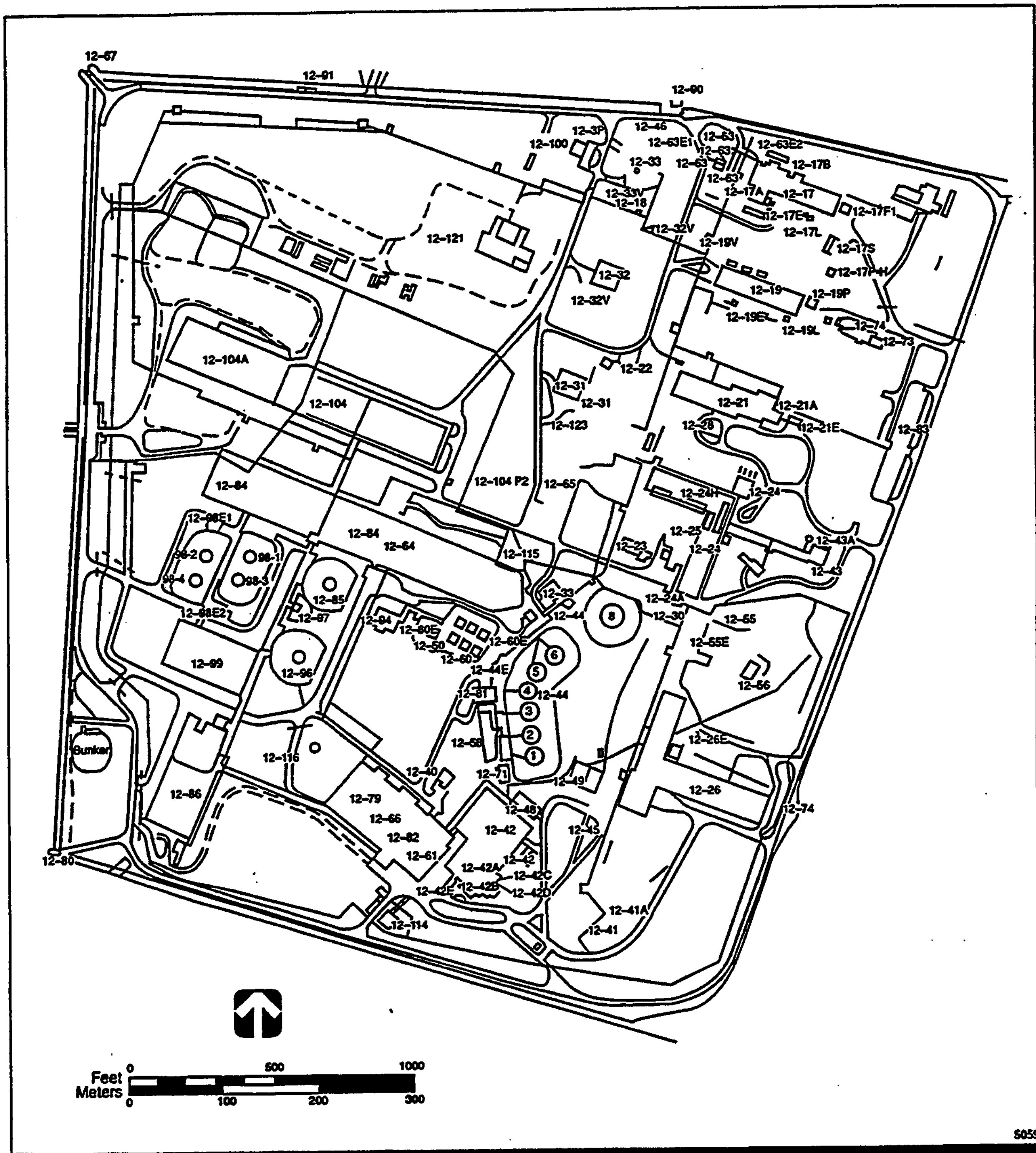


FIGURE 4.15.1.1–1.—*Layout of Zone 4 West.*



SOURCE: Pantex 1996a:3.1

FIGURE 4.15.1.1–2.—*Layout of Zone 12 South.*

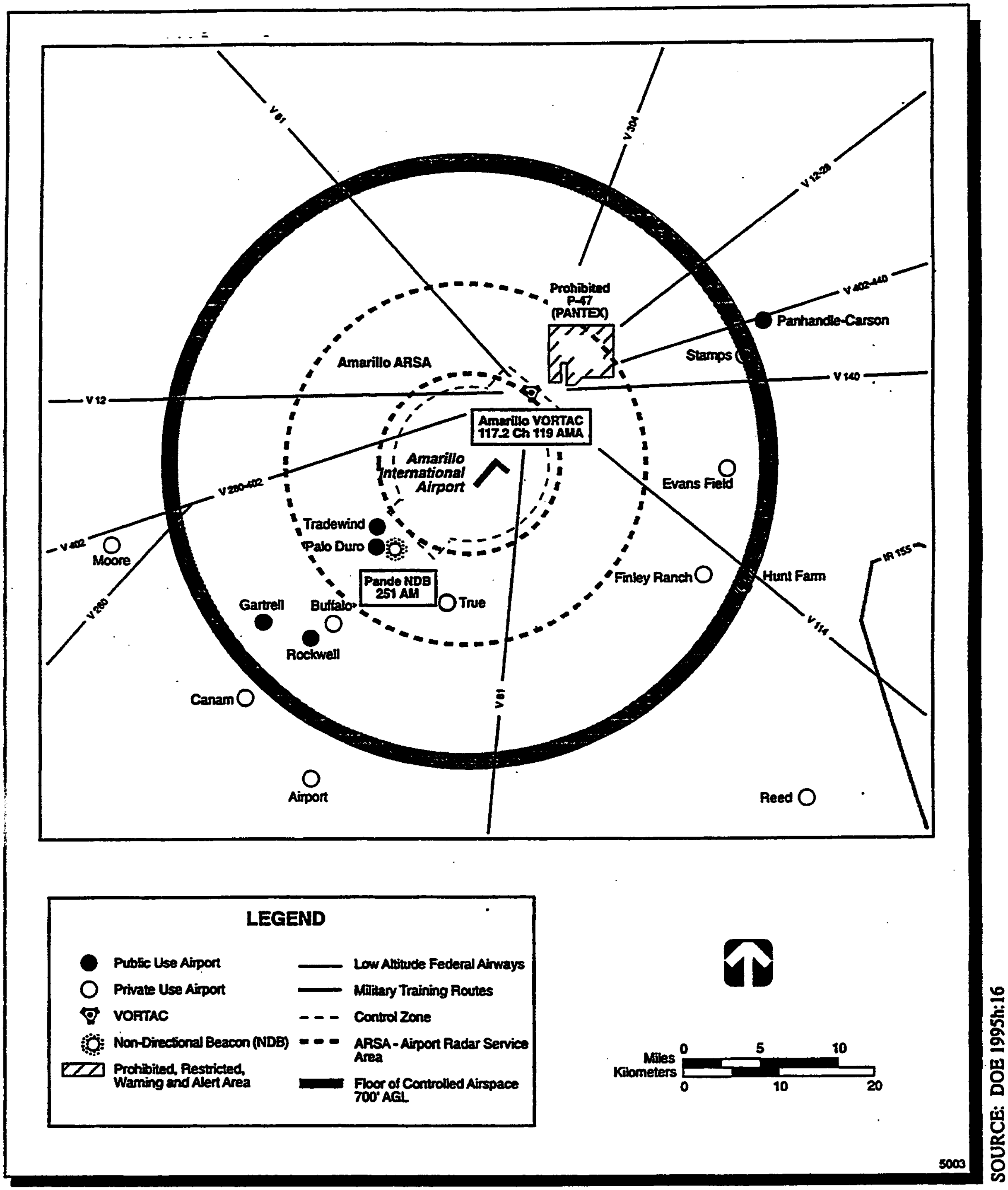
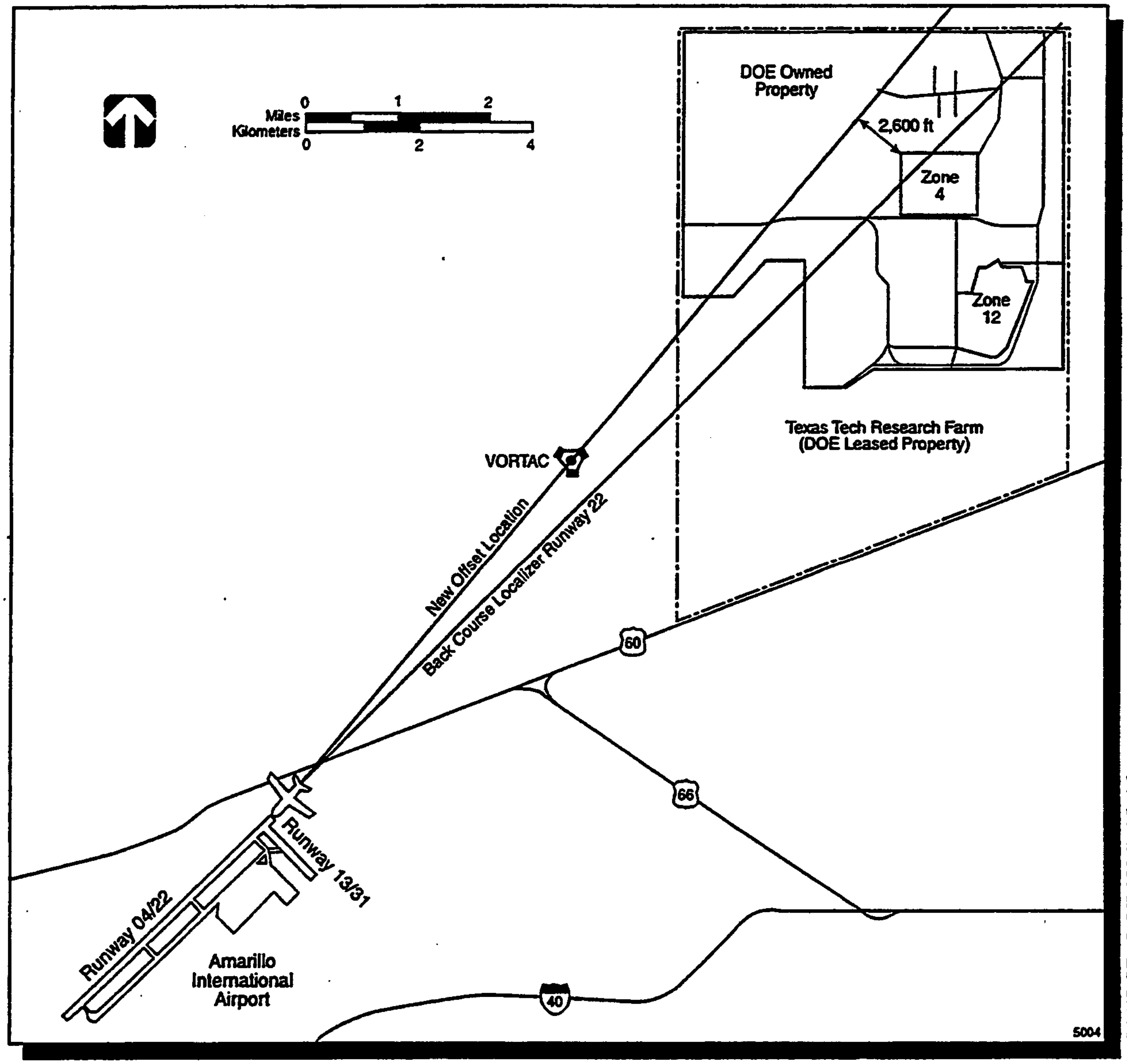


FIGURE 4.15.1.2–1.—***Current VORTAC Location and Low-Altitude Federal Airways.***



SOURCE: DOE 1995h:15, 16

FIGURE 4.15.1.2–2.—***Current and Proposed Back Course Approaches.***

January 1994. This document resulted in a Finding of No Significant Impact (FONSI) for the interim storage of up to 12,000 pits in Zone 4.

At that time, the frequency of an aircraft crash into the storage bunkers, which could result in plutonium release, was reported to be 6.6×10^{-7}, and thus termed "incredible". However, an Unreviewed Safety Question Determination (USQD) for the analysis contained in the Zone 4 SAR was issued in the spring of 1995. This determination questioned the validity of the aircraft overflight data used in the analysis. Additionally, the USQD found that the study used an incorrect application of the Solomon model. As part of the USQD, a corrected analysis was presented which gave a new probability of hitting a Zone 4 facility of approximately 2×10^{-5}.

To obtain up-to-date aircraft overflight data for the study presented herein, DOE, with cooperation from the Federal Aviation Administration (FAA), installed a Radar Airspace Monitoring System (RAMS) at the Amarillo International Airport. This system collects data on the number and type of aircraft operations in the vicinity of Pantex Plant. These new data were used in this EIS to help evaluate the likelihood of an aircraft impact into Pantex Plant nuclear facilities. The new data are also being used to close out the USQD. The results of the past and current aircraft crash studies are presented in Table 4.15.1.3–1. As can be seen from these results, the trend for aircraft crash hit probability is in the low to mid 10^{-5} range.

From a risk perspective, the hit and release probabilities (Table 4.15.1.3–1, Hit and Release Probability column) are the values of interest rather than the hit probabilities alone. Analyses of this type tend to be conservative in nature due to the inherent uncertainties. It is difficult to quantify these conservatisms and as a result, the hit and release probabilities for the Final EIS should be considered a conservative point estimate. The issue of conservatism is discussed in section 4.15.7.

4.15.1.4 *DOE Initiatives to Reduce and Monitor Pantex Overflights*

Due to public concern regarding the risk of aircraft crash at Pantex Plant, the Secretary of Energy committed DOE officials to meet with the City of Amarillo, FAA, the U.S. Air Force, and other stakeholders to discuss alternative civilian and military flight patterns. An Overflight Working Group was formed to address ways to reduce the number of aircraft flying over Pantex Plant. Their recommendations are listed below (DOE 1995h:12, 13, 18).

TABLE 4.15.1.3–1.—*Results of Past Pantex Plant Aircraft Crash Analyses*

STUDY	HIT PROBABILITY	HIT AND RELEASE PROBABILITY
SAND 76-0120 (entire site)	4.7×10^{-5}	—
Zone 4 SAR (DOE 1992f) (an incorrect value)	1.85×10^{-6}	6.63×10^{-7}
Zone 4 USQD (Pantex 1995a) (corrected analysis)	1.95×10^{-5}	—
Pantex Plant Pre-Draft EIS (Zone 4, Solomon)	4.0×10^{-5}	—
Pantex Plant Draft EIS (Zone 4, DOE Draft Standard, July 1995 version)	2.4×10^{-5}	9.0×10^{-6}
Pantex Plant Final EIS (Zone 4, DOE Draft Standard, July 1996 version)	1.3×10^{-5}	1.2×10^{-6}

Sources: Studies as listed in table.

- Develop a Memorandum of Understanding (MOU) between DOE's Amarillo Area Office and the local FAA facility. The MOU would permit:
  - — Establishment of a telephone "hot line" between the Approach Control Facility and DOE's Amarillo Area Office Emergency Operations Center. Improved communication would permit the FAA to warn DOE of aircraft nearby with in-flight emergencies. This would allow the plant to modify activities vulnerable to aircraft crashes (completed).
  - — Modified vectoring of approaching aircraft. When aircraft safety will not be affected, air controllers will avoid extended vectoring of aircraft over the plant boundaries (completed).
  - — Use of discretionary holding patterns. When feasible, air controllers would offer a practice holding pattern away from plant boundaries when pilots request such practice (completed).
- Develop and implement a new Global Positioning System (GPS) non-precision approach that tracks around the plant's boundaries. This new navigation system was recently approved by FAA for use in all aircraft. As increasing numbers of aircraft become equipped with GPS, pilots will more frequently request this approach, which routes the aircraft away from plant boundaries (completed). A depiction of this approach is provided in Figure 4.15.1.3–1.
- Build an offset localizer approach with vertical guidance and distance measuring equipment, called an "Localizer Displaced Approach Glide Slope Approach." Because the Runway 22 BCL cannot be angled to the runway, this alternative is suggested. By adding a new antenna array at the end of Runway 22, aircraft equipped with instrument landing systems will be able to arrive along a path angled to the runway. This alternative will move aircraft tracks away from the nuclear materials stored in Zone 4. This new approach is illustrated in Figure 4.15.1.2–2.
- Install a GPS Ground Differential Station that would permit use of GPS precision minimums. FAA indicated that by building a GPS Ground Differential Station near the airfield, navigation accuracy of aircraft will be increased and glide-slope information can be added to the GPS approach mentioned above.
- Install a new enroute-approach navigation aid farther away from the plant (a new VORTAC). After installing this new VORTAC, the older VORTAC located midway between the airfield and the plant would be decommissioned. The new VORTAC station near the airport would permit the moving of existing FAA airways away from the plant. Existing VORTAC approaches that pass over the plant would be eliminated, and if warranted, FAA may elect to develop new approaches to the airport that are angled away from the plant.
- DOE has agreed to study new methods to fortify the areas where nuclear materials are handled or stored. Structures such as "Jersey Walls", fortified bunker entrances, and berms may be considered.

4.15.2 Impacts of Proposed Action

The Proposed Action would include the continued operation of Pantex Plant and the storage of up to 20,000 pits onsite. A quantitative assessment of the frequency (per year) that an aircraft crash could initiate an accidental release of plutonium at Pantex Plant was performed. Three terms were considered in the assessment:

- The frequency of an aircraft impacting the facility (hit probability).

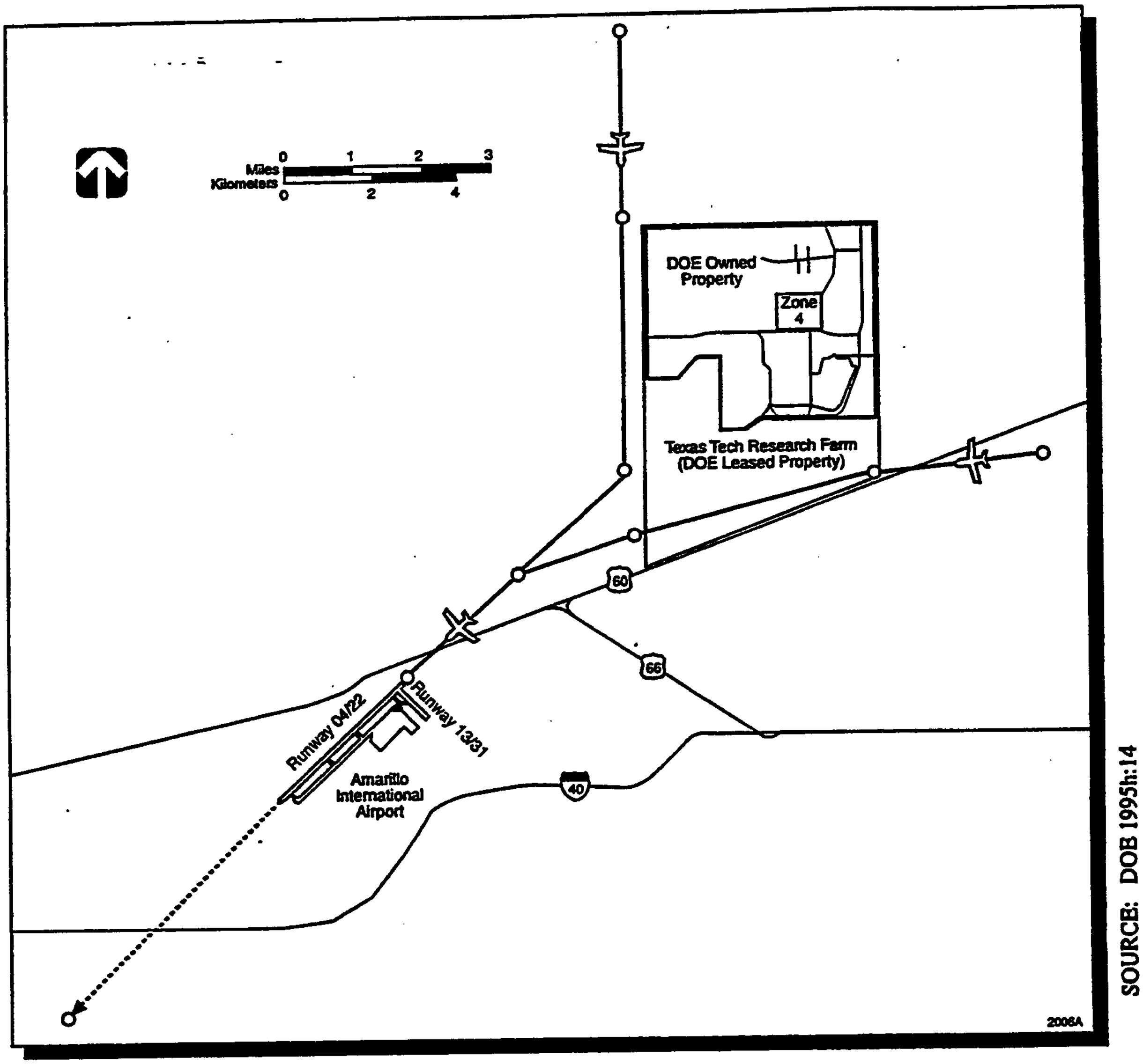


FIGURE 4.15.1.3–1.—*Global Positioning System Approach.*

- The potential of significantly damaging the building by scabbing or perforation, given the impact.
- The potential of a radioactive release, given significant building damage (release probability).

Facility Impact

Figure 4.15.2–1 is a graphical representation of the three events that must occur to have a radioactive material release from a Pantex Plant facility due to an aircraft crash. The frequency of an aircraft impacting a facility was calculated using the *Draft DOE Standard, Accident Analysis for Aircraft Crash into Hazardous Facilities* (Draft DOE Standard) (DOE 1996g). It should be noted that this analysis is applicable to accidents only, not intentional acts of sabotage or terrorism.

Air traffic data (for 6.5 years of runway operations) for the Amarillo International Airport were obtained from the FAA and used in conjunction with approximately 12 months of RAMS data collected at the Amarillo International Airport Tower (PC 1996h). Air traffic data in the vicinity of the airport on an annual basis are summarized in Table 4.15.2–1. Projected building areas and aircraft crash frequency data were combined with the air traffic data to calculate the aircraft impact

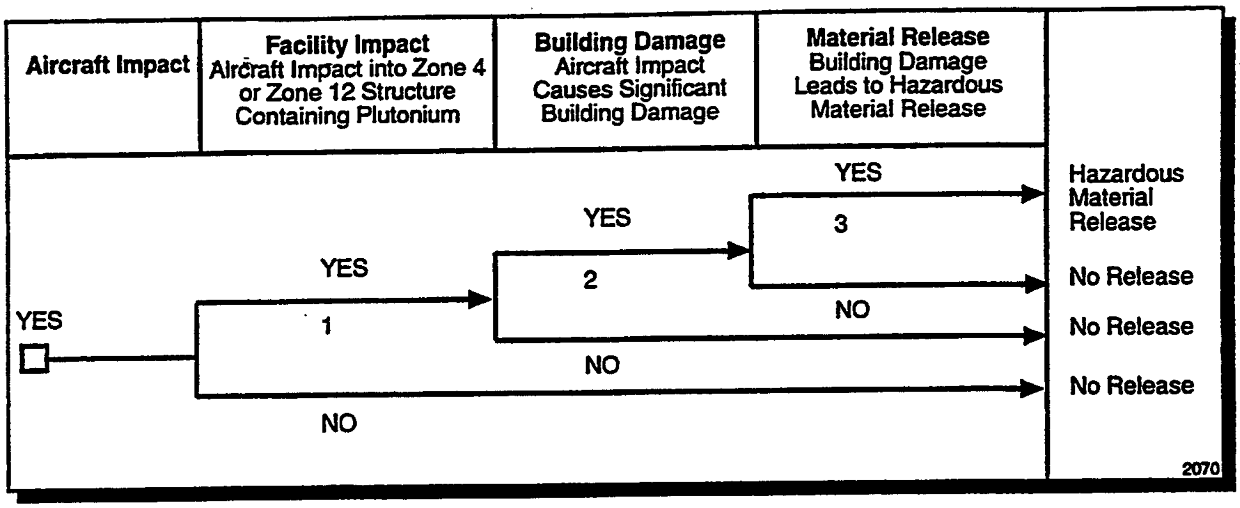


FIGURE 4.15.2–1—*Aircraft Impact Event Tree.*

TABLE 4.15.2–1.—*Maximum Yearly Flight Operations at the Amarillo International Airport*

AIRCRAFT CATEGORY	ANNUAL AIRCRAFT OPERATIONS
Commercial: Air Carrier	13,174
Commercial: Air Taxi	9,938
Military (large and small)	40,640
General (single-engine piston, multi-engine piston, turboprops, turbojets)	29,134
Helicopters	233
Total	93,119

Source: PC 1996h

frequency for Zone 4 and Zone 12 buildings. The likelihood of any aircraft impacting a building in either Zone 4 West or Zone 12 is extremely unlikely (3.2×10^{-5} per year). The likelihood that any aircraft impacts a Zone 12 building is slightly greater than that of impacting a Zone 4 West magazine, primarily due to the fact that the total Zone 12 target area is slightly larger than that of Zone 4 West.

Building Damage

The potential of significant building damage given an aircraft impact is then determined. If an impact occurs, the potential of significant building damage is predicated upon structural analyses that consider the weight and speed of the impacting aircraft compared with the resiliency of the facility. The potential for significant building damage from crashes involving various classes of aircraft was evaluated using the structural evaluation approach presented in the Draft DOE Standard (DOE 1996g). Table 4.15.2–2 presents the building damage matrix for each aircraft class for specific facilities in Zone 4 West and Zone 12. Significant building damage is defined as either *perforation*—when a missile (flying object) generated by an aircraft crash penetrates into a facility—or *scabbing*—when an impact of an aircraft missile on a facility generates a secondary missile inside the facility.

Based on calculations using structural penetration equations provided in the Draft DOE Standard, and given the nature of the heavily reinforced, earth covered structures at Pantex Plant, only about 9 percent of the potential aircraft impacts in Zone 4 West result in significant building damage. Similarly, for Zone 12, approximately 17 percent of the potential aircraft impacts in Zone 12 result in significant building damage.

TABLE 4.15.2–2.—*Aircraft Building Damage Matrix for Zone 4 and Zone 12, Pantex Plant*

BUILDING	AIRCRAFT CLASS								
	COMMERCIAL		MILITARY		GENERAL				
	AIR CARRIER	AIR TAXI	SMALL	LARGE	SINGLE ENGINE	MULTIPLE ENGINE	TURBO-PROP	TURBO-JET	HELICOPTERS
Modified Richmond Magazines	D¹	ND	D¹	D¹	ND	ND	ND	ND	ND
Steel Arch Construction Magazines	D¹	ND	D¹	D¹	ND	ND	ND	ND	ND
12-26 Pit Vault	D²	D²	D²	D²	D³	D²	D³	D²	D³
12-41	D²	D²	D²	D²	D²	D²	D²	D²	D²
12-44	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-44 Cell 8	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-50	D¹	ND	D¹	D¹	ND	ND	ND	ND	ND
12-58	D¹	ND	D¹	D¹	ND	ND	ND	ND	ND
12-60	D¹	D¹	D¹	D¹	ND	ND	ND	ND	ND
12-64	D²	D¹	D¹	D¹	ND	ND	ND	ND	ND
12-84 East	D¹	ND	D¹	ND	ND	ND	ND	ND	ND
12-84 West	D¹	ND	D¹	ND	ND	ND	ND	ND	ND
12-85	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-94	D²	ND	D²	ND	ND	ND	ND	ND	ND
12-96	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-98	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-99	D¹	ND	D¹	ND	ND	ND	ND	ND	ND
12-104	D¹	ND	D¹	ND	ND	ND	ND	ND	ND
12-104A	D²	ND	ND	ND	ND	ND	ND	ND	ND
12-116	D²	D²	D²	D²	ND	ND	ND	ND	ND
South Vault, North Vault	D²	D²	D²	D²	D²	D²	D²	D²	D²

D = Damage
ND = No Damage
¹Scabbing or perforation occurs for the roof, but not the walls.
²Scabbing or perforation occurs for the roof and the walls.
³Scabbing occurs for the walls, but not the roof.
Source: DOE 1995h:14

Material Release

An aircraft impact into a Zone 12 building that causes significant damage may not necessarily lead to a release of radioactive material. Release of radioactive material is *not reasonably foreseeable* for nuclear explosive bays, cells, and special purpose facilities (frequency of occurrence is less than 10^{-6} per year). In addition, the radioactive materials inventory is much less than what would be found in Zone 4 West magazines.

Consequently, the probability of a release in Zone 12 is approximately equal to that for Zone 4 West facilities.

A high explosive (HE) detonation in Zone 4 West is possible only in weapon magazines. However, if an aircraft crashes into a magazine and causes significant damage, it is unlikely that the magazine will contain weapons, since most of the storage magazines will be used for pit storage. For the 12,000-pit case, approximately 70 percent of the magazines will contain pits only, whereas for the 20,000-pit case, up to 100 percent of the Zone 4 West magazines could be occupied by pits only.

An aircraft crash that causes significant damage to a weapons magazine would not necessarily lead to an explosive plutonium release. The likelihood of an explosive release is dependent on numerous factors, including the type of explosive contained within weapons stored in the magazine (conventional or insensitive high explosives) and the nature of the crash and damage to the magazine (e.g., if there is a fire inside the magazine or a missile from the crash impacts a weapon).

For this analysis, it was conservatively assumed that significant building damage to a magazine containing HE (in weapons form) would lead to an explosive plutonium release involving the contents of the magazine. The likelihood of an HE detonation in a weapon magazine due to an aircraft impact is *not reasonably foreseeable* (frequency of occurrence is less than 10^{-6} per year). The aircraft crash analysis in this section and in appendix E focuses on release probability only. This probability is combined with other conditional probabilities and consequences to evaluate the risk due to aircraft crash at Pantex Plant. The consequences and risk associated with this event are discussed in section 4.14.2, Human Health.

An aircraft impact into a Zone 4 pit magazine may damage a large fraction of the pit containers, and an ensuing fire could result in a release of plutonium. An aircraft crash that causes significant damage to a pit storage magazine would not necessarily lead to a plutonium release. Pits are currently stored in AL–R8 containers, which provide significant thermal and impact resistance. In the future, pits will be stored in a new container, the AT–400A, that will provide additional thermal and impact protection. Appendix F provides a description of current and potential future pit containers.

Whether perforation of a pit magazine would result in damage to pit containers is uncertain. In this analysis, it is assumed that 25 percent of the pit containers in a magazine contribute to a release (DOE 1994w:App I). Spilled aircraft fuel is likely to cause a fire in a crash that results in perforation of a storage magazine, and for this analysis it is conservatively assumed that a fire occurs 100 percent of the time. Whether or not this fire involves the contents of the magazine is also uncertain. In this analysis, it is assumed that it does. The likelihood of impact depends on the number of pit magazines in use. For the Proposed Action, the maximum number of pits stored will be 20,000. The likelihood of an aircraft impact causing a release is *extremely unlikely* (frequency of occurrence is less than or equal to 10^{-4} per year, but greater than or equal to 10^{-6} per year).

The risk and consequences of aircraft impacts at Pantex Plant are discussed in section 4.14.2.1, Impacts of Continued Operations. The risk to the public from aircraft impact dispersal accidents is low relative to other risks. A person in the vicinity of Pantex Plant has an approximately 4.3×10^{-12} increase in fatal cancer risk from potential aircraft crash plutonium dispersal accidents compared with a baseline annual fatal cancer risk of 1.7×10^{-3}.

4.15.3 Impacts of No Action Alternative

The likelihood of an aircraft impacting either a weapon magazine or a Zone 12 building is the same as discussed under the Proposed Action.

The likelihood of an aircraft impacting a Zone 4 pit magazine depends on the number of pit magazines in use. For the No Action Alternative, the maximum number of pits stored at Pantex Plant will be 12,000, which would require all 18 Modified Richmond and 18 SAC magazines. This reduces the likelihood of an aircraft impacting a pit magazine and causing a release by 44 percent from the Proposed Action, such that it is *not reasonably foreseeable*. The reason for this disproportional reduction is the preferential storage of pits in Modified Richmond magazines, which are less vulnerable to aircraft impacts than SAC magazines. For the 12,000-pit case it is assumed that the remaining 24 SAC magazines contain weapons. The release frequency for weapons magazines is also *not reasonably foreseeable* (6.8×10^{-7}).

4.15.4 Impacts of Pit Storage Relocation Alternative

The likelihood of an aircraft impacting either a weapon magazine or a Zone 12 building is the same as discussed under the Proposed Action.

As previously stated, the likelihood of an aircraft impacting a Zone 4 pit magazine depends on the number of pit magazines in use. The maximum number of pits stored at Pantex Plant under the Pit Storage Relocation Alternative would be 12,000. As discussed under the No Action Alternative, the relocation of 8,000 pits reduces the likelihood of an aircraft impacting a pit magazine and causing a release by 44 percent from the Proposed Action, such that it is *not reasonably foreseeable*. Relocating 20,000 pits to another site will ultimately reduce the Pantex Plant pit inventory to zero. This would reduce the likelihood of a release from an aircraft impacting a pit magazine at Pantex Plant to zero.

4.15.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

Since the DOE programs have not identified exact locations of buildings where plutonium would be resident, it is not possible to quantitatively determine the impacts from these three programs. Therefore, a qualitative assessment was done comparing the three programs to the existing facilities in use.

4.15.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

The WM PEIS is only concerned with plutonium as transuranic (TRU) waste. Under normal operations Pantex Plant does not produce TRU waste. Actions in the WM PEIS would not affect the locations of plutonium (both in pits and weapons) in Zone 4 or 12. Therefore, there would be no change in the aircraft accident probability from WM PEIS actions.

4.15.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Although the No Action Alternative does not account for the time plutonium is at risk, there would be a reduction in the risk from an aircraft crash because of the reduction in operations. Under the downsizing alternative, there would be a consolidation of facilities and a commensurate reduction in the risk from an aircraft crash due to the fewer number of target facilities. Under the relocation alternative, the risk from an aircraft crash into assembly, disassembly, and HE fabrication facilities would be reduced to zero.

4.15.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons Usable Fissile Materials Programmatic Environmental Impact Statement*

If any of the three storage alternatives (Upgrade Facilities at Multiple Sites, Consolidate Plutonium in One Facility, or Collocate Plutonium and Highly Enriched Uranium in Two Facilities) were implemented, there would be a change in the aircraft crash probability. Since the result of any of these alternatives would be to remove all pits (plutonium not in weapons) from Zone 4, this would reduce the aircraft crash induced release probability. If the Upgrade Alternative is selected, all plutonium pits would be moved to existing buildings 12–66 and 12–82. This would reduce the aircraft accident probability almost proportionally to the number of Modified Richmond and SAC magazines no longer used in Zone 4. The aircraft crash probability in Zone 4 would be only for those magazines where nuclear weapons are staged. The impact of additional plutonium in Zone 12 would be minimal because buildings 12–66 and 12–82 are adjacent to buildings 12–41 and 12–42.

The Consolidation Alternative has two options at Pantex Plant: (1) to build a new facility and modify existing facilities in Zone 12 South or (2) build a new facility in Zone 12 South. Under the first option, there would be a reduction in the aircraft accident probability due to a reduction in the plutonium inventory in Zone 4 and a minimal increase in Zone 12 South as discussed in the Upgrade Alternative. The new facility in Zone 12 South would have a smaller total area (true, shadow, and skid) compared to the pit storage magazines no longer used in Zone 4. There would be an increase in the hit probability for Zone 12 because of the addition of a new facility, but overall, the aircraft accident probability would be reduced. The impacts from the second option, building a new facility, or from the Collocation Alternative, would be similar to the Upgrade Alternative since material would be moved from Zone 4 to Zone 12 South.

The final S&D PEIS will include an alternative that is a refinement of these storage alternatives. As discussed in sections 1.4 and 1.7.3 of this volume, the final S&D PEIS will include an alternative under which pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. The impacts of this alternative are fully accounted for in this EIS because the pits from RFETS could not cause the total number of pits stored in Zone 4 to exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Furthermore, RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant. However, the receipt of pits from RFETS would require additional repackaging activities prior to storing them in Zone 4 (see section 4.12.5.3). Appendix Q of the S&D PEIS indicates that these repackaging and intrasite transportation activities could result in less than 10^{-2} additional latent cancer fatalities. Impacts from the disposition alternatives are not assessed since the S&D PEIS will select a technology and strategy, not a site for disposition.

4.15.6 *Potential Mitigation Measures*

Potential mitigation measures either reduce the frequency of an aircraft impact or reduce the probability that the aircraft impact causes a release due to significant building damage, fire, and/or HE detonation. Results from this study indicate that a large fraction of the risk associated with aircraft crash in Zone 12 comes from older facilities that are not heavily reinforced or earth covered. Recommendations of the Overflight Working Group are presented in section 4.15.1.4. DOE has committed to implement the risk reduction measures proposed by the overflight working group. It is estimated that implementation of the MOU, the offset localizer, relocation of the VORTAC, and 65 percent use of the GPS would result in an 82 percent cumulative risk reduction (DOE 1995h:22). This 82 percent reduction was estimated using the Solomon Model. Fortification of areas and structures in which nuclear materials are handled and stored could further reduce the impact of aircraft accidents.

4.15.7 *Conservatisms*

There are many conservatisms included in the Pantex Plant aircraft accident analysis that, if reduced or removed, have the potential to lower the probabilities of an aircraft crash incident substantially. This section presents some of these conservatisms and explains their effect on the aircraft crash risk to the Pantex Plant.

The Draft DOE Standard was created as a tool to be applied to all DOE sites where hazardous materials exist (DOE 1996g). As a result, it was written in a generic form without much site-specific detail. The Pantex Plant is unique in that it is situated close to an international airport. Because of this proximity, and the weapons operations conducted at Pantex Plant, the public has expressed concern regarding aircraft overflying the plant and crashing into nuclear facilities. DOE, in cooperation with the FAA, has responded to these concerns by attempting to reduce Pantex Plant overflights with the mitigation measures discussed in sections 4.15.1.4 and 4.15.6. When fully completed, these measures will reduce the number of aircraft overflying the Pantex Plant and the risk of an aircraft crash.

However, the Draft DOE Standard, as written, does not allow for consideration of these measures in the risk calculation. For the purposes of this analysis, it is assumed that all aircraft are on approach to the airport on the BCL, which intersects Zone 4 West. Even with the mitigation measures in place to move aircraft away from the current BCL, RAMS data indicate that aircraft do not typically fly this route. RAMS data also indicate high-altitude aircraft flying on defined airways, which is not recognized in the DOE Standard's non-airport methodology.

In the event of an aircraft crash, the assumption used in the aircraft accident methodology is that a skidding aircraft will hit a facility with the same velocity that it had when it began the skid. This results in a highly conservative impact velocity since no credit is taken for drag, friction, or other factors that would reasonably be expected to contribute to a reduction in velocity. Additionally, the impact angles given are conservative when applied to facility roof impacts, because at these angles, it is quite possible that the potential penetrating missiles from the aircraft would simply ricochet off the facility. Pantex Plant has some structures in Zone 12 that are considered structurally "super stout." No credit is taken for these "super stout" facilities in the analysis.

Other conservatisms in the analysis include the assumption that the entire aircraft engine is the penetrating missile of concern. This is conservative since most of the fan shroud would be expected to tear away after striking a facility, leaving the engine shaft as the secondary penetrator. For the purposes of this analysis, it is also assumed that any facility authorized to contain nuclear explosives is occupied by nuclear explosives 24-hours a day, seven days a week (conservative because none of the authorized facilities contain nuclear explosives on a continual basis), and that the probability of an explosion after an accident resulting in a plutonium release is 1. This assumption is conservative because all impacts would not be expected to cause scabbing or perforation sufficient to cause an explosion and there is no consideration given as to whether high explosives are sensitive or insensitive.

Release assumptions are also considered to be highly conservative for several reasons. Potential impacts that could cause a wall or roof to fail, or a collapse of the whole facility, take no credit for the fact that the overburden would likely suppress any fire and prevent dispersal of materials. Further, no credit was taken for the filtration effects provided by earth covers on bays, cells, and Zone 4 West magazines.

A release of plutonium (from a magazine, for example) due to a fire would require sufficient fuel inside the facility to create a fire that would consume (completely surround) the plutonium container for at least 30 minutes. A sustained fire is unlikely since the assumed penetrators (engines) do not carry sufficient quantities of fuel to produce a sustained fire (fuel is typically contained in the wings of the aircraft). Further, there is a high probability that a skidding aircraft, which represents the majority of the risk, would dispense its fuel contents prior to facility impact.

The analysis takes no credit for the protection provided by the pit container (AL-R8) or the ability of the pits to withstand a fire. Pits, by themselves, have some degree of resiliency to fire, and the AL-R8 containers currently being used were previously certified as type B containers (i.e., were designed to withstand an all-consuming 30-minute fire and various drop and puncture tests). The analysis also assumes that 25 percent of the containers in a magazine would be torn open and their contents released as a result of the fire. Given the size of the penetrator (engine), it is unlikely that 25 percent of pit containers would be involved in an aircraft crash or that a sustained fire could occur.

Considering these many conservative assumptions, which could not be quantified, the actual risk associated with aircraft crash is probably much less than the point estimates presented in this document. Similarly, the actual radiological doses resulting from the aircraft accident scenarios are expected to be much less than those presented in section 4.14, Human Health.

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4.16 Intersite Transportation of Nuclear and Hazardous Materials

4.16.1 Affected Environment

Under the Proposed Action or any of the Alternatives the transfer of hazardous material between DOE and Department of Defense (DOD) sites, including nuclear explosives, nuclear components, high explosive(s) (HE), and radioactive wastes would be required. This section discusses the current intersite hazardous material transportation activities related to Pantex Plant. Radiological impacts are emphasized. Nonradiological impacts (i.e., Safe Secure Tractor Trailer [SST] vehicle exhaust) will not be considered; SST traffic will contribute less then one-tenth of 1 percent of the baseline vehicle traffic in the vicinity of Pantex Plant. Appendix F, Transportation Risk Analysis, provides detailed background information on transportation activities.

4.16.1.1 *Radioactive Material Shipments*

Intersite transportation of radioactive materials is governed by the requirements of DOE orders and Nuclear Regulatory Commission and Department of Transportation (DOT) regulations (Code of Federal Regulations [CFR] Titles 10 and 49). The Transportation and Staging Operations Department is responsible for transfers of tritium reservoirs to the Amarillo International Airport. The Transportation Safeguards Division (TSD) is responsible for coordinating offsite transfers of nuclear explosives and nuclear explosive components. The Waste Operations Department is responsible for offsite transfers of radioactive wastes and the Traffic Section of the Packaging and Shipping Department is responsible for coordinating offsite shipments of hazardous material by commercial carriers.

Intersite highway transportation of weapons, nuclear explosive-like assemblies, and weapons components is conducted by the DOE TSD using SSTs. Nuclear explosive-like assemblies not containing plutonium may be transported by air. SSTs are similar in appearance to commercial tractor-trailers but are equipped with unique safety and safeguard features that prevent unauthorized cargo removal and minimize the likelihood of an accidental radioactive material release. SSTs are also equipped with a robust tiedown and restraining system to prevent cargo movement during shipment.

Intersite shipment of tritium reservoirs is conducted by air, or infrequently, by SST. Hardened trailers are used to transport tritium reservoirs between Pantex Plant and the Amarillo Airport. Hardened trailers are similar in design to SSTs. Under contract with DOE and utilizing DOE aircraft, a contractor provides air transportation and related management services in support of the U.S. nuclear weapons program. One of the contractor's main functions is to transport tritium reservoirs to various locations throughout the continental U.S.

Offsite transfers of radioactive wastes and depleted uranium (DU) are performed by commercial trucks. These transfers are conducted in full compliance with Titles 10 and 49 of the CFR, which contain packaging requirements for intersite radioactive material transfers. These requirements are categorized based on the potential hazard of the material being shipped, which, in turn, is based on the type, quantity, and form of the radionuclide(s) being shipped.

Packaging refers to a container and all accompanying components or materials necessary to maintain confinement of radioactive material. For low potential hazard radioactive material, a DOT Type A packaging, designed to retain its contents under normal transportation conditions, is required. For higher potential hazard materials, such as weapons components, a DOT Type B packaging is required. Type B packages must meet all of the requirements for Type A packages as well as the requirement to prevent the release of radioactive material under all credible accident conditions. These conditions include the following:

- A 9-meter (30-foot) drop onto an unyielding surface.
- A dynamic crush test consisting of a drop of a 500-kilogram (1,100 pound) mass from 9 meters (30 feet) onto the container.
- A puncture test consisting of a free drop (greater than 102 centimeters [40 inches]) onto a 15-centimeter (6-inch) diameter steel pin.
- A 30-minute thermal exposure at 800 degrees Celsius (1,475 degrees Fahrenheit).
- Immersion in water for 8 hours (for fissile materials packaging only).

Appendix F provides a discussion of pit containers currently in use or planned for use at Pantex Plant.

Nuclear Explosives

Intersite nuclear explosive transfers are required for the following reasons:

- Weapons currently stored at classified DOD facilities are returned to Pantex Plant for dismantlement.
- Weapons are returned to Pantex Plant from DOD facilities for testing, modifications, component replacement, or repairs.
- Weapons are returned to DOD facilities from Pantex Plant after completion of testing, modifications, component replacement, or repairs.
- Weapons are shipped between Pantex Plant and DOD sites for field testing of subsystems.

SSTs and weapon-specific handling gear (H-gear) containers are used for intersite transportation of nuclear explosives. For a bounding case weapons shipment, an external dose rate of 3 millirem per hour at the outside surface of the trailer has been measured. Typical weapon shipments produce a much lower dose rate. No measurable radiation exposure occurs within the tractor cab (PC 1995q). Certain types of nuclear explosives are transported as complete units and are attached to their H-gear containers. Nuclear warheads, however, are contained in system-specific H-gear packages. All H-gear is designed to allow secure tiedown within SSTs.

Fully assembled nuclear explosives arrive at and depart from Pantex Plant at Zone 4 West. Loading and unloading activities are discussed in section 4.12, Intrasite Transportation.

Plutonium Pits

As part of stockpile management activities at Pantex Plant, a limited number of pits are shipped to Los Alamos National Laboratory (LANL) for testing. Pits are transported intersite by SSTs in FL containers or other approved Type B packages. FL containers are double-containment stainless steel drums categorized as Type B shipping packages. The FL container has an outer steel containment drum (51 centimeters [22.5 inches] in diameter, 127 centimeters [50 inches] in height) and a stainless steel inner containment drum (35 centimeters [13.8 inches] in diameter, 97 centimeters [38 inches] in height).

When a shipment of pits to LANL is required, the pits are repacked into FL containers, within Zone 12, and sealed with a tamper-indicating device. The containers are loaded onto a pallet and driven by electric forklift to a loading dock within Zone 12. The containers are loaded and secured into an SST and driven to LANL. Figure 4.16.1.1–1 shows the LANL delivery location with nearby access roads. Further operations involving pits at LANL will be discussed in the *Los Alamos Site-Wide Environmental Impact Statement.* The actual number of surveillance pit shipments from Pantex Plant is classified.

Canned Subassemblies

Canned subassemblies (CSAs) that may contain highly enriched uranium (HEU) and DU removed from dismantled weapons are shipped to the Y–12 Plant at the Oak Ridge Reservation (ORR) for prestorage processing and interim storage of nuclear material. CSAs are transported intersite by SSTs in DOT-criteria Type B packages including DT–23, DT–18, and DT–20. The number of CSAs shipped from Pantex Plant is classified. DOE has assessed the impacts of transporting CSAs to Y–12 in the *Environmental Assessment for the Interim Storage of Enriched Uranium at the Y–12 Plant* (DOE/EA–0919). A Finding of No Significant Impact was issued for this Environmental Assessment (EA) on September 14, 1995 (60 FR 54069).

When a shipment of CSAs is made from Pantex Plant, the containers, staged in an approved storage facility, are loaded onto a pallet and driven by electric forklift to a loading dock within Zone 12. These containers are loaded and secured into an SST that is then driven to the Y–12 Plant. CSAs staged in Zone 4 are loaded into SSTs at the storage magazine. The Y–12 Plant, which receives the uranium components from Pantex Plant, is located within the boundaries of ORR, near Knoxville, Tennessee. Figure 4.16.1.1–2 shows the location of ORR. Vehicular access to the Y–12 Plant is via Bear Creek Valley Road, a two-lane, paved State highway. Following this road, Interstate 40 is approximately 6 kilometers (4 miles) from the ORR site boundary and approximately 18 kilometers (11 miles) from the Y–12 Plant. Figure 4.16.1.1–3 shows the access roads to the Y–12 Plant. Arriving containers are unloaded and brought into a facility where a transfer check is performed. The transfer check confirms the identity and quantity of the shipment and verifies the integrity of the tamper-indicating devices on the containers.

Depleted Uranium

DU components removed from dismantled weapons are shipped to the Y–12 Plant at ORR for prestorage processing and interim storage. These shipments are made by commercial truck carriers using DOT Type A packaging and are made in full compliance with Titles 10 and 49 of the CFR. Table 4.16.1.1–1 presents the DU shipments for the years 1992–1994.

Tritium Reservoirs

Tritium reservoirs are shipped intersite for the following reasons:

- Depleted reservoirs removed from weapons are returned to the Savannah River Site (SRS) for reuse and recycling.

TABLE 4.16.1.1–1.—*Depleted Uranium Shipments from Pantex Plant*

YEAR	ROUTE	NUMBER OF SHIPMENTS	NUMBER OF COMPONENTS
1992	Pantex to ORR	20	2,119
1993	Pantex to ORR	13	794
1994	Pantex to ORR	4	857

Source: PC 1995p:1

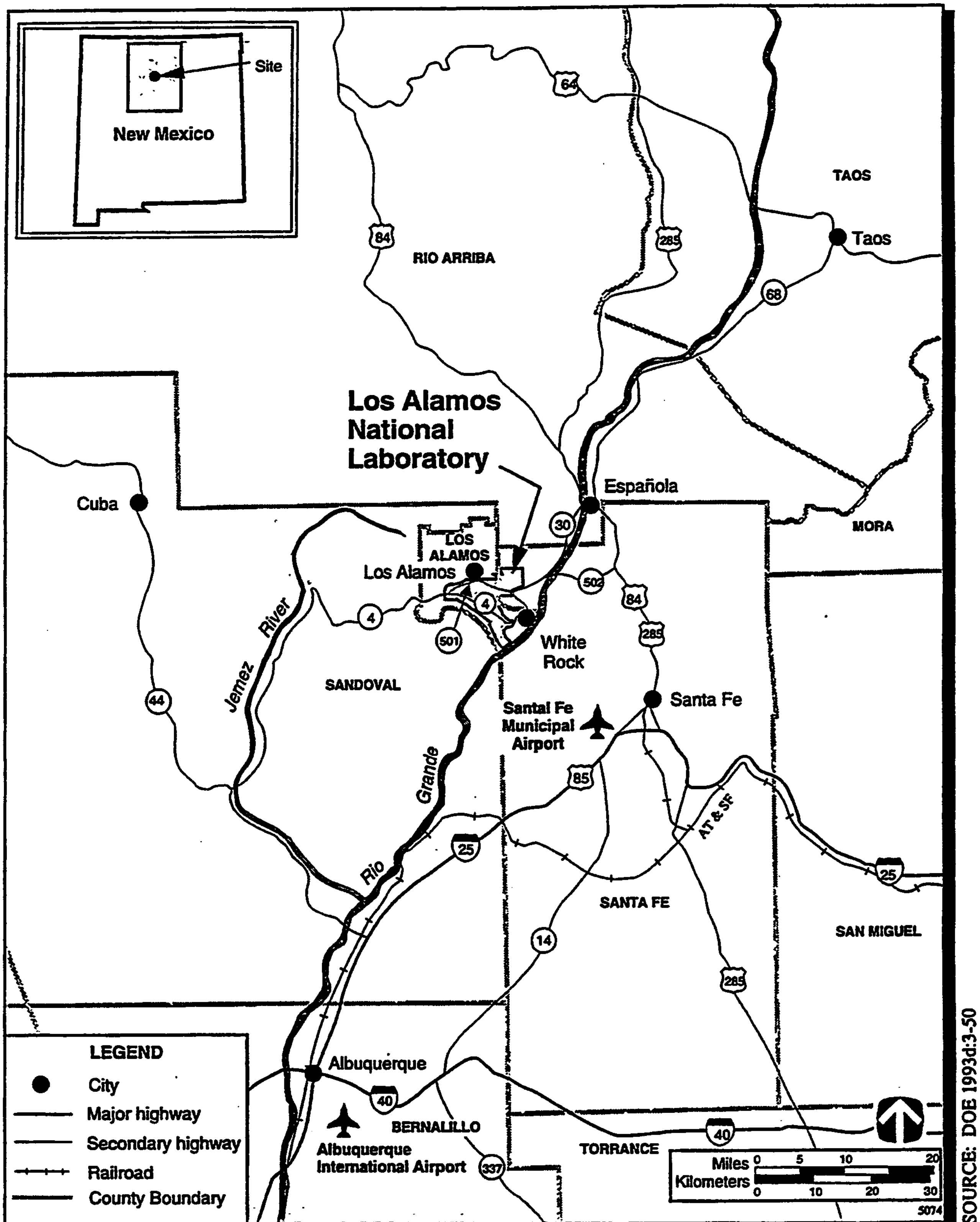


FIGURE 4.16.1.1–1.—*Los Alamos National Laboratory Delivery Location with Nearby Access Roads.*

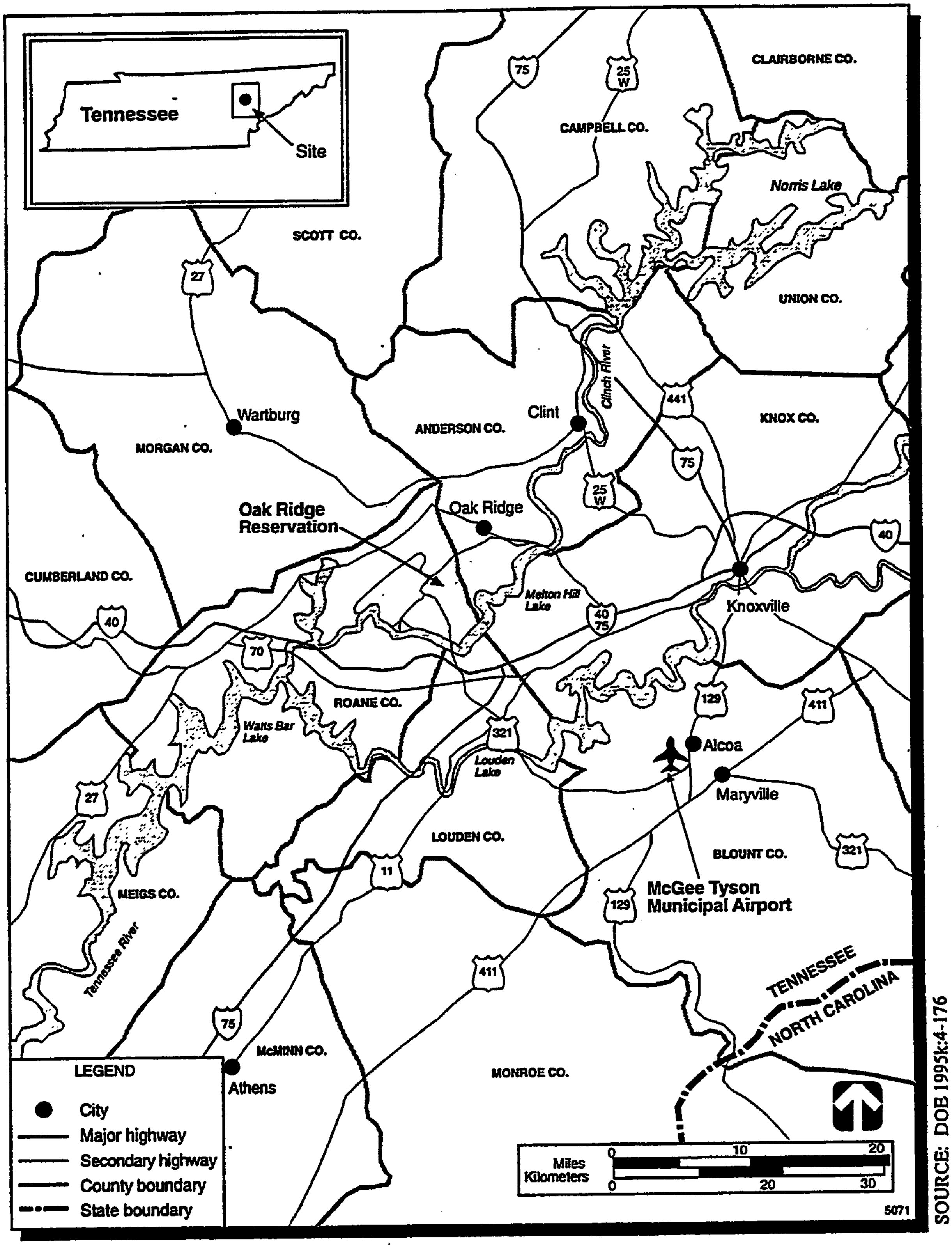
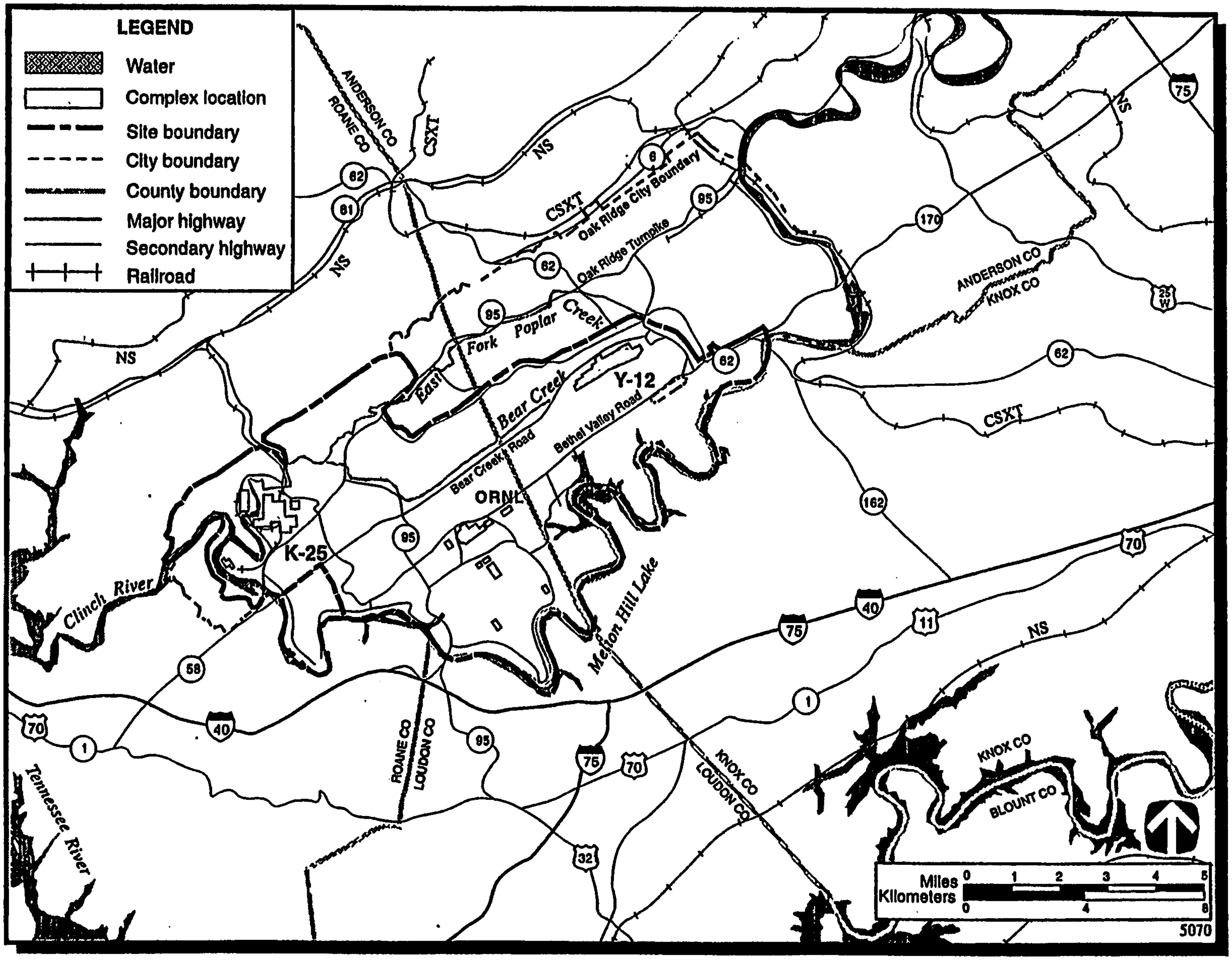


FIGURE 4.16.1.1–2.—*Oak Ridge Reservation, Tennessee, and Region.*



SOURCE: DOE 1995k:4-177

FIGURE 4.16.1.1–3.—*Access Roads to the Y–12 Plant at Oak Ridge Reservation.*

- Filled reservoirs are shipped from SRS to Pantex Plant for installation in weapon systems.

Tritium reservoirs are transported intersite by air or by highway, in SSTs. Tritium reservoirs are shipped in H1616 containers, which are DOT-approved Type B packages. The H1616 container has an outer drum of stainless steel that is 41.65 centimeters (16.4 inches) in diameter and an inner containment vessel made of stainless steel that is 31 centimeters (12.11 inches) in diameter and 36 centimeters (14.3 inches) in height. Tritium reservoirs within these containers do not pose an external radiation hazard.

When a shipment of depleted reservoirs is made from Pantex Plant by air, the H1616 container is loaded and sealed with a tamper-indicating device at the Tritium Staging Facility. The H1616 container is taken to a loading dock within Zone 12 and loaded and secured within a hardened trailer. The vehicle is driven from Pantex Plant to a "secure" terminal at the Amarillo International Airport where the container is removed from the vehicle, loaded aboard the aircraft, and secured; loading operations are performed under controlled conditions in secured areas at the Amarillo airport. The aircraft is flown to Bush Field in Augusta, Georgia where the H1616 containers are removed from the aircraft and loaded and secured within an SST or similar vehicle. This vehicle is driven to the H-area at SRS, where the package is unloaded. Table 4.16.1.1–2 summarizes air shipments of tritium reservoirs. Further operations with tritium reservoirs at SRS are discussed in the *Environmental Assessment, Tritium Loading Facility* (DOE 1986). Newly filled tritium reservoir transfers from SRS follow a reverse procedure.

The H-area is located approximately 16 kilometers (10 miles) within the northwestern site boundary of SRS. Bush Field is located outside of Augusta, Georgia and is approximately 32 kilometers (20 miles) northwest of the SRS boundary. Vehicular access to SRS from Bush Field is via either South Carolina Highway 125 or U.S. Highway 278. The closest Interstate highway access to SRS is Interstate 20, approximately 32 kilometers (20 miles) northwest of the site boundary.

Radioisotopic Thermoelectric Generator

Radioisotopic thermoelectric generators (RTGs) removed from dismantled weapons are shipped to LANL for prestorage processing and interim storage of nuclear material. RTGs are transported intersite by SSTs in DOT Type 6M containers. The Type 6M container is a DOT-criteria Type B package. The Type 6M container is a standard 37.85-liter (10-gallon), DOT-specification metal package. This package is constructed of 20-gauge carbon steel

TABLE 4.16.1.1–2.—*Pantex Tritium Reservoir Air Shipments, 1992–1994*

YEAR	ROUTE	NUMBER OF FLIGHTS	TOTAL RESERVOIRS PER YEAR
1992	SRS to Pantex	5	52
	Pantex to SRS	12	1,215
1993	SRS to Pantex	6	82
	Pantex to SRS	27	1,055
1994	SRS to Pantex	6	37
	Pantex to SRS	22	2,254

Source: PC 1994b:1

and measures about 33 centimeters (13 inches) in diameter and 61 centimeters (24 inches) in height.

When a shipment of RTGs is made from Pantex Plant to LANL, the Type 6M packages are loaded onto a pallet and transported by electric forklift to a loading dock within Zone 12 where the containers are loaded and secured within an SST. The SST is driven to LANL where it is brought into the TA–55 area. Further operations with RTGs at LANL will be discussed in the *Los Alamos Site-Wide Environmental Impact Statement.*

Low-Level and Low-Level Mixed Radioactive Wastes

Pantex Plant currently ships low-level radioactive materials and wastes by commercial carriers to the Nevada Test Site (NTS) in southern Nevada for ultimate disposition. These transfers are made in Type A packages in full compliance with all applicable DOT regulations. In the years 1992–1994, no shipments of radioactive waste from Pantex Plant have produced measurable radiation levels outside the shipment trailer. Table 4.16.1.1–3 presents the low-level waste shipments for the years 1992–1994.

Pantex Plant currently ships low-level mixed waste by commercial carriers for ultimate disposal at the Envirocare Disposal Facility approximately 129 kilometers (80 miles) west of Salt Lake City, Utah. These shipments are made in full compliance with all applicable DOT regulations. Table 4.16.1.1–3 presents the low-level mixed waste shipments for the years 1992–1994.

Transportation impacts associated with intersite transfers of radioactive wastes and alternatives to the current shipping practices are evaluated in the *Draft Waste Management Programmatic Environmental Impact Statement* (DOE 1995)and the Environmental Impact Statement for the Nevada Test Site and Offsite locations in the State of Nevada (DOE/RIS-0243).

4.16.1.2 *Offsite Radioactive Material Shipments*

Nuclear explosives and nuclear explosive components are shipped by SST to and from Pantex Plant. Transportation is conducted by the DOE TSD. Since its establishment in 1975, TSD has accumulated more than 119 million kilometers (74 million miles) of over-the-road experience in transporting DOE-owned cargo without any accidents that resulted in a release of radioactive material. The Pantex Plant *Safety Information Document* provides a listing of all accidents involving SSTs that involved fatalities or resulted in damage to the vehicle (Pantex 1996a). TSD has a liaison program through which it communicates with law enforcement and public safety agencies throughout the Nation, making them aware of TSD operations. The liaison program provides law enforcement officers information to assist them in recognizing TSD vehicles should they be involved in an accident, and deciding what

TABLE 4.16.1.1–3.—*Pantex Radioactive Waste Shipments*

YEAR	WASTE TYPE	NUMBER OF SHIPMENTS	VOLUME m^3 (ft^3)	DESTINATION
1992	LLW	5	119.70 (4,227)	NTS
1993	LLW	11	261.43 (9,232)	NTS
1994	LLW LLMW	28 1	609.81 (21,535) 32.6 (1,150)	NTS Envirocare

Source: PC 1995n

actions to take in conjunction with the actions of the couriers in the rig and escort vehicles.

TSD personnel are briefed on construction, congestion, and severe weather prior to travel. TSD will make every effort to alter a route or change the travel time to avoid potential traffic hazards.

TSD directs and manages an emergency management drill and exercise program that involves facility personnel, resources, and offsite elements. To stay proficient in all aspects of TSD convoy operations, TSD annually plans, implements, monitors, and performs follow-up analysis for couriers, known as in-service training (IST). For each iteration of IST, TSD invites participation from a State police agency. These police agencies train with TSD in all aspects of the program, but TSD's primary interest is in their participation in convoy tactical training with emphasis on law enforcement link-up in the case of an emergency. Both Arkansas and Missouri State Police are participating in the present (fiscal year [FY] 1996) IST program; Oklahoma and Arizona State Police participated in FY 1995, and the Texas Department of Public Safety participated in FY 1994.

TSD's emergency response plans involve a tiered organizational response to radiological incidents. In Tier 0, local law enforcement and TSD couriers assess the severity of the accident and determine the need for radiological assistance. Tier I involves the deployment of Radiological Assistance Teams, a Regional Response Coordinator, and Public Affairs Office personnel. These personnel have appropriate monitoring and communications equipment to assess the radiological status of the incident. At Tier II additional technical expertise is provided to the response group. At Tier III the accident response group will assist in recovery, repackaging, and decontamination operations. These four tiers correspond, respectively, to the following levels:

- 0—no structural damage and no potential for public controversy.
- I—status of unknown or limited damage.
- II—excessive damage of SST or shipment.
- III—radiological release cleanup/ repackaging required.

Additional national emergency response resources from around the Nation are available if the severity of an SST convoy incident warrants such a call. Further details on other Federal agency responsibilities in the event of a radiological emergency can be found in the Federal Radiological Emergency Response Plan (61 FR 20944).

SSTs used for intersite transportation are specially designed semi-trailers that use penetration resistance and delay mechanisms to prevent unauthorized cargo removal. SSTs provide thermal protection for cargo within the trailer. A robust tie-down and restraining system is provided to secure cargo within the trailer.

SSTs are accompanied by escort vehicles equipped with armed couriers, communication and electronics systems, radiological monitoring equipment, and other equipment to enhance safety and security. Redundant communication systems assure that intra-convoy communications and communications between each vehicle and the Security Communications System in Albuquerque, New Mexico, are maintained.

SSTs follow strict procedures during transport and are not allowed to travel when hazardous road conditions exist. When hazardous road conditions are anticipated enroute, the SST stops at a safe haven, usually a predetermined military installation. In addition, SSTs are limited to a maximum 89 kilometer-per-hour (55 mile-per-hour) speed limit, even if the posted limit is greater.

TSD operations are in compliance with the requirements of 49 CFR 177 for selecting, notifying drivers of, and adhering to preferred routes. The majority of TSD travel (90 percent) is over interstate highway; the remaining 10 percent is over routes that meet the conditions for deviating from the preferred route. Regulations permit deviation from the preferred route when safety or security requirements dictate such deviation.

Regulations permit TSD deviation from the requirements regarding notification of the routes used. Routes used are classified, compartmented information that may not be disseminated except to persons with appropriate security clearance and a need to know.

All SST crew members wear radiation dosimeters. Because of the nature of the material and the design of the containers, the transport of both nuclear explosives and plutonium/uranium weapons components has led to ionizing radiation doses to SST crew members. SST crew members are required to inspect the cargo within the trailer prior to shipment. This action is the primary contributor to dose for the crew. Table 4.16.1.2–1 provides the doses received from transport operations for the years 1992–1994.

4.16.1.3 *Intersite Shipments of High Explosive Material*

Intersite transportation of HE material is governed by the requirements of DOE orders and DOT regulations. HE material is packaged and shipped in compliance with applicable regulations by DOE courier, commercial carrier, or by a DOE-contracted air carrier. Highway shipments are performed using the most direct route on interstate and state highways. Air shipments are performed through the Amarillo International Airport. Air transport of Class 1.1 explosives is allowed under DOT exemption number DOT–E–1088J. However, Class 1.1 shipments are generally sent by truck.

Most intersite shipments of HE material since 1992 have been bulk shipments involving unprocessed raw material that is no longer needed for weapons production. This material is being sold to commercial end users. Only a very limited amount of raw HE is expected to be shipped to Pantex Plant during the years under evaluation in this EIS.

All other hazardous material shipments are transported via commercial carriers in full compliance with applicable DOT regulations. Pantex Plant type operations do not consume or produce large quantities of hazardous materials. Consequently, the risks associated with Pantex Plant related hazardous material shipments are no greater than those associated with other industrial facilities. Further information on the types and quantities of hazardous material shipments associated with Pantex Plant operations is available in the *Safety Information Document* (Pantex 1996a).

TABLE 4.16.1.2–1.—*DOE Transportation Safeguards Division Dosimeter History*

YEAR	CUMULATIVE DOSE (PERSON-REM)	NUMBER OF PERSONS MONITORED	MAXIMUM INDIVIDUAL DOSE (REM)
1992	0.059	314	0.018
1993	0.067	306	0.021
1994	0.158	297	0.088

Source: PC 1995m

Transferring the HE fabrication mission from Pantex to LANL or LLNL would require an estimated 150 rebuilds to be shipped per year from the HE fabrication site to Pantex. The public accident risk from transporting this material would be no greater than the risk encountered from industry's transport of similar explosives. Transferring all or part of the HE fabrication mission from Pantex to LANL or LLNL would require an estimated 12 round trips per year to transport HE materials, including the return of scrap HE to the laboratories.

4.16.1.4 *Alternative Pit Storage Locations*

If a Pit Storage Relocation Alternative is chosen, pits in DOT-criteria shipping containers will be shipped to other sites by SSTs. Since NTS, SRS, the Hanford Site, and the Manzano Weapons Storage Area (WSA) at Kirtland Air Force Base (KAFB) are being considered as alternative pit storage locations, these sites must have roads that allow for all-weather highway access by the SSTs. This section provides a brief description of the roadways leading to alternative pit storage sites. (SRS is described in section 4.16.1.1).

Nevada Test Site

NTS is located in southern Nevada, approximately 105 kilometers (65 miles) northwest of Las Vegas. Interstate 15 is the major regional access road for NTS. Interstate 15 connects San Diego, California to Salt Lake City, Utah, passing through the Las Vegas metropolitan area. Vehicular access to NTS is provided by U.S. Route 95. The Mercury Highway is the primary route into NTS from U.S. Highway 95. Figure 4.16.1.4–1 shows the roadways in the vicinity of NTS.

Hanford Site

The Hanford Site is located in southeastern Washington State, northwest of the tri-cities of Richland, Kennewick, and Pasco. The tri-cities are linked to other regions of the country by interstate highways. Both Route 395 and Route 240, which crosses through the Hanford Site, connect with Interstate 90 to the north. The tri-city area is linked to other parts of the country via Interstate 82 and Route 12. Access to the Hanford Site is provided by Routes 240 and 24, which traverse the site. Figure 4.16.1.4–2 shows the roadways in the vicinity of the Hanford Site.

Manzano Weapons Storage Area

The Manzano WSA is located on KAFB, near Albuquerque, New Mexico. Interstate 40 and Interstate 25 provide access to the Albuquerque metropolitan area. KAFB can be accessed from Eubank or Wyoming Boulevard (from Interstate 40) or Gibson Boulevard (from Interstate 25). Figure 4.16.1.4–3 shows the roadways in the vicinity of KAFB.

4.16.2 Impacts of Proposed Action

Under the Proposed Action, DOE would continue to perform the following intersite transportation activities related to Pantex Plant:

- Nuclear weapon shipments between the Pantex Plant and DOD sites.
- Pit and RTG shipments between Pantex Plant and LANL.
- HEU component shipments between Pantex Plant and the Y–12 plant.
- DU shipments between Pantex Plant and the Y–12 Plant.
- Tritium reservoir shipments between Pantex Plant and SRS.

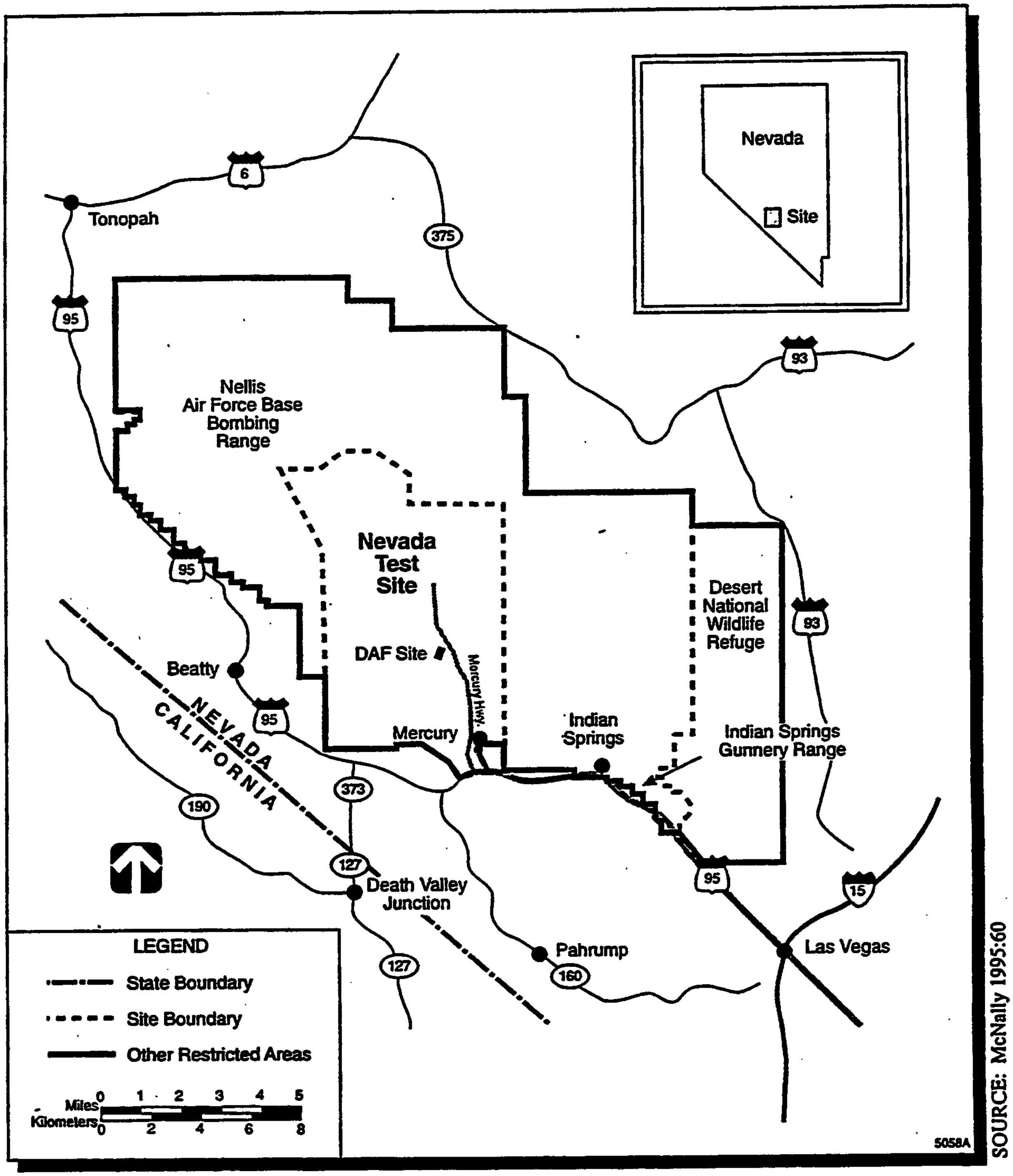
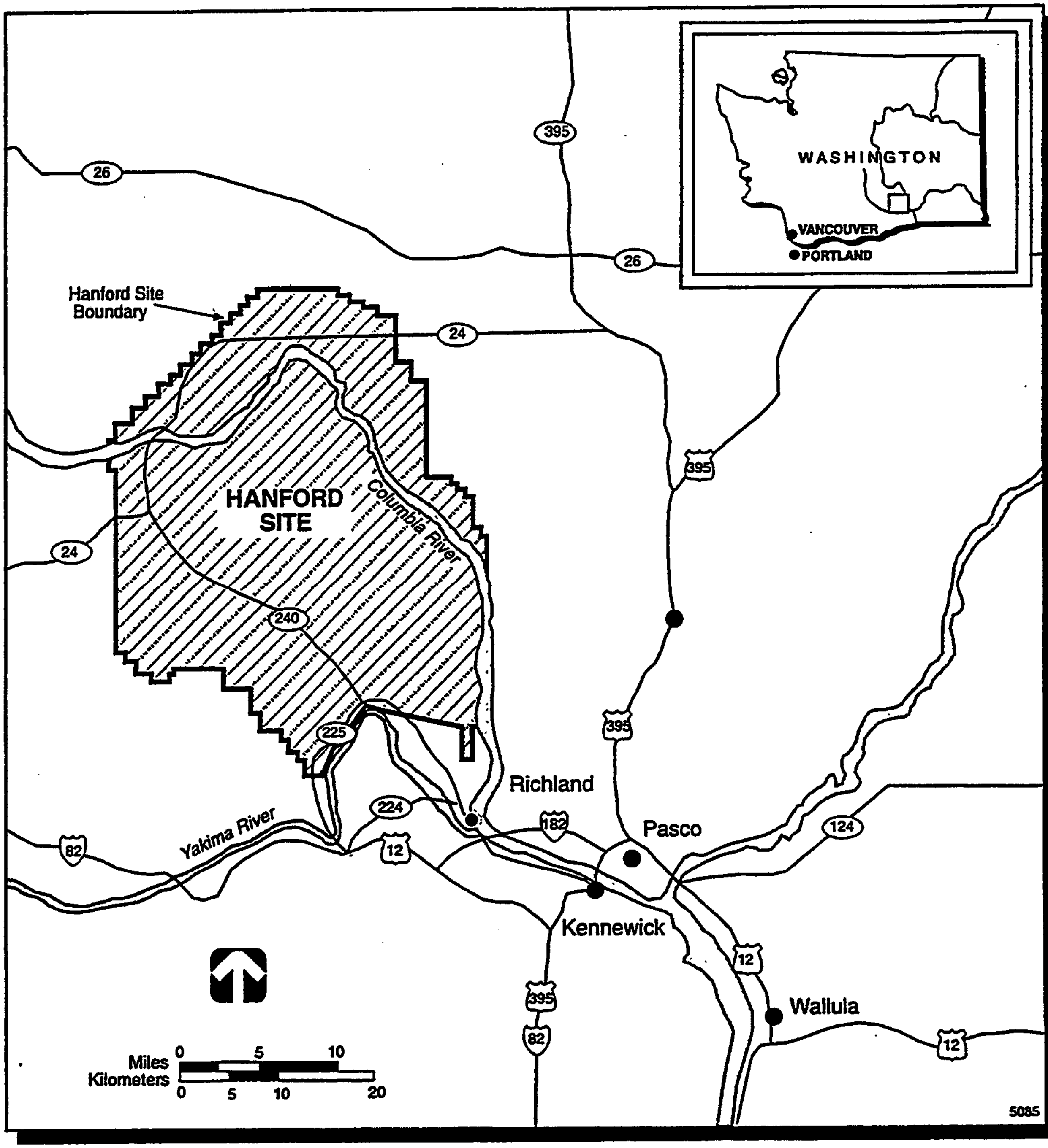


FIGURE 4.16.1.4–1.—*Roadways in the Vicinity of the Nevada Test Site.*



SOURCE: McNally 1995:103

FIGURE 4.16.1.4–2.—*Roadways in the Vicinity of the Hanford Site.*

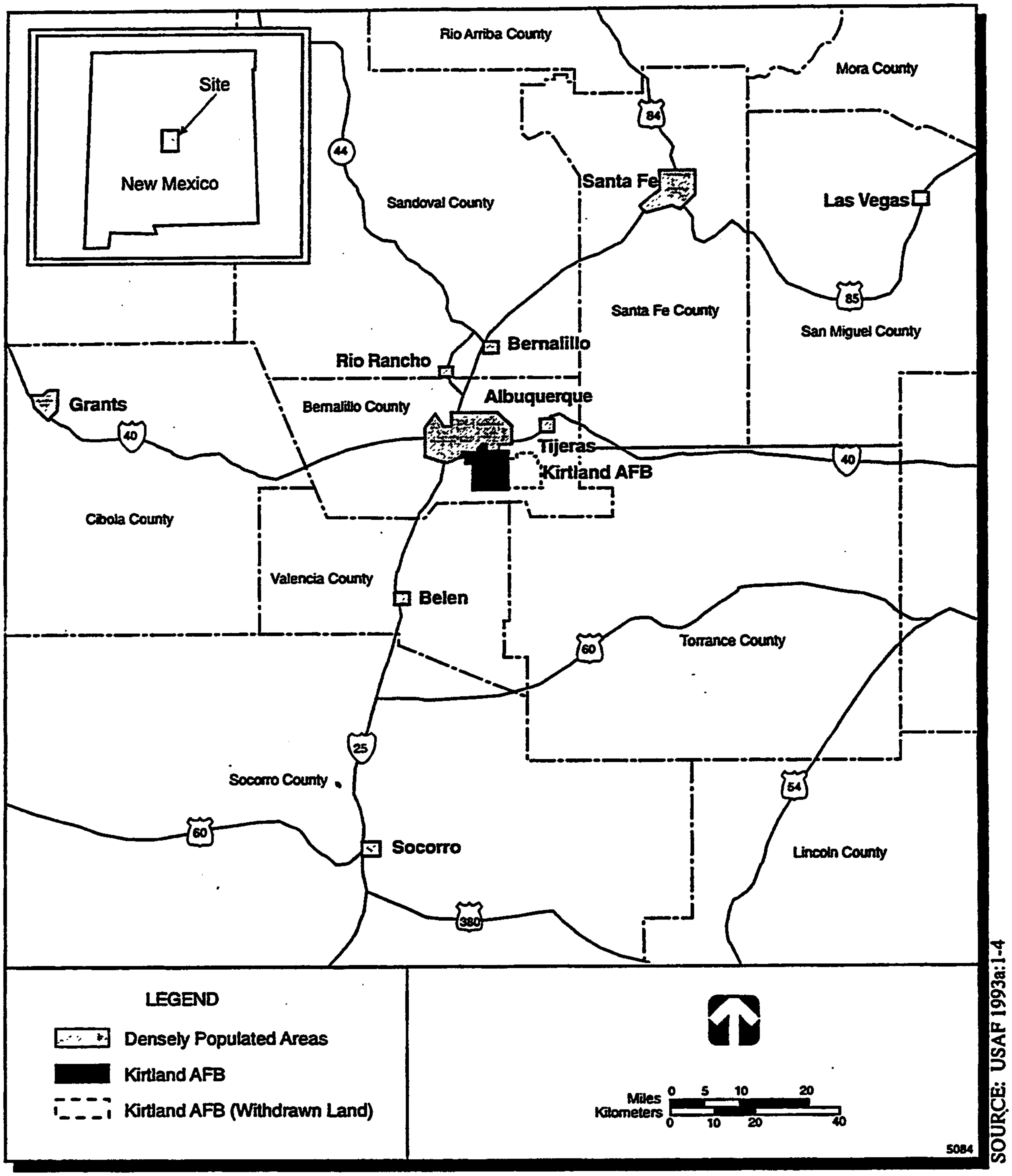


FIGURE 4.16.1.4–3.—*Roadways in the Vicinity of Kirtland Air Force Base.*

4.16.2.1 *Nuclear Weapon Shipments*

Human health impacts associated with weapon shipments include the radiological exposure of transport personnel and members of the general public as well as the potential release of radioactive material during an accident. The health risks associated with these shipments are evaluated in terms of the expected excess latent cancers (i.e., the number of cancers above those expected without any impacts from weapon shipments).

An analysis was performed using the Analysis of Risk Occurring in Transportation (ADROIT) code to determine the incident-free radiological impact to the public from intersite weapon shipments (a description of the ADROIT code is provided in appendix F). The ADROIT code utilizes the RADTRAN IV methodology to estimate incident-free exposures. This methodology is used to calculate the off-link exposure to persons adjacent to the transport route (e.g., residents); on-link exposure to persons sharing the transport route (e.g., passengers within passing vehicles); exposure to persons at stops (e.g., residents or truck crews not directly involved with the shipment); and maximally exposed members of the public. The exposures calculated for the first three groups are added together to estimate general population exposures for the 10-year period under evaluation in the EIS. The estimated radiation exposure to the public is provided in Table 4.16.2.1–1. Since the number of shipments between Pantex Plant and DOD sites is subject to change from the current schedule, Table 4.16.2.1–1 shows the impacts associated with possible changes from the base shipment schedule.

Approximately 20 percent of the general population is expected to develop a lethal cancer from all sources (NAP 1990). The incident-free impact from intersite weapons shipments is conservatively estimated to cause a maximum of 1.8×10^{-3} excess latent cancer fatalities (LCFs) in the exposed population on and along the roadways (for a 100 percent increase shipment scenario).

Intersite weapon shipments also pose a public health risk from potential severe accidents that could result in the dispersal of radionuclides from SSTs. The risk is the expected number of excess latent cancers caused by dispersal accidents. The ADROIT code calculates the public health risk from potential accidents involving SSTs carrying nuclear explosives and weapons components. The risk assessment implemented in the ADROIT code considers both the frequency and consequences of accidents resulting in severe impact, puncture, crush, and thermal environments. Probability of releases is developed based on event tree analysis. Consequences are evaluated through an assessment which integrates dispersal calculations, route characterization, population data, and dose-health effects models to provide an estimate of excess LCFs.

The accidental dispersal latent cancer risk is obtained by summing the risk (frequency times consequence) from potential accidents at different locations along individual weapon shipment routes. The dominant risk environments are highway accidents involving severe collisions and fires, particularly accidents involving very long duration fires. There is not a single, dominant scenario associated with risk significant events; instead, there is a collection of scenarios that constitutes the dispersal risk. These scenarios have the following characteristics:

- Accidents that involve either a severe collision and fire (such as a collision with a heavy truck or fixed object that also involves a fuel fire) or a very long duration fuel fire (such as an accident with a fuel tanker or train that involves a fuel fire).
- Accidents that result in a violent reaction of HE contained within a weapon.

TABLE 4.16.2.1–1.—*10-Year Impacts from Proposed Weapon Shipments*

SHIPMENT SCENARIO	PUBLIC EXPOSURE (PERSON-REM)[1]	MAXIMUM EXPOSED INDIVIDUAL (REM)	PUBLIC INCIDENT FREE RISK (EXPECTED NUMBER OF EXCESS LCFs)	PUBLIC ACCIDENT DISPERSAL RISK (EXPECTED NUMBER OF EXCESS LCFs FROM DISPERSAL ACCIDENTS)	CREW EXPOSURE (PERSON-REM)[2]	CREW INCIDENT FREE RISK (EXCESS CANCER FATALITIES)	EXPECTED NUMBER OF TRAFFIC FATALITIES
+100%	4.0	0.01	1.8×10^{-3}	1.6×10^{-6}	3.2	1.3×10^{-3}	1.2×10^{-2}
+ 50%	3.0	7.5×10^{-3}	1.4×10^{-3}	1.2×10^{-6}	2.4	1.0×10^{-3}	9.0×10^{-3}
+ 30%	2.6	6.5×10^{-3}	1.2×10^{-3}	1.0×10^{-6}	2.1	8.0×10^{-4}	7.8×10^{-4}
+ 10%	2.2	5.5×10^{-3}	1.0×10^{-3}	8.8×10^{-7}	1.7	6.6×10^{-4}	6.6×10^{-4}
Base Shipment Schedule	2.0	5.0×10^{-3}	9.0×10^{-4}	8.0×10^{-7}	1.6	6.0×10^{-4}	6.0×10^{-3}
-10%	1.8	4.5×10^{-3}	8.1×10^{-4}	7.2×10^{-7}	1.4	5.6×10^{-4}	5.4×10^{-4}
-30%	1.4	3.5×10^{-3}	6.3×10^{-4}	5.6×10^{-7}	1.1	4.4×10^{-4}	4.2×10^{-4}
-50%	1.0	2.5×10^{-3}	4.5×10^{-4}	4.0×10^{-7}	0.8	3.2×10^{-4}	3.0×10^{-3}

[1]Exposure calculations performed using a conservative external SST dose rate of 3.0 mrem/hr.
[2]Crew exposures based on past DOE TSD Dosimetry.

Given a very severe transportation accident, radioactive materials could be dispersed into the atmosphere and subsequently expose the general public in the vicinity of the accident to ionizing radiation. Table 4.16.2.1–1 presents radiological risks from dispersion accidents occurring during intersite weapon shipments. The accidental dispersal of radionuclides from these shipments is estimated to cause 1.6×10^{-6} excess LCF in the population along weapon shipment routes with a maximum annual individual excess LCF risk of 1×10^{-9}. The annual LCF risk from all causes for an individual in the U.S. is 2.2×10^{-3} (DOE 1995v:4-110). Table 4.16.2.1–1 also summarizes the expected number of traffic fatalities resulting from weapon shipments. Appendix F provides additional information on traffic fatality estimates.

4.16.2.2 *Plutonium Pits*

Human health impacts associated with plutonium pit shipments to LANL include the radiological exposure of transport personnel and members of the general public as well as the potential release of radioactive material during an accident. The ADROIT code calculates the impacts from both incident-free transport and potential accidents resulting from pit shipments between Pantex Plant and LANL. The incident-free transport of pits during the 10-year period under evaluation in the EIS will result in 2×10^{-5} excess LCFs in the exposed population on and along the roadways. Approximately 20 percent of the general population is expected to develop a lethal cancer from all sources.

The expected number of excess LCFs associated with potential accidents has been estimated as 2×10^{-9} with a maximum annual individual excess LCF risk of 5×10^{-13}. The annual LCF risk from all causes for an individual in the U.S. is 2.2×10^{-3}.

4.16.2.3 *Canned Subassemblies*

DOE has prepared an *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Storage Level at the Y–12 Plant, Oak Ridge, Tennessee*, DOE/EA-0929 (DOE 1994). The Environmental Assessment evaluates the environmental effects of transportation, prestorage processing, and interim storage of bounding quantities of enriched uranium at the Y–12 Plant over a 10-year period. Included in the sources for HEU is the continued shipment of retired weapons components, known as secondaries or CSAs, which are removed from nuclear weapons dismantled at Pantex Plant.

The Environmental Assessment analyzes the effects of shipping the maximum bounding quantities of HEU to the Y–12 Plant from numerous sources, including Pantex Plant. The 10-year collective dose to all transport workers under incident-free conditions was estimated to be 246 person-rem for all shipments of HEU, including those from Pantex Plant. The 10-year collective dose to the public from incident-free transportation was estimated to be 486 person-rem for all shipments of HEU, including those from Pantex Plant. DOE has determined that these impacts are not significant (DOE 1995v).

4.16.2.4 *Radioisotopic Thermoelectric Generators*

RTG Shipments from Pantex Plant to LANL will continue. These shipments do not significantly contribute to potential environmental impacts from intersite transportation because:

- An RTG within a transfer container does not present an external radiological hazard.
- RTGs are constructed in such a way that an accidental release of plutonium is not a reasonably foreseeable event in the transportation environment. RTGs are

able to withstand an exposure of 1000 °C (1,832 °F) for 1 hour or an impact of 571 kilometers (355 miles) per hour on a steel surface with no plutonium release.

- RTGs are transported intersite in Type B packages, which further decrease the risk associated with their transport.

4.16.2.5 *Depleted Uranium*

Shipments of DU from Pantex Plant to the Y–12 Plant do not significantly contribute to potential environmental impacts from intersite transportation because DU does not produce an external radiological hazard. Moreover, the inhalation hazard of DU in the event of an accident is significantly less than that posed by other radionuclides shipped intersite (DOE 1988).

4.16.2.6 *Tritium Reservoirs*

Human health impacts associated with tritium reservoir shipments involve the potential for accidental dispersion of tritium due to reservoir failures during transfer. The ADROIT code calculates the public health risk from potential accidents involving aircraft carrying tritium reservoirs. The dominant risk environment is accidents at or near an airport that involve severe crashes and/or fires. The expected number of excess LCFs associated with potential accidents is estimated to be 4×10^{-8} (8×10^{-8} for a 100-percent increase shipment scenario) with a maximum individual annual cancer risk from tritium reservoir shipments of 9×10^{-11}. The annual LCF risk from all causes for an individual in the U.S. is 2.2×10^{-3}.

4.16.3 Impacts of No Action Alternative

Because of the uncertainty in predicting the number of future weapon shipments related to stockpile management, the potential environmental impacts from the No Action Alternative are bound within those presented for the Proposed Action. Even though dismantlement shipments would cease under No Action, other shipments related to stockpile management may increase.

INTERSITE TRANSPORTATION IMPACTS

- *The additional intersite shipment of 20,000 pits will increase the radiological impact to the public from 4.0 person-rem to a maximum of 7.0 person-rem over the period covered by the Proposed Action.*
- *The additional intersite shipment of 20,000 pits will increase the dispersal risk (i.e., the risk to public health from accidental releases of radioactive material) from 1.7×10^{-6} LCFs to 2.2×10^{-6} LCFs, a 29 percent increase over the Proposed Action.*
- *All intersite transportation alternatives meet the DOE Safety Policy of a cancer risk from radiological accidents of less than one-tenth of 1 percent above background cancer rates.*

4.16.4 Impacts of Pit Storage Relocation Alternative

4.16.4.1 *Impacts of Relocating 20,000 Pits*

Under this option, up to 20,000 pits would be relocated from Pantex Plant to one of three candidate storage sites: NTS, Manzano WSA at KAFB, or SRS.

Human health impacts associated with plutonium pit shipments to alternative storage sites include the radiological exposure of transport personnel and members of the general public as well as the potential release of radioactive material during an accident. The ADROIT code calculates the impacts from both incident-free transport and potential accidents resulting from pit shipments between Pantex Plant and the alternative pit storage sites. Table 4.16.4.1–1 summarizes the impacts associated with shipments of 20,000 pits.

The incident-free transport of pits would result in a maximum of 1.5×10^{-3} excess LCFs in the exposed population on and along the roadways. The baseline cancer fatality incidence in the general public is 20 percent.

The public risk from dispersal accidents is the expected number of latent cancers caused by accidents involving the dispersal of radionuclides from SSTs. Given a very severe transportation accident, radioactive materials could be dispersed into the atmosphere and subsequently expose the general public in the vicinity of the accident to ionizing radiation. Table 4.16.4.1–1 presents radiological risks from dispersion accidents occurring during intersite weapon shipments. The accidental dispersal of radionuclides from these shipments is estimated to cause 5×10^{-7} excess LCFs in the population along the pit shipment routes with a maximum annual individual excess LCF risk of 1×10^{-10} for the SRS alternative. The annual LCF risk from all causes for an individual in the U.S. is 2.2×10^{-3}.

4.16.4.2 *Impacts of Relocating 8,000 Pits*

Under this option, 8,000 pits would be relocated from Pantex Plant to one or more of four candidate storage sites: NTS, SRS, Hanford Site, and Manzano WSA at KAFB.

Table 4.16.4.2–1 summarizes the impacts associated with 8,000 pit shipments. Impacts related to loading or unloading pits into SSTs are discussed in Section 4.12, Intrasite Transportation.

The incident-free transport of pits would result in a maximum of 6×10^{-4} excess LCFs in the exposed population on and along the roadways.

TABLE 4.16.4.1–1.—*Radiological Exposure and Health Risk from 20,000 Pit Shipments from Pantex Plant to Other Potential Sites*

GENERAL PUBLIC	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WSA
Cumulative Dose (Person-Rem)[1]	2.0	3.0	NA	0.5
Maximally Exposed Individual (rem)	4×10^{-3}	4×10^{-3}	NA	4×10^{-3}
Expected Excess LCFs from Incident Free Impacts	1×10^{-3}	1.5×10^{-3}	NA	2.5×10^{-4}
Expected Excess LCFs from Plutonium Dispersal Accidents	4×10^{-7}	5×10^{-7}	NA	4×10^{-8}
Maximum Annual Individual LCF Risk from Dispersal Accidents	4×10^{-11}	1×10^{-10}	NA	1×10^{-11}

[1] Using a dose rate of 1 mrem/yr at 1 meter from the surface of the trailer.
NA - Not Available

TABLE 4.16.4.2–1.—*Radiological Exposure and Health Risk from 8,000 Pit Shipments from Pantex Plant to Other Potential Sites*

GENERAL PUBLIC	NEVADA TEST SITE	SAVANNAH RIVER SITE	HANFORD SITE	MANZANO WEAPONS STORAGE AREA
Cumulative Dose (Person-Rem)	0.80	1.2	1.2	0.20
Maximally Exposed Individual (rem)	1.6×10^{-3}	1.6×10^{-3}	1.6×10^{-3}	1.6×10^{-3}
Expected excess LCFs from Incident Free Impacts	4.0×10^{-4}	6.0×10^{-4}	6.0×10^{-4}	1.0×10^{-4}
Expected excess LCFs from Plutonium Dispersal Accidents	1.6×10^{-7}	2.0×10^{-7}	3.2×10^{-7}	1.6×10^{-8}
Maximum Annual Individual LCF Risk from Dispersal Accidents	4.0×10^{-11}	1.0×10^{-10}	1.0×10^{-10}	1.0×10^{-11}

The public risk from dispersal accidents is the expected number of latent cancers caused by accidents involving the dispersal of radionuclides from SSTs. The accident scenarios analyzed here have the following characteristics:

- Accidents that involve either a severe collision and fire (such as a collision with a heavy truck or fixed object that also involves a fuel fire) or a very long duration fuel fire (such as an accident with a fuel tanker or train that involves a fuel fire).
- Accidents that result in a fire-driven dispersal.

Given a very severe transportation accident, radioactive materials could be dispersed into the atmosphere and subsequently expose the general public in the vicinity of the accident to ionizing radiation. Table 4.16.4.2–1 presents radiological risks from dispersion accidents occurring during intersite weapon shipments. The accidental dispersal of radionuclides from these shipments is estimated to cause a maximum of 3.2×10^{-7} excess LCFs in the population along pit shipment routes with a maximum annual individual excess LCF risk of 1×10^{-10} for the Hanford Site and SRS alternatives. The annual LCF risk from all causes for an individual in the U.S. is 2.2×10^{-3}.

4.16.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

Pantex Plant-related transportation impacts result in a small increase in cumulative exposures from nationwide radioactive material shipments. Under the Proposed Action, Pantex Plant-related intersite transportation activities will result in a maximum annual collective dose to SST crews of 0.32 person-rem (3.2 person-rem for 10 years of operations) and a maximum annual collective general population dose of 0.40 person-rem (4.0 person-rem for ten years of operation).

The U.S. Nuclear Regulatory Commission evaluated radiological impacts for transportation of radioactive material categories unrelated to Pantex Plant activities. These categories include: limited quantity shipments, medical, industrial, fuel cycle, and waste. The transportation of these materials results in an annual collective worker dose of 5,600 person-rem. The annual collective general population dose for these shipments was estimated to be 4,200 person-rem.

Other studies of radioactive material transportation in the U.S. have been performed. Weiner et al. (1991) evaluated eight categories of radioactive material shipments by truck, including, industrial, radiography, medical, fuel cycle, research and development, unknown, waste, and other. Based on a median external exposure rate, an annual collective worker dose of 1,400 person-rem and an annual collective general population dose of 1,400 person-rem were estimated.

Weiner et al. (1991) also evaluated six categories of radioactive material shipments by plane: industrial, radiography, medical, research and development, unknown, and waste. Based on a median external exposure rate, an annual collective worker dose of 290 person-rem and an annual collective general population dose of 450 person-rem were estimated.

Pantex Plant-related transportation impacts result in a small increase in cumulative exposures from other reasonably foreseeable DOE transportation activities. Proposed projects that involve extensive transportation of radioactive materials include shipments of high-level radioactive waste to a geologic repository, shipments of transuranic waste to the Waste Isolation Pilot Plant, and DOE spent nuclear fuel regionalization by fuel type.

For the assumed geologic repository at Yucca Mountain, Nevada, the transportation impacts include a worker collective dose for truck shipments of 8,600 person-rem and a general population collective dose from truck shipments of 48,000 person-rem (DOE 1986).

For the Waste Isolation Pilot Plant, the transportation impacts include a worker collective dose from truck shipments of 1,900 person-rem and a general population collective dose from truck shipments of 1,500 person-rem (DOE 1990).

For the regionalization of DOE spent nuclear fuel by fuel type, the transportation impacts include a worker collective dose of 417 person-rem for the 40-year shipment campaign and a general population collective dose of 910 person-rem for the 40-year shipment campaign.

The determination of past transportation impacts is difficult because of the lack of historical shipping information. However, based on the projected impacts of Pantex Plant activities, along with the similarity of future activities with those of the past (excluding pit shipments between Pantex Plant and the Rocky Flats Plant, it is estimated that the impact from past Pantex Plant-related shipments were no more than 10 person-rem per year. Assuming 46 years of operation, past activities resulted in less than 0.23 excess LCFs.

4.16.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

The WM PEIS analyzes a range of alternatives, including waste shipments by rail and truck. These shipments included a range of 0 to 470 truck shipments and 0 to 200 rail shipments of

LLMW/LLW. Impacts to the offsite Maximally Exposed Individual are provided in section 4.14.5.1 (Human Health).

4.16.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability; and Relocate Capability. Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, impacts from intersite transportation activities are expected to be less than current impacts. Under the downsizing alternative, the facilities would be consolidated; however, this would not result in a reduction of intersite transportation impacts from those of the No Action Alternative. Under the Relocation Alternative, intersite transportation associated with assembly and disassembly operations and HE fabrication at Pantex Plant would cease.

4.16.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. If Pantex Plant is chosen as the collocation site, weapons-usable fissile materials would be transported from existing storage sites to Pantex Plant. The transportation health effects were calculated, and the potential fatalities would be 0.461.

For the Disposition Alternatives, because the emphasis at this stage in the decision process is on choosing the technology rather than the actual site, the cumulative impacts discussion is qualitative and necessarily imprecise, particularly for the generic sites. The evolutionary Light Water Reactor was chosen as the bounding alternative for disposition. Implementation of this Disposition Alternative would require construction and operation of the pit disassembly/conversion facility, the plutonium conversion facility, and the mixed oxide fuel fabrication facility. The bounding alternative also assumes that all facilities previously mentioned would be collocated at the same site. The potential fatalities from transporting materials for disposition would be 5.64 (DOE 1996a:chapter 4).

4.17 ENVIRONMENTAL JUSTICE

4.17.1 Affected Environment

Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations,* directs Federal agencies to address the environmental justice impacts of their actions on minority and low-income populations. Each Federal agency must analyze environmental effects, including human health, economic, and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA.

The Region of Influence (ROI) around Pantex Plant in which the target populations covered by the Executive Order were examined is an 80-kilometer (50-mile) radius circle centered in the southwest corner of Zone 4 of Pantex Plant. As noted in sections 4.11.1.1 and 4.11.1.2, which address socioeconomic resources, nearly all minority and low-income persons in the four-county socioeconomic ROI around Pantex Plant were found to reside in the Amarillo urbanized area in 1990. The ROI utilized for the environmental justice analysis extends beyond the four-county socioeconomic ROI, but in this larger area also, most minority and/or low-income persons were found in 1990 to be residing in the Amarillo urbanized area.

According to the 1990 Census, there were 267,107 persons within the Pantex Plant ROI. White persons comprised nearly 81 percent of the population, Hispanics were the second largest group with 13 percent, and Blacks accounted for just over 4 percent of the total population. American Indians, Asians, Pacific Islanders and other racial groups totaled slightly more than 2 percent of the population within the ROI (UN 1995).

Most of the population in the ROI resides in various cities and towns (Figure 4.17.1–1). Amarillo is the most populous city with 157,615 persons in 1990; overall, 23 percent of Amarillo's population were minority persons and 17 percent of all persons were below the poverty level. The town of Pampa, about 56 kilometers (35 miles) northeast of Pantex Plant, is the second largest community in the area, with a 1990 population of 19,959, nearly 15 percent of which was minority and 14 percent of which was below the poverty level. Forty kilometers (25 miles) north of the plant is the town of Borger, with 15,675 persons in 1990; over 18 percent of Borger's residents in 1990 were minority and 15 percent were below the poverty level.

Dumas is about 68 kilometers (42 miles) northwest of Pantex Plant and its 1990 census count was 12,871 persons; more than 30 percent of this town's population was minority and 12 percent was below the poverty level. Canyon, approximately 48 kilometers (30 miles) southwest of Pantex Plant, had 11,365 persons in 1990; nearly 14 percent of this population was minority persons and 17 percent was below the poverty level. The towns of Clarendon, Claude, Panhandle, and White Deer had 1990 populations ranging between 1,125 and 2,353, with none having more than 10 percent minority population. The remainder of the 1990 population within the ROI, approximately 43,000 persons, lived on farms and ranches and in communities with fewer than 1,000 persons (TX Cen 1992a:Table 6; TX Cen 1993:Table 178).

The analysis of environmental justice presented in this section is based on the definitions of minority and low-income populations as contained in the notice of the Environmental Protection Agency's (EPA's) Office of Environmental Justice (59 FR 192). These definitions call for identification of Census tracts where 25 percent or more of the persons in 1990 were either minority group members or below poverty level based on their income in 1989. For comparison purposes, definitions of minority and low-income populations as

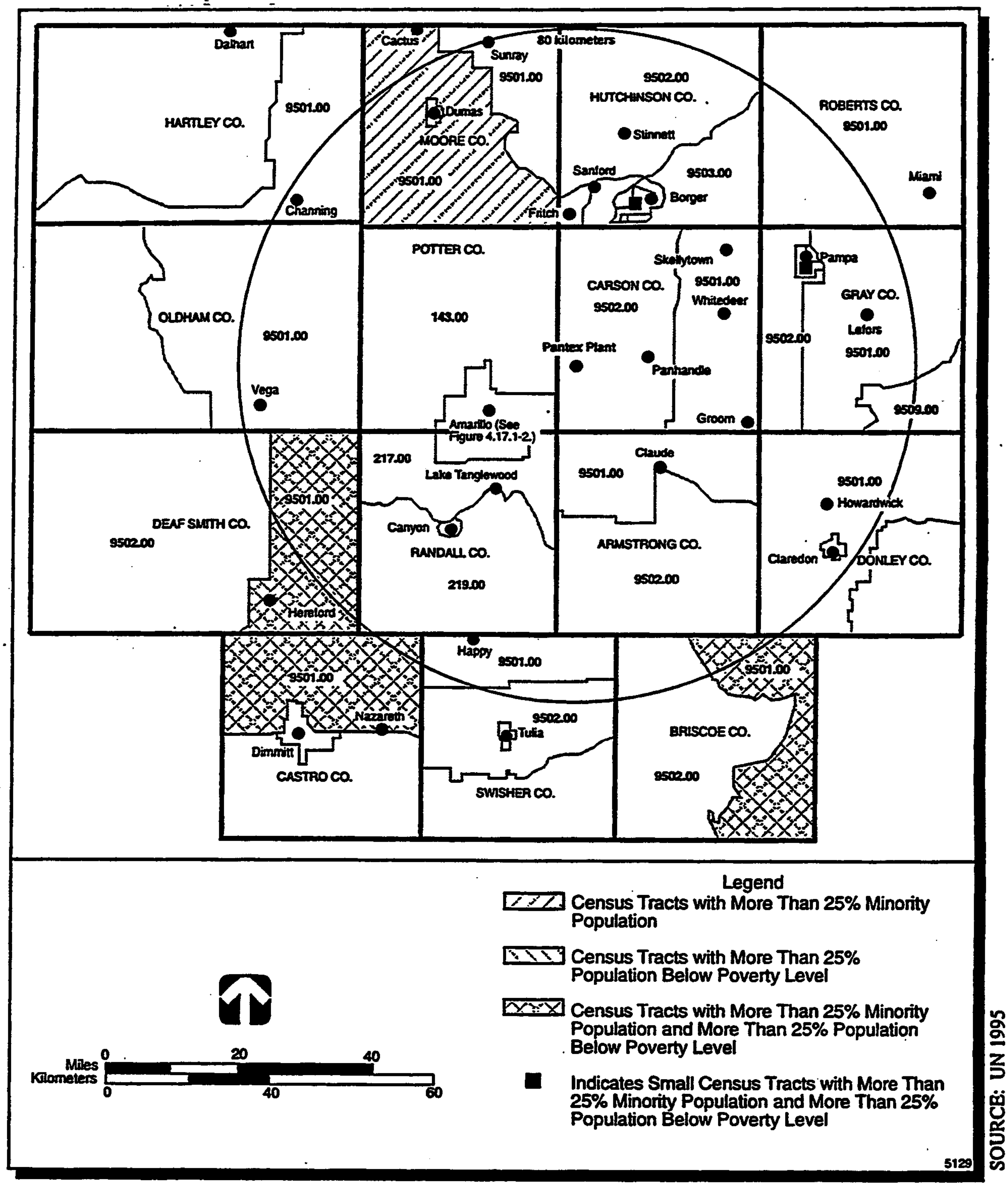


FIGURE 4.17.1–1.—*Minority and Low-Income Populations in the Pantex Plant Region of Influence, 1990.*

provided by the Council on Environmental Quality (CEQ) in April 1996 (CEQ 1996), and also reported in EPA's Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis (EPA 1996a), were also applied to the 1990 Census data. Earlier EPA guidelines (59 FR 192), used in the following discussion, identified more Census tracts with minority and low-income populations than the CEQ or later EPA guidelines (EPA 1996a). Therefore, the impacts identified in the subsequent analysis in this document are more conservative (greater) than would have been the case if CEQ guidelines were applied.

The CEQ guidelines define minority populations as an area where either the minority population of the affected area (in this case, the Census tract or Block Numbering Area [BNA]) exceeds 50 percent or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (in this case, the ROI). Using the 50 percent criterion, only 10 Census tracts (all in the Potter County portion of the Amarillo Metropolitan Area) fall in the minority category. The second criterion of minority population being meaningfully greater than the regional average was defined as the average minority population plus one standard deviation that resulted in a minority population greater than 28.5 percent. Application of this criterion resulted in the identification of 19 Census tracts with meaningfully greater than average minority populations. In both cases, fewer than 23 tracts were identified with the application of EPA definition. If the CEQ guidelines are applied, the impacts on minority populations would be lower than those identified in this document.

The CEQ guidelines were also applied to the low-income populations. With the application of the first criterion using the U.S. Department of Health and Human Services definition, the affected Census tracts were reduced from 27 to 14 (12 in Potter County portion of the Amarillo Metropolitan Area and one each in the towns of Borger and Pampa). The number of Census tracts with low-income populations remained at 14 when the U.S. Department of Housing and Urban Development definition was applied. Once again, the definition applied in the present analysis on subsequent pages is more conservative (resulting in 27 Census tracts with low-income populations), and the impacts on low-income populations would be substantially lower if CEQ guidelines were applied.

Table 4.17.1–1 presents the 1990 Census counts of minority and low-income populations found in the rural BNAs wholly or partially within the ROI. Figure 4.17.1–1 identifies the BNAs where 25 percent or more of the persons, in 1990, were either minority group members or below the poverty level based on their incomes in 1989.

Figure 4.17.1–1 shows that 10 of the rural BNAs within the Pantex Plant ROI exceed the 25 percent thresholds for concentrations of minority and low-income persons. Most of the 10 areas are located in the outer reaches of the ROI, or more than 48 kilometers (30 miles) from Pantex Plant. Only small portions of the BNAs with minority and low-income populations in Briscoe and Castro Counties fall within the ROI. The community of Dumas in Moore County, northwest of the plant, and the rural area in the immediate vicinity of Dumas have resident populations that are more than 25 percent minority. BNA 9508, in the town of Borger in Hutchinson County due north of the plant, also has a more than 25 percent minority population. The remaining six BNAs, represent areas in which both minority and low-income populations have higher than 25 percent concentration.

Figure 4.17.1–2 presents the concentration of minority and low-income populations in the Amarillo metropolitan area, which extends across the Potter/Randall County line. Table 4.17.1–2 presents the 1990 Census counts of

TABLE 4.17.1–1.—*Minority and Low-Income Populations in Rural Areas Within the Pantex Plant Region of Influence, 1990*

COUNTY/BLOCK NUMBERING AREA	TOTAL POPULATION	MINORITY POPULATION	PERCENT OF TOTAL POPULATION	NUMBER OF PERSONS BELOW POVERTY LEVEL	PERCENT OF TOTAL POPULATION
Armstrong County					
BNA 9501	568	15	2.6	85	14.8
BNA 9502	1,453	55	3.8	147	10.6
Briscoe County (part)					
BNA 9501	674	178	26.4	206	30.7
BNA 9502	1,297	261	20.1	309	23.8
Carson County					
BNA 9501	2,907	128	4.4	231	8.1
BNA 9502	3,669	290	7.9	352	9.7
Castro County (part)					
BNA 9501	1,405	419	29.8	369	26.4
Deaf Smith County (part)					
BNA 9501	3,074	1,437	46.7	843	27.7
BNA 9502	1,175	231	19.7	176	15.8
Donley County (part)					
BNA 9501	789	12	1.5	132	16.9
BNA 9502	2,095	198	9.5	425	22.2
Gray County (part)					
BNA 9501	1,574	76	4.8	187	12.2
BNA 9502	1,083	59	5.4	13	1.2
BNA 9503	4,607	202	4.4	183	3.9
BNA 9504	5,222	353	6.8	253	5.0
BNA 9505	2,818	383	13.6	398	13.8
BNA 9506	2,890	771	26.7	793	28.4
BNA 9507	2,683	397	14.8	517	21.0
BNA 9508	1,939	864	44.6	680	32.6
BNA 9509	1,151	21	1.8	187	17.2

TABLE 4.17.1–1.—*Minority and Low-Income Populations in Rural Areas Within the Pantex Plant Region of Influence, 1990*-Continued

COUNTY/BLOCK NUMBERING AREA	TOTAL POPULATION	MINORITY POPULATION	PERCENT OF TOTAL POPULATION	NUMBER OF PERSONS BELOW POVERTY LEVEL	PERCENT OF TOTAL POPULATION
Hartley County (part)					
BNA 9501	730	47	6.5	47	6.5
Hutchinson County (part)					
BNA 9502	3,277	295	9.0	502	15.6
BNA 9503	701	25	3.6	66	8.8
BNA 9504	462	25	5.4	72	15.5
BNA 9505	4,621	253	5.5	404	8.7
BNA 9506	4,481	1,033	23.1	686	15.5
BNA 9507	2,234	848	38.0	783	34.6
BNA 9508	1,428	390	27.3	307	22.8
BNA 9509	4,781	448	9.4	415	9.1
BNA 9510	3,704	274	7.4	191	5.2
Moore County (part)					
BNA 9501	1,963	461	23.5	219	11.2
BNA 9502	3,816	1,874	49.1	577	15.0
BNA 9503	7,247	1,843	25.4	581	8.2
BNA 9504	4,839	1,980	40.9	936	19.6
Oldham County (part)					
BNA 9501	1,971	208	10.6	240	14.9
Roberts County (part)					
BNA 9501	1,025	37	3.6	64	6.2
Swisher County (part)					
BNA 9501	839	151	18.0	163	20.0
BNA 9502	851	134	15.7	42	4.8

Source: TX Cen 1993a:Tables 8 and 19

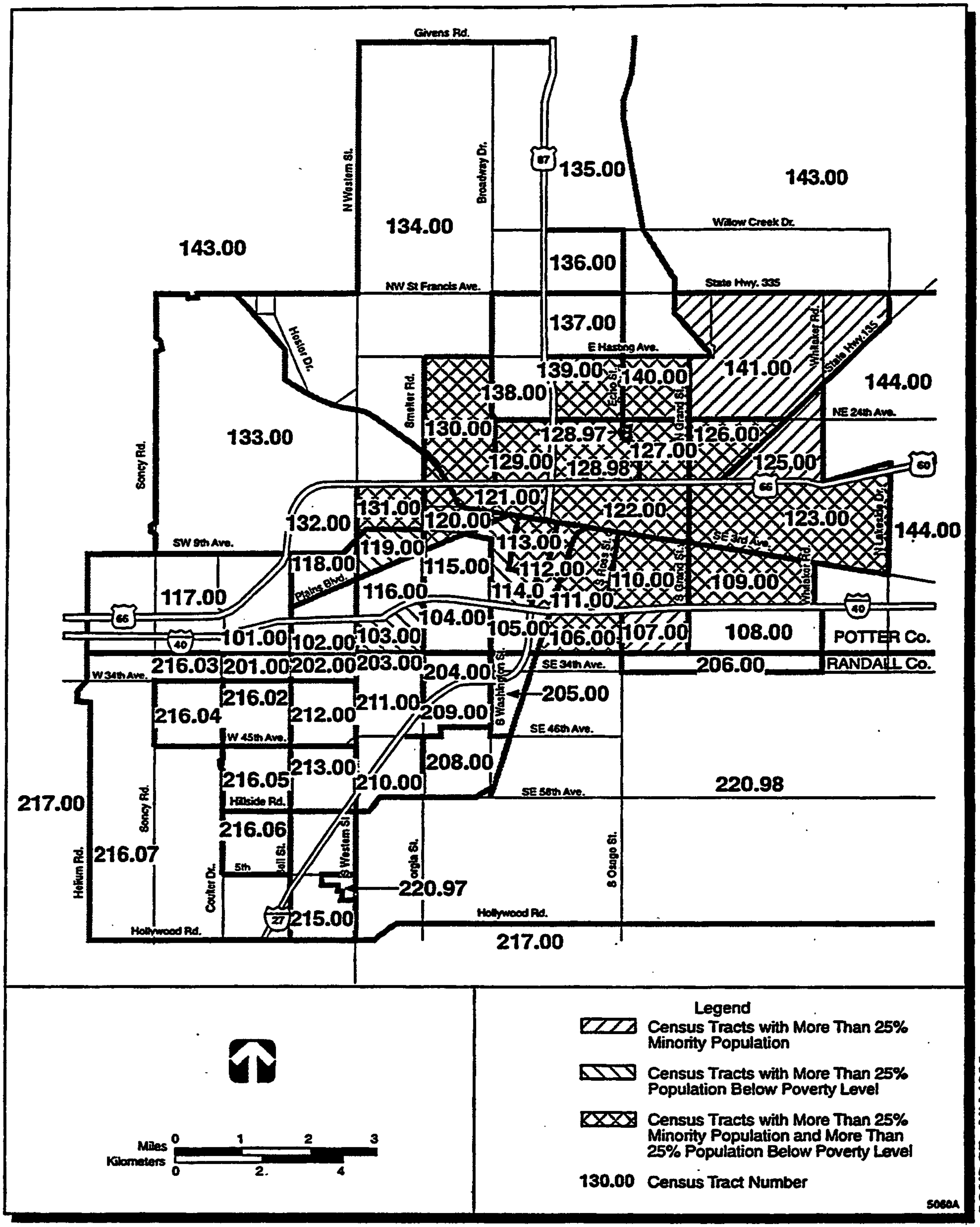


FIGURE 4.17.1–2.—*Minority and Low-Income Populations in the Amarillo Metropolitan Area, 1990.*

minority and low-income populations in Potter and Randall Counties.

There are no tracts in Randall County, within or outside of the Amarillo urban area, that had concentrations of 25 percent or more of minority or low-income persons. In Potter County, on the other hand, most tracts in the Amarillo urban area were characterized by one or both of these threshold conditions. These tracts are found primarily in the northeast quadrant of the city, in the general direction of Pantex Plant.

Tracts 125 and 141, the two tracts closest to Pantex Plant, were characterized by minority populations in excess of 25 percent, as were Tracts 107 and 128.97 in the east central and north central part of Amarillo. Tracts 103, 114, and 119, near the center of town, had more than one-fourth of their populations with incomes below the poverty level in 1989. Eighteen tracts, largely situated between the areas with one threshold condition or the other, are characterized by both threshold conditions; that is, more than 25 percent of their populations in 1990 were minority persons, and more than 25 percent of their populations were below the poverty level in 1989.

Thus, the minority and low-income populations specified by Executive Order 12898 are found in sufficient concentrations in 25 tracts in the northeast quadrant of the Amarillo urban area and in 10 rural BNAs within Pantex Plant ROI to warrant an analysis of the possible disproportionately high and adverse health and environmental impacts of the Proposed Action and the Alternatives considered in this EIS. Both Figures 4.17.1–1 and 4.17.1–2 clearly indicate that Pantex Plant is surrounded by rural tracts of white majority populations, and minority and low-income populations are located either in the Amarillo Urban area, approximately 27 kilometers (17 miles) away from Pantex Plant, or in the outer fringes of the ROI.

4.17.2 Impacts of Proposed Action

The Proposed Action includes the continuation of Pantex Plant operations at different levels of activity. Since the future stockpile requirements cannot be accurately predicted, three activities are analyzed to cover the possible range of activities at Pantex Plant: high level of activity which assumes handling of 2,000 weapons operations per year including assembly, disassembly, modifications, and surveillance activities; a moderate activity level to handle 1,000 weapons operations per year; and a low activity level to handle 500 weapons operations per year. To handle 2,000 weapons operations per year, the employment levels at Pantex Plant would remain at its 1995 operations. With no change in employment, the environmental impacts on the general population as well as on the minority and low-income populations would be similar to those currently experienced.

Approximately 60 percent of the total population in the Pantex Plant ROI is located in the City of Amarillo, and 96 percent are located in the Amarillo metropolitan area consisting of Potter and Randall Counties. Since Pantex Plant is located approximately 27 kilometers (17 miles) northeast of Amarillo, none of the biophysical impacts (such as impacts to air quality and water resources) and human health risks are experienced by the total population including the minority and low-income populations living in the metropolitan area. Even outside the Amarillo metropolitan area, most of the minority and low-income population is located in BNAs at the outer reaches of the ROI, more than 48 kilometers (30 miles) from Pantex Plant (Figure 4.17.1–1). The minority and low-income populations are, therefore, not expected to experience any disproportionately high or adverse human health, social, economic, or environmental effects from Pantex Plant operations.

Beneficial economic impacts of Pantex Plant are concentrated in the Amarillo metropolitan

TABLE 4.17.1–2.—*Minority and Low-Income Population in Amarillo Metropolitan Area, Texas, 1990*

CENSUS TRACT	TOTAL POPULATION	MINORITY POPULATION	PERCENT OF TOTAL POPULATION	NUMBER PERSONS BELOW POVERTY	PERCENT OF TOTAL POPULATION
POTTER COUNTY					
101	1,882	153	8.1	157	8.3
102	1,886	60	3.2	40	2.1
103	1,587	340	21.4	493	33.3
104	3,109	163	5.2	375	12.1
105	2,095	384	18.3	353	17.0
106	1,600	1,113	69.6	579	37.3
107	3,247	872	26.9	283	8.9
108	812	199	24.5	192	22.6
109	4,491	2,078	46.3	1,398	31.2
110	2,064	1,123	54.4	575	27.1
111	2,334	1,890	81.0	952	42.0
112	717	381	53.1	301	44.3
113	363	160	44.1	170	55.9
114	1,790	391	21.8	556	31.4
115	3,867	536	13.9	618	16.1
116	3,597	357	9.9	408	11.3
117	3,824	666	17.4	744	22.3
118	3,696	319	8.6	264	7.4
119	2,971	520	17.5	823	27.9
120	1,654	541	32.7	766	49.3
121	563	410	72.8	282	55.6
122	2,959	1,323	44.7	981	33.2
123	597	246	41.2	242	40.7
125	4,670	2,875	61.6	660	14.4
126	2,301	953	41.4	780	32.6
127	4,907	2,096	42.7	1,365	28.1
128.97	100	32	32.0	28	18.3
128.98	3,756	1,899	50.6	1,079	29.3
129	1,853	1,529	82.5	1,032	53.3
130	1,756	1,710	97.4	533	31.9
131	4,036	1,038	25.7	1,381	34.4
132	1,308	103	7.9	132	10.8
133	2,174	284	13.1	221	10.7
134	2,129	149	7.0	154	7.3
135	1,755	103	5.9	176	9.9
136	1,044	92	8.8	92	8.7

TABLE 4.17.1-2.—*Minority and Low-Income Population in Amarillo Metropolitan Area, Texas, 1990*-Continued

CENSUS TRACT	TOTAL POPULATION	MINORITY POPULATION	PERCENT OF TOTAL POPULATION	NUMBER PERSONS BELOW POVERTY	PERCENT OF TOTAL POPULATION
137	1,938	164	8.5	307	16.4
138	888	86	9.7	167	18.3
139	3,218	1,910	59.4	839	26.4
140	794	393	49.5	251	34.3
141	2,543	707	27.8	465	18.0
143	2,713	207	7.6	162	6.1
144	2,286	442	19.3	243	12.4
RANDALL COUNTY					
201	2,176	73	3.4	91	4.1
202	2,145	118	5.5	128	6.3
203	1,812	180	9.9	207	11.1
204	2,008	83	4.1	150	7.6
205	3,536	618	17.5	702	20.0
206	4,118	827	20.1	414	10.1
208	5,519	596	10.8	617	11.3
209	2,793	312	11.2	248	9.1
210	2,450	208	8.5	164	6.6
211	6,228	599	9.6	611	10.0
212	5,395	342	6.3	305	5.7
213	5,649	453	8.0	437	7.7
215	4,480	204	4.6	198	4.4
216.02	5,604	345	6.2	233	4.2
216.03	2,315	144	6.2	100	4.1
216.04	3,441	239	6.9	119	3.6
216.05	1,093	102	9.3	38	3.4
216.06	4,006	238	5.9	89	2.2
216.07	714	62	8.7	118	16.5
217	9,335	714	7.6	614	6.6
218.01	6,247	820	13.1	1,070	17.3
218.02	4,301	710	16.5	681	21.8
219	2,610	92	3.5	362	13.7
220.97	218	9	4.1	0	0.0
220.98	1,480	221	14.9	123	8.5
Total Metro. Area	187,547	39,306	20.9	29,438	15.7

Source: TX Cen 1993c:Tables 8 and 19

area where almost all of the employees working at the plant reside and where most of the local procurement expenditures for Pantex Plant occur. Almost 20 percent of the employees at Pantex Plant belong to the minority populations. This ratio is comparable to the minority population in the Amarillo metropolitan area where 20.9 percent of the total population belongs to minority. Employment at Pantex Plant, therefore, benefits both the majority (White) and minority populations proportionately.

Construction and/or modification of buildings for the six projects identified under the Proposed Action would not affect the minority and low-income populations disproportionately because these facilities do not require additional employees. The Gas Analysis Laboratory, Materials Compatibility Assurance Facility, Nondestructive Evaluation Facility, and Metrology and Health Physics Calibration and Acceptance Facility do not require additional workers; employees performing these functions in the existing facilities would be transferred to new facilities. The Hazardous Waste Treatment and Processing Facility and the Pit Reuse Facility would add 5 and 7 new employees, respectively. The impacts of these additions are considered negligible. In addition, all these facilities, except the Pit Reuse Facility, are intended to replace the existing facilities and to improve the health and safety conditions at the plant.

Overall, the minority and low-income populations in the Pantex Plant ROI are not disproportionately affected by the Proposed Action.

4.17.3 Impacts of No Action

Although the diassembly of weapons would cease at Pantex Plant once the number of pits stored at the site reaches 12,000, the weapons activity levels are assumed to stay at 2,000, 1,000, or 500. As a result, the employment levels and the biophysical impacts of the operations at Pantex Plant would be similar to those identified for the Proposed Action. No disproportionate effects on the minority and low-income populations are anticipated in the Pantex Plant ROI.

4.17.4 Impacts of Pit Storage Relocation Alternative

Even when the pits are relocated to other candidate site(s), the activity levels at Pantex Plant would remain the same as under the Proposed Action; only the activities related to pit storage would be eliminated. This would reduce Pantex Plant employment by approximately 30 workers and would not result in any substantial impacts. However, the pit handling activity at Pantex Plant would increase as pits are transferred to other sites. The impacts of this activity are discussed in sections 4.14, Human Health; 4.15, Aircraft Accidents; and 4.16, Intersite Transportation of Nuclear and Hazardous Materials. After the pits have been transferred to other site(s), human health and aircraft accident risks associated with the pit storage would be substantially reduced at Pantex Plant Site. These impacts are considered to be beneficial to the general population as well as to the minority and low-income populations in the Pantex Plant ROI.

4.17.5 Cumulative Impacts

The cumulative impacts presented here include impacts of the continued operations at Pantex Plant combined with impacts associated with activities described in the WM PEIS, SSM PEIS, and S&D PEIS. Since the Pantex Plant EIS Proposed Action and the SSM PEIS No Action Alternative represent a continuum of operations, the impacts associated with any new mission or facility that could be implemented at Pantex Plant are discussed in the context of that continuum. The impacts from the WM PEIS program are combined with those of the Pantex

Plant EIS Proposed Action. The impacts from the S&D PEIS are combined with those of the SSM PEIS No Action Alternative. A detailed discussion of this methodology is presented in section 4.2.

The final S&D PEIS will include an alternative that is a refinement of these storage alternatives. As discussed in sections 1.4 and 1.7.3 of this volume, the final S&D PEIS will include an alternative under which pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. The impacts of this alternative are fully accounted for in this EIS because the pits from RFETS could not cause the total number of pits stored in Zone 4 to exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Furthermore, RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant.

4.17.5.1 *Impacts of Alternatives in the Waste Management Programmatic Environmental Impact Statement*

Neither the Proposed Action nor the WM PEIS has identified any disproportionate effects on minority or low-income population in the Pantex Plant ROI. Hence, no cumulative impacts are anticipated.

4.17.5.2 *Impacts of Alternatives in the Stockpile Stewardship and Management Programmatic Environmental Impact Statement*

The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. None of the alternatives would result in impacts that would disproportionately affect minority or low-income populations in the Pantex Plant area.

4.17.5.3 *Impacts of Alternatives in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement*

The S&D PEIS is considering Pantex Plant for long-term storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU), storage of inventories of surplus weapons-usable plutonium and HEU pending disposition, and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. The storage alternatives include upgrading the existing plutonium storage facilities, consolidation of plutonium from other sites, and collocation of plutonium and HEU storage. The collocation alternative is used for analysis purposes in this EIS as the bounding storage alternative.

Under the S&D PEIS Collocation Alternative, construction of new storage facilities would be required in order to store plutonium and HEU at Pantex Plant. The analysis of the demographic data indicates that even if there were any health impacts to the communities around the candidate sites, these impacts would not appear to disproportionately affect minority or low-income populations. Wind direction frequencies at all the DOE sites show that any emissions from the sites would not be disproportionately directed at minority or low-income communities.

For the disposition alternatives in the S&D PEIS, the emphasis at this stage in the NEPA decision process is on the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor is used for analysis purposes in this EIS as the bounding disposition alternative. Implementation of this disposition alternative would require the construction and operation of a pit disassembly and conversion facility, plutonium conversion facility, mixed oxide fuel fabrication facility, and one or more light water reactors. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

The analysis of the demographic data indicates that even if there were any health impacts to the communities around the candidate sites, these impacts would not appear to disproportionately affect minority or low-income populations. Wind direction frequencies at all the DOE sites show that any emissions from the sites would not be disproportionately directed at minority or low-income communities (DOE 1996a:4.0).

4.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section describes the major irreversible and irretrievable commitments of resources that can be identified at a site-specific level of analysis. A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations.

This section discusses three major resource categories that are committed irreversibly or irretrievably under the Proposed Action: water, materials, and energy.

4.18.1 Water

There are no streams or rivers at or near Pantex Plant; all site water needs are met by groundwater. Regional demand on the Ogallala aquifer continues to exceed recharge. As such, a large portion of the water resources that support the plant represents expenditure of a nonrenewable resource. Taking the difference between the projected water usage and wastewater volumes for the 2,000 weapons scenario and those for FY 1995, this expenditure is estimated to be at least 300 million liters (80 million gallons).

4.18.2 Materials

The irreversible and irretrievable commitment of material resources during the entire life cycle and operation of Pantex Plant in support of assembly and disassembly facilities, high explosive manufacturing and processing facilities, plutonium storage, and operational support facilities includes construction materials (e.g., roofing materials), maintenance materials (e.g., paint), and operational support materials (e.g., chemicals). Consumption of these irretrievable materials is not expected to result in critical shortages.

4.18.3 Energy

The irretrievable commitment of resources during construction and operation of the facilities would include nonrenewable fuels to generate heat and power. Energy would be expended in the form of electricity and natural gas. The maximum consumption of electricity at Pantex Plant from continued operations at the 2,000 weapons level is estimated at 90,400 megawatt-hours per year. Corresponding natural gas consumption is estimated at 16.2 million cubic meters (573 million cubic feet) per year.

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4.19 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Continued operation, construction of new facilities, and an increase in plutonium storage capabilities at Pantex Plant would result in some adverse environmental impacts. The impact assessment conducted in this EIS has identified adverse impacts that cannot be fully mitigated. Residual impacts following mitigation are unavoidable.

Some unavoidable adverse environmental impacts would occur during construction of the new facilities. Natural resources would be impacted during construction as land is cleared for new facilities. However, the extent of the impact has been mitigated by selecting sites that were previously disturbed or are part of existing industrial areas.

During normal operations at Pantex Plant, a minimal amount of radioactive material is released to the environment. However, any radiation dose received by a member of the public from emissions from Pantex Plant is too small to be distinguished from naturally occurring background radiation. During normal operations at Pantex Plant, even with a strong As Low as Reasonably Achievable program and engineering and administrative controls, some radiological exposures to workers are expected.

During the timeframe of this EIS, the cumulative radiological exposure to the Pantex Plant workforce is expected to be essentially the same as for the Proposed Action (330 person-rem). This exposure will result in 0.13 excess cancer fatalities in the group. Maximum individual radiological exposures will be maintained below the DOE administrative goal of 900 millirem per year. Assuming that a single individual is exposed to 900 millirem per year for 10 years, this individual's risk of contracting a fatal cancer will increase by 3.6×10^{-3}.

Since hazardous and toxic chemicals are associated with the construction and operation of Pantex Plant facilities, worker exposure to these chemicals is unavoidable. However, no onsite chemical concentrations exceed the Occupational Safety and Health Administration threshold limit values. No fence line chemical concentrations exceed the TNRCC Effects Screening Levels (ESLs), and thus do not pose a threat to the public

Remote, automated, and robotic production methods (e.g., high explosive machining) are currently in place. Additional development through technology transfer is an ongoing effort. Continued success in the Pollution Prevention and Waste Minimization program (see appendix G) would further reduce the hazard index and could possibly eliminate the cancer risk.

Solid wastes (which include liquids and gases by definition) would be generated as an unavoidable result of Pantex Plant operations. Although Pantex Plant utilizes a Pollution Prevention and Waste Minimization program, generation of low-level, low-level mixed, hazardous, and nonhazardous wastes is unavoidable. No new waste types are expected as a result of the Proposed Action, No Action, or Pit Storage Relocation Alternative scenarios at Pantex Plant.

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4.20 Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The implementation of the Proposed Action or one of the Alternatives would cause some adverse impacts to the environment and permanently commit some resources to specific plant activities. This section describes the relationship between short-term effects of the continued operations at Pantex Plant and the associated long-term effects on productivity.

The Proposed Action and Alternatives for Pantex Plant would require the short-term use of resources (e.g., fuel, electricity, water, construction materials, land, and labor) to achieve the long-term goal of maintaining a safe nuclear weapons stockpile. Under Presidential direction, the stockpile has been reduced. A large number of weapons are no longer designated for the stockpile. In assembled form these weapons require a great deal of security and monitoring. Disassembled, these weapons are safer, less likely to impact the environment, and less expensive to maintain and secure. Thus the short-term expenditure of resources to disassemble the weapons results in long-term benefits in terms of lowered risk and greater cost efficiency.

The use of land being considered for the continued operations and increasing plutonium storage at Pantex Plant would enhance the long-term productivity in two ways. First, assembly and disassembly of nuclear weapons, high explosive manufacturing and processing, and plutonium storage missions represent a long-term production function compatible with historic nuclear weapons support and require a skilled and stable workforce. Second, since existing facilities suitable to assemble and disassemble nuclear weapons, manufacture and process high explosives, and store plutonium do exist, DOE is able to minimize short-term impacts and selectively construct new, modern support facilities that will enhance the existing productivity and ensure long-term productivity at Pantex Plant.

The only requirements for additional land use are for the construction of six new projects. The continued operations, including existing plutonium storage, do not require additional land at this time. The Pit Reuse Facility would be placed in an existing building, and would enhance the safety and reliability of the plutonium stockpile without a production reactor. The Gas Analysis Laboratory, the Nondestructive Evaluation Facility, the Metrology and Health Physics Calibration and Acceptance Facility, and the Material Compatibility Assurance Facility projects, while requiring additional land for the consolidation and modernization of existing facilities and operations, are expected to enhance long-term productivity.

The Hazardous Waste Treatment and Processing Facility (HWTPF) represents an enhancement and modernization of existing capabilities in Building 11–9S. The HWTPF is part of a major commitment by Pantex Plant for the protection of the environment through the treatment of wastes in agreement with TNRCC and the Environmental Protection Agency (EPA). Through the *Federal Facility Compliance Act* Site Treatment Plan, the plant expects to treat waste to meet the EPA's Land Disposal Restrictions standards.

Losses of terrestrial habitats to accommodate the new facilities and temporary disturbances during construction of these facilities are expected. However, these impacts have been minimized by selecting sites in areas where industrial operations currently exist. Short-term disturbances and impacts on previously disturbed land are expected to be minimal.

Pantex Plant is developing and implementing plans for ecosystem management in specific areas of Pantex Plant (e.g., playa areas) and studying the use of existing surplus facilities for other purposes. The Pantex Plant environmental restoration program and Texas' Clean 2000 program are currently managing cleanup and restoration of 144 solid waste management units. Environmental restoration activities, while causing some short-term impacts, provide for long-term improvement.

4.21 Summary of Cumulative Impacts

Cumulative impacts include the incremental impacts of the actions (usually Proposed or Preferred Action) when added to other past, present, and reasonably foreseeable future actions. The impacts of past actions have been described in the Affected Environment sections of this EIS and are reflected in the Proposed Action impacts at the 2,000 weapons activity level (current operations at Pantex Plant). Additional DOE programs planned or underway at Pantex Plant include the Stockpile Stewardship and Management (SSM), Waste Management (WM), and Storage and Disposition (S&D) programs which are the subject of three separate Programmatic EISs described in section 1.7 of this volume.

In addition to the DOE programs, information on other Federal, State, or local projects, including private developments, was sought through contacts with Federal and State regulatory agencies, the Amarillo Economic Development Corporation, the Panhandle Municipal Water Authority, and the City of Amarillo. This effort yielded only one project (future closure of the Helium Plant) that would contribute to the cumulative impacts in the Pantex Plant Region of Influence. A discussion of its cumulative impacts has been added in section 4.11.5 because cumulative impacts are limited to socioeconomic impacts.

The Pantex Plant EIS and the SSM PEIS both discuss the operations of the entire Pantex Plant but over different time frames. The level of operations, and associated impacts, discussed in the Pantex Plant EIS is for an approximately 10-year time frame beginning in the year 1997. The SSM PEIS discusses a lower level of the same kind of operations for the time frame of approximately the year 2005 and later. The operational levels discussed in the Pantex Plant EIS Proposed Action will evolve over the next 10 years into the level of operations discussed in the No Action Alternative of the SSM PEIS. The cumulative impacts associated with any new mission or facility at Pantex Plant should be placed in the time frame of the overall impacts of Pantex Plant Site at the time those facilities or missions would be implemented.

In chapter 4, the new missions and facilities associated with the WM PEIS are assumed to take place in the same time frame as the Pantex Plant EIS Proposed Action. The new missions and facilities associated with the S&D PEIS are assumed to take place in the same time frame as the SSM PEIS No Action. While these assumptions are well founded, the elements of the different programs could be delayed or moved ahead. In this section, the impacts of the different programs are presented by themselves without being combined with the impacts of either the Pantex Plant EIS Proposed Action or the SSM PEIS No Action. This is done in order that the reader can see in detail the impacts associated with each of the different missions, facilities, and time frames, and can add the impacts in any combination.

The Preferred Alternative for stockpile management is a downsized (rightsized) plant to provide an effective and efficient manufacturing capability for a smaller stockpile. With a smaller stockpile and no new-design weapons production, industrial capacity can be reduced to meet anticipated manufacturing requirements for stockpile repair and replacement activities. If the SSM PEIS decision, as announced in the Record of Decision, is to downsize Pantex Plant, such action would commence in the year 1998 and be completed by approximately the year 2005. Because downsizing would involve internal modifications to existing facilities, no land would be disturbed, and there would be no significant change to any environmental resources during the completion of modifications. Consequently, there would no significant cumulative impacts associated with the downsizing of Pantex Plant facilities.

The SSM column in Table 4.21–1 shows the impacts of downsizing-in-place the assembly/

disassembly and high explosive (HE) fabrication facilities at Pantex Plant. These impacts are not in addition (cumulative) to the impacts identified for the continued operations at the 2,000 weapons activity level. Instead, environmental impacts resulting from SSM activities at Pantex Plant represent a reduced level of impacts after the plant completes its disassembly activities and evolves into a long-term stockpile management facility.

The WM PEIS examines the environmental impacts of alternative configurations for the management of radioactive and hazardous wastes at DOE sites throughout the U.S. Pantex Plant is considered one of 17 "major" sites managing DOE wastes. For Pantex Plant, the PEIS analyzes management of low-level mixed waste (LLMW), low-level waste (LLW), and hazardous waste (HW) in four configuration alternatives: No Action, Decentralized, Regionalized, and Centralized.

The most adverse impacts of activities at Pantex Plant would occur as a result of the Decentralized Alternative. Therefore, only the impacts of this alternative are provided in Table 4.21–1. With this alternative, treatment and disposal facilities would be constructed for LLMW and LLW at Pantex Plant. The treatment facilities needed for LLMW and LLW have already been evaluated in chapter 4 of this volume. The WM PEIS does not provide NEPA analysis for the construction of new disposal facilities, such as a landfill, which would be needed if the Decentralized Alternative is selected as the Preferred Alternative for LLMW and LLW disposal.

For the S&D PEIS, two bounding alternatives (alternatives with the most adverse environmental impacts), one for storage and the other for disposition activities, are considered in this cumulative impact analysis. For the storage alternatives, collocation of plutonium and highly enriched uranium (HEU) facilities generates the most adverse impacts as it would require construction of new storage facilities at Pantex Plant. For the disposition alternatives, the most adverse impacts would occur if the pit disassembly/conversion facility, the plutonium conversion (non-pit) facility, the mixed oxide (MOX) fuel fabrication facility, and the evolutionary light water reactor were all located at Pantex Plant.

As discussed in sections 1.4 and 1.7.3 of this volume, the final S&D PEIS will include an alternative under which plutonium pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. Impacts related to the intersite transportation of these pits are described in section 4.4 of the S&D PEIS. The total potential fatalities from the intersite transportation of the RFETS pits to Pantex Plant is estimated as 6.4×10^{-3} from both radiological and nonradiological impacts to the public and workers for both routine and accident conditions.

The impacts from the Storage Collocation Alternative and the MOX Fuel/Light Water Reactor Alternative would probably occur during the next seven to 20 years and, therefore, would be cumulative to the impacts discussed in the SSM PEIS No Action Alternative. However, the construction and operation of the S&D facilities could take place within the next five to seven years, and thus could be cumulative to the impacts discussed in the Pantex Plant EIS Proposed Action. So the impacts of the Storage Collocation Alternative, the construction of the MOX Fuel/Light Water Reactor Alternative, and the operation of the MOX Fuel/Light Water Reactor Alternative are presented separately in Table 4.21–1 without being combined with the impacts of either the Pantex Plant EIS Proposed Action or the SSM PEIS No Action.

Table 4.21–1 summarizes the impacts for Proposed Actions at the 2,000 weapons activity level and the most adverse impacts from the SSM, WM, and S&D programs at Pantex Plant.

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
PLANT FACILITIES AND INFRASTRUCTURE					
The annual utility usage for the plant and six new projects would be: Steam - 181M kg (398M lb) Electricity - 90,400 MWh Natural Gas - 16.2M m^3 (573M ft^3) Utility demand would be substantially less than utility capacity; therefore, no significant impacts to infrastructure are expected.	Under the No Action Alternative, no downsizing or modification of facilities would occur, and there would be no construction impacts. Due to reduced workload expected in the future, infrastructure impacts from current operations would be expected to be less than current impacts. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Facilities would be consolidated and impacts would be expected to be less than current impacts. Under the relocation alternative, the facilities would undergo decontamination and decommissioning.	The utility usage would conservatively be: Steam - 180M kg (392M lb) Electricity - 33,350 MWh Natural Gas - 0.8M m^3 (27M ft^3) Utility demand would be within system capacity; therefore, there are no significant impacts to infrastructure expected	Site infrastructure resources required would be less than resources available onsite. No increases in electricity and gas usage would occur. Oil requirements would increase slightly during construction.	Site infrastructure requirements would be: Electricity - 24,333 MWh Oil - 1,356,233 liters Gas - 0 m^3	Site infrastructure requirements would be: Electricity - 1,154,000 MWh Oil - 844,750 liters Gas - 8,976,000 m^3

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
LAND RESOURCES					
The impacts to land resources are expected to be limited. New land use for new facilities would involve an area of 1.6 hectares (4 acres), equal to 0.04 percent of total area at Pantex Plant.	Under the No Action Alternative, no downsizing or modification of facilities would occur, and there would be no change in land use. Under the downsizing alternative, facilities would be consolidated and impacts would be expected to be less than current impacts. Under the relocation alternative, the Pantex Plant facilities would be decommissioned and no longer active.	Total land used for the new facilities would involve an area of 10.6 hectares (26.3 acres).	New plutonium (Pu) and HEU storage facility would require 89.5 hectares (221 acres) of land. No new land disturbance would occur.	Land disturbance would conservatively be 639 hectares (1,580 acres).	Land disturbance would conservatively be 403 hectares (995 acres).
GEOLOGY AND SOILS					
The impacts to geology or soils would be limited to the temporary disturbance of 31,800 m^2 (342,000 ft^2) resulting from construction of new facilities.	Under the No Action Alternative, no downsizing or modification of facilities would occur, and there would be no construction. Therefore, impacts to soils would be expected to be the same as those from current operations. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Consequently, no significant land disturbance would occur. Under the relocation alternative, decontamination and decommissioning of the facilities would not be expected to have impacts to the soil.	No impacts on soils identified in the PEIS. However, temporary disturbance of up to 21.2 hectares (56.2 acres) could occur during construction.	No apparent direct or indirect effects on geologic resources would be anticipated. Soil impacts during construction would be minimal.	No apparent direct or indirect effects on geologic resources would be anticipated. Soil impacts during construction would be minimal.	No apparent direct or indirect effects on geologic resources and soils are anticipated.

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
WATER RESOURCES					
Annual wastewater generation and water demand for the plant and six new projects would be: Wastewater - 647M liters (172M gal) Water - 1,011M liters (267M gal) Compliance with current discharge standards would keep levels of contaminants the same. The increase in Pantex Plant annual water usage (currently 0.6 percent of regional withdrawal from the Ogallala aquifer) would not significantly affect the ongoing regional depletion of the aquifer.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, impacts to water resources from operations would be expected to be approximately 249M liters (66M gallons) per year. Water requirements would be met without increased aquifer drawdowns. Under the downsizing alternative, the groundwater withdrawals would be approximately 209M liters (55M gallons) per year, a reduction of 16 percent compared to those under the No Action Alternative. Under the relocation alternative, all water use for assembly and disassembly operations and HE fabrication would cease.	Annual wastewater generation and water demands would be: Wastewater - 43,660 liters (11,535 gal) Water - 96,200 liters (25,416 gal) The Pantex Plant water usage (currently 0.6 percent of regional withdrawal from the Ogallala aquifer) would not significantly affect the ongoing regional depletion of the aquifer.	Annual wastewater generation and water usage would be: Wastewater - 13M liters (3.4M gal) Water - 130M liters (34M gal)	Annual wastewater generation and water usage would be: Wastewater - 110.2M liters (29M gal) Water - 130.2M liters (34.4M gal)	Annual wastewater generation and water usage would be: Wastewater - 484.7M liters (128M gal) Water - 572.9M liters (151.3M gal)

TABLE 4.21-1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
AIR QUALITY					
Offsite concentrations of air pollutants were modeled and compared to screening levels which showed no adverse impacts to human health are expected. The onsite air quality levels are below those that would pose health risks to workers. The impacts from temporary increases in emissions from construction of new facilities would be negligible.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, air quality impacts from operations would be expected to be less than current impacts. Air quality would remain within regulatory limits. Under the downsizing alternative, the operations would be consolidated. Air quality impacts would be equivalent to those of the No Action Alternative. Under the relocation alternative, air quality impacts from assembly and disassembly operations and HE fabrication would cease.	Impacts would remain below the National and State air quality standards.	The new Pu and HEU facility would have minimal air quality impacts. Concentrations of criteria, toxic, and hazardous air pollutants are predicted to be in compliance with Federal, State, and local air quality regulations or guidelines.	Construction of facilities would result in emissions of some pollutants. Emissions would typically not exceed Federal, State, or local air quality regulations or guidelines.	Operations of facilities would result in emissions of some pollutants. Emissions would typically not exceed Federal, State, or local air quality regulations or guidelines.
ACOUSTICS					
Except for airblast from HE detonations, noise levels from Pantex Plant activities would be below 65 dBA at the plant boundary. The detonations could be audible at a distance of 5 to 10 kilometers (3 to 6 miles). Due to the size of the site, noise from construction of the new facilities would not reach the public.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, noise impacts from operations would be expected to be less than current impacts. Under the downsizing alternative, facilities would be consolidated. The noise impacts would be equivalent to the No Action Alternative. Under the relocation alternative, noise from assembly and disassembly operations and HE fabrication would cease.	Associated construction activities include heavy construction equipment and increased traffic. Non-traffic noise associated with the operation would be located at sufficient distance that contribution to offsite noise levels would continue to be small.	Noise from construction equipment or operations activities would not be expected to cause annoyance to the public due to size of the site.	Noise from construction equipment would not be expected to cause annoyance to the public.	Noise from operations activities would not be expected to cause annoyance to the public.

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
BIOTIC RESOURCES					
There would be no impacts to threatened or endangered species, wetlands, or terrestrial or aquatic resources from Pantex Plant operations. The construction of new facilities would result in loss of 15,900 m^2 (171,000 ft^2) of common plant and animal habitat, but would not impact sensitive species or habitats.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Impacts to biological resources from operations would be expected to remain the same as current impacts. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Consequently, no potential impacts to biota would occur. Under the relocation alternative, decontamination and decommissioning activities of the existing facilities would not impact biotic resources.	Since specific sites for disposal facilities have not yet been identified, no specific impacts can be discussed at this stage.	Construction and operations of new Pu and HEU facility would have minimal impact on biological resources due to use of disturbed area of the site.	Facility construction would adversely affect 429 hectares (1,150 acres) of vegetation from land clearing activities. Animal populations would also be affected.	Facility operations would not result in any additional impacts other than those shown for construction of facilities.

TABLE 4.21-1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
CULTURAL RESOURCES					
No impacts to cultural, Native American, or paleontological resources are anticipated from the Proposed Action or the construction of new facilities.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Impacts to cultural resources from operations would be expected to remain the same as current impacts. Under the downsizing alternative, all construction activities would be modifications to existing facilities. Consequently, no potential impacts to cultural resources would occur. Under the relocation alternative, decontamination and decommissioning of existing facilities would not impact cultural resources.	Since specific sites for disposal facilities have not yet been identified, no specific impacts can be discussed at this stage. In general, given that future siting priorities would include minimum or no impact to specific cultural resources, significant impacts from these activities are unlikely.	Impacts to prehistoric and historic resources are not anticipated within the previously disturbed construction area of the new facility. Operations would not result in additional impacts.	Facility construction could adversely affect some cultural resources on as much as 429 hectares (1,150 acres) of previously undisturbed lands.	Facility operations would not result in additional impacts other than those shown for construction of facilities.

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
SOCIOECONOMIC RESOURCES					
3,800 direct jobs and 6,257 secondary jobs would continue. Total personal income of $564 million would be added to the economy annually. Construction of new facilities would temporarily generate 1,227 direct and indirect jobs. A total of $56 million of personal income would be added to the economy in the peak construction year.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, the most significant change at Pantex Plant would involve the number of workers associated with the assembly and disassembly mission, which would be expected to decrease from approximately 2,365 to approximately 915 for one-shift operations. The number of direct workers associated with HE fabrication would decrease from approximately 365 to 105. Under the downsizing alternative, assembly and disassembly operations at Pantex Plant would proceed more efficiently and require approximately 800 workers for one-shift operations, 115 workers less than under the No Action Alternative. For three-shift operations, the bounding-case, approximately 1,266 workers would be required. All construction activities would be modifications to existing facilities. Consequently, socioeconomic impacts from the construction would be minimal.	654 direct workers would be required during the operations period. This figure is conservative because the employment due to new treatment facilities is already taken into account in the figures for the Proposed Action.	Construction and operation of the new facility would require 1,524 and 676 workers, respectively.	Construction of facilities would require an average of 1,850 construction workers per year over a 6-year period.	Facility operations would require 5,122 new workers at the plant site.

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
SOCIOECONOMIC RESOURCES (CONTINUED)					
	Under the relocation alternative, approximately 1,644 direct and 1,905 indirect jobs would be lost in the regional economic area. The loss of approximately 3,549 total jobs would cause the regional economic area unemployment rate to increase from 4.8 to 6.2 percent. Housing and rental vacancies and public finance expenditures and revenue would change by less than 1 percent.				
INTRASITE TRANSPORTATION					
The Proposed Action would have an estimated worker exposure of 61 person-rem, and a group latent cancer fatality risk for 10-year exposure of 0.024.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, impacts from intrasite transportation activities would be expected to be less than current impacts. Under the downsizing alternative, the facilities would be consolidated; this could further reduce the amount of intrasite transportation impacts. Under the relocation alternative, intrasite transportation associated with assembly and disassembly operations and HE fabrication would cease.	Potential fatalities to the offsite population and to workers from waste management activities are essentially zero for every alternative.			

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
		WASTE MANAGEMENT			
The Proposed Action would result in the annual generation of the following amounts of waste: LLW - 249 m^3 (326 yd^3) LLMW - 183 m^3 (240 yd^3) HW - 192 m^3 (251 yd^3) NHW (Class 1) - 742 m^3 (970 yd^3) NHW (Class 2) - 574 m^3 (751 yd^3)	Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, waste management impacts from operations would be expected to be less than current impacts. Generated wastes would be adequately managed with existing waste management facilities. Under the downsizing alternative, Pantex Plant would have adequate waste management facilities to treat, store, and dispose of its wastes, although LLW at Pantex Plant would continue to be shipped offsite to Nevada Test Site. Under the relocation alternative, the amount of eventual decontamination and decommissioning activities and wastes would increase.	The Pantex Plant Proposed Action includes the construction and operation of the treatment facilities. The construction of the disposal facilities would not generate any waste, only fill dirt. The operation of the disposal facilities would not generate any wastes. Therefore, the amount of waste to be managed would remain as shown under the Pantex Plant Proposed Action.	The collocated facility would result in annual generation of the following amounts of liquid/solid waste: TRU Waste - 0.02/10 m^3 Mixed TRU - 0/4 m^3 LLW - 2.1/1,300 m^3 LLMW - 0.2/66 m^3 HW - 2/2 m^3 NHW - 129,500/ 1,840 m^3	Construction of facilities would result in the generation of minimal amounts of hazardous and non-hazardous wastes. These wastes would be managed onsite.	Facility operations would result in the annual generation of the following amounts of liquid/solid waste: TRU Waste - 3.2/651 m^3 Mixed TRU - 0/204 m^3 LLW - 18,964/2,498 m^3 LLMW - 1.24/235.7 m^3 HW - 8/191.7 m^3 NHW - 485,300/ 7,516 m^3 Spent fuel - 52 metric tons

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
HUMAN HEALTH					
The Proposed Action would have an estimated worker exposure of 330 person-rem, and a group latent cancer risk for 10-year exposure of 0.13.	Under the No Action Alternative, no downsizing or modification of facilities would occur. Due to the reduced workload expected in the future, human health impacts from operations would be expected to be less than current impacts. The average radiological dose to workers would not be expected to change, although the total worker dose would change due to the reduced number of workers associated with a reduction in workload. Potential impacts from accidents, which are essentially independent of a given operating tempo, would not be expected to change.	Potential fatalities to the offsite population and to workers from waste management activities are essentially zero for every alternative.	The annual dose to the public from the collocated facility would be 5.3×10^{-5} person-rem. This would cause an estimated 1.3×10^{-6} fatal cancers during 50 years of operation. The alternative of storing surplus pits from RFETS at Pantex Plant in the near-term could cause less than 10^{-2} fatal cancers for affected workers due to repackaging operations. There would be no effect to the public.	Facility construction is expected to have negligible human health impacts.	The annual doses resulting from facility operations would be within radiological limits and well below levels of natural background radiation.

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
AIRCRAFT ACCIDENT					
An aircraft accident capable of causing a release from a pit storage or weapons storage magazine is extremely unlikely (frequency of occurrence less than 10^{-4} but greater than or equal to 10^{-6}). A person in the vicinity of the plant has an approximately 3.0×10^{-12} increase in fatal cancer risk from potential aircraft crash plutonium dispersal accidents for the bounding Zone 4 storage configuration.	The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. Although the No Action Alternative, does not account for the time plutonium is at risk, there would be a reduction in the risk from an aircraft crash because of the reduction in operations. Under the downsizing alternative, there would be a consolidation of facilities and a commensurate reduction in the risk from an aircraft crash due to the fewer number of facilities. Under the relocation alternative, the risk from an aircraft crash into assembly and disassembly and HE fabrication facilities would be reduced to zero.	The impacts resulting from an aircraft accident to waste management facilities were not calculated in the WM PEIS.	The collocated storage facility would result in a reduction in the probability of an aircraft crash into a building or magazine containing plutonium. This reduction is due to the reduced number of buildings and magazines that would be utilized.	Facility construction was not analyzed for aircraft accidents. No plutonium release would occur in the event of an aircraft crash.	No aircraft accident analysis was conducted in the S&D PEIS.

TABLE 4.21–1.—*Environmental Impacts of Pantex Plant Operations and Other Reasonably Foreseeable Projects*-Continued

IMPACTS OF PANTEX PLANT OPERATIONS AT PROPOSED ACTION LEVEL (2,000 WEAPONS LEVEL INCLUDING 20,000 PITS IN STORAGE)	IMPACTS OF PANTEX PLANT OPERATIONS AT STOCKPILE STEWARDSHIP AND MANAGEMENT PEIS LEVEL (SSM PEIS)	IMPACTS OF WASTE MANAGEMENT PROGRAM (WM PEIS)	IMPACTS OF COLLOCATION OF PU AND HEU STORAGE FACILITY (S&D PEIS)	IMPACTS OF CONSTRUCTION OF DISPOSITION FACILITIES (S&D PEIS)	IMPACTS OF OPERATIONS OF DISPOSITION FACILITIES (S&D PEIS)
ENVIRONMENTAL JUSTICE					
Minority and low-income populations would not be disproportionately affected.	The SSM PEIS includes three alternatives that apply to Pantex Plant: No Action, Downsize Existing Capability, and Relocate Capability. None of the alternatives would result in impacts that would disproportionately affect minority or low-income populations in the Pantex Plant area.	No disproportionate effects on minority or low income populations were identified in the WM PEIS.	Minority and low-income populations would not be disproportionately affected.	Minority and low-income populations would not be disproportionately affected.	Minority and low-income populations would not be disproportionately affected.

M - Million
LLW - Low-level waste
HW - Hazardous waste
dBA - Decibel A-weighted scale
MWh - Megawatt hours
LLMW - Low-level mixed waste
NHW - Nonhazardous nonradioactive waste

CHAPTER 5

Affected Environment and Environmental Consequences at Alternative Pit Storage Sites

CHAPTER 5
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES AT ALTERNATIVE PIT STORAGE SITES

Chapter 5 focuses on the affected environment and impacts of relocating pit interim storage to the candidate sites. The candidate sites, in order of presentation, are Nevada Test Site, Savannah River Site, Hanford Site, and Kirtland Air Force Base. For each of these sites, the affected environment and impacts of relocating storage (for either 20,000 or 8,000 pits) are addressed by type of affected resource or other issue area—just as is done in chapter 4 for Pantex Plant.

5.1 INTRODUCTION

This chapter discusses the affected environment and the potential environmental impacts at the four sites being considered for the interim storage of pits under the Pit Storage Relocation Alternative. The discussion of the general information associated with relocation of pit storage operations is followed by discussions of each site, which focus on the facilities being considered for interim pit storage. Subsequently, the site's affected environment and the environmental impacts due to interim pit storage are presented.

General Information on Relocation of Pit Storage Operations

The AL–R8 pit packaging that is currently used for storing pits at Pantex Plant is no longer used for intersite transportation of pits. A new storage and transport container, known as AT–400A, is being developed by Sandia National Laboratories and could be used for relocation of pits to an alternative interim storage site. This container or any other containers certified by the Department of Transportation for shipment of pits to the alternative site would be transported from Pantex Plant to an alternative site by the DOE Transportation Safeguards Division's Safe Secure Tractor Trailers. The impacts of transporting pits to the candidate facilities are discussed in section 4.16, Intersite Transportation of Nuclear and Hazardous Material.

In the candidate facilities at any of the relocation sites, the pit transportation and storage containers would be stored in a manner similar to the Stage Right pit storage system currently used at Pantex Plant (i.e., a multiple stacking configuration of containers placed horizontally on pallets) (see section 4.12.1.1). The pallets for this configuration have been designed to ensure structural integrity and stability in a maximum credible earthquake scenario. The pallets are lifted into place using a commercially available turret forklift that has been modified to provide radiation shielding that reduces operator exposure to extremely low levels (essentially background level). This electric forklift would be used for storage, retrieval, and inventory operations.

Efforts are currently underway to develop Automated Guided Vehicles (AGVs) that could be used both to place pits in the interim storage facilities and to assist in taking inventories using bar code readers. The use of AGVs could virtually eliminate any need for humans to enter the interim pit storage area. The AGVs would be utilized at the candidate sites as soon as the system becomes available.

Operations in the candidate interim storage facilities would include periodic inventory and inspections. Inspections would coincide with planned inventory activities and would consist of a visual inspection of facility conditions and container surfaces as well as removal of selected containers for surveillance tests. Except at Hanford Site, the surveillance tests would be conducted at another facility where both visual and nondestructive evaluation techniques would be used for evaluation (for corrosion), weld integrity, and integrity of insulation and plastic parts. At Hanford Site, the facility that would be used for storage is also large enough to house surveillance testing. The shielded forklift or AGV would carry a bar code reader, camera, and gamma spectrometer to allow inventory and inspection to be performed without operator exposure to radiation.

For each of the sites being evaluated in this chapter, the candidate facilities would require at least minor modification and upgrades before interim pit storage could be implemented. These modifications and upgrades would mostly involve sealing wall penetrations, rerouting utilities, and installing new doors, security equipment, and equipment to store and monitor the pits (e.g., Stage Right). Approximately 30 persons would be needed to perform materials handling activities; materials control and accountability; surveillance testing; environment, safety, and health activities; and other support. In addition, approximately 120 security personnel would be needed to provide continuous security at the site. Equipment at a site would include but not be limited to two shielded forklifts or AGVs, gamma spectrometer, radiation inspection, monitoring, and calibration equipment. Any special modifications needed for a facility are discussed in the introduction to each candidate site. Approximately 2,000 pits per year are assumed to be transported to the site for storage.

In planning the transition of facilities to accept a pit storage mission, the following guidelines would be followed:

- Laws, regulations, formal agreements, and DOE orders will form the basis for transition planning and execution.
- Transition planning will be coordinated with the appropriate regulatory agencies, host state, and other affected stakeholders.
- DOE will ensure that all vital safety and utility systems within the affected facility will be fully functional prior to pit storage.
- DOE will develop a current safety analysis report and other technical safety requirements that address the change in facility mission and condition of the facility prior to pit storage.
- DOE will establish an appropriate Environment, Safety, and Health organization to support pit storage activities prior to pit storage.

The S&D PEIS is evaluating some of the sites being considered in this EIS for interim storage, for the long-term storage of weapons-usable fissile materials. The impacts of transporting fissile materials from interim storage site(s) to the long-term storage site are too speculative for meaningful assessment at this time and are, therefore, not discussed in this EIS.

THE NEVADA TEST SITE

5.2 NEVADA TEST SITE

Under the Pit Storage Relocation Alternative (see section 3.1.3), pit storage operations at Pantex Plant would be transferred to another site. The Nevada Test Site (NTS) is one of the candidate sites for the storage of pits (Figure 5.2–1). The Device Assembly Facility (DAF), located in Area 6, and the P-Tunnel complex, located in Area 12, are the specific facilities being considered for interim pit storage at NTS. This section discusses each facility, the affected environment at NTS, and the potential impacts that would be associated with pit storage.

Each aspect of the affected environment at NTS has been assessed and the potential environmental impacts to each have been evaluated. Each environmental resource is discussed commensurate with the degree to which the resource could be impacted by or have an effect on interim pit storage at the candidate facilities.

Nevada Test Site. NTS is a government-owned, contractor-operated facility, currently managed by Bechtel Nevada. NTS encompasses approximately 3,500 square kilometers (1,350 square miles) of land area reserved to the jurisdiction of DOE. This land has been withdrawn from all forms of appropriation under public land laws. The four existing land withdrawals that comprise NTS are still being used for the purpose for which they were withdrawn. NTS is located in Nye County, Nevada, approximately 105 kilometers (65 miles) northwest of Las Vegas (Figure 5.2–1) (DOE 1996c:4-9). Due to its large size, the perimeter of NTS is not fenced; however, security patrols are used to control the site. Security and hazardous areas are fenced and some are protected with armed guards and electronic security measures (DOE 1995q:A-7).

Major activities at the site include maintaining the capability to conduct underground nuclear weapon tests, performing environmental restoration actions, supporting the Yucca Mountain high-level waste repository project and the DOE nuclear emergency response team activities, operating a DOE low-level waste disposal facility, and offsite monitoring of nuclear treaty compliance (DOE 1995q:A-8). Both DAF and P-Tunnel complex were designed and built to support the site's historical nuclear weapons mission.

Device Assembly Facility. DAF, located approximately 24 kilometers (15 miles) north of Mercury, is designed specifically to accommodate operations involving nuclear materials (PC 1995a). DAF is a 9,000-square meter (100,000-square foot) facility with state-of-the-art safeguards and security systems (Figure 5.2–2). Approximately 1,170 square meters (12,600 square feet) of this space is available for storing up to 8,000 pits. The facility structures are designed to withstand effects of site-specific natural phenomena, and a Perimeter Intrusion Detection and Alarm System already exists around the building. No construction involving new land disturbance would be required at this site.

As shown in Figure 5.2–2, DAF consists of a number of separate facilities (assembly cells, assembly bays and high bays, testing laboratories, and staging areas) and corridors under an earth cover. Since the original mission of DAF was nuclear explosive operations, the design of bays and cells in DAF is based on existing designs for bays and cells at Pantex Plant.

DAF has two shipping and receiving buildings for loading and unloading of pit containers. These buildings provide truck loading and unloading equipment, including a truckbed-height dock with a built-in leveler ramp and a staging area that is forklift, cart, and crane accessible.

Should DOE choose to store pits at DAF, a pit placement, retrieval, and inventory system would be implemented. It is expected that a Stage Right-like automated or shielded pit

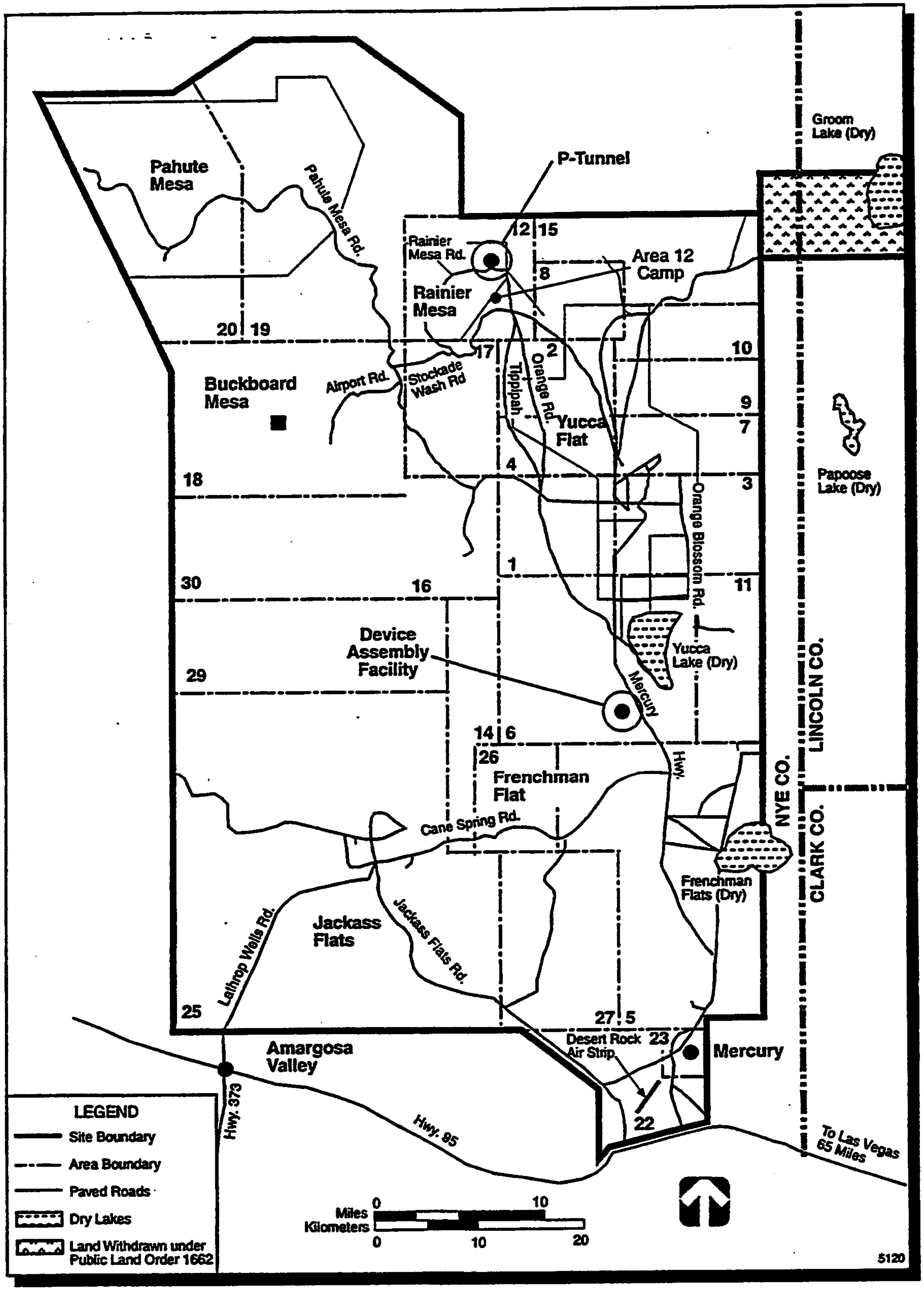
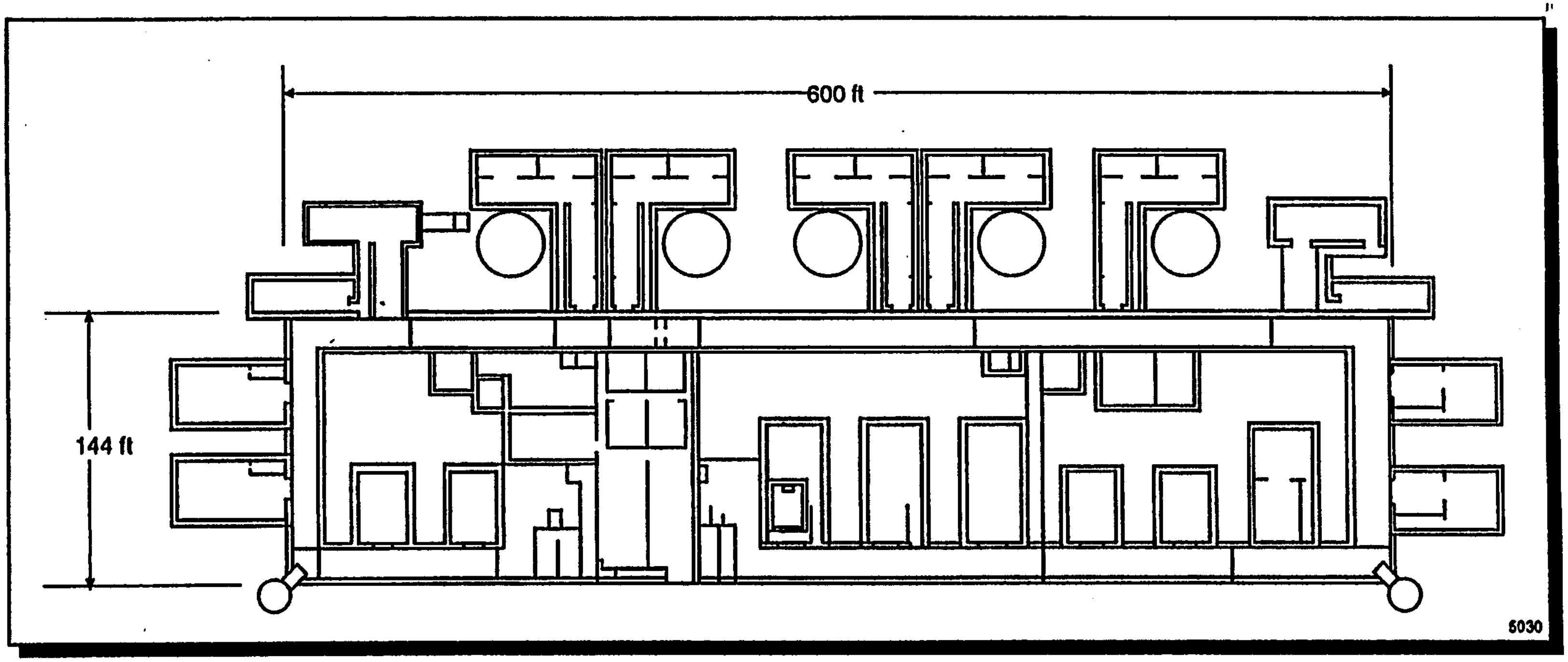


FIGURE 5.2–1.—*Location of Device Assembly Facility and P-Tunnel at the Nevada Test Site.*



SOURCE: SNL 1994:13

FIGURE 5.2–2.—*Simplified Layout of Device Assembly Facility at the Nevada Test Site.*

handling and inventory system would be developed.

P-Tunnel. P-Tunnel is one of several tunnels at Rainier Mesa (Area 12 of NTS) previously used by the Defense Nuclear Agency for conducting underground nuclear experiments (Figure 5.2–3). This tunnel has approximately 5 kilometers (3 miles) of usable tunnel length and approximately 240 meters (800 feet) of protective overburden. The tunnel is large enough to accommodate more than 20,000 pits. The tunnel portal area currently has several support structures, but there is no security fence to protect the tunnel area. A security system to protect the tunnel portal can be developed within the already disturbed area without disturbing new lands.

P-Tunnel would require minimal facility upgrades (primarily the installation of guide rails for a Stage Right forklift). No new pit placement, retrieval, and inventory system development effort would be required to accept a pit storage mission. The P-Tunnel alternative is well suited for the Stage Right equipment and techniques successfully implemented at Pantex Plant.

P-Tunnel is also being proposed for the long-term storage of weapons-usable fissile materials. The *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS* (DOE/EIS–0229) will address the long-term storage options including the P-Tunnel.

5.2.1 Environmental Resources Not Discussed in Detail

Each of the following environmental resources at NTS has been assessed. The analyses show that the impacts to these resources from the potential storage of pits at either DAF or P-Tunnel are small enough to warrant a limited discussion. Therefore, these resources are discussed briefly below and will not be addressed further in this section.

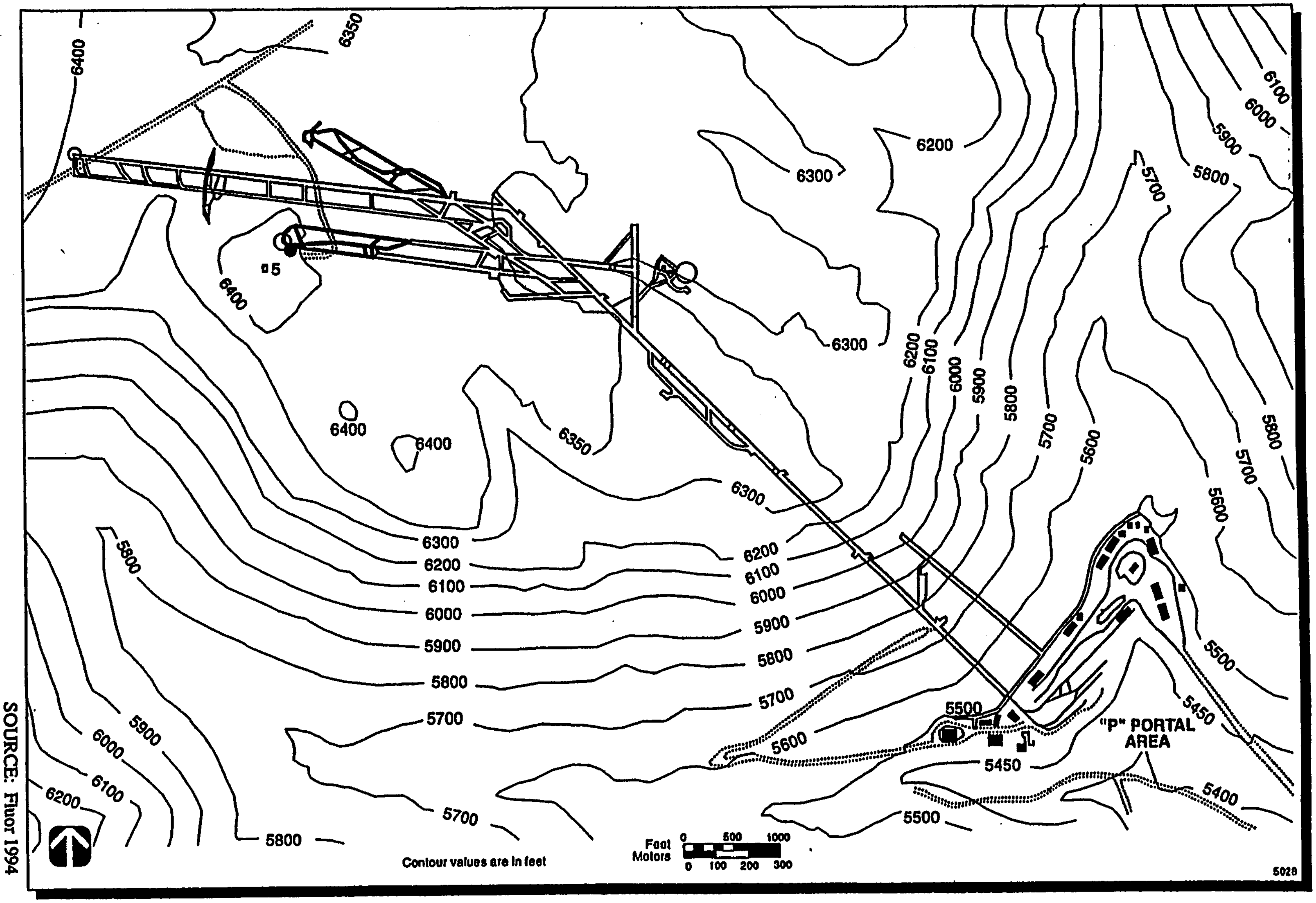
5.2.1.1 *Facilities and Infrastructure*

The infrastructure operations at NTS that could be impacted by or be expected to directly support pit storage operations include security, vehicle and building maintenance, utilities, administration, safety and health protection, and general support (e.g., cafeteria, general stores, etc.). Waste management and transportation support are discussed below and in sections 5.2.1.10 and 5.2.1.11, respectively.

Direct impacts from the implementation of pit storage include a small increase in the NTS security force. Electrical usage due to interim pit storage (estimated to be 4,110 megawatthours per year) represents a 2.4 percent increase over the site's fiscal year 1993 usage of 168,000 megawatthours and 1.2 percent of the site's fiscal year 1993 system capacity of 350,000 megawatthours (DOE 1995k:A-8). Maintenance support and the indirect impacts resulting from pit storage worker requirements (e.g., water, wastewater treatment, and fuel), would increase minimally in comparison to the current and historical onsite infrastructure support levels and system capacities. Neither facility is currently being utilized at historical or design levels. P-Tunnel modifications would involve construction of a secure access control system at the tunnel portal. There would only be a insubstantial temporary impact to infrastructure services during this construction.

5.2.1.2 *Land Resources*

No land disturbance is projected for DAF under the Pit Storage Relocation Alternative, and only limited soil disturbance in an already disturbed area is being considered for P-Tunnel (installation of a security system at the portal to P-Tunnel). The Pit Storage Relocation Alternative does not include any new land uses



SOURCE: Fluor 1994

FIGURE 5.2–3.—*Layout of P-Tunnel at the Nevada Test Site.*

at NTS. Impacts to land use would not be expected.

5.2.1.3 *Geology and Soils*

The only aspects of geology and soils that could be affected by or have an effect on the implementation of interim pit storage at NTS are soil disturbances and the risks associated with earthquakes. The risks due to earthquakes were assessed and found to be bounded by other accidents, as discussed in section 5.2.2.1. The only impact to soils would be from the construction of a secure access control system at the P-Tunnel portal. This area has already been repeatedly disturbed by the original mining of the tunnel and the subsequent activities associated with nuclear testing. Upgrades to DAF that would involve land disturbance are not anticipated; therefore, impacts to soils are not anticipated.

5.2.1.4 *Water Resources*

Because of the nature of pit storage activities, operations at DAF or P-Tunnel would not impact surface water or groundwater. The construction of a secure access control system at the P-Tunnel portal is expected to minimally impact surface water and groundwater because of the currently disturbed state of the ground surface. No surface waters are withdrawn for use at NTS. Wastewater is discharged to sewage lagoons, ponds, or septic tank/leach field systems and not to natural surface waters. Wastewater would not have a measurable effect on groundwater quality because of the combined effects of a deep water table (152 to 732 meters [500 to 2,400 feet] below land surface), low discharge volumes, high evaporation rates, and a composition consistent with treated and sanitary wastewater regulations. The water demands of pit storage operations are attributed to personnel usage and are considered negligible in comparison to the 2,400 million liters (633 million gallons) used annually at NTS (DOE 1995k:4-116, 4-147).

5.2.1.5 *Air Quality*

NTS air quality is well within all applicable local, State, and Federal ambient air quality standards except for particulate matter of aerodynamic diameter less than 10 micrometers (PM_{10}). The 24-hour PM_{10} standard is exceeded due to moderate background concentrations of dust and contributions from operations at NTS. The impacts to air quality from normal pit storage operations would be due entirely to vehicle emissions (approximately 150 vehicles per day) and are considered negligible relative to the overall vehicular emissions at NTS.

5.2.1.6 *Acoustics*

The major sources of noise at NTS include equipment, machines, blasting and explosives testing, and military aircraft operations. At the NTS boundary, away from most facilities, noise from most sources is barely distinguishable above background sources. The only sources of noise that would be associated with pit storage operations would be from transportation vehicles and air conditioning and heating equipment for the occupied areas of the facility. These impacts would be minimal and are not expected to be discernible offsite.

5.2.1.7 *Biotic Resources*

The threatened desert tortoise (*Gopherus agassizii*) is the only Federally listed threatened or endangered species that permanently resides on NTS, although the bald eagle (*Haliaeetus leucocephalus*) and American peregrine falcon (*Falco peregrinus anatum*) may occur on an incidental basis (DOE 1995p). DAF is in an area of infrequent desert tortoise activity, and P-Tunnel is outside the range of the desert tortoise at NTS. Though the existing U.S. Fish and Wildlife Service Biological Opinion for NTS requires a preactivity survey for any project that would result in soil disturbance, no soil disturbance is projected for interim storage of pits at DAF, where desert tortoise activity is infrequent (DOE 1995n:10). The existing U.S. Fish and Wildlife Service Biological Opinion requires all personnel at NTS to complete the DOE Nevada Area Office Desert Tortoise Education Program to minimize the risk to desert tortoises from construction, maintenance, and transportation activities (Letter 1992:7-8). No wetlands beyond those associated with isolated springs have been identified at NTS (DOE 1993g:4-12, 4-27). As a result, impacts to biotic resources would not be expected.

5.2.1.8 *Cultural Resources*

No historic or prehistoric sites have been found at P-Tunnel (DOE 1992d:1-4, 8). Nine sites, seven of which were single, isolated artifacts, were located at DAF. These sites were not recommended for eligibility to the National Register of Historic Places (DRI nd:1-3; DOE 1994s). The Pit Storage Relocation Alternative does not include any action that would disturb these sites. Therefore, no direct impacts to cultural or paleontological resources would be expected.

DOE has ongoing consultation with 13 Native American tribes and one pan-tribal organization (the Owens Valley Board of Trustees) that have cultural ties to NTS. Native American groups including the American Indian Writers Subgroup of the Consolidated Group of Tribes and Organizations at NTS have expressed concern regarding areas containing Traditional Cultural Properties (DOE 1995k:4-123). The Pit Storage Relocation Alternative is not expected to adversely affect these areas of concern. However, the Consolidated Group of Tribes and Organizations would be consulted prior to initiation of any activities.

5.2.1.9 *Socioeconomic Resources*

Approximately 150 additional personnel (including 120 security personnel) would be required for interim storage of pits at NTS. This number represents less than a 3 percent increase in the total NTS workforce. Most of these workers can be locally hired; therefore, no significant site or regional population and workforce increases are anticipated. According to the 1990 Census, 150 workers represent 0.03 percent of the employed workforce in the socioeconomic Region of Influence, which includes the Las Vegas metropolitan area (NV Cen 1993:Table 145). No socioeconomic impacts would be anticipated.

5.2.1.10 *Waste Management*

NTS currently manages mixed waste, low-level waste, hazardous waste, and nonhazardous waste in accordance with a number of Federal and State regulations, permits obtained under these regulations, and DOE orders. These requirements are primarily under the authority of the Environmental Protection Agency, DOE, and the State of Nevada Department of Environmental Protection's Bureau of Waste Management (DOE 1995k:Chapter 5). NTS anticipates disposal of 14,100 cubic meters (18,500 cubic yards) of mixed waste and 28,300 cubic meters (37,000 cubic yards) of low-level waste annually (DOE 1993h:63). Pit storage operations would generate less than 1 cubic meter (1.3 cubic yards) each of mixed, low-level, and hazardous waste, which would not impact the current waste management at NTS.

5.2.1.11 *Intrasite Transportation*

Mercury Highway is the primary route into NTS from U.S. Highway 95 (Figure 5.2–1). Vehicular access to the DAF is via the Mercury Highway, which is a 7.8-meter (26-foot) wide paved road. DAF is approximately 1.5 kilometers (4,900 feet) west of the Mercury Highway and is served by a paved access road. The Mercury Highway is a controlled access road within the NTS boundaries and is not open to the public.

P-Tunnel is located in Area 12 of NTS, north of the Area 12 camp. Vehicular access to P–Tunnel is via the Mercury Highway, Tippipah Highway, Rainier Mesa Road, and Road 12–01, as shown in Figure 5.2–1. The traffic on these roads is controlled by NTS personnel; no public traffic is allowed on these roads. Because a release of plutonium from an intersite pit shipment would require a severe accident (e.g., an accident with a fuel tanker or train [see section 4.16.4.2]), the controlled transportation environment within NTS does not pose a significant threat to pit shipments. Consequently, the contribution to overall transportation risk from onsite transportation is negligible.

Radiological impacts of unloading pits at the two facilities are described in section 5.2.2.1, Human Health.

5.2.1.12 *Aircraft Accidents*

The airspace above NTS, designated as R4808, is a special-use airspace identified by Federal Aviation Administration regulations. This designation applies to all aircraft and is unlimited in height. Clearance to enter the restricted airspace above NTS must be obtained from DOE. Aircraft pilots desiring to fly through NTS airspace are required to contact the DOE Operations Coordination Center at NTS; information regarding the type of aircraft and nature of flight into the restricted airspace must be provided. DOE does authorize flights into the restricted airspace.

There are four airports and five landing strips in the vicinity of DAF and P-Tunnel. Las Vegas McCarran International Airport is the major commercial airfield in the State of Nevada. This airport, located approximately 122 kilometers (76 miles) southeast of NTS, is used by commercial (air carrier and air taxi), military, and general aviation aircraft. In 1994, McCarran International Airport had 488,347 aircraft operations (take-offs and landings). North Las Vegas Airport is located just north of McCarran International Airport and is used by commercial air taxi, military, and general aviation aircraft. In 1994, North Las Vegas Airport had 188,707 aircraft operations (take-offs and landings). Table 5.2.1.12–1 summarizes the total number of airfield operations at the McCarran International and North Las Vegas Airports (PC 1996j). Nellis Air Force Base, located 107 kilometers (67 miles) from NTS, is also north of McCarran International Airport and is only used by military aircraft.

The closest airfield to NTS, Indian Springs Auxiliary Field, approximately 48 kilometers (30 miles) southeast of DAF, has two runways used only by military aircraft. Beatty Airfield,

TABLE 5.2.1.12–1.—*Las Vegas McCarran International and North Las Vegas Airport Operations for 1994*

AIRCRAFT CATEGORY	NUMBER OF OPERATIONS	
	MCCARRAN	N. LAS VEGAS
Air Carrier	229,497	0
Air Taxi	104,395	9,928
Military	17,280	1,164
General Aviation	137,175	177,615
Total Airfield Operations	488,347	188,707

Source: PC 1996j

approximately 67 kilometers (42 miles) west of DAF, has one runway used only by general aviation aircraft. There are five landing strips located on or near NTS; the most frequently used is the Desert Rock Airstrip, located in Area 22 southwest of Mercury. Desert Rock Airstrip has a single runway and is 30 kilometers (19 miles) south of DAF. Two single runway airstrips are located on NTS; one 6 kilometers (4 miles) north at Yucca Lake in Area 6, and the other 27 kilometers (17 miles) south in Area 22. Two single-runway airstrips are located west of NTS; one 62 kilometers (39 miles) west-northwest and the other 78 kilometers (49 miles) north-northwest.

Four of the landing strips and the four airfields are outside the probability density function boundary for the types of aircraft that use each of the facilities. The operations at the landing strip near Yucca Lake are infrequent and restricted to use by the public, and were therefore not included in the analysis. Only non-airport (in-flight) aircraft were therefore included in the analysis as required by the Draft DOE Standard (DOE 1996g). Further details on these nine facilities are contained in volume II, appendix E.

Penetration calculations for Manzano Weapons Storage Area (WSA) indicate aircraft cannot penetrate 9 meters (30 feet) of soil and rock. Since the proposed pit storage location inside of P-Tunnel is approximately 240 meters (800 feet) below the mesa, pits stored in P-Tunnel are immune from aircraft accidents (PC 1995b).

DAF was modeled conservatively as a single facility with a length of 201 meters (659 feet), a width of 76 meters (250 feet), and a height of 9 meters (30 feet) (PC 1994c). Using the Draft DOE Standard for determining the frequency of aircraft crashes, the frequency of hitting DAF was calculated as 1.5×10^{-6} for all types of aircraft (DOE 1996g). It should be noted that the frequency calculation represents a conservative upper bound. Since this frequency is greater than 10^{-7}, in accordance with the Draft DOE Standard, further analysis was necessary. A local response structural analysis for the facility was performed according to the Draft DOE Standard with a wall thickness of 46 centimeters (18 inches) (DOE 1986b). This wall thickness was selected since it is the minimum thickness for the bays and cells where plutonium would be stored. An overburden of 1.5 meters (5 feet) was included for three sides of the facility.

The analysis was performed for the maximum penetrator missile for each of the aircraft categories mentioned in section 4.15.2, except for helicopters. The commercial air carrier, large military, and small military aircraft categories were the only three aircraft missiles capable of penetrating the facility from the side with no overburden; the frequency of releasing material from DAF was 8.1×10^{-8}. Since this frequency is less than 10^{-7}, in accordance with the Draft DOE Standard, no further analysis was required. Further details of the frequency of hitting DAF and the frequency of releasing material are contained in volume II, appendix E.

5.2.2 Resources Discussed in Detail

5.2.2.1 *Human Health*

The basic approach used in assessing human health concerns is to first identify the affected environments and establish a baseline that represents the risk from current operations. Changes in this baseline risk resulting from the Pit Storage Relocation Alternative are then examined. Impacts from both normal operations and potential accidents are estimated.

Assessing the human health risk impact from potential accidents resulting from the relocation of pits to NTS and storing them in either DAF or P-Tunnel involves a risk screening process. The first step in this process is to identify a broad spectrum of potential accident scenarios. The second step in the process uses screening techniques to identify the specific scenarios that dominate risk (i.e., scenarios that contribute an appreciable fraction of the total risk), where risk is the product of frequency and consequence. Rigorous consequence evaluations are only performed for the identified risk-dominant scenarios.

Two types of accident consequences are examined:

- Worker and public exposure.
- The probability of the accident causing fatal cancer in a worker or the public.

If DOE chooses to relocate pits to NTS, two aspects of this relocation contribute to a potential for environmental impacts. They are the impacts associated with:

- Transferring pits from the transporter to their storage location inside the facility.
- Storage itself (i.e., potential impacts resulting from having the pits reside inside the facility).

Each time pits are transferred from the transporter to their storage location inside the facility, there is a small probability that an accidental release could occur due to a handling accident. In addition, the transfer of pits from the transporter to their storage location would result in radiological exposures to involved workers.

Affected Environment

The release of radioactivity and toxic chemicals to the environment from a DOE facility is an important issue for onsite workers and the public. Since the human environment contains many sources of radioactivity and toxic chemicals, it is essential to understand the sources of these substances and how effectively they are controlled.

Table 5.2.2.1–1 summarizes the major sources of radiation exposure in the vicinity of NTS. The average annual probability of developing a fatal cancer for a resident of Nevada is 1.4×10^{-3}. Using a nominal fatal cancer risk factor of 5×10^{-4} cancer fatalities per person rem and the environmental radioactivity data for NTS in Table 5.2.2.1–1, it is calculated that fatal cancers attributable to environmental radioactivity released from NTS constitute a negligible fraction of the average yearly fatal cancer probability in the vicinity of NTS (DOE 1994t:4-20).

Figures 5.2.2.1–1 and 5.2.2.1–2 depict the offsite population within an 80-kilometer (50-mile) radius of DAF and P-Tunnel, respectively. Wind speeds and directions in the NTS vicinity are presented in Figure 5.2.2.1–3. Winds are predominately from the southwest during the summer and from the northeast during the winter.

Impacts of Facility Upgrades

There is no significant impact on human health associated with NTS facility upgrades. The only upgrade required is to modify P-Tunnel and DAF to accept Stage Right transfer and storage equipment. The facility impact involves modifying floor space to accept Stage Right guide rails and fastening Stage Right attachment fixtures to storage facility walls. These are standard industrial operations that do not expose workers to any special hazards (e.g., radionuclides, toxic chemicals, or high explosives).

Impacts of Storing 20,000 Pits

Human health impacts from pit storage activities could potentially result from normal operations and potential accident scenarios. Normal operations would impact only onsite workers. Normal operational impacts result from the unloading of pits from Safe Secure Tractor Trailers (SSTs) at the P-Tunnel access area. Unloading operations would result in radiological exposure to cargo handlers. Based on conservative calculations made for the

TABLE 5.2.2.1–1.—*Major Sources of Radiation Exposure in the Vicinity of the Nevada Test Site*

SOURCE OF EXPOSURE	DOSE TO AVERAGE INDIVIDUAL (mrem/yr)[1]	PERCENTAGE OF TOTAL EXPOSURE
NATURAL BACKGROUND RADIATION		
Cosmic and external terrestrial	97	
Internal terrestrial	39	
Radon in home	200	
Total natural	336	84
MEDICAL RADIATION		
Diagnostic x-rays	39	
Nuclear medicine	14	
Total medical	53	13.2
OTHER SOURCES		
Weapons test fallout	<1	
Consumer and industrial products	10	
Air travel	1	
Nuclear facilities (other than NTS and transportation of radioactive materials)	<1	
NTS - environmental radioactivity	.00055	
Total other	11	2.8
Total—all sources	400	100

[1]Effective dose equivalent.

Sources: NCRP 1987:15, 53; DOE 1994t:1-6; DOE 1994v:2.4-42

handling of pits at Pantex Plant, worker doses from unloading 2,000 pits per year are estimated to be 27 person-rem per year or 270 person-rem for unloading 20,000 pits (the maximum number of pits which may be stored at P-Tunnel). Once removed from the SSTs, pits would be transferred into P-Tunnel for storage. Pit transfers within P-Tunnel would result in radiological exposures to onsite workers handling the pits; doses of less than 2 person-rem per year for handling 2,000 pits and about 13 person-rem for the placement of 20,000 pits.

The combined worker dose from unloading and storage of 20,000 pits at P-Tunnel would be 283 person-rem distributed over the 30 people directly involved in material handling. Assuming that the same 30 people continue to handle 20,000 pits over a period of 10 years and using a dose-to-risk conversion factor of 4×10^{-4} latent cancer fatality (LCF) per person-rem, there would be an additional 0.11 LCF experienced by this group due to radiological exposure from pit handling.

The probability of LCFs from all causes in the general population is estimated at 20 percent, which implies that 6 of 30 workers would develop a fatal cancer from all other causes. With an additional 0.11 LCF from pit handling, the total risk of latent cancers among workers at P-Tunnel would increase by 1.8 percent.

Some operational accidents could result in impacts to both onsite workers and the offsite general population. Radiological exposures and the resultant risk of LCFs have been calculated.

The probability of an onsite worker contracting a fatal cancer from radiological exposures from

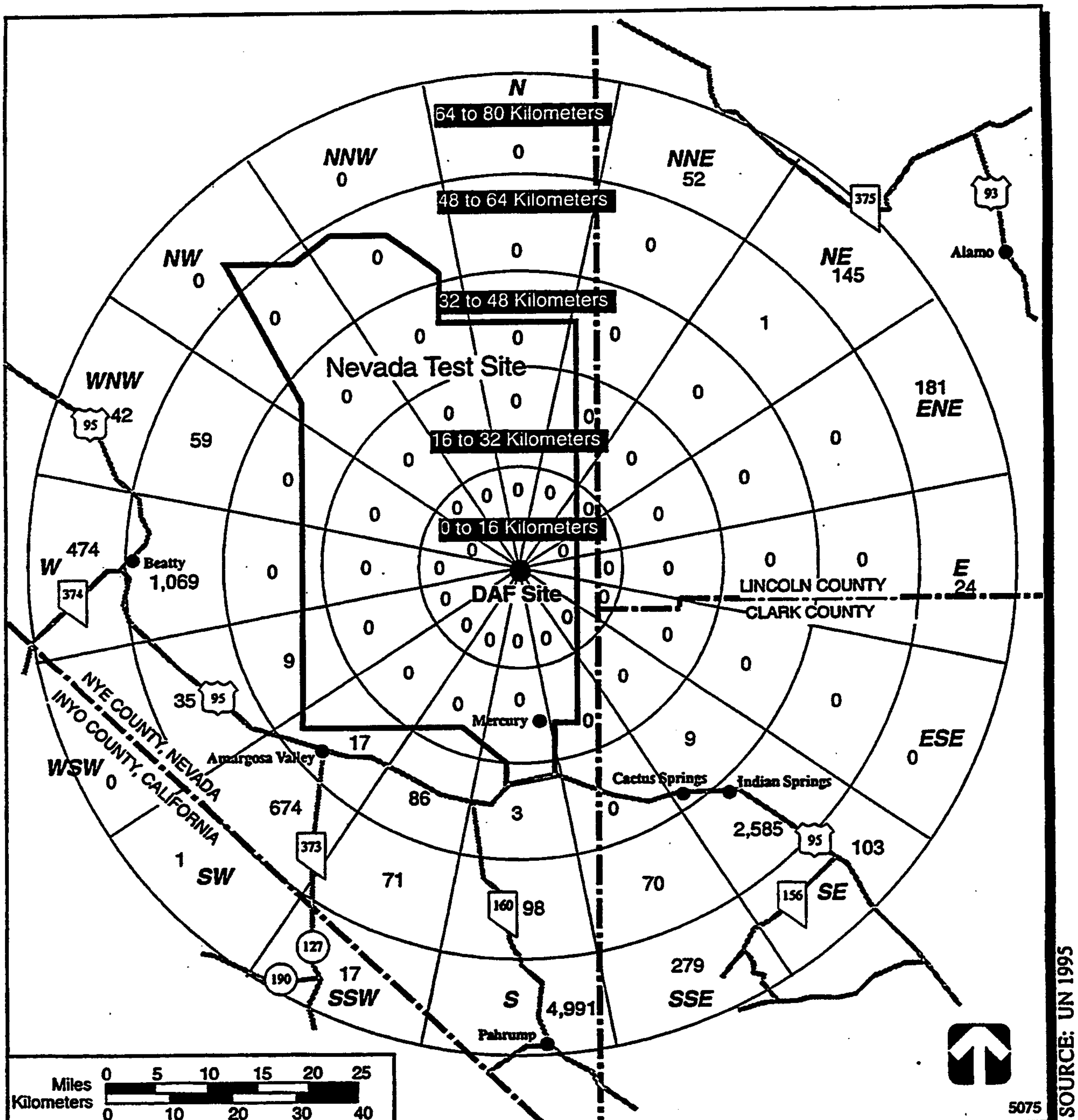


FIGURE 5.2.2.1–1.—*Population Within 80 kilometers (50 miles) of Device Assembly Facility.*

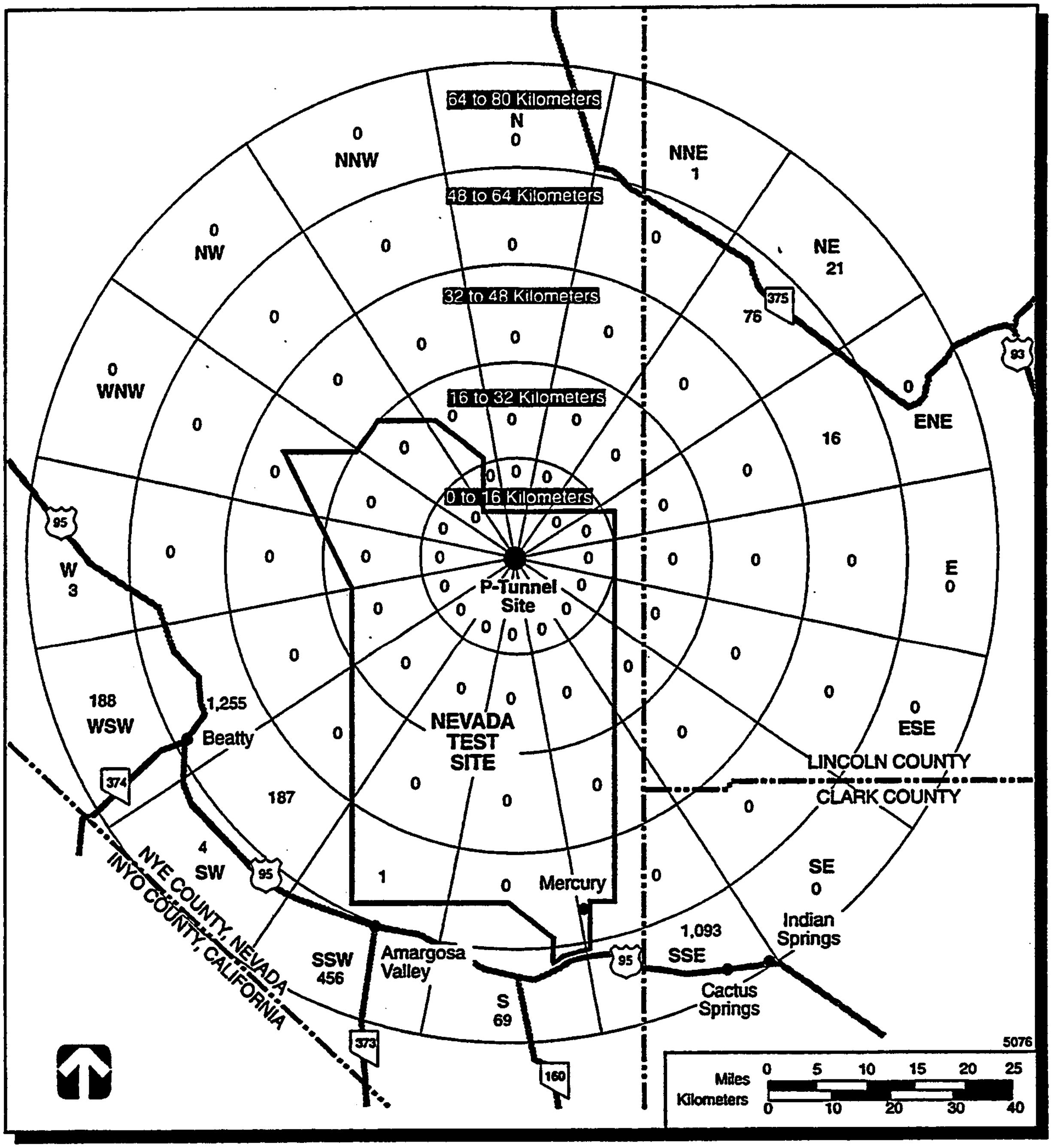


FIGURE 5.2.2.1–2.—*Population Within 80 kilometers (50 miles) of P-Tunnel.*

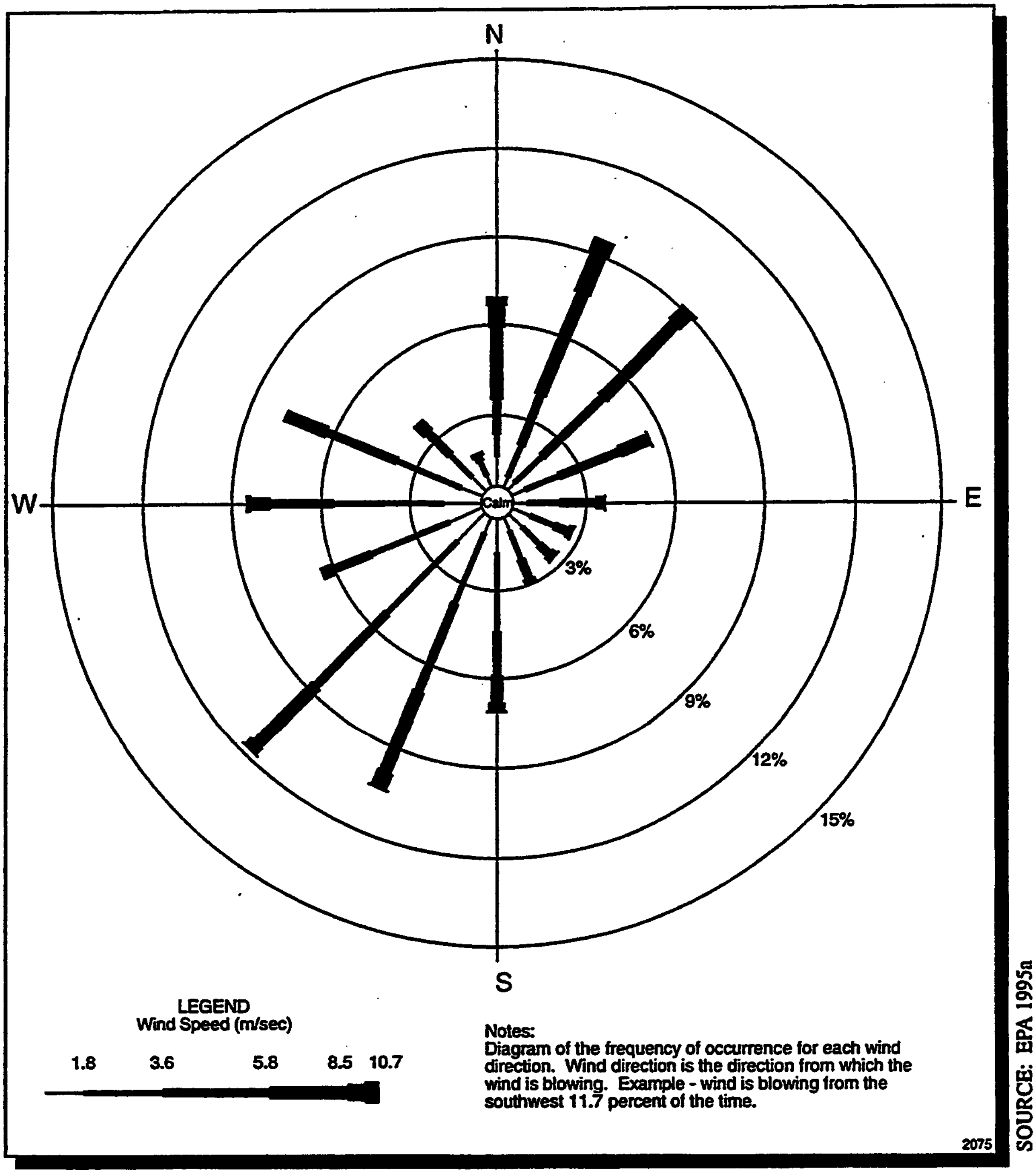


FIGURE 5.2.2.1–3.—*Wind Speed and Direction at the Nevada Test Site.*

pit storage activities was calculated using a fatal cancer risk factor of 4×10^{-4} LCF per person-rem, and the cumulative worker dose was estimated from previous historical doses resulting from similar operations (ICRP 1991).

The risk screening methodology indicates that the radiological health risk from accidents associated with the storage of 20,000 pits in P-Tunnel is dominated by handling accidents that could occur when the pits are being transferred from the transporter. A standard tine forklift is likely to be used to remove pit containers from an SST. Using DOE's methodology, the probability of a standard tine forklift causing a puncture during a single handling operation is in the extremely unlikely range (i.e., 10^{-4} to 10^{-6}) (DOE 1992h). For handling 2,000 pits annually, the accident frequency is approximately 10^{-3} per year. This relatively low accident frequency results from the robust construction of AT–400A shipping containers.

Pit container inventories at NTS are expected to be performed using either shielded or automated techniques and equipment. Consequently, these normal operations are not expected to result in any significant radiological exposure to workers.

Other storage activities that may occur within the timeframe evaluated in this EIS include:

- Restacking a limited number of pits to comply with design laboratory temperature goals.
- A limited number of pit movements and/ or instrumentation placements to facilitate third-party inspections.

Impacts of these routine activities are also considered to be negligible.

Earthquakes offer the greatest threat from natural phenomena (see appendix D). Available seismology studies show that active faults such as the Mine Mountain Fault, the Carpetbag Fault, Yucca Flat Fault, and the Cane Spring Fault in the NTS vicinity are capable of generating earthquakes of up to 0.85 *g* (Raytheon 1995:2-36). NTS has a natural background seismicity (Raytheon 1995:2-33). The Cane Springs fault, located 5 to 8 kilometers (3 to 5 miles) south-southeast of DAF, has been identified as the most significant feature from the standpoint of seismic risk. However, a large proportion of seismic events occurring near NTS may have been aftershocks from past nuclear explosions.

The proposed pit storage area in P-Tunnel is only a few hundred feet away from the site of some past nuclear explosions. Since the tunnel has survived these explosions without noticeable degradation, it is not reasonably foreseeable that the proposed pit storage area would be damaged by an earthquake. However, if the tunnel collapses, the impact forces could breach some certified shipping containers. The collapse would also seal the containers inside the tunnel, resulting in no significant short-term radionuclide releases to the exterior environment. Thus, the consequences to the public and workers are considered negligible. Some mitigation of a tunnel collapse would be needed after a major seismic event. A separate assessment of the risk associated with the mitigation would be necessary in order to address the specific magnitude of the collapse and the applicable mitigation technology.

Impacts of Storing 8,000 Pits

Storage of 8,000 pits could be accomplished at either P-Tunnel or DAF. The risks associated with storing 8,000 pits in P-Tunnel are similar to but less than those of the 20,000-pit storage alternative. The total worker doses from unloading and pit transfer operations would be below 113 person-rem over 4 years. This exposure would result in an additional 0.04 LCF in this group. With an additional 0.04 LCF from pit handling, the total risk of LCFs among workers at NTS would increase by 0.7 percent.

Risk screening methodology also indicates that the risk from storage of 8,000 pits in DAF is dominated by forklift handling accidents. Note that the risk screening methodology evaluated all potential threats to pit container integrity, such as fire, aircraft crash, earthquake, flood, and other internal and external events.

Although DAF is more vulnerable to external events and natural phenomena than P-Tunnel, the contribution from these events to overall risk remains negligible as discussed in appendix D. Compared to the risk from a forklift accident during pit handling, the risk from aircraft accidents and earthquakes at DAF is low. To a significant extent, the low seismic risk at DAF is attributable to the robust construction of the facility (Raytheon 1995:5-7). Aircraft accidents are negligible risk contributors because of the extremely low probability of an impact.

It is estimated that a forklift puncture of a pit container would release 9.2×10^{-5} curies of plutonium. This is a conservative estimate of the respirable, airborne release caused by a puncture of one shipping container (DOE 1992f:7-39).

Given such a release, an involved worker (the forklift driver) would receive a dose of 6.6 rem, corresponding to an incremental increase in lifetime fatal cancer probability of 2.6×10^{-3}. In addition, a non-involved worker 100 meters (328 feet) downwind along the center line of the plutonium dispersion plume would received a 6.3×10^{-2} rem exposure, corresponding to an incremental increase in lifetime fatal cancer probability of 2.5×10^{-5}. The maximally exposed member of the public would receive a 3.9×10^{-5} rem exposure, corresponding to an incremental increase in lifetime fatal cancer probability of 2×10^{-8}. The lifetime fatal cancer probability for an average individual from all other causes is approximately 0.2 (20 percent).

This event would result in an exposure to the public of 3.3×10^{-5} person-rem. Considering the likelihood and consequence of this event, on the average, a member of the public will have an increased annual risk of developing a fatal cancer from this potential accident of 1.1×10^{-15} fatal cancers per year. The annual fatal cancer risk to a person in Nevada from all other causes is 1.4×10^{-3} fatal cancers per year.

5.2.2.2 *Environmental Justice*

Affected Environment

In order to identify the target populations covered by Executive Order 12898, 80-kilometer (50-mile) radius circles centered on DAF and P-Tunnel were overlaid on 1990 Census tract maps (UN 1995). The communities that lie within these 80-kilometer (50-mile) circles, hereafter called the DAF and P-Tunnel Regions of Influence (ROIs), are shown in Figure 5.2.2.2–1.

Population. According to the 1990 Census, there were 11,741 persons within the DAF ROI. White persons comprised nearly 84 percent of the population, Hispanics were the second largest group with slightly more than 7 percent, and Blacks accounted for slightly less than 7 percent of the total population in the ROIs. American Indians, Asians, Pacific Islanders, and other racial groups totaled less than 3 percent of the total population within 80 kilometers (50 miles) of the DAF ROI in 1990 (UN 1995).

In 1990, nearly 96 percent of the population in the DAF ROI lived in the communities of Beatty, Pahrump, Mercury, and Indian Springs; the remaining population lived in the Amargosa Valley area (NV Cen 1992:Table 1; UN 1995). Thus, the entire population within the DAF ROI lived west, south, and southeast of the DAF site.

According to the 1990 Census, there were 4,386 persons within the P-Tunnel ROI. White persons comprised 84 percent of the population, Hispanics were the second largest group with 8 percent, and Blacks accounted for 5 percent of

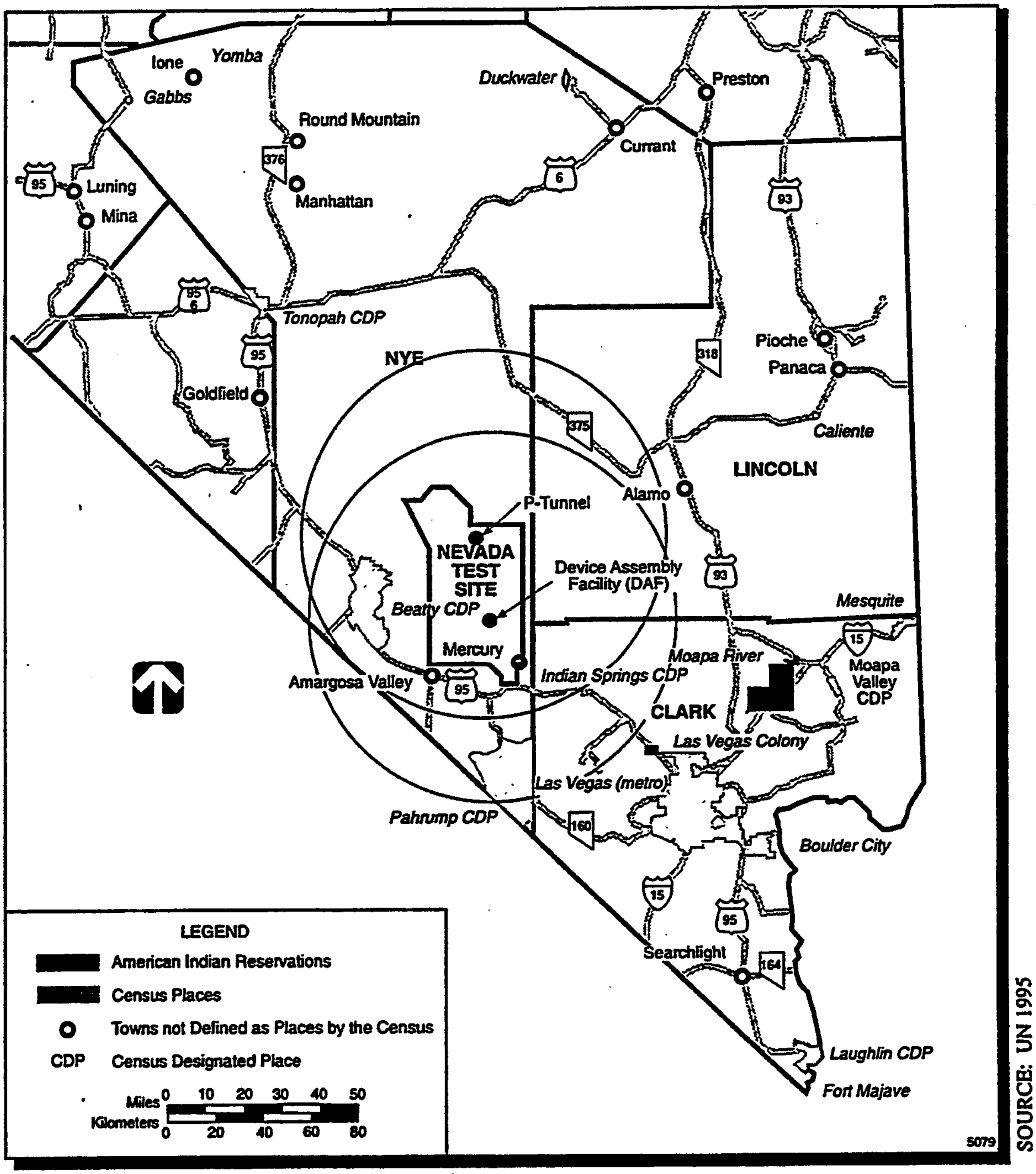


FIGURE 5.2.2.2–1.—*The Device Assembly Facility and P-Tunnel Regions of Influence in Nevada.*

the total population in the circle. American Indians, Asians, Pacific Islanders, and other racial groups totaled less than 3 percent of the total population within the P-Tunnel ROI in 1990 (UN 1995).

In 1990, nearly 87 percent of the population in the P-Tunnel ROI lived in the communities of Beatty, Mercury and Indian Springs; the remaining population lived in the Amargosa Valley area (NV Cen 1992:Table 1; UN 1995). Thus, the entire population within the P-Tunnel ROI lived south, southwest, and southeast of P-Tunnel.

Minority Population. Figure 5.2.2.2–2 shows the 1990 Census block groups within the DAF ROI. The block groups are shaded if 25 percent or more of their populations were minority persons in 1990 and/or if 25 percent or more of their populations were below the poverty level based on their incomes in 1989. The 25 percent threshold levels for minority or low-income persons are based on the working definitions contained in the notice of the EPA's Office of Environmental Justice (59 FR 192). Three block groups within the DAF ROI have populations which were at least 25 percent minority or non-White in 1990. These concentrations of minority persons are found primarily in the communities of Indian Springs, Cactus Springs, and Mercury. In the P-Tunnel ROI, the distribution of minority population is similar to that of the DAF ROI (Figure 5.2.2.2–3).

Low-Income Population. Three block groups within the DAF ROI have populations in which at least 25 percent of persons were below the poverty level based on their incomes in 1989. These concentrations of low-income persons are found primarily at the eastern edge of Pahrump, in the western portion of Amargosa Valley, and in the Death Valley Junction area in California. In the P-Tunnel ROI, only one block group (the western portion of the Amargosa Valley area) has a population in which at least 25 percent of persons were below the poverty level.

Impacts of Storing 20,000 Pits

Because the interim storage of pits at the P-Tunnel would not require any major construction and because all facility modifications would take place inside existing facilities, impacts to the natural environment would be minimal. Under normal operating conditions, there would be minor increases in air pollutants associated with vehicles used during pit storage activities. Also, a minor increase in PM_{10} concentrations would be expected. These increases are associated with the operation of forklifts which are used to move the pits from the unloading area to the storage area.

These impacts are not likely to affect the surrounding population. Radiological releases from normal pit storage operations would have no measurable effect on an individual occupying a position near the NTS boundary for an entire year. Levels at the site boundary would be indistinguishable from natural background radiation. No adverse health effects would be expected among the general public, including minority and low-income populations, as a result of normal storage operations.

An abnormal event, such as accidental puncture of a pit storage container by a forklift, has the potential of exposing the general public to radiation. The analysis in the section 5.2.2.1, Human Health, indicates that the risk to the public from such an accident would be negligible. With no measurable impacts on the general population, the minority and low-income populations would not be disproportionately impacted.

Impacts of Storing 8,000 Pits

The human health impact of storing 8,000 pits in P-Tunnel would be lower than those identified for the storage of 20,000 pits. No significant adverse impacts are expected, and minority and

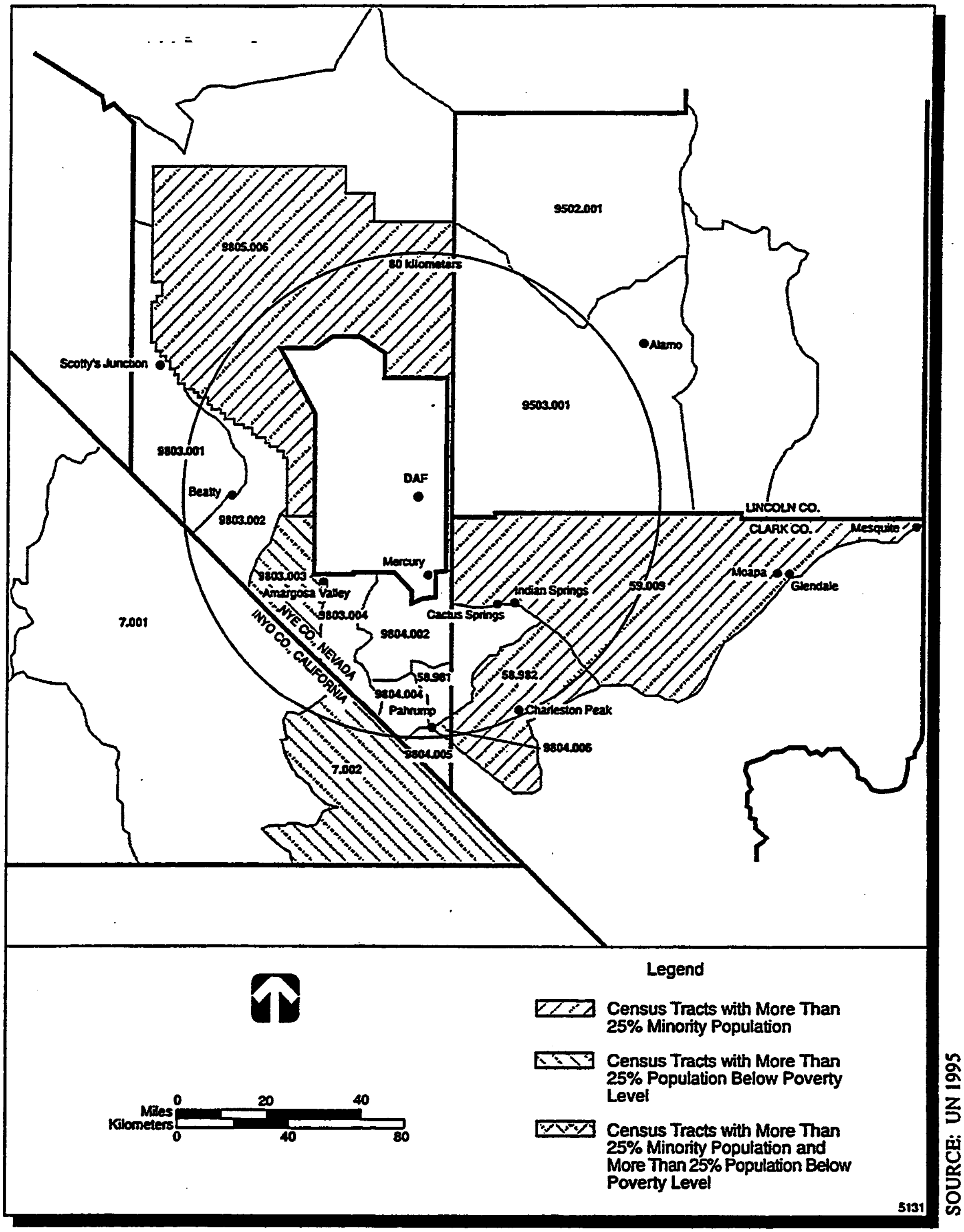


FIGURE 5.2.2.2–2.—*Distribution of Minority and Low-Income Populations in the Device Assembly Facility Region of Influence.*

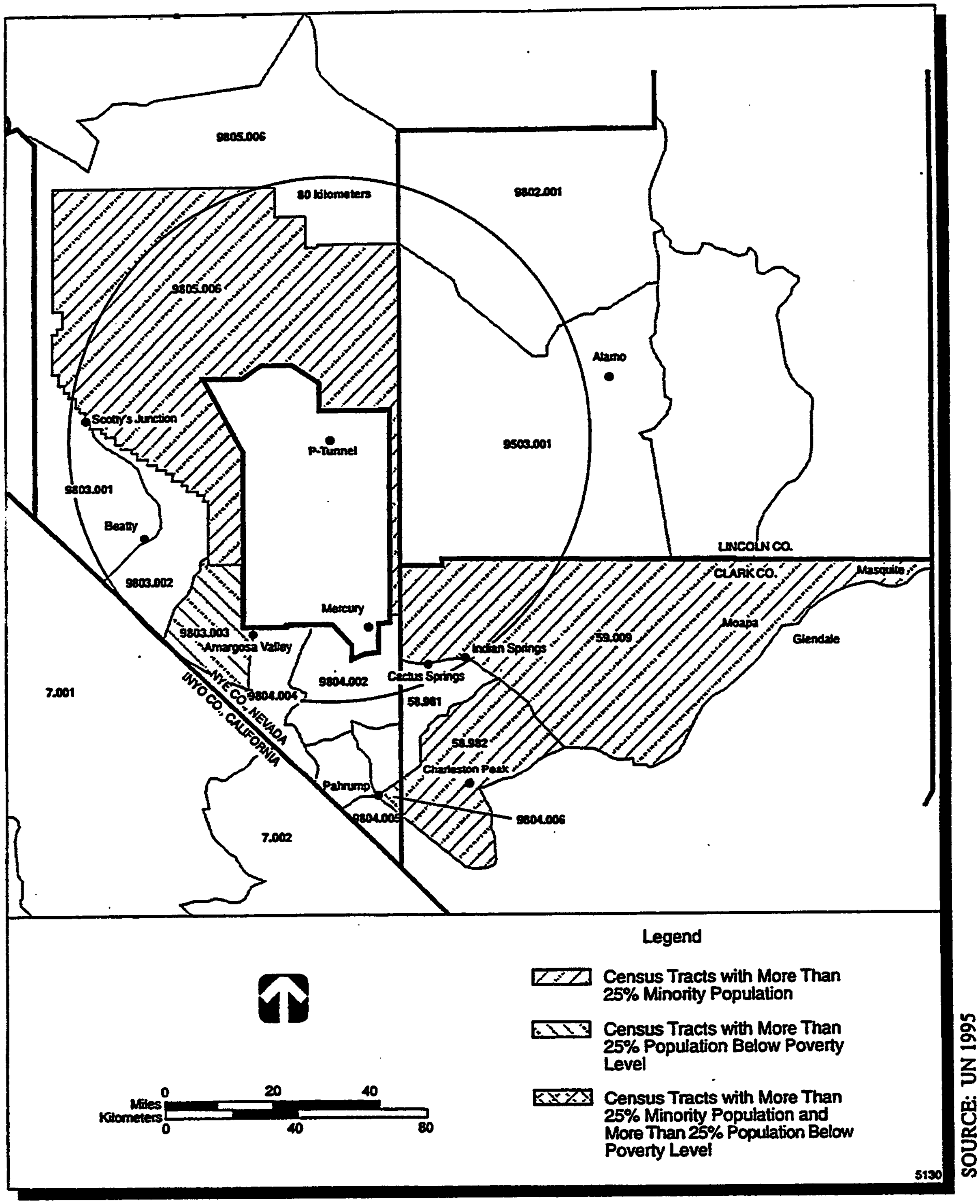


FIGURE 5.2.2.2–3.—*Distribution of Minority and Low-Income Populations in the P-Tunnel Region of Influence.*

low-income populations would not be disproportionately impacted.

The human health impacts of storing 8,000 pits in DAF would be negligible to the general public in the DAF ROI. Since impacts to the general public are expected to be negligible, minority and low-income populations would not be disproportionately impacted.

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THE SAVANNAH RIVER SITE

5.3 SAVANNAH RIVER SITE

Under the Pit Storage Relocation Alternative (see section 3.1.3), the pit storage function currently carried out at Pantex Plant would be transferred to another site. The Savannah River Site (SRS) is one of the candidate sites for the storage of pits (Figure 5.3–1). The P-Reactor building is the specific facility being considered for the interim pit storage at SRS. This section discusses the P-Reactor facility, the affected environment at SRS, and the potential impacts that would be associated with pit storage.

Each aspect of the affected environment at SRS has been assessed and the potential environmental impacts to each have been evaluated. Each environmental resource is discussed commensurate with the degree to which the resource could be impacted by or have an effect on interim pit storage at the candidate facility.

Savannah River Site. SRS is a government-owned and contractor-operated facility, managed by Westinghouse Savannah River Company (DOE 1993d:3-42). DOE owns approximately 780 square kilometers (300 square miles) in Aiken and Barnwell Counties, South Carolina, approximately 26 kilometers (16 miles) southeast of Augusta, Georgia and 19 kilometers (12 miles) south of Aiken, South Carolina (DOE 1993f:1). Less than 5 percent of the site is developed; the remaining area (approximately 73,300 hectares [181,000 acres]) is primarily forest land (DOE 1995q:A-25).

The primary mission at SRS from the 1950's until the recent end of the Cold War was the production and processing of nuclear materials to support defense programs. Major categories of activities at the site include tritium recycling, the processing of plutonium-238 for space missions, processing of irradiated targets and spent nuclear fuel, the interim storage of plutonium, environmental restoration actions, waste management, and research and development. P-Reactor is one of five reactors (C, K, L, P, and R) at SRS (DOE 1995q:A-25).

P-Reactor. P-Reactor is the candidate pit storage facility at SRS; it is located within a controlled area about 4 kilometers (2.6 miles) east-southeast of the geographical center of the site and about 6.5 kilometers (4 miles) west of the closest site boundary (Figure 5.3–1). P-Reactor was built in 1954 and was shut down in August 1988 for maintenance. In February 1991, it was placed in cold standby so that it could be used to provide spare parts for L-Reactor and K-Reactor. P-Reactor is now permanently shut down. The reactor building is a reinforced concrete building that houses four major process areas; the reactor area, the assembly area, the disassembly area, and the purification area (Figure 5.3–2).

The assembly area within the P-Reactor building is the proposed facility for pit storage. The assembly area was originally built for receiving, handling, and preparing fresh fuel and target assemblies for P-Reactor. Separated from the reactor building by a reinforced concrete wall and steel doors, the assembly area is a large warehouse-type facility that is divided into three large rooms; the receiving bay, process zone, and final storage area. Up to 20,000 pits could be stored in this building if appropriate modifications are made. A Perimeter Intrusion Detection and Alarm System already exists around the building. No construction involving new land disturbance would be required at the site.

If DOE chooses to store pits at the P-Reactor facility at SRS, a pit placement, retrieval, and inventory system would be developed. It is expected that an automated or shielded pit movement and inventory system would be developed for this site.

The P-Reactor facility would require some internal facility modifications to enable a pit storage mission. Pit storage would require the installation of seismically qualified racks, and

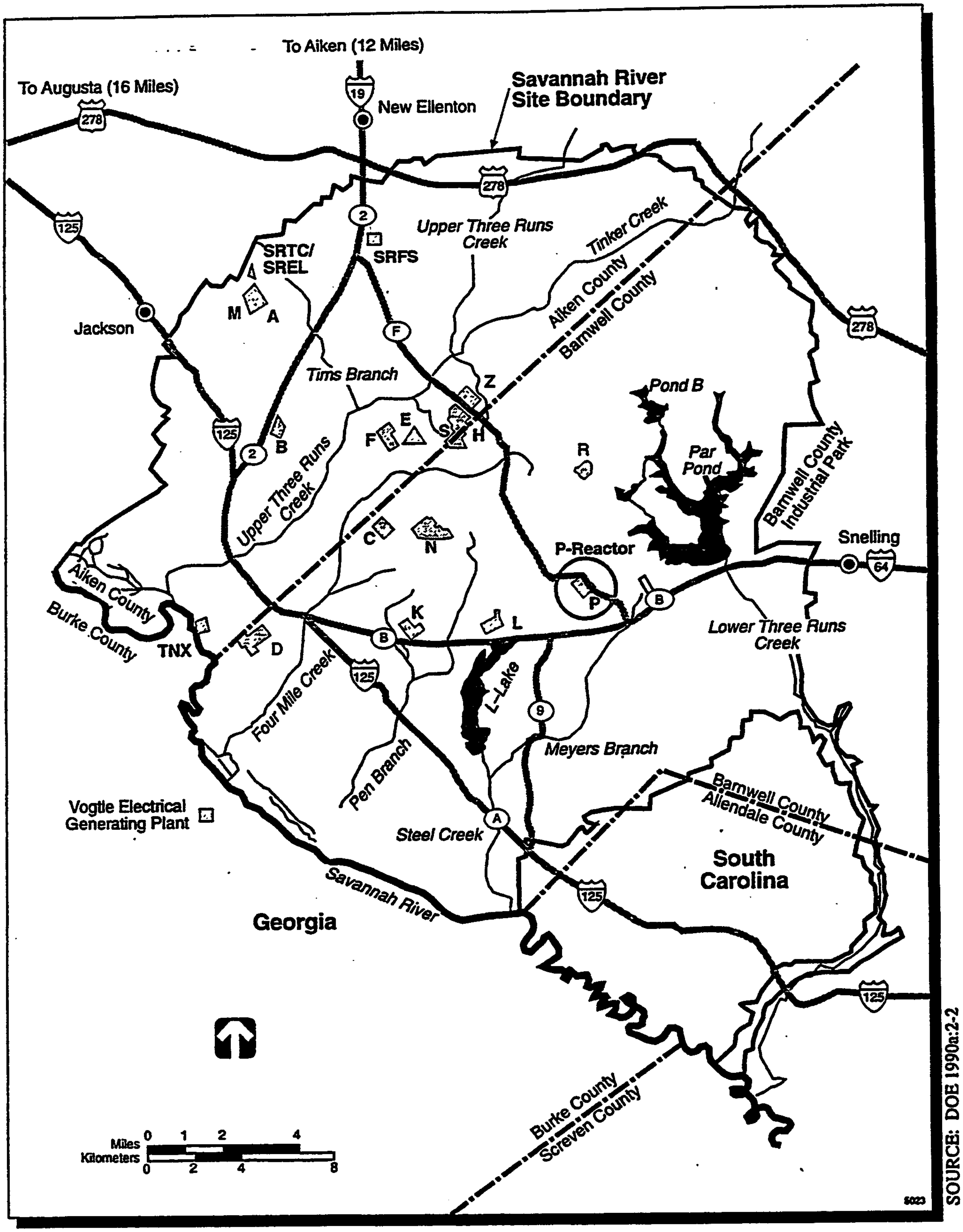
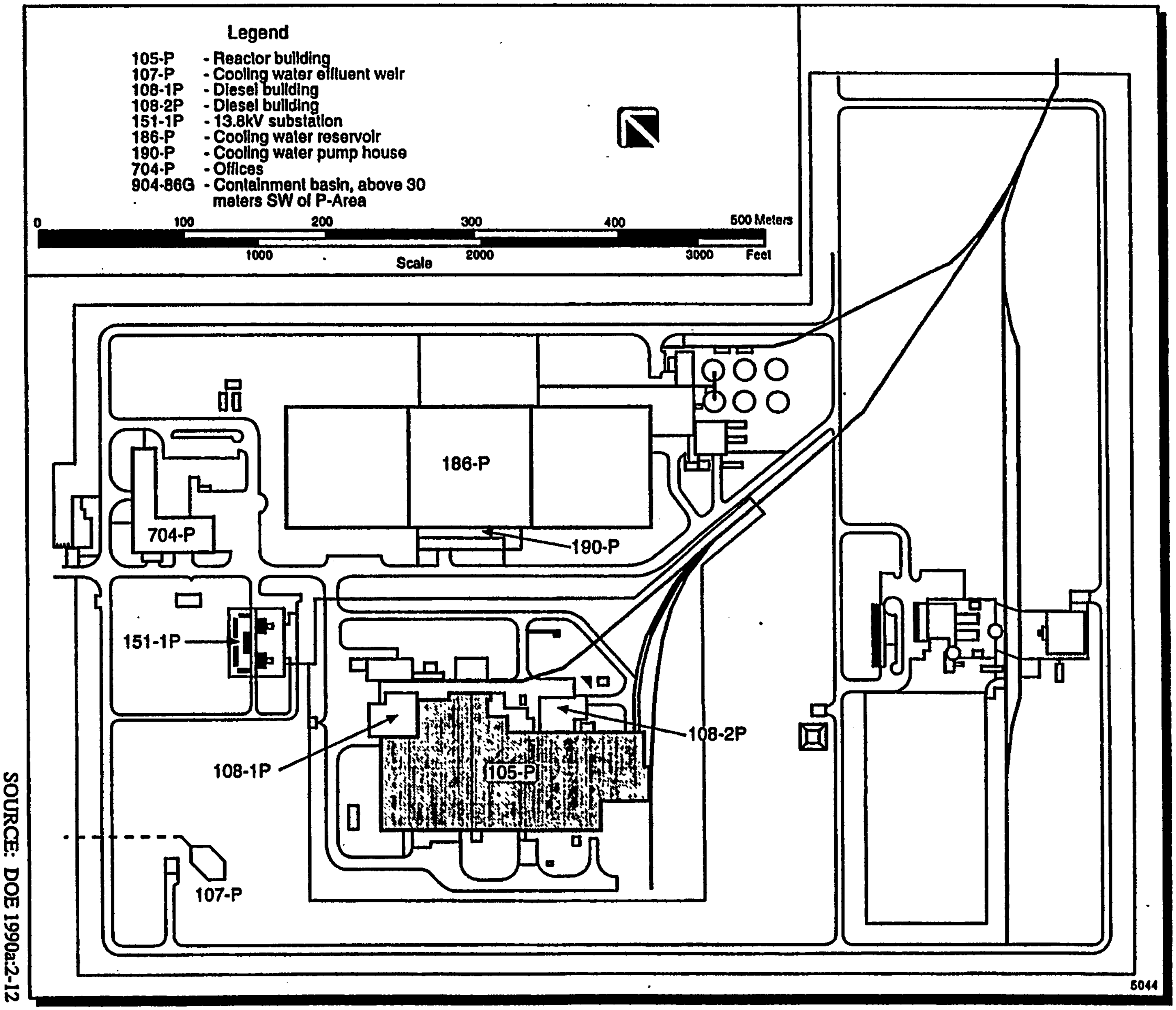


FIGURE 5.3–1.—*Location of P-Reactor at the Savannah River Site.*



SOURCE: DOE 1990a:2-12

FIGURE 5.3–2.—*Layout of P-Reactor at the Savannah River Site.*

the development of an automated or shielded pit placement and retrieval system utilizing a bridge crane or high-lift forklift.

5.3.1 Environmental Resources Not Discussed in Detail

The environmental resources discussed below have been assessed at SRS. The analyses have shown that the impacts to these resources from potential pits storage activities at the P-Reactor facility would be small enough to warrant limited discussion. Therefore, these resources are discussed briefly below and will not be addressed further in this section.

5.3.1.1 *Facilities and Infrastructure*

The infrastructure operations at SRS that could be impacted by or be expected to directly support pit storage operations include security, vehicle and building maintenance, utilities, administration, safety and health protection, and general support (e.g., cafeteria, general stores). Waste management and transportation support are discussed below and in sections 5.3.1.10 and 5.3.1.11, respectively.

The direct impacts from the implementation of pit storage would include a small increase in the site's security force. Electrical usage due to interim pit storage (estimated to be 4,110 megawatthours per year) represents a 0.6 percent increase over the site's 1993 usage of 659,000 megawatthours and just under 0.2 percent of the site's remaining fiscal year 1993 system capacity of 2,980,000 megawatthours (DOE 1995p:C.4-66). Maintenance support and the indirect impacts resulting from pit storage worker requirements (e.g., water, wastewater treatment, and fuel) would increase minimally in comparison to the current and historical onsite infrastructure support levels and system capacities. The P-Reactor facility is not currently being utilized at historical or design levels; therefore, the utility systems generally have excess capacity available to support pit storage activity.

5.3.1.2 *Land Resources*

No land disturbance is projected under the Pit Storage Relocation Alternative for SRS. The Pit Storage Relocation Alternative does not include any new land uses at SRS. Impacts to land use would not be expected.

5.3.1.3 *Geology and Soils*

The only aspects of the geology and soils resource area that could be affected by or have an effect on the implementation of interim pit storage at SRS are the risks associated with earthquakes. P-Reactor is not anticipated to require upgrades that would involve land disturbance; therefore, impacts to soils are not anticipated. The risk due to earthquakes was assessed and found to be bounded by other accidents, as discussed in section 5.3.2.1.

5.3.1.4 *Water Resources*

Because of the nature of the pit storage activities, operations at the P-Reactor would not impact surface water, groundwater, or floodplains. The pit storage activities would not use surface waters at SRS and the nearest 100-year floodplain is 2.4 kilometers (1.5 miles) to the south and would not be impacted by pit storage activities. The increase in discharge of sanitary sewer waste due to a larger number of workers than presently utilized at the P-Reactor would be negligible in comparison to the site's annual wastewater treatment of 708 million liters (187 million gallons) and capacity of 2,043 million liters (540 million gallons). Since the site-wide compliance for SRS in 1993 was 99.9 percent, and because all sanitary discharges are regulated by National Pollutant Discharge Elimination System permits, no impacts to surface water quality are expected (WSRC 1994:16). No wastewater is discharged directly to groundwater; therefore groundwater quality would not be affected (DOE 1995k:4-411). The water demands of pit storage operations are solely due to use by storage personnel. In comparison to historical usage at the P-Reactor and the over 14 billion liters (3.7 billion gallons) used at SRS in 1993, water demands from pit storage are negligible (DOE 1995p:4-46).

5.3.1.5 *Air Quality*

Based on data collected at stations in Aiken and Barnwell counties, SRS and the surrounding area are well within all applicable local, State, and Federal ambient air quality standards (DHEC 1992; DHEC 1993; DHEC 1994). The impacts to air quality from normal pit storage operations would be due entirely to vehicle emissions (approximately 150 vehicles per day). The air impacts caused by vehicle emissions from pit storage activity would be negligible relative to the overall vehicular emissions at SRS.

5.3.1.6 *Acoustics*

The major sources of noise at SRS are located in developed or active areas and include industrial facilities, equipment, and machines. Because of the distance of P-Reactor from the site boundary and residential receptors, noise emitted from the site is not distinguishable above background noise levels at the SRS boundary (DOE 1995k:4-351). The only sources of noise that would be associated with pit storage operations would be from transportation vehicles and air conditioning and heating equipment for the occupied areas of the facility. These impacts would be minimal.

5.3.1.7 *Biotic Resources*

No Federally listed threatened or endangered plant and animal species are known to occur at P-Reactor (DOE 1995k:4-386). The smooth coneflower (*Echinacea laevigata*) is the only threatened or endangered plant that occurs on SRS. The bald eagle (*Haliaeetus leucocephalus*) and red-cockaded woodpecker (*Picoides borealis*) nest at SRS, and the wood stork (*Mycteria americana*) forages in the Savannah River Swamp and several of its tributaries on SRS. The peregrine falcon (*Falco peregrinus*) and Kirtland's warbler (*Dendroica kirtlandii*) may occur on an incidental basis. The shortnose sturgeon (*Acipenser brevirostrum*) occurs in the Savannah River near SRS (DOE 1995m:3-42 through 3-44). The interim storage of pits at the P-Reactor would not disturb the above mentioned species at SRS. Further, no wetlands at SRS would be disturbed by the Pit Storage Relocation Alternative (DOE 1995k:4-423). As a result, impacts to biotic resources would not be expected.

5.3.1.8 *Cultural Resources*

No historic, prehistoric, or paleontological sites have been found in the immediate vicinity of P-Reactor at SRS. Further, no National Register of Historic Places-eligible buildings are located at the P-Reactor. The Pit Storage Relocation Alternative would not adversely impact cultural and paleontological resources at SRS.

Native American groups with traditional ties to the area include the Westo, Shawnee, Yuchi, Apalachee, Chickasaw, Creek, and Cherokee (DOE 1993d). Consultations regarding traditional Cultural Properties and concerns have been conducted by DOE. As a result, Pee Dee, Creek, and Yuchi townsites are considered sensitive, and the Yuchi and Muskogee Creek groups have expressed a general concern regarding traditional use areas (DOE 1995m:55, 56; DOE 1993d:4-56, 57). These areas are not located at P-Reactor and, as a result, no impacts are expected from the Pit Storage Relocation Alternative.

5.3.1.9 *Socioeconomic Resources*

Approximately 150 additional personnel (including 120 security personnel) would be required for interim storage of pits at SRS. This number represents less than a 1.0 percent increase in the total SRS workforce. Most of these workers can be hired locally; therefore, no significant site or regional population and workforce increases are anticipated. According to the 1990 Census, 150 workers represent 0.07 percent of the workforce employed within the SRS Region of Influence (SC Cen 1993:Table 145; GA Cen 1993:Table 145). No socioeconomic impacts would be anticipated.

5.3.1.10 *Waste Management*

Currently, SRS manages high-level waste, mixed transuranic waste, transuranic waste, mixed waste, low-level waste, hazardous waste, and nonhazardous wastes in accordance with the requirements of a number of Federal and State regulations, permits obtained under these regulations, and DOE orders. These requirements are primarily under the authority of the Environmental Protection Agency, DOE, and the South Carolina Department of Health and Environmental Control. SRS anticipates generating 18,000 cubic meters (23,500 cubic yards) of low-level waste, approximately 2,000 cubic meters (2,600 cubic yards) of mixed waste, and 1,400 cubic meters (1,800 cubic yards) of hazardous waste in 1996 (DOE 1995m:A-1). The pit storage operations would generate less than 1 cubic meter (1.3 cubic yards) of mixed, low-level, and hazardous waste. This amount of waste would not impact current waste management at SRS.

5.3.1.11 *Intrasite Transportation*

The P-Reactor facility is located approximately 4 kilometers (2.6 miles) east-southeast of the geographical center of SRS and approximately 6.5 kilometers (4 miles) west of the closest site boundary (Figure 5.3–1). State Highway 125 provides access to the P-Reactor facility from the Augusta region; State Highway 64 provides access from Snelling. The P-Reactor facility is located on SRS primary Road F. All roads within SRS are suitable for passage in all weather conditions. Although some roads within the SRS boundaries are public access roads, the DOE would control access during passage of Safe Secure Tractor Trailer (SST) convoys. Because a release of plutonium from an intersite pit shipment would require a severe accident (e.g., an accident with a fuel tanker or train [see section 4.16.4.2]), the controlled transportation environment within SRS does not pose a significant threat to pit shipments. Consequently, the contribution of overall intersite transportation risk from onsite transportation is negligible.

5.3.1.12 *Aircraft Accidents*

There are four airports in the vicinity of P-Reactor. Bush Field, the major commercial airfield in the area, has two runways and is approximately 38 kilometers (24 miles) west-northwest of P-Reactor. The airport is used by commercial (air carrier and air taxi), military, and general aviation aircraft. In 1994, Bush Field had 39,461 aircraft operations (take-offs and landings). Table 5.3.1.12–1 summarizes the total number of airfield operations at Bush Field (PC 1996j). The closest airport, the

TABLE 5.3.1.12–1.—*Bush Field Operations for 1994*

AIRCRAFT CATEGORY	NUMBER OF OPERATIONS
Air Carrier	6,473
Air Taxi	5,961
Military	5,677
General Aviation	21,350
Total Airfield Operations	39,461

Source: (PC 1996j)

county airport near Barnwell, has three runways and is located approximately 18 kilometers (11 miles) east of P-Reactor. This airport is used by general aviation aircraft. Similarly, Aiken Airport, approximately 46 kilometers (29 miles) north-northwest, has three runways, used only by general aviation aircraft.

The North Army Base, approximately 61 kilometers (38 miles) northeast, has one runway used by military aircraft only. All four airports are outside the probability density function boundary for all categories of aircraft, and were therefore not included in the aircraft crash analysis. Only non-airport (in-flight) aircraft were included in the analysis as required by the Draft DOE Standard (DOE 1996g). Further details on these four facilities are contained in volume II, appendix E.

P-Reactor was modeled conservatively as a facility with a length of 69 meters (225 feet), a width of 57 meters (187 feet), and a height of 9 meters (30 feet). Using the Draft DOE Standard for determining the probability of aircraft crashes and 1994 data from the FAA, the frequency of hitting P-Reactor was calculated as 1.2×10^{-6} for all types of aircraft (DOE 1996g). It should be noted that the frequency calculation represents a conservative upper bound. Since this frequency is greater than 10^{-7}, in accordance with the Draft DOE Standard, further analysis was required. A local response structural analysis was performed according to the Draft DOE Standard, for the facility with a wall thickness of 76 centimeters (30 inches).

The analysis was performed for the maximum penetrator missile for each of the aircraft categories mentioned in section 4.15.2, except for helicopters. The commercial air carrier and large military aircraft categories were the only two aircraft missiles capable of penetrating the facility; the frequency of releasing material from P-Reactor was $\leq 9.2 \times 10^{-9}$. Since this frequency is less than 10^{-7}, in accordance with the Draft DOE Standard, no further analysis was required. Further details of the frequency of hitting P-Reactor and the frequency of releasing material are contained in volume II, appendix E.

5.3.2 Resources Discussed in Detail

5.3.2.1 *Human Health*

The basic approach used in assessing human health concerns is to first identify the affected environments and establish a baseline that represents the risk from current operations. Changes in this baseline risk resulting from the Pit Storage Relocation Alternative are then examined. Impacts from both normal operations and potential accidents are estimated.

Assessing the human health risk impact from potential accidents resulting from the relocation of pits to SRS and storing them in the P-Reactor facility involves a risk screening process. The first step in this process is to identify a broad spectrum of potential accident scenarios. The second step in the process uses screening techniques to identify the specific scenarios that dominate risk (i.e., scenarios that contribute an appreciable fraction of the total risk). Finally, risk is the product of frequency and consequence. Rigorous consequence evaluations are only performed for the identified risk dominant scenarios.

Two types of accident consequences are examined:

- Worker and public exposure.
- The probability of the accident causing fatal cancer in a worker or the public.

If DOE chooses to relocate pits to SRS, two aspects of this relocation would contribute to a potential for environmental impacts. These impacts are associated with:

- Transferring pits from the transporter to their storage location inside the facility.

- Storage itself (i.e., potential impacts resulting from having the pits reside inside the facility).

Each time pits are transferred from the transporter to their storage location inside the facility, there is a small probability that an accidental release could occur due to a handling accident. In addition, the transfer of pits from the transporter to their storage location would result in radiological exposures to involved workers.

Affected Environment

The release of radioactivity and toxic chemicals to the environment from a DOE facility is an important issue for onsite workers and the public. Since the human environment contains many sources of radioactivity and toxic chemicals, it is essential to understand the sources of these substances and how effectively they are controlled.

Table 5.3.2.1–1 summarizes the major sources of radiation exposure in the vicinity of SRS. Cancer statistics for the States of Georgia and South Carolina indicate that annually, an average person in those states has a 1.7×10^{-3} probability of contracting a fatal cancer (DOE 1990a:4-36). Using nominal fatal cancer risk factor of 5×10^{-4} cancer fatalities per person rem and the environmental radioactivity data for SRS in Table 5.3.2.1–1, it is calculated that fatal cancers within 80 kilometers (50 miles) of SRS attributable to environmental radioactivity released from SRS constitute 0.005 percent of

TABLE 5.3.2.1–1.—*Major Sources of Radiation Exposure in the Vicinity of the Savannah River Site*

SOURCE OF EXPOSURE	DOSE TO AVERAGE INDIVIDUAL (mrem/yr)[1]	PERCENTAGE OF TOTAL EXPOSURE
NATURAL BACKGROUND RADIATION		
Cosmic and external terrestrial	72	
Internal terrestrial	40	
Radon in home	200	
Total natural	312	82.8
MEDICAL RADIATION		
Diagnostic x-rays	39	
Nuclear medicine	14	
Total medical	53	14.0
OTHER SOURCES		
Weapons test fallout	<1	
Consumer and industrial products	10	
Air travel	1	
Nuclear facilities (other than SRS and transportation of radioactive materials)	<0.1	
SRS—environmental radioactivity	<0.1	
Total other	12	3.2
Total—all sources	377	100

[1]Effective dose equivalent.

Sources: NCRP 1987:15, 53; DOE 1990a:3-52 the average yearly fatal cancer probability in Georgia and South Carolina (DOE 1994o:4-20).

Figure 5.3.2.1–1 depicts the offsite population within an 80-kilometer (50-mile) radius of SRS. Meteorological data for the P-Area are presented in Figure 5.3.2.1–2 (DOE 1994v:4-25; DOE 1993a:12). Winds from the northeast sector occurred most often, with southwest and northeast quadrants more frequent than northwest and southeast quadrants.

Impacts of Facilities Upgrades

There is no significant impact on human health associated with SRS facility upgrades. The principal upgrade required is to modify P-Reactor to accept Stage Right transfer and storage equipment. The facility impact involves modifying floor space to accept Stage Right guide rails and fastening Stage Right attachment fixtures to storage facility walls. These are standard industrial operations that do not expose workers to any special hazards (e.g., radionuclides, toxic chemicals, or high explosives).

Impacts of Storing 20,000 Pits

Human health impacts from pit storage activities could potentially result from normal operations and accident scenarios. Impacts from normal operations would be confined to onsite workers. Normal operational impacts result from unloading of pits from SSTs at the P-Reactor facility. Unloading operations would result in radiological exposure to cargo handlers. Based on conservative calculations made for handling of pits at Pantex Plant, the worker doses from unloading of 2,000 pits per year are estimated to be 27 person-rem per year or 270 person-rem for the unloading of 20,000 pits (the maximum number of pits which may be stored at the P-Reactor facility).

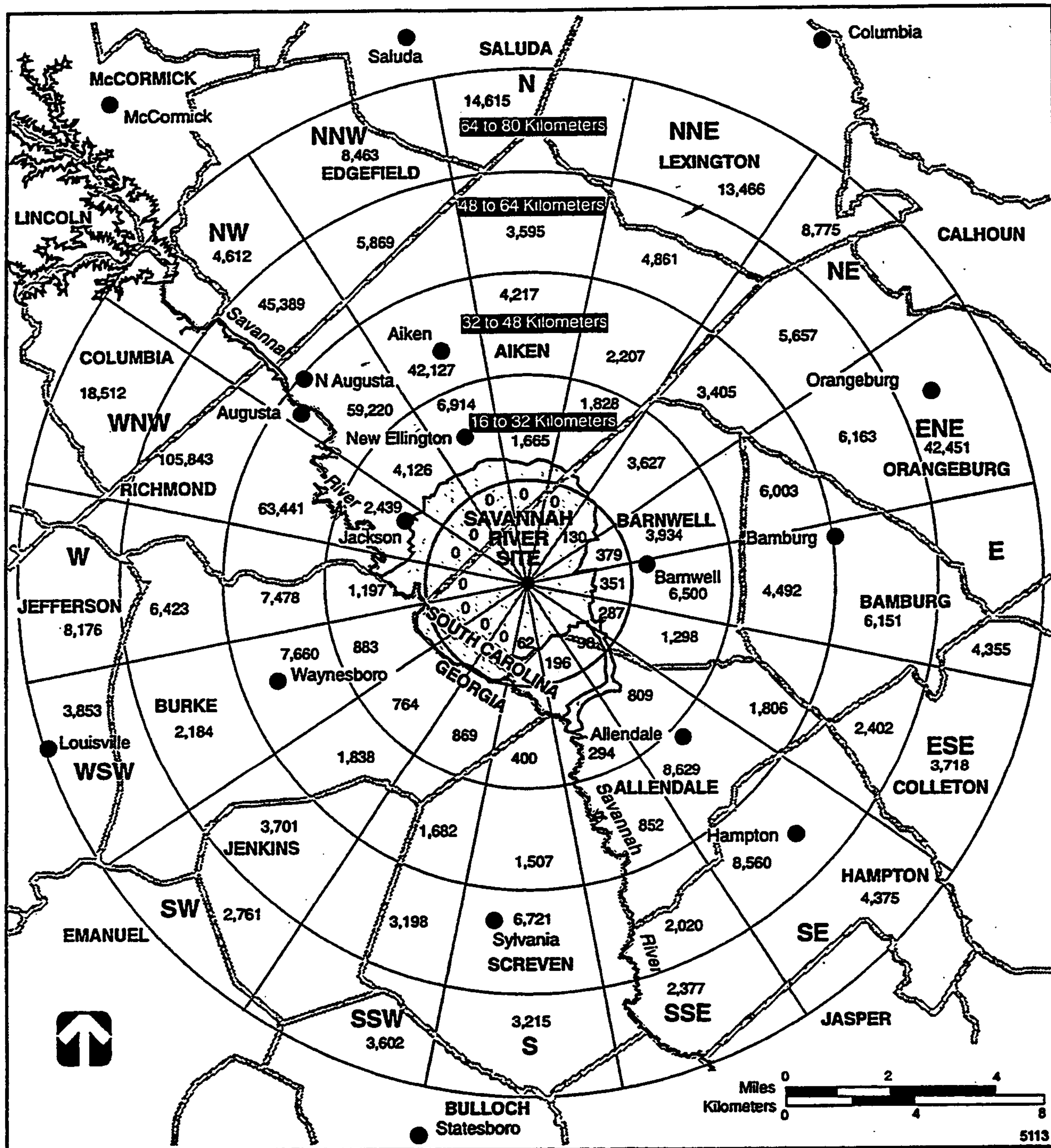
Once removed from SSTs, pits would be transferred into the P-Reactor facility for storage. Pit transfers within the P-Reactor facility would result in radiological exposures to onsite workers handling the pits. The transfer of pits would result in worker doses of less than 2 person-rem per year for handling 2,000 pits and about 13 person-rem for the placement of 20,000 pits. The combined worker dose from unloading and storage of 20,000 pits at the P-Reactor facility would be 283 person-rem distributed over the 30 people directly involved in material handling. Assuming that the same 30 people continue to handle 20,000 pits over a period of 10 years and using a dose-to-risk conversion factor of 4 x 10^{-4} latent cancer fatality (LCF) per person-rem, there would be an additional 0.11 LCF experienced by this group due to radiological exposure from pit handling.

The probability of LCFs from all causes in the general population is estimated at 20 percent which implies that 6 of 30 workers would develop cancer from all other causes. With an additional 0.11 LCF from pit handling, the total risk of latent cancer among workers at the P-Reactor site would increase by 1.8 percent.

Some operational accidents could result in impacts to both onsite workers and the offsite general population. Radiological exposures and the resultant risk of latent cancers have been evaluated and described in paragraphs that follow.

The risk screening methodology indicates that the radiological health risk from accidents associated with the storage of 20,000 pits in P-Reactor is dominated by handling accidents that could occur when the pits are being transferred from the transporter. A standard tine forklift is likely to be used to remove pit containers from an SST. The probability of a standard tine forklift causing a puncture during a single handling operation is in the extremely unlikely range (i.e., 10^{-4} to 10^{-6}).

It is estimated that a forklift puncture of a pit container would release 9.2 x 10^{-5} curies of plutonium. This is a conservative estimate of



SOURCE: UN 1995

FIGURE 5.3.2.1–1.—*Offsite Population in the Vicinity of the Savannah River Site.*

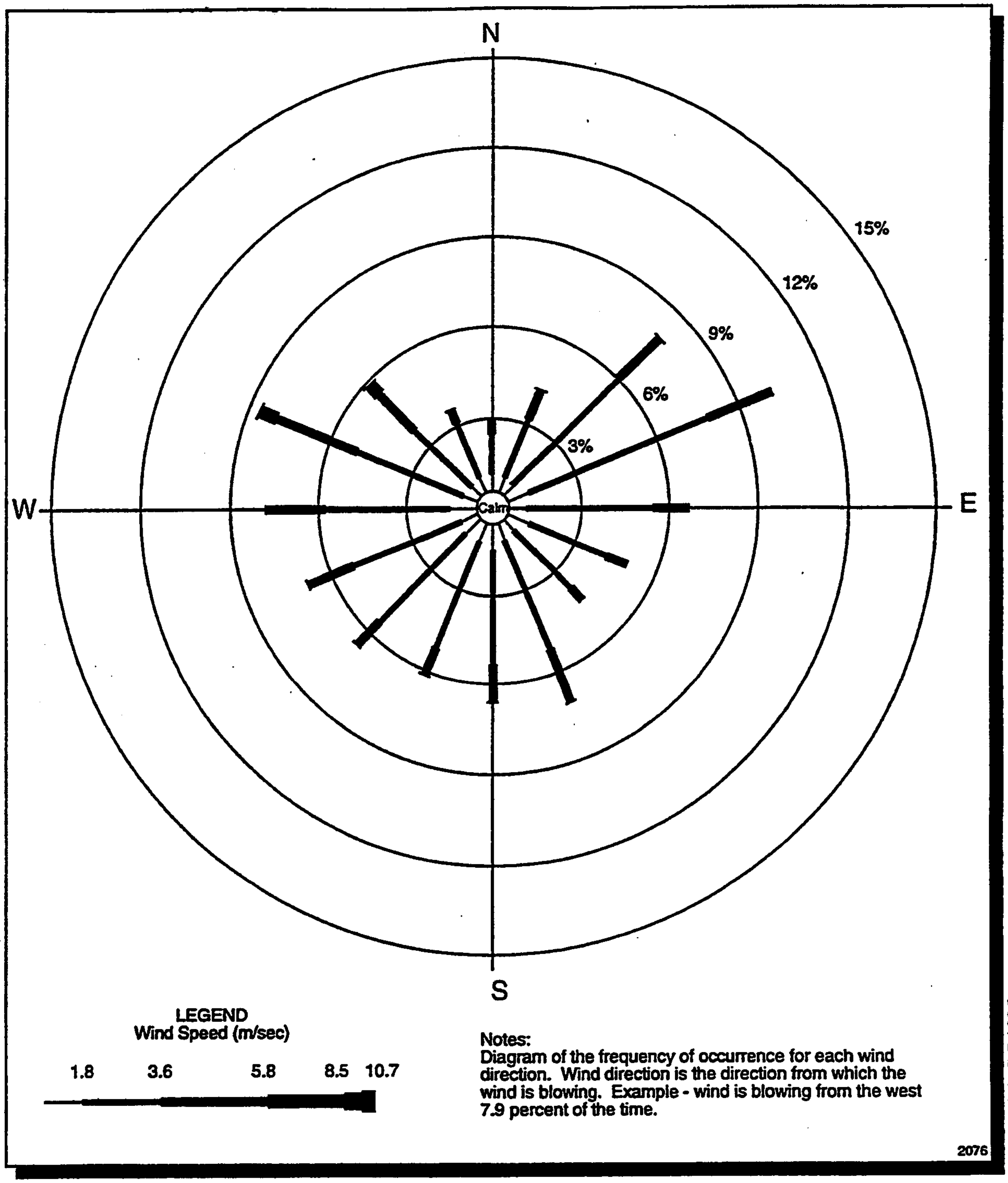


FIGURE 5.3.2.1–2.—*Wind Direction and Speed at the Savannah River Site, South Carolina, 1986.*

the respirable, airborne release caused by a puncture of one shipping container (DOE 1992f:7-39).

Given such a release, an involved worker (the forklift driver) would receive a dose of 6.6 rem, corresponding to an incremental increase in lifetime cancer probability of 2.6×10^{-3}. In addition, a non-involved worker 100 meters (328 feet) downwind along the center line of the plutonium dispersion plume would received a 5.2×10^{-2} rem exposure, corresponding to an incremental increase in lifetime fatal cancer probability of 2.1×10^{-5}. The maximally exposed member of the public would receive a 1.1×10^{-5} rem exposure, corresponding to an incremental increase in lifetime fatal cancer probability of 5.5×10^{-9}. The lifetime fatal cancer probability for an average individual from all other causes is approximately 0.2 (20 percent).

This event would result in an exposure to the public of 4.6×10^{-3} person-rem. Considering the likelihood and consequence of this event, on the average, a member of the public will have an increased annual risk of developing a fatal cancer from this potential accident of 3×10^{-15} fatal cancers per year. The annual fatal cancer risk to a person in the States of South Carolina and Georgia from all other causes is 1.7×10^{-3} fatal cancers per year.

Pit container inventories at P-Reactor are expected to be performed using either shielded or automated techniques and equipment. Consequently, these normal operations are not expected to result in any significant radiological exposure to workers.

Other storage activities that may occur within the time frame evaluated in this EIS include:

- Restacking a limited number of pits to comply with design laboratory temperature requirements.
- A limited number of pit movements and/ or instrumentation placements to facilitate third-party inspections.

Impacts of these routine activities are also considered to be negligible.

The greatest threat to pit containers from natural phenomena is from natural earthquakes. Analysis of available seismology studies and estimates of the reactor building's seismic capacity indicate that the relative risk from earthquakes is over two orders of magnitude below the risk from a forklift accident, (3.0×10^{-15} LCF per year to an average member of the public) (DOE 1994v:4-24; DOE 1994u:C-25; NRC 1985:C-45).

Impacts of Storing 8,000 Pits

The risks associated with storing 8,000 pits in P-Reactor are similar to but less than those of the 20,000-pit storage alternative. If DOE chooses to store only 8,000 pits at SRS, the worker doses from unloading and pit transfer operations would be below 113 person-rem over 4 years. This exposure would result in an additional 0.04 LCF in this group. With 0.04 LCF from pit handling, the total risk of LCFs among workers at SRS would increase by 0.7 percent.

Risk screening methodology also indicates that the risk from storage of 8,000 pits in P-Reactor is dominated by forklift handling accidents. These impacts would be similar to those described for the storage of 20,000 pits (i.e., a LCF risk of 3.0×10^{-15} latent fatal cancers per year to an average member of the public).

5.3.2.2 *Environmental Justice*

Affected Environment

P-Reactor is located at SRS in west-central South Carolina along the Savannah River which forms the border between South Carolina and its western neighbor, Georgia. A 1990–1991 survey of the SRS workforce found that 90.5 percent of onsite workers reside in four South Carolina counties and two Georgia counties (DOE 1992g). In order to identify the target resident populations covered by Executive Order 12898, an 80-kilometer (50-mile) radius circle centered on the P-Reactor facility at SRS was overlaid on 1990 Census maps. The communities which lie within the 80-kilometer (50-mile) circle, hereafter called the P-Reactor Region of Influence (ROI), are shown in Figure 5.3.2.2–1.

Population. According to the 1990 Census, 621,677 persons reside within the P-Reactor ROI. The population is 61 percent White and 37 percent Black (UN 1995). Twenty-seven counties are wholly or partially included within the ROI. Blacks are a majority of the population in ten of these counties; 7 of 14 counties in South Carolina and 3 of 13 counties in Georgia. The largest population concentration within the ROI is northwest of SRS in Aiken, Columbia, and Richmond Counties (GA Cen 1992:Tables 1 and 8; SC Cen 1992:Tables 1 and 8).

Communities with 1990 populations greater than 10,000 persons within the ROI are: Augusta, Georgia (44,639), the South Augusta Census Designated Place (CDP) (55,998), the West Augusta CDP (27,637), Aiken, South Carolina (19,872), North Augusta, South Carolina (15,351), and Orangeburg, South Carolina (13,739). There are also eight towns and CDPs within the ROI whose 1990 population counts are between 1,000 and 10,000 persons. The combined 1990 population for all communities within the ROI that are greater than 1,000 persons is 213,968, or 34.4 percent. Thus, nearly two-thirds of the 1990 population within the ROI lived in rural areas and in towns with populations less than 1,000 persons (GA Cen 1992:Table 6; SC Cen 1992:Table 6).

Minority Population. Figure 5.3.2.2–2 shows 1990 Census tracts within the ROI. The tracts are shaded if 25 percent or more of their populations were minority persons in 1990 or if 25 percent or more of their populations were below the poverty level based on their incomes in 1989. The 25 percent threshold levels for minority or low income persons are based on the working definitions contained in the notice of the Environmental Protection Agency's Office of Environmental Justice (59 FR 192).

With the exception of five tracts northeast of the P-Reactor facility and a number of ROI tracts to the northwest, in Augusta and Aiken Counties, virtually every tract within the ROI has at least a 25 percent minority population. All of the tracts in the largely rural counties west, south and east of the P-Reactor facility—namely, Burke, Emanuel, Jefferson, Jenkins and Screven in Georgia; and Allendale, Bamberg, Barnwell, Colleton and Hampton in South Carolina—have populations that are 25 percent or more minority or non-White. In the Augusta urban area, including the City and its unincorporated neighbors, West and South Augusta, most tracts contain 25 percent minority populations; Blacks comprise 45 percent of the total population (GA Cen 1992:Tables 5 and 6; SC Cen 1992:Tables 5 and 6).

Low-Income Population. The greatest concentration of low-income population within the ROI is found in the largely rural counties west, south and east of SRS. With the exception of seven tracts, all of Burke, Emanuel, Jefferson, Jenkins and Screven counties in Georgia have populations in which at least one in four persons live below the poverty level based on their incomes in 1989. In South Carolina, threshold levels of low-income persons are not as widespread. Portions of Allendale, Hampton, Bamberg and Barnwell counties in South Carolina are the areas closest to the P-Reactor facility where 25 percent or more persons lived below the poverty level in 1989.

Several cities and towns within the ROI have poverty rates which are characteristic of their neighboring areas. In Georgia, Augusta had a

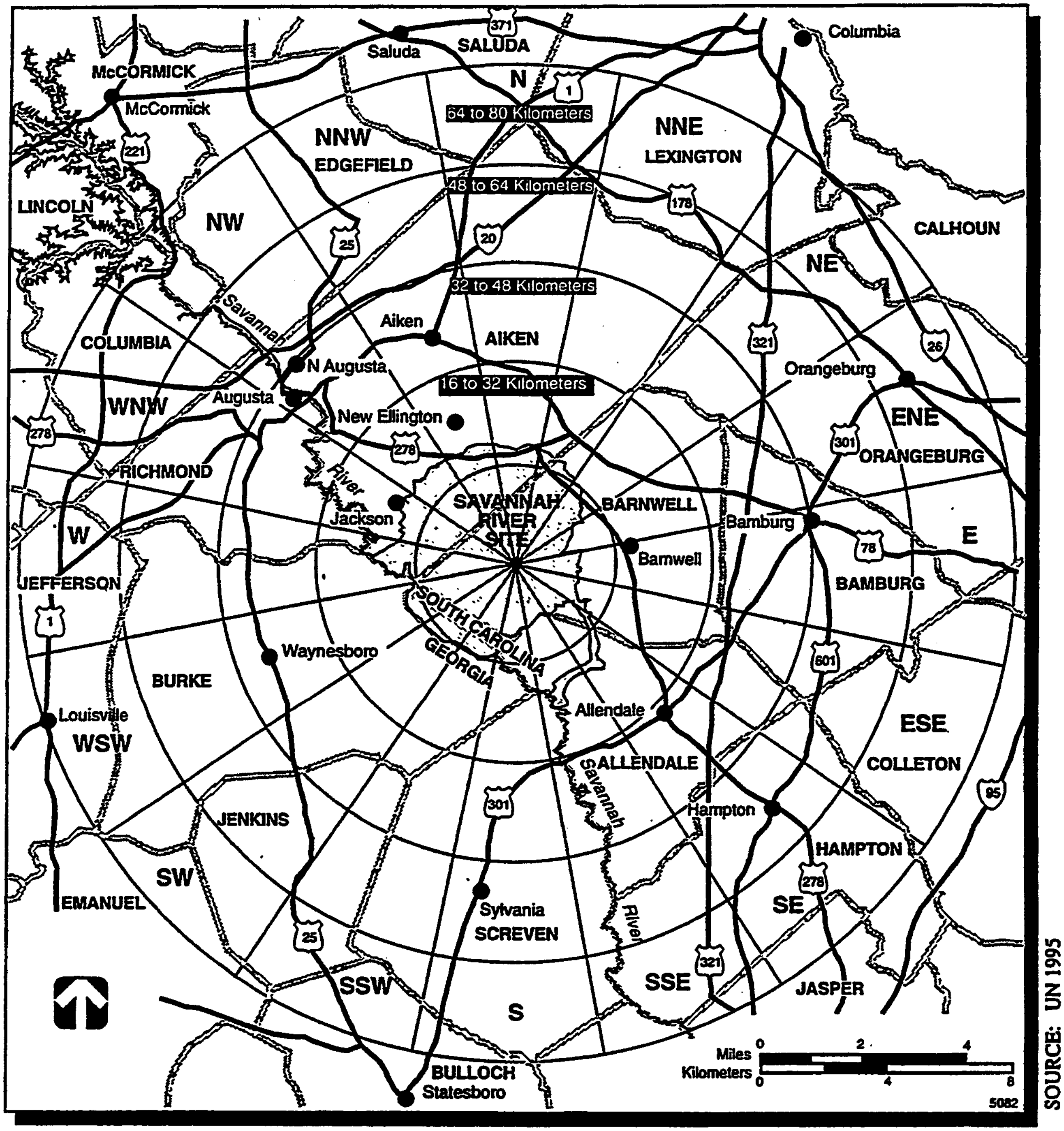


FIGURE 5.3.2.2–1.—*P-Reactor Region of Influence.*

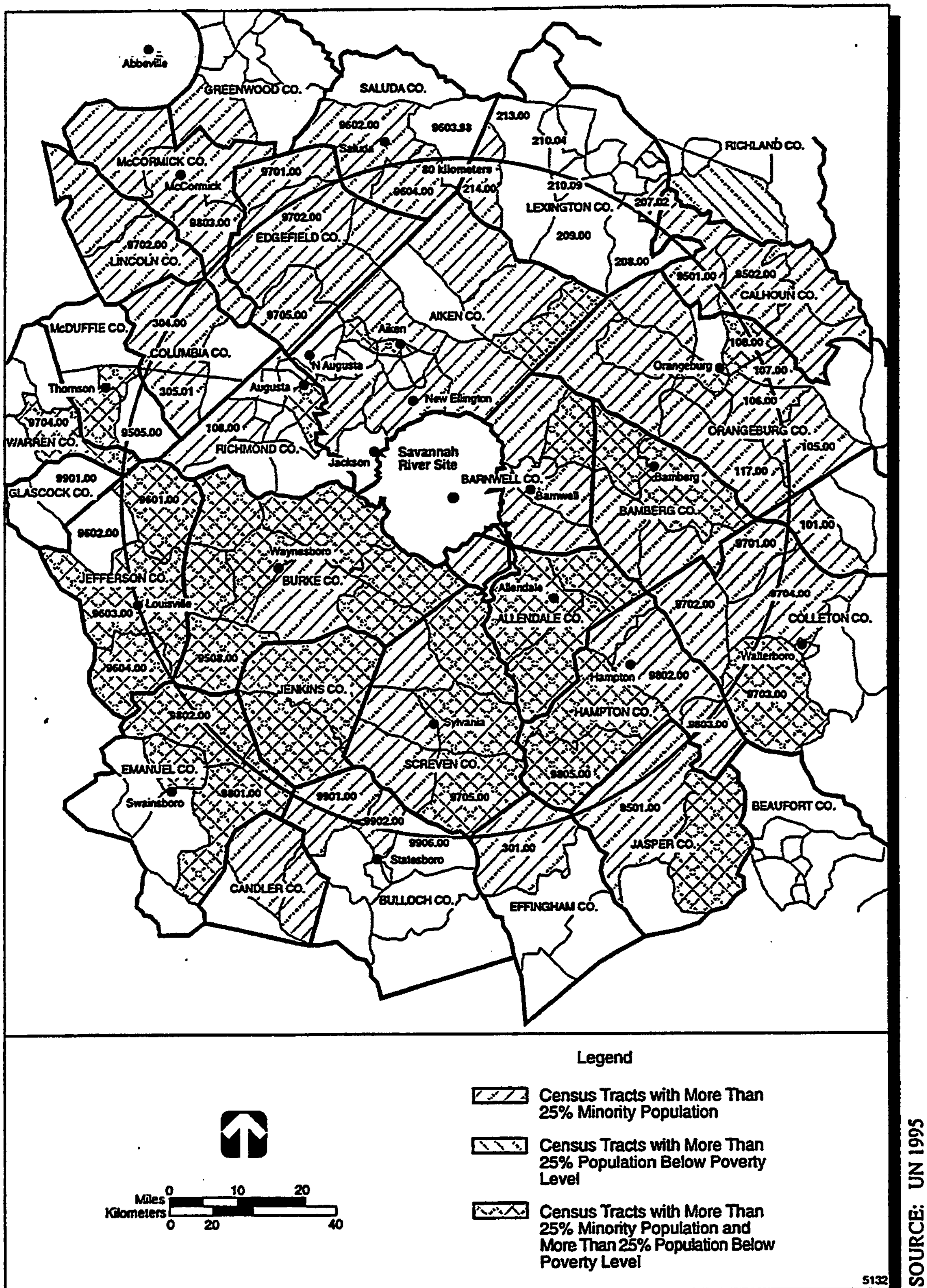


FIGURE 5.3.2.2–2.—*Minority and Low-Income Populations in the P-Reactor Region of Influence.*

33 percent rate, while Sylvania and Waynesboro had 26 and 34 percent rates, respectively. In South Carolina, Allendale had a 44 percent poverty rate, while Bamberg, Barnwell and Orangeburg had poverty rates of 34, 26, and 25 percent, respectively (GA Cen 1993:Tables 178 and 203; SC Cen 1993:Tables 178 and 203).

Impacts of Storing 20,000 Pits

Because the interim storage of 20,000 pits at the P-Reactor facility would not require any construction activities and because all facility modifications would take place inside existing facilities, impacts to the natural environment would be minimal. Under normal operating conditions, there would be minor increases in air pollutants associated with vehicles used during pit storage activities. Also, a minor increase in particulate matter of aerodynamic diameter less than 10 micrometers concentrations would be expected. These increases are associated with the operation of forklifts which are used to move the pits from the unloading area to the storage area. These impacts are not likely to affect the surrounding population.

Radiological releases from normal pit storage operations would have no measurable effect on an individual occupying a position near the SRS boundary for an entire year. Levels at the site boundary would be indistinguishable from natural background radiation. No adverse health effects would be expected among the general public, including minority and low-income populations, as a result of normal storage operations.

An abnormal event, such as accidental puncture of the transport container from a forklift, has the potential of exposing the general public to radiation. The analysis in the section 5.3.2.1, Human Health, indicates that the risk to the public from such an accident would be negligible. With no measurable impacts on the general population, the minority and low-income populations would not be disproportionately impacted.

Impacts of Storing 8,000 Pits

The human health impact of storing 8,000 pits at the P-Reactor facility would be lower than those identified for the storage of 20,000 pits. No significant adverse impacts are expected, and minority and low-income populations would not be disproportionately impacted.

THE HANFORD SITE

5.4 HANFORD SITE

Under the Pit Storage Relocation Alternative (see section 3.1.3), the pit storage function currently carried out at Pantex Plant would be transferred to another site. The Hanford Site is one of the candidate sites for the storage of pits (Figure 5.4–1). The Fuels and Materials Examination Facility (FMEF) is the candidate pit storage facility at the Hanford Site. FMEF is currently capable of storing approximately 8,000 pits with relatively minor modification. With more extensive modifications it may be possible to store up to 20,000 pits in the facility. However, due to the time constraints within which the facility would need to be available, this study only considers the alternative of storing 8,000 pits in FMEF.

This section discusses FMEF, the affected environment at and near the Hanford Site, and the potential impacts that would be associated with pit storage. The Plutonium Finishing Plant is not considered a viable option for interim pit storage of the minimum 8,000 pits. Readily available storage space is limited, and the cost of facility modification to accommodate the pits would be excessive. Additionally, the potential for pit storage operations to interfere with important stabilization activities makes the storage option at Plutonium Finishing Plant impractical.

Each aspect of the affected environment at the Hanford Site has been assessed and the potential environmental impacts to each have been evaluated. Each environmental resource is discussed commensurate with the degree the resource could be impacted by or have an effect on interim pit storage at the candidate facility.

Hanford Site. The Hanford Site is a government-owned and contractor-operated facility, managed by Fluor Daniel Hanford, Inc.; Lockheed Martin Hanford Corporation; Rust Federal Services of Hanford, Inc.; Duke Engineering & Services Hanford, Inc.; Babcock & Wilcox Hanford Company; Numatec Hanford Corporation; and Bechtel Hanford Inc. The approximately 145,000-hectare (358,000-acre) Site is located just north of Richland, Washington (DOE 1994s:O-1; DOE 1994r:4.3). The general Site location map, Figure 5.4–1, shows that most of the land is vacant. Due to its large size, the perimeter of the Hanford Site is not fenced; however, the Site is patrolled by car and boat. The primary missions at the Hanford Site are the management of stored defense wastes and wastes from current operations, environmental restoration (ER) of approximately 1,100 inactive waste sites and 100 surplus facilities, and research and development in a broad range of disciplines including ER and waste management technologies (DOE 1994p:3).

Fuels and Materials Examination Facility. FMEF is located in a controlled area (400 Area) in the southeastern part of the Hanford Site, approximately 11 kilometers (7 miles) from the City of Richland (Figure 5.4–2). Completed in 1984, FMEF was intended to support the Liquid Metal Fast Breeder Reactor Program. However, the building was never used for that purpose. About 8,000 pits could be stored in the main process cell of FMEF if appropriate modifications are made. Facility modifications would include plugging cell penetrations, moving doors, and installing vault doors and electronic equipment.

The FMEF building is divided into numerous compartments and areas, including shipping/receiving, maintenance and decontamination, entry tunnel, equipment rooms, and process cells. There are two areas within FMEF proposed for pit storage. These are the maintenance and decontamination cell (decon cell) and the main process cell (originally called the nondestructive evaluation cell and upper nondestructive evaluation cell). The main process cell is one large room with a 15-meter (50-foot) high ceiling and approximately 465 square meters (5,000 square feet) of floor space. A Perimeter Intrusion Detection and Alarm System already exists around the building. No

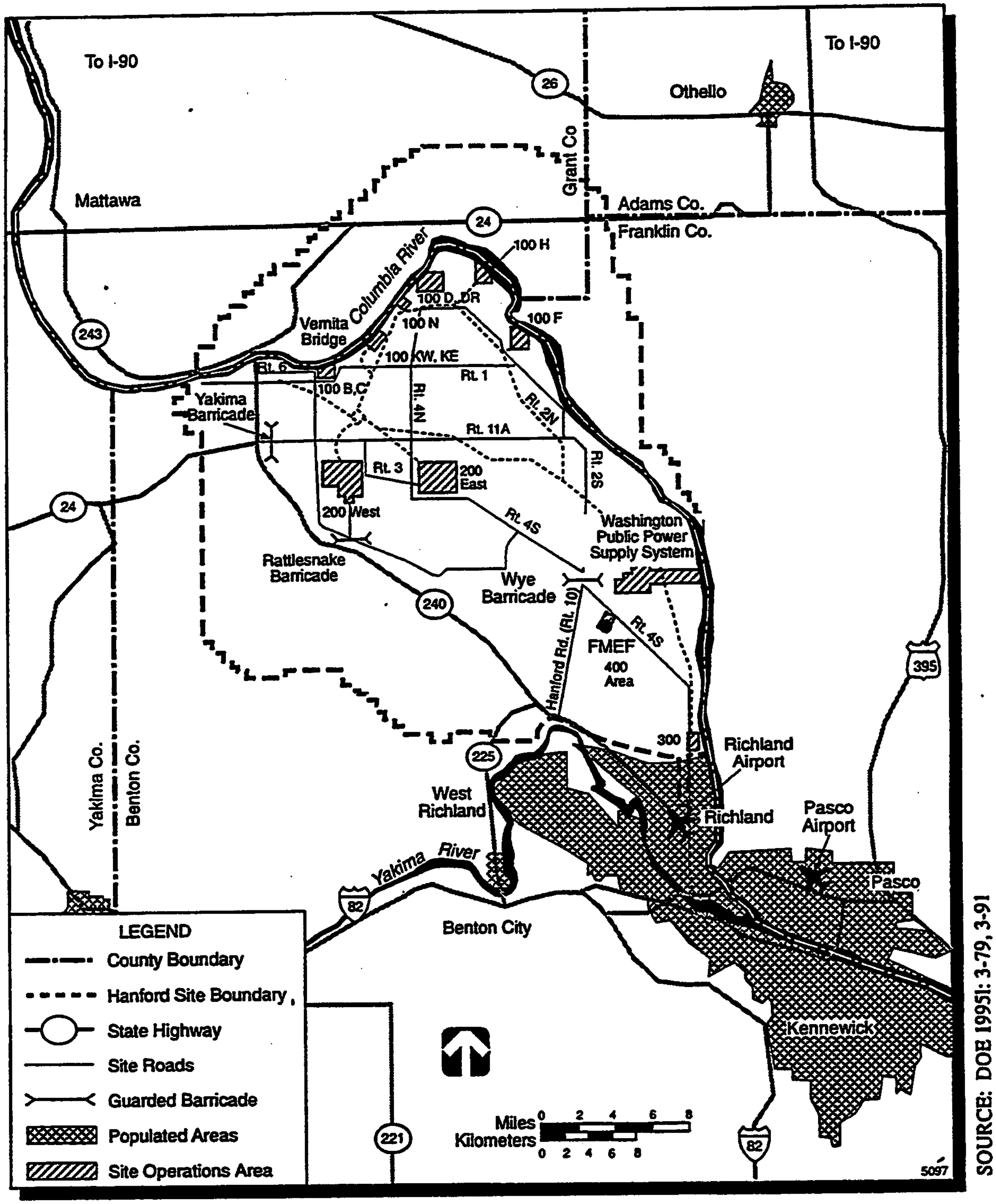


FIGURE 5.4–1.—*Location of the Fuels and Materials Examination Facility at the Hanford Site.*

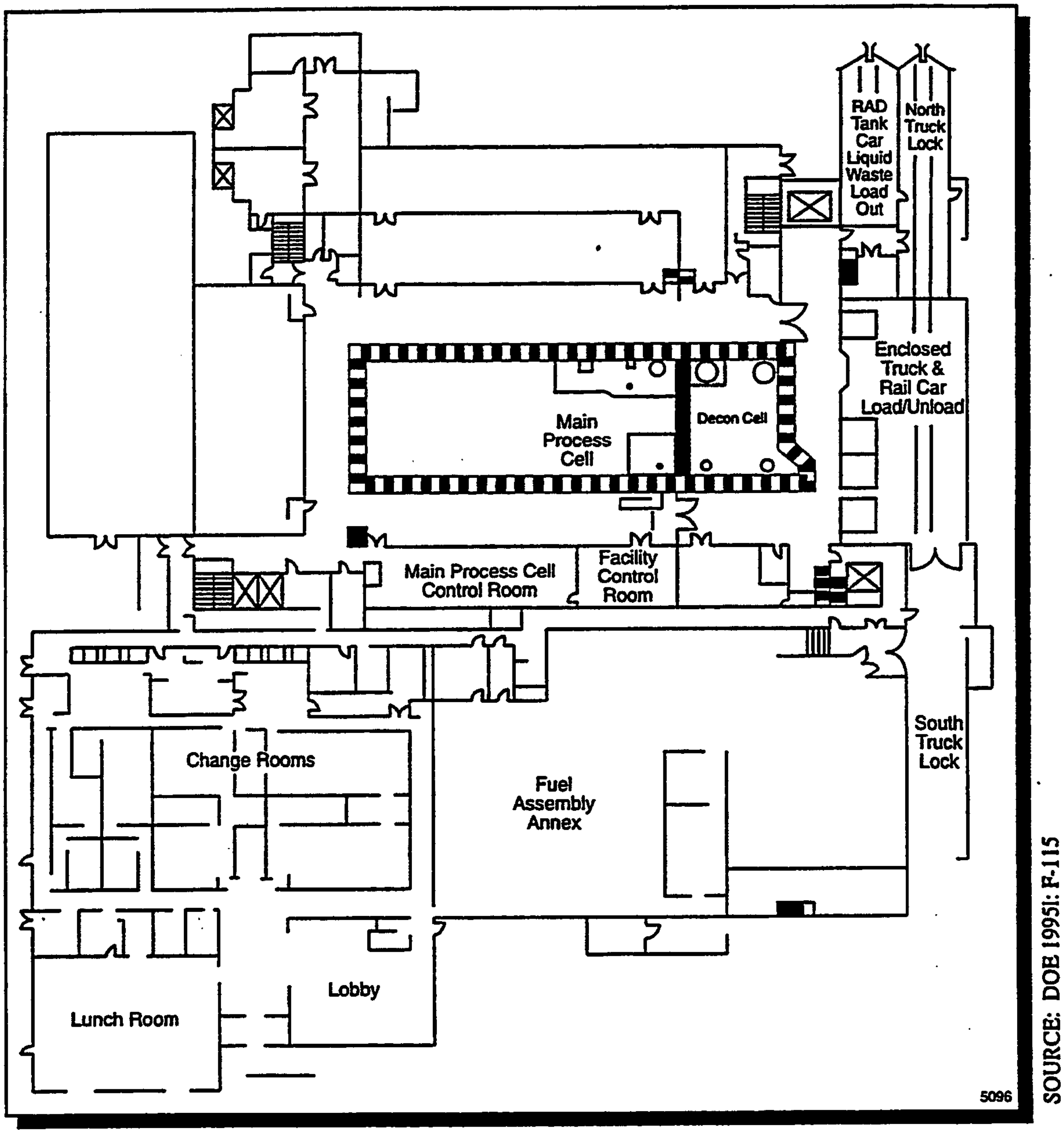


FIGURE 5.4–2.—*Layout of the Fuels and Materials Examination Facility.*

construction involving new land disturbance would be required at this Site. If DOE chooses to store pits at FMEF, a pit placement, retrieval, and inventory system would be implemented. It is expected that an automated or shielded pit movement and inventory system would be developed.

5.4.1 Environmental Resources Not Discussed in Detail

The following environmental resources at the Hanford Site have been assessed. The analyses have shown that the impacts to these resources from the potential storage of pits at the FMEF facility are small enough to warrant only limited discussion. Therefore, these resources are discussed briefly below and will not be addressed further in this section.

5.4.1.1 *Facilities and Infrastructure*

The infrastructure operations at the Hanford Site that could be impacted by or be expected to directly support pit storage operations include security, vehicle and building maintenance, utilities, administration, safety and health protection, and general support (e.g., road maintenance, general stores). Waste management and transportation support are discussed below in sections 5.4.1.10 and 5.4.1.11, respectively.

The direct impacts from the implementation of pit storage would include an increase in the Site's security force. Electrical usage due to interim pit storage (estimated to be 4,110 megawatthours per year) represents a 1.2 percent increase over the Site's 1994 usage of 345,500 megawatthours (DOE 1995s:Table B). Maintenance support and the indirect impacts resulting from pit storage worker requirements (e.g., water, wastewater treatment, and fuel) would increase minimally in comparison to current and historical onsite infrastructure support levels and system capacities. FMEF is not currently being utilized at design levels; therefore, the utility systems generally have excess capacity available to support pit storage activity.

5.4.1.2 *Land Resources*

No land disturbance is projected under the Pit Storage Relocation Alternative for FMEF. The Pit Storage Relocation Alternative does not include any new land uses near the FMEF. Impacts to land use would not be expected.

5.4.1.3 *Geology and Soils*

FMEF is not anticipated to require modifications that would involve land disturbance; therefore, impacts to soils are not anticipated. The risks due to earthquakes were assessed and found to be bounded by other accidents, as discussed in section 5.4.2.1.

5.4.1.4 *Water Resources*

Because of the nature of the pit storage activities, operations at FMEF would not impact surface water or groundwater. The pit storage activities would not use surface waters at the Hanford Site. The sanitary sewer waste from FMEF would be discharged first to an existing septic tank, then to the 400 Area sanitary leaching pond; therefore, no impacts to water quality are expected (DOE 1987:3-111). The wastewater generated by pit storage activity would not have a measurable effect on groundwater quality because of the combined effects of a deep water table (approximately 43 meters [140 feet]), low discharge volumes (less than 50 liters [14 gallons] per minute), and composition and concentrations consistent with existing treated and sanitary wastewater (DOE 1977:2.2-113, 3.2-4).

The water demands of pit storage operations are solely due to use by storage personnel. In comparison with the designed usage at FMEF of

142 million liters (37.5 million gallons) of groundwater from two vicinity wells, and the total quantity of surface water and groundwater used at the Hanford Site annually, the water demands for pit storage are negligible (DOE 1995p:4-65). Flooding at FMEF is not expected because it is located outside of the Probable Maximum Flood and dam failure floodplains.

5.4.1.5 *Air Quality*

The Hanford Site is well within all applicable local, State, and Federal ambient air quality standards (DOE 1994p). The impacts to air quality from normal pit storage operations would be due entirely to vehicle emissions (approximately 150 vehicles per day). The air impacts caused by vehicles involved in pit storage would be negligible relative to the overall vehicular emissions at the Hanford Site.

5.4.1.6 *Acoustics*

At the Hanford Site boundary, away from most facilities, noise from most sources is barely distinguishable above background sources. The only sources of noise that would be associated with pit storage operations would be from transportation vehicles and air conditioning and heating equipment for the occupied areas of the facility. These impacts would be minimal.

5.4.1.7 *Biotic Resources*

The bald eagle (*Haliaeetus leucocephalus*) is the only Federally listed threatened or endangered species that resides on the Hanford Site, although the Aleutian Canada goose (*Branta canadensis leucopareia*) and the peregrine falcon (*Falco peregrinus*) may occur on an incidental basis (DOE 1994r). The use of FMEF for interim storage of pits, would not disturb bald eagle roosting sites on the Hanford Site (DOE 1994p:28). Further, no wetlands at the Hanford Site would be disturbed by the Pit Storage Relocation Alternative (WHC 1986:3.4-8). As a result, impacts to biotic resources are not expected.

5.4.1.8 *Cultural Resources*

No historic, prehistoric, or paleontological sites have been found at or in the immediate vicinity of FMEF at the Hanford Site. Further, no National Register of Historic Places-eligible buildings are located at FMEF (DOE 1994q:4-89). The Pit Storage Relocation Alternative does not involve new land disturbance and would not adversely affect cultural or paleontological resources at the Hanford Site. Therefore, impacts to cultural and paleontological resources would not be expected.

Native American groups have retained traditional secular and religious ties to the region. Members of the Yakama, Umatilla, Warm Springs, and Nez Perce still adhere to the Washane religion, which has its origins on the Hanford Site. The secular and non-secular ties to this portion of the Columbia River Basin could make the entire area potentially eligible for the National Register of Historic Places based on its traditional cultural significance to Native Americans (DOE 1994q:4-80). However, the area containing FMEF has been completely disturbed by previous facility construction, and no impact to Traditional Cultural Properties is anticipated from the Pit Storage Relocation Alternative.

5.4.1.9 *Socioeconomic Resources*

Approximately 150 additional personnel (including 120 security personnel) would be required for the interim storage of pits at the Hanford Site. This number represents less than 1.0 percent increase in the total Hanford Site workforce. Most of the workers can be hired locally; therefore no significant Site or regional population and workforce increases are anticipated. According to the 1990 Census, 150 workers represent 0.1 percent of the employed workforce within the Hanford Site Region of Influence (WA Cen 1993:Table 145). No socioeconomic impacts would be anticipated.

5.4.1.10 *Waste Management*

Currently, the Hanford Site manages high-level waste, spent nuclear fuel, plutonium materials, mixed transuranic waste, transuranic waste, mixed waste, low-level waste, hazardous waste, and nonhazardous waste in accordance with the requirements of a number of Federal and State regulations, permits obtained under these regulations, and DOE orders. These requirements are primarily under the authority of the Environmental Protection Agency, DOE, and the Washington State Department of Ecology.

The Hanford Site generated approximately 2,300 cubic meters (3,000 cubic yards) of low-level waste, approximately 2,000 cubic meters (2,600 cubic yards) of mixed waste, and approximately 700 cubic meters (900 cubic yards) of hazardous waste in 1992 (DOE 1994d:248). The pit storage operations would generate less than 1 cubic meter (1.3 cubic yards) of mixed, low-level, and hazardous waste. This amount of waste would not impact the current waste management at the Hanford Site.

5.4.1.11 *Intrasite Transportation*

The Hanford Site onsite road system consists of a number of rural highway routes (see Figure 5.4–1). The majority of onsite travel, however, occurs on Route 4 and Route 11A, which are barricaded at the Yakima and Wye barricades, respectively, to control public access. Public Highways 240 and 24 provide access to the Site from the north and west up to the security control points at the Yakima and Rattlesnake Barricades. Although some roads within the Hanford Site are public access roads, the DOE would control access during passage of Safe Secure Tractor-Trailer (SST) convoys. Because a release of plutonium from an intersite pit shipment would require a severe accident (e.g., an accident with a fuel tanker or a train [see section 4.16.4.2]), the controlled transportation environment within the Hanford Site does not pose a significant threat to pit shipments. Consequently, the contribution to overall intersite transportation accident risk from onsite transport is negligible.

5.4.1.12 *Aircraft Accidents*

The Federal Aviation Administration (FAA) maintains a Very High Frequency Omni-Directional Radio (VOR) navigation aid at the Tri-Cities Airport. This VOR is used for en route navigation along airways as well as for instrument approaches to the airport. Several Federal airways pass in the proximity of FMEF. However, the FAA reports that these routes have low usage (WHC 1991). There are no military installations or training routes that would place military aircraft in the vicinity of FMEF.

There are five airports and one landing strip in the vicinity of FMEF. The Tri-Cities Airport, the major commercial airfield in the area is approximately 27 kilometers (17 miles) southeast of FMEF. The airport's two runways are used by commercial (air carrier and air taxi), military, and general aviation aircraft. In 1994, the Tri-Cites Airport had 81,867 aircraft operations (take-offs and landings). Table 5.4.1.12–1 summarizes the total number of airfield operations at the Tri-Cities Airport (PC 1996j).

The closest airport, Richland Airport, approximately 13 kilometers (8 miles) southeast of FMEF, has three runways used only by general aviation aircraft. Similarly, Vista Field in Kennewick, approximately 26 kilometers (16 miles) south-southeast, has two runways, also used by general aviation aircraft. Beardsley Field, near Prosser, approximately

TABLE 5.4.1.12–1.—*Tri-Cities Airport Operations for 1994*

AIRCRAFT TYPE	NUMBER OF OPERATIONS
Air Carrier	2,645
Air Taxi	21,807
Military	2,597
General Aviation	54,818
Total Airfield Operations	81,867

Source: (PC 1996j)

42 kilometers (26 miles) southwest, has one runway used only by general aviation aircraft. Sunnyside Airport is located 48 kilometers (30 miles) west-southwest and has one runway used by general aviation aircraft only. There is an unnamed landing strip near Horse Heaven Hills, approximately 32 kilometers (20 miles) south-southwest, which has one runway used only by general aviation aircraft.

All four general aviation airports and the landing strip are outside the probability density function boundary for general aviation aircraft and were therefore not included in the aircraft crash analysis. Only small military aircraft in the landing mode at the Tri-Cities Airport and non-airport (in-flight) aircraft were included in the analysis as required by the Draft DOE Standard (DOE 1996g). Further details on these six facilities are contained in volume II, appendix E.

FMEF was modeled conservatively as a facility with a length of 98 meters (320 feet), a width of 47 meters (155 feet), and a height of 21 meters (70 feet). (DOE 1994bb). Using the Draft DOE Standard for determining the probability of aircraft crashes and 1994 data from the FAA, the frequency of hitting FMEF was calculated as 1.2×10^{-6} for all types of aircraft (DOE 1996g). It should be noted that the frequency calculation represents a conservative upper bound. Since this frequency is greater than 10^{-7}, in accordance with the Draft DOE Standard, further analysis was required. A local response structural analysis was performed according to the Draft DOE Standard for the facility with a wall thickness of 122 centimeters (48 inches).

The analysis was performed for the maximum penetrator missile for each of the aircraft categories mentioned in section 4.15.2, except for helicopters. None of the eight aircraft missiles was capable of penetrating the facility. Therefore, since this frequency is 0, in accordance with the Draft DOE Standard, no further analysis was required. Further details of the frequency of hitting FMEF and the frequency of releasing material are contained in volume II, appendix E.

5.4.2 Resources Discussed in Detail

5.4.2.1 *Human Health*

The basic approach used in assessing human health impacts is first to identify the affected environment and establish a baseline representing the risk from current operations. Changes in this baseline risk resulting from potential pit storage activities are then examined. Impacts from both normal operations and potential accidents are estimated.

Assessing the human health risk impact from potential accidents resulting from the storage of pits in FMEF at the Hanford Site involves a risk screening process. The first step in this process is to identify a broad spectrum of potential accident scenarios. The second step in the process uses screening techniques to identify the specific scenarios that dominate risk (i.e., scenarios that contribute an appreciable fraction of the total risk), where risk is calculated as the product of frequency and consequence. Rigorous consequence evaluations are only performed for the identified risk-dominant scenarios.

Two types of accident consequences are examined:

- Worker and public exposure.
- The probability of an accident causing fatal cancer in a worker or the public.

If DOE chooses to relocate pits to the Hanford Site, two aspects of relocation would contribute to potential environmental impacts. These impacts are associated with:

- Transferring pits within FMEF from the transporter to their storage location inside the facility.
- Storage itself (i.e., potential impacts resulting from having the pits reside inside the facility).

Each time pits are transferred within the facility from the transporter to their storage location, there is a small probability that an accidental release could occur due to a handling accident. In addition, the transfer of pits from the transporter to their storage location would result in radiological exposures to involved workers.

Affected Environment

The release of radioactivity and toxic chemicals to the environment from a DOE facility is an important issue for onsite workers and the public. Since the human environment contains many sources of radioactivity and toxic chemicals, it is essential to understand the sources of these substances and how effectively they are controlled.

Table 5.4.2.1–1 summarizes the major sources of radiation exposure in the vicinity of the Hanford Site. A person in the State of Washington has an average annual cancer probability of 1.4×10^{-3} (DOE 1994i:4-110). Using nominal fatal cancer risk factors and the data in Table 5.4.2.1–1, it is calculated that fatal cancers attributable to environmental radioactivity released from the Hanford Site constitute less than one ten-thousandth of one percent of the average yearly fatal cancer probability in the State of Washington (DOE 1994l:4-20).

Figure 5.4.2.1–1 depicts the offsite population within an 80-kilometer (50-mile) radius of FMEF at the Hanford Site. Wind speeds and directions in the Hanford Site vicinity are presented in Figure 5.4.2.1–2. The prevailing wind direction is from the south and southwest in the summer months and from the northwest in the winter months.

Impacts of Facility Upgrades

Numerous facility modifications are necessary before FMEF is suitable for pit storage. They include plugging cell penetrations, moving doors, and installing vault doors and electronic equipment. An additional upgrade required is to modify FMEF to accept Stage Right transfer and storage equipment. However, these are standard industrial operations that do not expose workers to any special hazards (e.g., radionuclides, toxic chemicals, or high explosives). No significant impacts from facility upgrades are anticipated.

Impacts of Storing 20,000 Pits

Hanford Site is not being considered for the storage of 20,000 pits; hence, there are no impacts for this option.

Impacts of Storing 8,000 Pits

Unloading operations would result in radiological exposure to cargo handlers. Based on conservative calculations made for handling of pits at Pantex Plant, the worker doses from unloading of 2,000 pits per year are estimated to be less than 11 person-rem per year or 108 person-rem for the unloading of 8,000 pits (the maximum number of pits which may be stored at FMEF). Once removed from the SSTs, pits would be transferred within FMEF for storage. Pit transfers within FMEF would result in radiological exposures to onsite workers

TABLE 5.4.2.1–1.—*Major Sources of Radiation Exposure in the Vicinity of the Hanford Site*

SOURCE OF EXPOSURE	DOSE TO AVERAGE INDIVIDUAL (mrem/yr)[1]	PERCENTAGE OF TOTAL EXPOSURE
NATURAL BACKGROUND RADIATION		
Cosmic and external terrestrial radiation	78	
Internal terrestrial	39	
Radon in home	200	
Total natural	317	83.2
MEDICAL RADIATION		
Diagnostic x-rays	39	
Nuclear medicine	14	
Total Medical	53	13.9
OTHER SOURCES		
Weapons test fallout	<1	
Consumer and industrial products	10	
Air travel	1	
Nuclear fuel cycle	<1	
Hanford Site - environmental radioactivity	.002	
Total other	11	2.9
Total - all sources	381	100

[1]Effective dose equivalent.
Sources: NCRP 1987:15, 53; DOE 1992e:139

handling the pits. The transfer of pits would result in worker doses of less than 2 person-rem per year for handling 2,000 pits and about 5 person-rem for the placement of 8,000 pits.

The combined worker dose from unloading and storage of 8,000 pits at FMEF would be 113 person-rem distributed over the 30 people directly involved in material handling. Assuming that the same 30 people continue to handle 8,000 pits over a period of 4 years and using a dose-to-risk conversion factor of 4×10^{-4} latent cancer fatality (LCF) per person-rem, there would be an additional 0.04 LCF in this group due to radiological exposure from pit handling.

The probability of LCFs from all causes in the general population is estimated at 20 percent, which implies that 6 of 30 workers would develop a fatal cancer from all other causes. With an additional 0.04 LCF from pit handling, the total risk of latent cancers among workers at the FMEF site would increase by 0.7 percent.

Storage of 8,000 pits could be accomplished at FMEF. Pit container inventories at the Hanford Site are expected to be performed using either shielded or automated techniques and equipment. Consequently, these normal operations are not expected to result in any significant radiological exposure to workers.

Other storage activities that may occur within the time frame evaluated in this EIS include:

- Restacking a limited number of pits to comply with design laboratory temperature requirements.

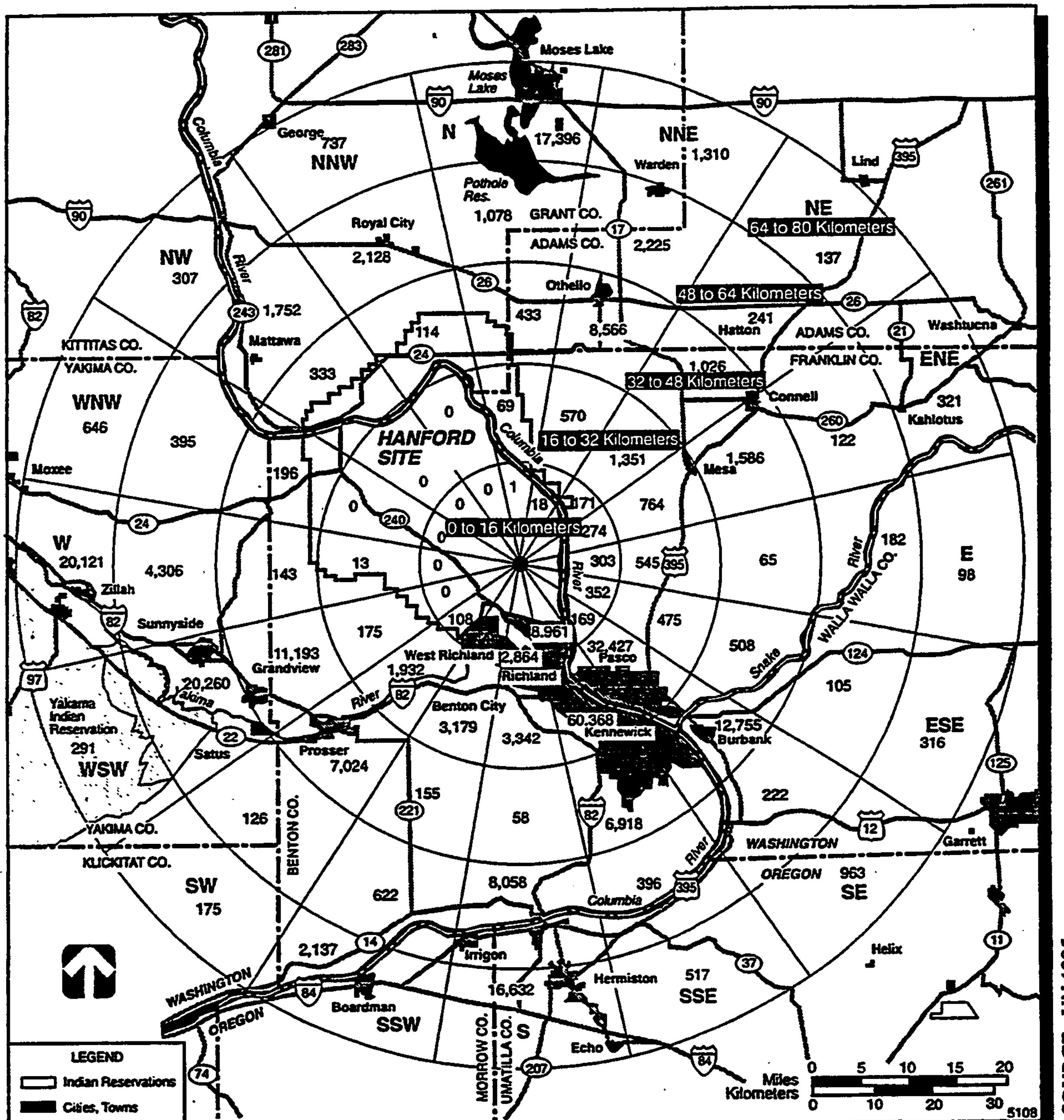


FIGURE 5.4.2.1–1.—*Offsite Population in the Vicinity of the Hanford Site (Distances Measured from the Fuels and Materials Examination Facility).*

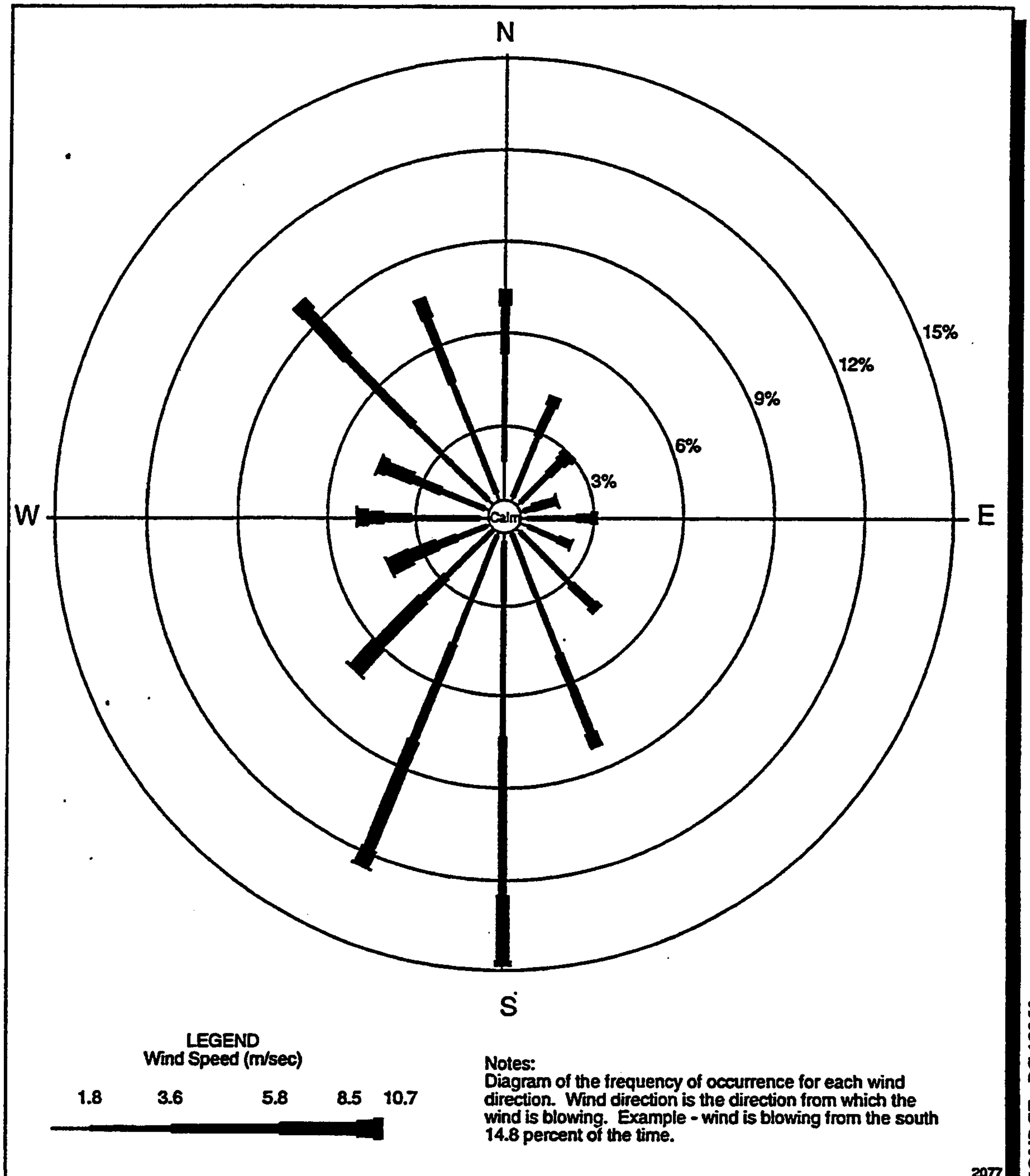


FIGURE 5.4.2.1–2.—*Wind Direction and Speed at the Hanford Site, Washington, 1994.*

- A limited number of pit movements and/ or instrumentation placements to facilitate third-party inspections.

Impacts of these routine activities are also considered to be negligible.

The risk screening methodology (appendix D) indicates that the radiological health risk from accidents associated with the storage of 8,000 pits in FMEF is dominated by handling accidents that could occur when the pits are being transferred from the transporter. A standard tine forklift is assumed to be used to remove pit containers from an SST. The probability of a standard tine forklift causing a puncture during a single handling operation is in the extremely unlikely range (i.e., 10^{-4} to 10^{-6}).

It is estimated that a forklift puncture of a pit container would release 9.2×10^{-5} curies of plutonium. This is a conservative estimate of the respirable, airborne release caused by a puncture of one shipping container (DOE 1992f:7-34).

Given such a release, an involved worker (the forklift driver) would receive a dose of 6.6 rem, corresponding to an incremental increase in lifetime fatal cancer probability of 2.6×10^{-3}. In addition, a non-involved worker 100 meters (328 feet) downwind along the center line of the plutonium dispersion plume would receive a 6.3×10^{-5} rem exposure, corresponding to an incremental increase in lifetime fatal cancer probability of 2.5×10^{-8}. The maximally exposed member of the public would be expected to receive an exposure of 5.5×10^{-8} rem, corresponding to an incremental increase in lifetime fatal cancer probability of 2.8×10^{-11}. The lifetime fatal cancer probability for an average individual from all other causes is approximately 0.2 (20 percent).

This event would result in an exposure to the public of 2.9×10^{-5} person-rem. Considering the likelihood and consequence of this event, on the average, a member of the public will have an increased annual risk of developing a fatal cancer from this potential accident of 5.3×10^{-17} fatal cancers per year. The annual fatal cancer risk to a person in the State of Washington from all other causes is 1.4×10^{-3} fatal cancers per year.

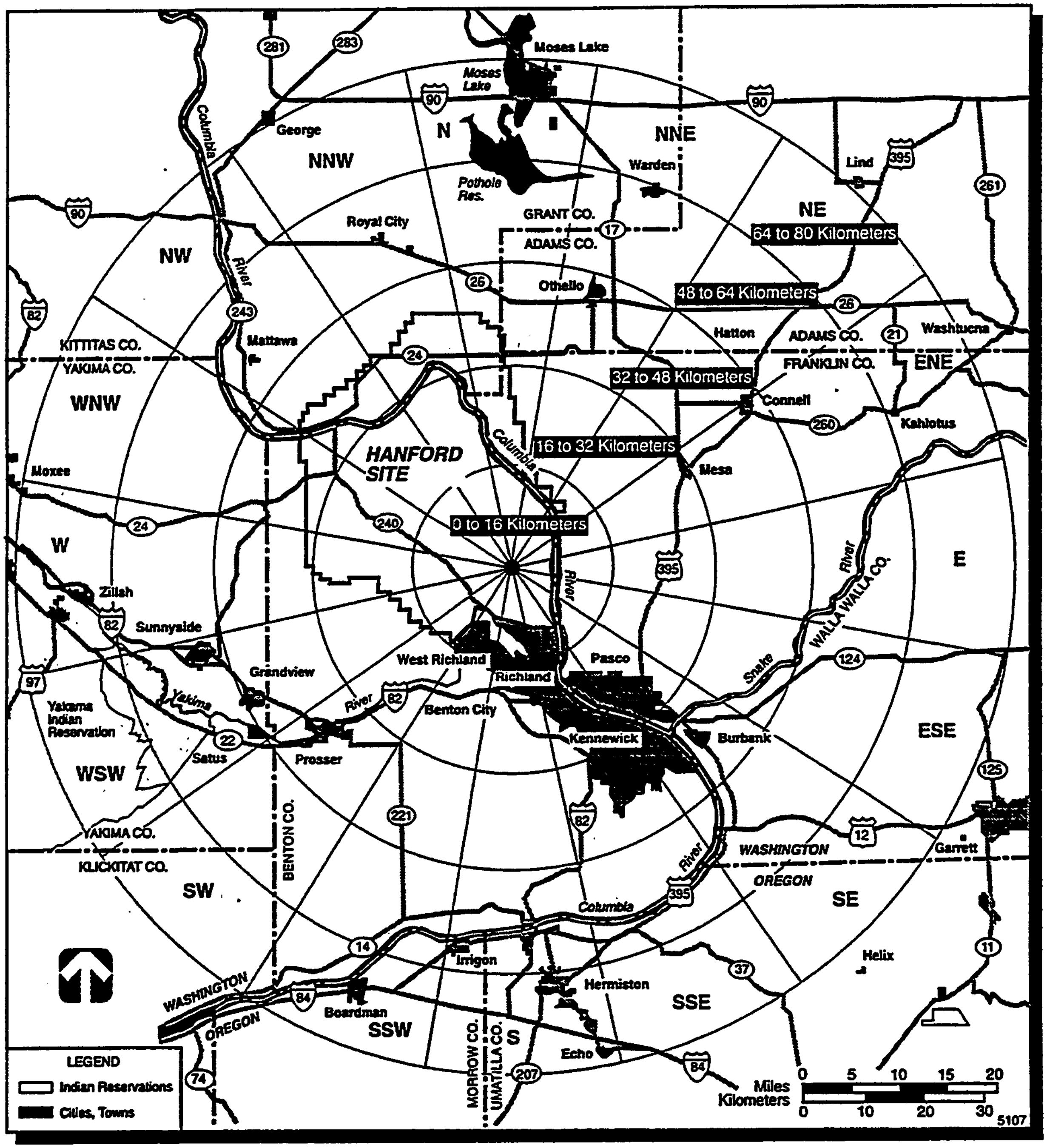
Seismic events are not important risk contributors at FMEF. The design basis for FMEF is a 0.25 *g* earthquake, which was considered to be the largest credible earthquake that could occur given the regional geology (WHC 1986:3.6-2, 4.2-6, 9.2-34). It is also larger than the 0.17 *g* standard for Performance Category 3 facilities per DOE–STD–1020–94 (DOE 1994u:C-25). As described in appendix D, there is no risk from external events or natural phenomena (including earthquakes) that are within the design basis. Even for earthquakes beyond the design basis (which have a very low probability), the onset of facility damage is typically insufficient to cause the AT–400A shipping containers to fail. Consequently, the relative risk from earthquakes is negligible because of the low frequency that the release can occur.

5.4.2.2 *Environmental Justice*

Affected Environment

FMEF is located at the Hanford Site, which is adjacent to the Tri-Cities (Richland-Kennewick-Pasco) urban area in the south-central part of Washington State. In order to identify the target populations covered by Executive Order 12898, an 80-kilometer (50-mile) radius circle centered on FMEF was overlaid on 1990 Census tract maps. The communities that lie within the 80-kilometer (50-mile) circle, hereafter called the FMEF Region of Influence (ROI) are shown in Figure 5.4.2.2–1.

Population. According to the 1990 Census, there were 274,391 persons within the FMEF ROI. White persons comprised 75 percent of



SOURCE: UN 1995

FIGURE 5.4.2.2–1.—*The Fuels and Materials Examination Facility Region of Influence.*

the population; Hispanics were the second largest group with 22 percent; and Asians, Pacific Islanders, American Indians, and Blacks accounted for the remaining 3 percent (UN 1995).

The largest concentration of the population in the FMEF ROI is in the Tri-Cities, which accounts for 94,807 or 34.6 percent of the total ROI population in 1990. Outside this urban concentration, two communities had populations of 10,000 or more. These were: Sunnyside (11,238 persons), located approximately 50 kilometers (32 miles) west of FMEF; and Moses Lake (11,235 persons), located approximately 72 kilometers (45 miles) north of FMEF. About 20 communities account for an additional 58,800 persons and the remaining 43,484 persons live in rural areas of the FMEF ROI. A portion of the Yakama Indian Reservation is located in the southwestern part of the ROI. Of the 26,961 persons counted on this Reservation in 1990, 6,110 were American Indians (WA Cen 1992:Tables 6 and 17; OR Cen 1992 Table 6).

Minority Population. Figure 5.4.2.2–2 shows 1990 Census tracts within the FMEF ROI. The tracts are shaded if minority populations comprised 25 percent or more of the total population in 1990 or if 25 percent or more of the persons in a tract were below the poverty level based on their incomes in 1989. The 25 percent threshold levels for minority or low-income persons are based on the working definitions contained in the notice of the Environmental Protection Agency's Office of Environmental Justice (59 FR 192).

The census tracts with 25 percent or more minority population are located north and southwest of the Site at a minimum distance of 16 kilometers (10 miles) from FMEF. Four tracts in Pasco and one in Kennewick also have minority populations greater than 25 percent. A number of tracts with primarily white populations are located closer to FMEF than the tracts with minority populations (UN 1995).

Low-Income Population. Low-income population tracts in the FMEF ROI are not as widely distributed as the tracts with minority populations. Concentration of low-income population is to the northwest and southwest of FMEF at a distance of more than 32 kilometers (20 miles). All four tracts in Pasco and one in Kennewick also have greater than 25 percent population below poverty level. Forty-six percent of American Indians in the Yakama Reservation had incomes below the poverty level (UN 1995; WA Cen 1992).

Impacts of Storing 20,000 Pits

FMEF is not being considered for storing 20,000 pits; therefore, there would be no impacts for this option.

Impacts of Storing 8,000 Pits

Because the interim storage of pits at FMEF would not require any construction activities and because all facility modifications would take place inside existing facilities, impacts to the natural environment would be minimal. Under normal operating conditions, there would be minor increases in air pollutants associated with vehicles used during pit storage activities. Also, a very minor increase in particulate matter of aerodynamic diameter less than 10 micrometers concentrations would be expected. These increases are associated with the operation of forklifts within FMEF that are used to move the pits from the unloading area to the storage area.

These impacts are not likely to effect the surrounding population. Radiological releases from normal pit storage operations would have no measurable effect on an individual occupying a position near the Hanford Site boundary for an entire year. Levels at the Site boundary would be indistinguishable from natural background radiation. No adverse health effects would be expected among the general public, including minority and low-

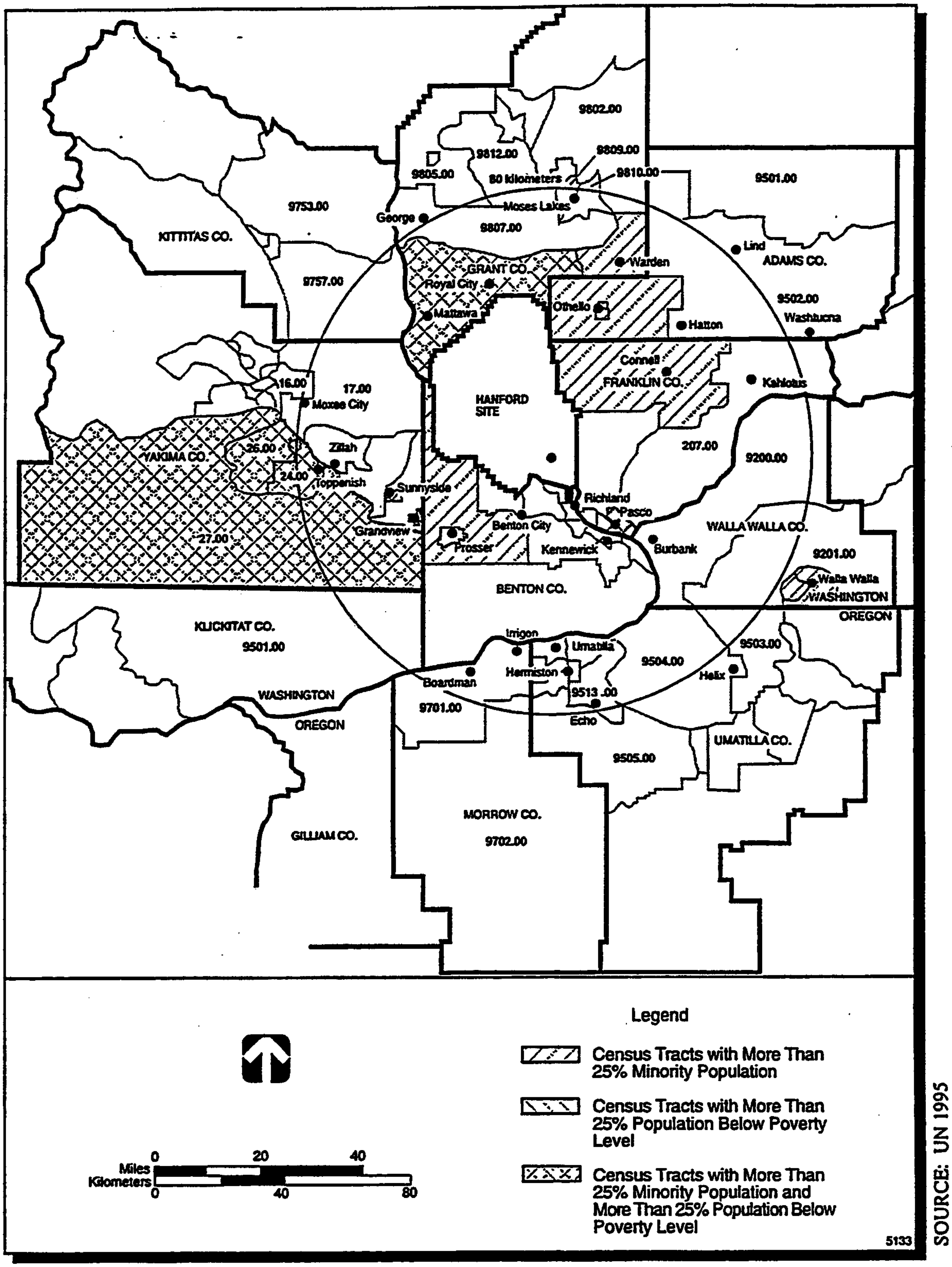


FIGURE 5.4.2.2–2.—*Low-Income and Minority Populations in the Fuels and Materials Examination Facility Region of Influence.*

income populations, as a result of normal storage operations.

An abnormal event, such as accidental puncture of a pit storage container by a forklift or seismic event, has the potential of exposing the general public to radiation. The analysis in section 5.4.2.1, Human Health indicates that the risk to the public from such accidents would be negligible. With no measurable impacts on the general population, the minority and low-income populations would not be disproportionately impacted.

KIRTLAND AIR FORCE BASE

5.5 KIRTLAND AIR FORCE BASE

Under the Pit Storage Relocation Alternative (see section 3.1.3) the pit storage function currently carried out at Pantex Plant would be transferred to another site. Kirtland Air Force Base (KAFB) is one of the candidate sites for the storage of pits (Figure 5.5–1). The Manzano WSA is the candidate pit storage facility at KAFB. This section discusses the Manzano WSA, the affected environment at KAFB, and the potential impacts that would be associated with pit storage.

Each aspect of the affected environment at KAFB has been assessed and the potential environmental impacts to each have been evaluated. Each environmental resource is discussed in detail commensurate with the degree to which the resource could be impacted by or have an effect on interim pit storage at the candidate facility.

Kirtland Air Force Base. KAFB is an Air Force Materiel Command base sharing base facilities and infrastructure with a number of major tenants, including DOE, Sandia National Laboratories (SNL), the Defense Nuclear Agency, and Phillips Laboratory. The base covers an area of 21,320 hectares (52,600 acres) on the southeast boundary of Albuquerque, New Mexico. Approximately 8,300 hectares (20,500 acres) of this area is withdrawn public lands (USAF 1993a:1-3).

Major Air Force units at KAFB include the 377th Air Base Wing, 58th Special Operations Wing (which performs helicopter crew training and pararescue training) and Phillips Laboratory (which performs research and development for space systems, ballistic missiles, geophysics, and directed energy systems). SNL conducts research and development for space systems, testing, stockpile surveillance, and the transportation of nuclear materials (USAF 1993a:3-2).

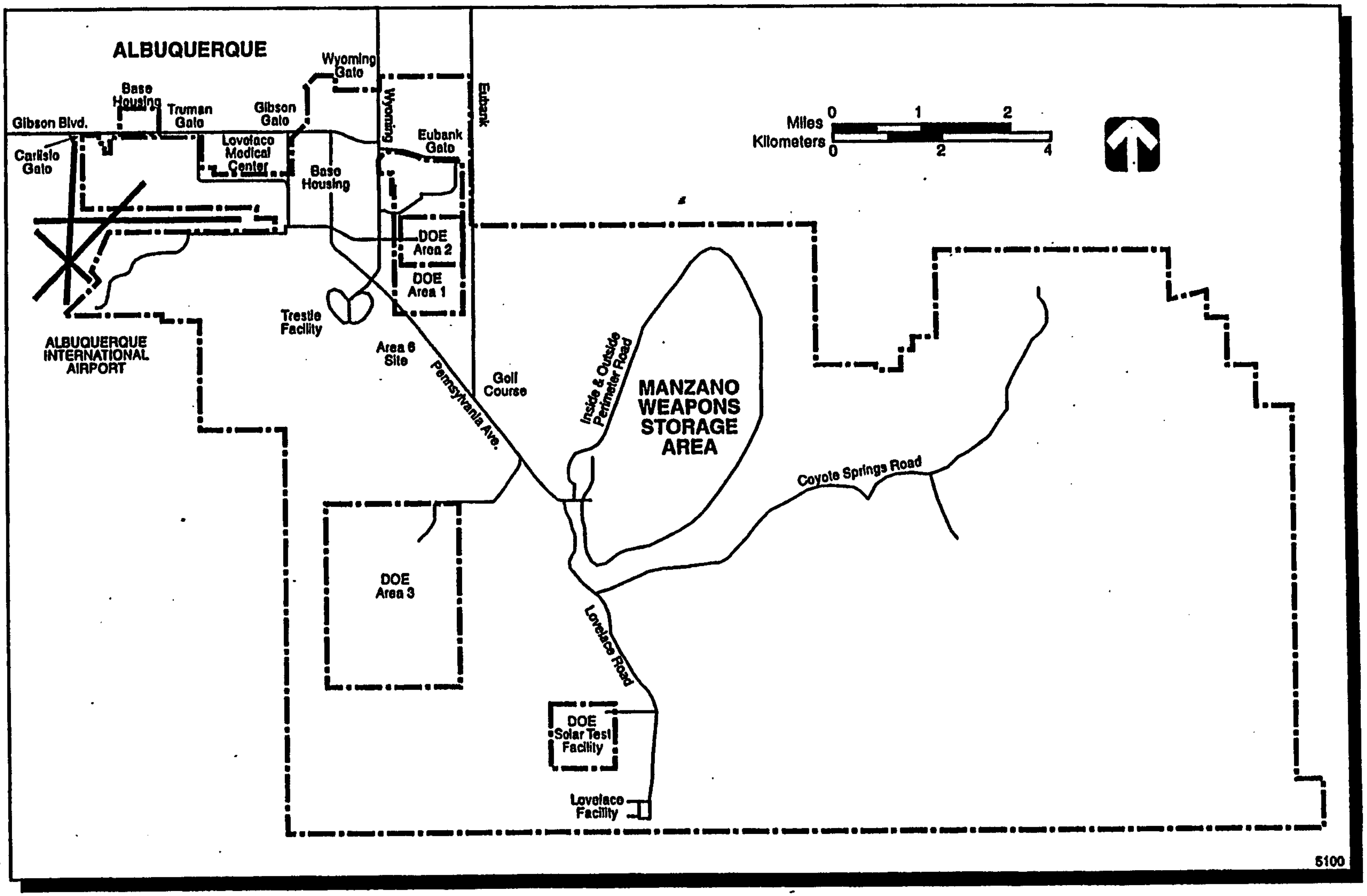
Manzano Weapons Storage Area. The Manzano WSA at KAFB consists of 4 plants inside Manzano Mountain (used primarily for research activities) and 122 magazines, of which 81 are earth covered and 41 are tunneled into the mountainside (KAFB 1993:13) (Figure 5.5–2). Construction began in June 1947, and the facility became operational in April 1950. In June 1992, the Manzano WSA was deactivated and Phillips Laboratory assumed responsibility for its maintenance. SNL continues to provide minimum security, although the Perimeter Intrusion Detection and Alarm System was deactivated with the termination of the main mission in 1992.

The Manzano WSA has enough magazine space to store more than 20,000 pits. The proposed location for the storage of pits is the set of 41 magazines that are tunneled into the mountainside. As many as 35 magazines have overburden greater than 9 meters (30 feet) of earth and granite. Depending on the storage capacity of individual magazines, it is estimated that not more than 25 of them would be required for storing 20,000 pits, leaving the rest of the magazines for other uses.

The existing fence would be reactivated to the extent necessary and no new fence or security systems would be required. If DOE chooses to store pits in the Manzano WSA at KAFB, a pit placement, retrieval, and inventory system will be implemented. The storage areas at the Manzano WSA are well suited for the Stage Right equipment and techniques successfully implemented at Pantex Plant. Consequently, the development of a pit placement, retrieval, and inventory system would not be necessary.

5.5.1 Environmental Resources Not Discussed in Detail

The environmental resources discussed below have been assessed for KAFB. Analyses have shown that the impacts to these resources from the potential storage of pits at the Manzano



SOURCE: KAFB 1993:16

FIGURE 5.5–1.—*Albuquerque International Airport and the Manzano Weapons Storage Area at Kirtland Air Force Base, New Mexico.*

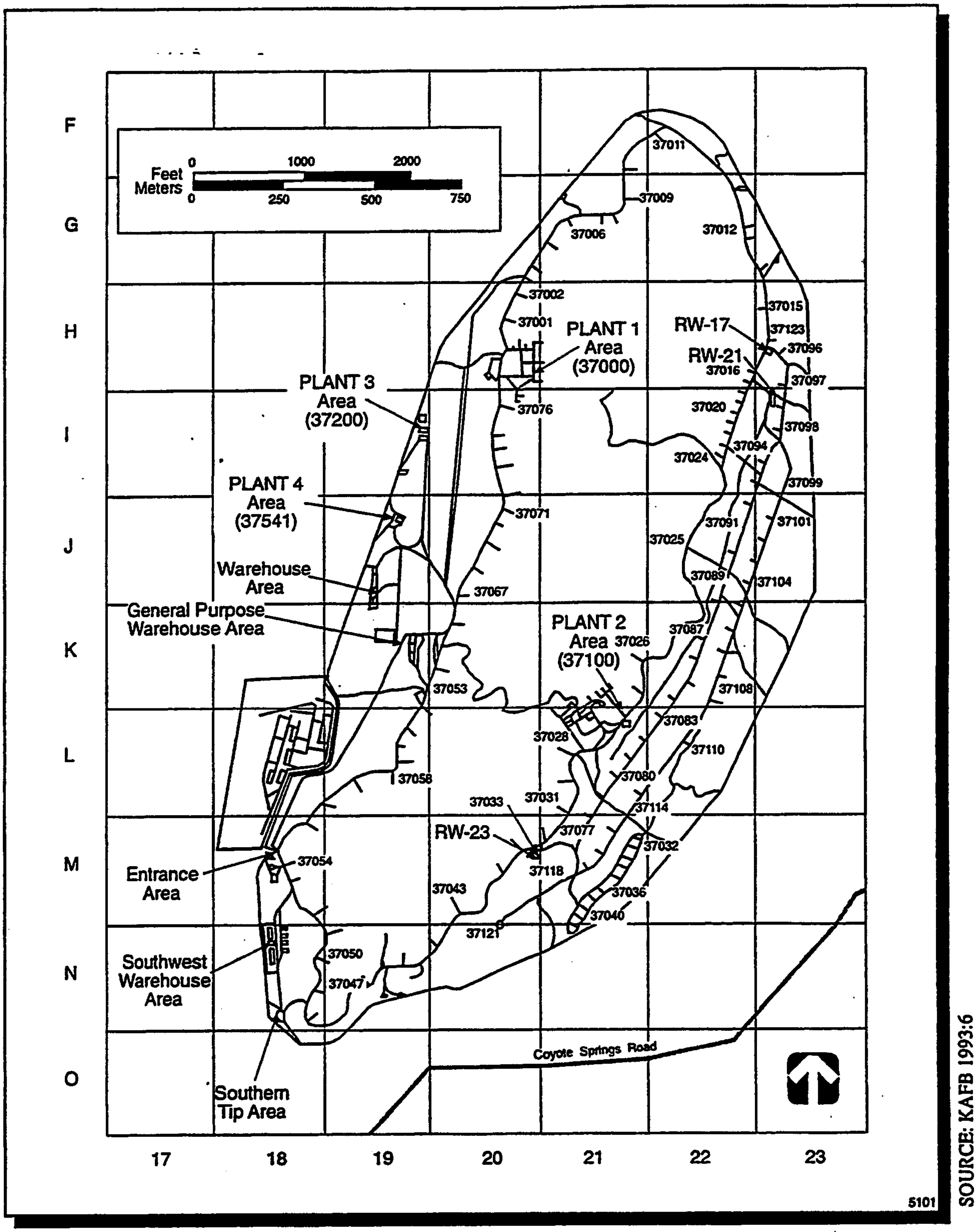


FIGURE 5.5–2.— *Layout of the Manzano Weapons Storage Area at Kirtland Air Force Base.*

WSA are small enough to warrant only limited discussion. Therefore, these resources are discussed briefly below and are not addressed further in this section.

5.5.1.1 *Facilities and Infrastructure*

The KAFB infrastructure is managed by the 377th Air Base Wing and includes support to all tenants. As the Manzano WSA is not a DOE site, the exact breakdown of infrastructure support activities that would be performed by KAFB and DOE personnel has yet to be worked out in detail. Should this site be selected for interim pit storage, a Memorandum of Understanding between the Department of the Air Force and DOE would be developed detailing these duties. The infrastructure operations at KAFB that could be impacted by or be expected to directly support pit storage operations include security, vehicle and building maintenance, safety and health protection, utilities, administration, and general support (e.g., cafeteria, general stores). Waste management and transportation support are discussed below and in sections 5.5.1.10 and 5.5.1.11, respectively.

The direct impacts from the implementation of pit storage would include a small increase in the site's security force. Electrical usage due to interim pit storage (estimated to be 4,110 megawatthours per year) represents a 0.8-percent increase over the site's fiscal year 1993 usage of 490,000 megawatthours and 0.4 percent of the fiscal year 1993 system capacity of 1,095,000 megawatthours (USAF 1993a:3-17). Maintenance support and indirect impacts resulting from pit storage worker requirements (e.g., water, wastewater treatment, and fuel) would increase minimally in comparison to the current and historical onsite infrastructure support levels and system capacities. The Manzano WSA is not currently being utilized at historical or design levels; therefore, the utility systems supporting this facility generally have excess capacity available to support pit storage activity.

5.5.1.2 *Land Resources*

The Manzano WSA is currently being used in part for storage of a variety of items such as furniture and document boxes. These items can easily be removed and space made available for storage of pits if such a decision were made. The use of some storage magazines for the interim storage of 8,000 to 20,000 pits would not change the array of potential storage materials for which these weapon storage magazines are designed. Additionally, no land disturbance is projected under the Pit Storage Relocation Alternative as it pertains to the Manzano WSA. Impacts to land use would not be expected.

5.5.1.3 *Geology and Soils*

The only aspects of geology and soils that could be affected by or have an effect on the implementation of interim pit storage at the Manzano WSA are the risks associated with earthquakes. The earthquake risk was assessed and found to be bounded by other accidents, as discussed in section 5.5.2.1. The Manzano WSA is not anticipated to require upgrades that would involve land disturbance; therefore, impacts to soils are not anticipated.

5.5.1.4 *Water Resources*

Because of the nature of the pit storage activities, operations at the Manzano WSA would not impact surface water or groundwater. The pit storage activities would not use surface waters at the Manzano WSA. The Manzano WSA has several springs and seeps. Four springs are located on the mountains that make up the Manzano WSA (USCOE 1995c:22, 23, 27). Some magazines show evidence of water intrusion (KAFB 1993:48). These magazines were designated as unsuitable for interim pit storage and would not be used. The sanitary sewer waste from the Manzano WSA would be discharged to approved septic systems. The wastewater would not have a measurable affect on groundwater quality because of the combined effects of a deep water table (15 to 30 meters [50 to 100 feet]), low additional discharge volumes, high evaporation rates, and a composition and concentration consistent with treated and sanitary wastewater.

The water demands of pit storage operations are solely due to use by storage personnel. The water demands would be less than historical usage at the Manzano WSA and negligible in comparison to the 6.4 billion liters (1.7 billion gallons) used annually at KAFB (USAF 1994:3-20). The Manzano WSA is located outside of the 100-year and 500-year floodplains (USAF 1979).

5.5.1.5 *Air Quality*

Manzano WSA is in an attainment area for carbon monoxide (CO). A more detailed air quality analysis for this site is provided in section 5.5.2.3.

5.5.1.6 *Acoustics*

The major sources of noise within KAFB include blasting and explosives testing, aircraft operations, and equipment and machine operations. The only additional sources of noise that would be associated with pit storage operations would be from transportation vehicles. These impacts would be minimal.

5.5.1.7 *Biotic Resources*

No Federally listed threatened or endangered plant and animal species have been reported from the Manzano WSA, although the peregrine falcon (*Falco peregrinus*) and the bald eagle (*Haliaeetus leucocephalus*) may be occasional KAFB migrants (USAF 1994:3-8, 3-9). The western burrowing owl (*Athene cunicularia hypergea*), a species of concern, has been reported 1.6 kilometers (1 mile) west of the Manzano WSA perimeter fence, but not within that facility's boundary. Additionally, a State endangered plant, the Wright's fishhook cactus (*Mammillaria wrightii*), was found on gravelly or rocky slopes at nine sites within the Manzano WSA (NHP 1995:15, C-176, C-177, plant map). Further, four springs were identified within the perimeter of the Manzano WSA (USCOE 1995c:ES 15–27). However, the Pit Storage Relocation Alternative does not include any action that would disturb the animal or plant species noted above or any of the four springs. Therefore, no impacts to biotic resources would be expected.

5.5.1.8 *Cultural Resources*

Twenty-seven historic and prehistoric archaeological sites have been found in the Manzano WSA. Of these sites, 8 have been recommended for inclusion in the National Register of Historic Places and 14 others are considered to be potentially eligible for inclusion (Argonne 1995:1-1, 1-2, 8-2 through 8-6). The Pit Storage Relocation Alternative does not include any action that would disturb these resources. No storage facilities identified in the Pit Storage Relocation Alternative have been nominated to the National Register of Historic Places. Therefore, no impacts to cultural and paleontological resources would be expected.

To identify areas of potential concern and locations of Traditional Cultural Properties, DOE has, in the past, sought consultations with Native American groups with traditional ties to the area. Two of these groups, the Sandia and Isleta Pueblos, expressed a general concern about the Manzano WSA. Isleta Pueblo considers the Four Hills area that comprises the Manzano WSA to be within their traditional area of cultural activities. They have requested that KAFB inform them of any archaeological finds at the Manzano WSA, specifically in regards to human remains and ritual paraphernalia (Argonne 1995:1-1, 1-2). The Pit Storage Relocation Alternative is not expected to adversely affect these concerns.

5.5.1.9 *Socioeconomic Resources*

Approximately 150 additional personnel (including 120 security personnel) would be required to operate the storage magazines at the Manzano WSA if pit storage activities are moved to this facility. This number represents less than a 0.8 percent increase in the total Federal workforce at KAFB. Most of these workers can be hired locally; therefore the increase to the KAFB workforce or the regional population would not be significant. According to the 1990 Census, 150 workers represent 0.06 percent of the of the workforce employed within the KAFB Region of Influence (NM Cen, 1993:Table 145). No socioeconomic impacts would be anticipated.

5.5.1.10 *Waste Management*

For the purpose of this assessment, it is assumed that DOE would manage the wastes from pit storage at the Manzano WSA. Waste management figures from SNL are used for comparison. SNL manages mixed transuranic waste, transuranic waste, mixed waste, low-level waste, hazardous waste, and nonhazardous wastes in accordance with the requirements of a number of Federal and State regulations, permits obtained under these regulations (e.g., New Mexico unilateral FFCA order), and DOE orders. These requirements are primarily under the authority of the Environmental Protection Agency, DOE, and the New Mexico Environment Department.

SNL generated an estimated 90 cubic meters (110 cubic yards) of low-level waste and an estimated 1.7 cubic meters (2.2 cubic yards) of mixed waste in 1994. In addition, SNL currently stores approximately 70 cubic meters (91 cubic yards) of mixed waste onsite (DOE 1995:6-4; DOE 1993d:3-71). The new Radioactive Mixed Waste Management Facility for handling these wastes is due to become operational in the near future. SNL generated 751 cubic meters (198,450 gallons) of liquid and 127 cubic meters (166 cubic yards) of solid hazardous waste in 1991 (DOE 1993d:3-71). The pit storage operations would generate less than 1 cubic meter (1.3 cubic yard) of mixed, low-level, and hazardous wastes. Compared to the amounts of waste generated and stored at SNL, the wastes generated by the pit storage activities would be minimal and would not impact the current waste management at SNL.

5.5.1.11 *Intrasite Transportation*

Interstate 40 and Interstate 25 provide access to the Albuquerque metropolitan area. Access to KAFB from Interstate 40 is provided from either the Wyoming or Eubank gate entrances (Figure 5.5–1). Access to KAFB from Interstate 25 is via Gibson Boulevard.

The onsite road system at KAFB consists of paved streets and access roads. The Manzano WSA is located on the east side of KAFB. Access to the Manzano WSA is via Pennsylvania Avenue. The Manzano WSA is surrounded by fencing. Access to facilities within the area is provided via a ring road which encircles the mountain (Figure 5.5–1). Traffic within the KAFB boundaries is strictly controlled and the roads are not open to public traffic. Base personnel traffic would be controlled as Safe Secure Tractor Trailer (SST) convoys pass through the base roads. Because a release of plutonium from an intersite pit shipment would require a severe accident (e.g., an accident with a fuel tanker or a train [see section 4.16.4.2]), the controlled transportation environment at KAFB does not pose a significant threat to pit shipments. Consequently, the contribution to overall intersite transportation accident risk from onsite transport is negligible.

Two high-speed transportation corridors (Gibson and Tijeras Arroyo corridors) that would traverse KAFB have been proposed. Of these, the Tijeras Arroyo Corridor would come in closest proximity to the Manzano WSA. Both transportation routes have been discussed for a number of years. . However, NEPA documentation has not been completed on either project.

5.5.1.12 *Aircraft Accidents*

The Manzano WSA is located in the foothills of the Manzano Mountains, approximately 6.5 kilometers (4 miles) southeast of the main (east-west) runway of the Albuquerque International Airport. Figure 5.5–1 shows the locations of the Manzano WSA relative to the two runways of interest for the Albuquerque International Airport, one of three airports in the vicinity of the Manzano WSA.

The Albuquerque International Airport is the major commercial airfield in the State of New Mexico; it is the only airport with regular commercial jet service. In addition to its role as a commercial airfield, the Albuquerque International Airport is used by military aircraft at KAFB. In 1994, the Albuquerque International Airport had 220,914 aircraft operations (take-offs and landings) (PC 1996j). Table 5.5.1.12–1 summarizes the total number of airfield operations at the Albuquerque International Airport.

TABLE 5.5.1.12–1.—*Albuquerque International Airport Operations for 1994*

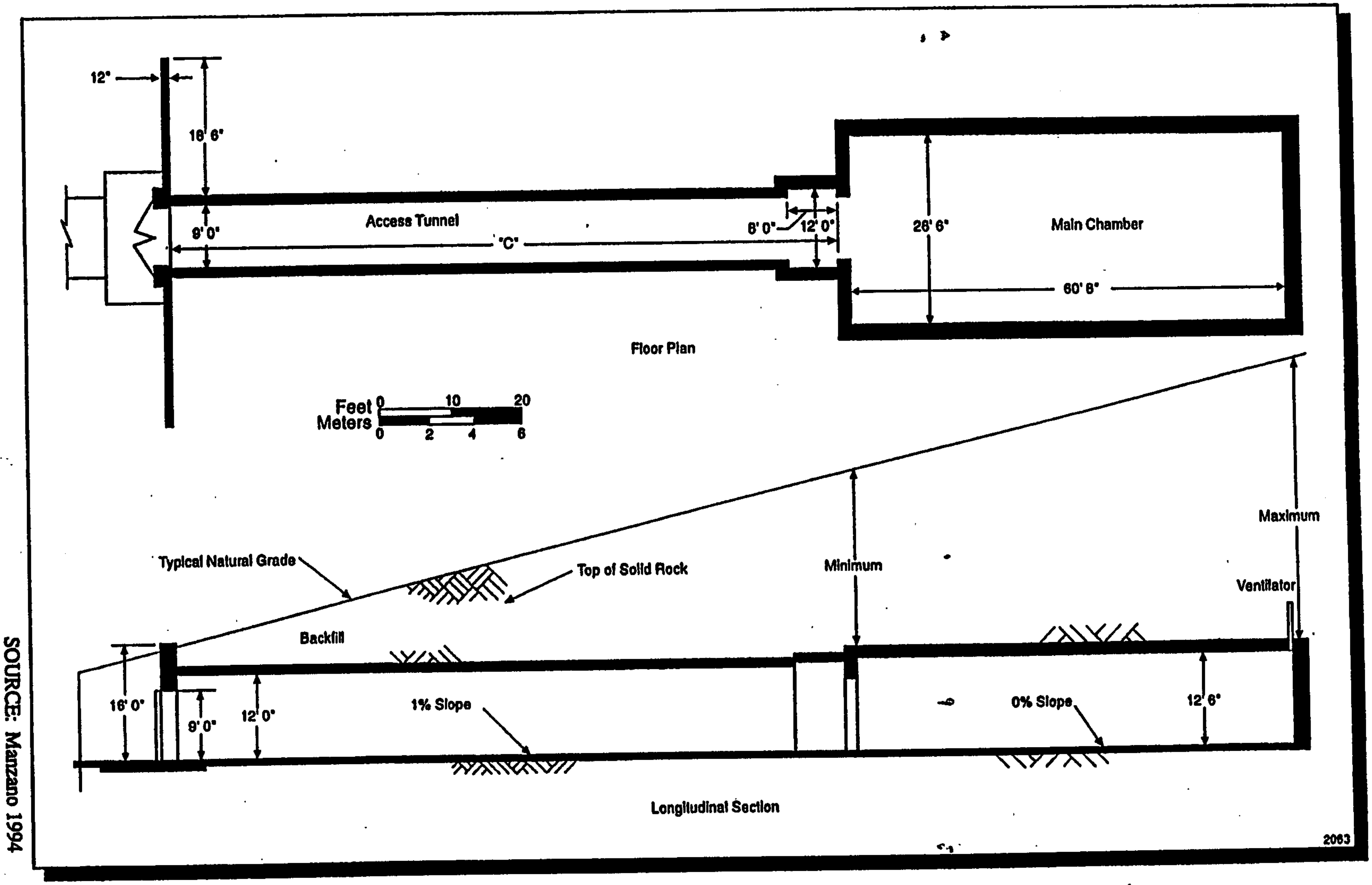
AIRCRAFT TYPE	NUMBER OF OPERATIONS
Air Carrier	77,978
Air Taxi	41,349
Military	29,929
General Aviation	71,658
Total Airfield Operations	220,914

Source: (PC 1996j)

In addition to the Albuquerque International Airport, there are two other airports in the Albuquerque area. Coronado Airport, approximately 19 kilometers (12 miles) to the north-northwest, has two runways, used only by general aviation aircraft. Similarly, Alameda Airport, approximately 24 kilometers (15 miles) to the northwest, has two runways also used by general aviation aircraft. Both of these airports are outside the probability density function boundary for general aviation aircraft and, therefore, were not included in the aircraft crash analysis. Further details on these two airports are contained in volume II, appendix E. Only the Albuquerque International Airport and non-airport (in-flight) aircraft were included in the analysis as required by the Draft DOE Standard (DOE 1996g).

In the history of the Manzano WSA, there have been three aircraft crashes. One crash involved an F-100C; the crash site was located east of the Manzano WSA administration area. Another crash involved a B-29 in the northern portion of the site. This aircraft departed from KAFB and crashed after approximately three minutes in flight, killing the crew. The third crash also occurred in the northern portion of the site and involved an EC-135 (KAFB 1993:69, 73, 74). None of these crashes affected the storage facilities.

If DOE chooses to relocate pits to the Manzano WSA, the pits would be stored in Type D magazines. Type D magazines (as shown in Figure 5.5.1.12–1) have access tunnels that vary in length from 20 meters to over 30 meters (65 feet to over 100 feet). The main chambers are approximately 19 meters (61 feet) long and have the capacity to store up to 800 pit containers each in a Stage Right configuration. In addition, the main chambers are protected by two vault-like steel doors at both ends of the access tunnel.



SOURCE: Manzano 1994

FIGURE 5.5.1.12–1.—*Type D Storage Facility at the Manzano Weapons Storage Area.*

Type D facilities are tunneled into the mountainside, which provides significant earth overburden protection from penetrating aircraft. As many as 35 magazines have overburden greater than 9 meters (30 feet) and are potentially available for pit storage.

For the 20,000-pit storage option, approximately 25 Type D magazines would be utilized. For the 8,000-pit storage option, approximately 10 Type D magazines would be utilized. The frequency of an aircraft impact at the Manzano WSA is relatively high compared with other potential storage sites. However, the earth overburden of Type D magazine provides complete protection against potential damage from aircraft impacts.

At Manzano WSA, the potential exists for airplanes overflying the area to be carrying conventional bombs. An analysis was performed to determine whether expected bomb loads (one to four 909-kilogram [2,000-pound] bombs) could damage the Manzano WSA storage magazines in the event of an airplane crash. With the minimum overburden cover of 9 meters (30 feet) of granite and earth, the magazines can not be damaged by any foreseeable aircraft events (PC 1995e).

Using the Draft DOE Standard for determining the probability of aircraft crashes and 1994 data from the FAA, the frequency of hitting one of the 25 Type D magazines was calculated as 8.8×10^{-5} for all types of aircraft (DOE 1996g). It should be noted that the frequency calculation represents a conservative upper bound. Since this frequency is greater than 10^{-7}, in accordance with the Draft DOE Standard, further analysis was required. A local response structural analysis was performed according to the Draft DOE Standard for the facility with a 9-meter (30-foot) overburden. The analysis was performed for the maximum penetrator missile for each of the aircraft categories mentioned in section 4.15.2, except for helicopters. None of the aircraft missiles was capable of penetrating the facility. Since this frequency is 0, in accordance with the Draft DOE Standard, no further analysis was required. Further details of the frequency of hitting a magazine and the frequency of releasing material are contained in volume II, appendix E.

5.5.2 Resources Discussed in Detail

5.5.2.1 *Human Health*

The basic approach used in assessing human health concerns is to first identify the affected environments and establish a baseline that represents the risk from current operations. Changes in this baseline risk resulting from the Pit Storage Relocation Alternative are then examined. Impacts from both normal operations and potential accidents are estimated.

Assessing the human health risk impact from potential accidents that result from the relocation of pits to KAFB and storing them in the Manzano WSA involves a risk screening process. The first step in this process is to identify a broad spectrum of potential accident scenarios. The second step in the process uses screening techniques to identify the specific scenarios that dominate risk (i.e., scenarios that contribute an appreciable fraction of the total risk). Finally, risk is calculated as the product of frequency and consequence. Rigorous consequence evaluations are only performed for the identified risk-dominant scenarios.

Two types of accident consequences are examined:

- Worker and public exposure.
- The probability of the accident causing fatal cancer in a worker or the public.

If DOE chooses to relocate pits to KAFB, two aspects of this relocation contribute to a potential for environmental impacts. They are the impacts associated with:

- Transferring pits from the transporter to their storage location inside the facility.
- Storage itself (i.e., potential impacts resulting from having the pits reside inside the facility).

Each time pits are transferred from the transporter to their storage location inside the facility, there is a small probability that an accidental release could occur due to a handling accident. In addition, the transfer of pits from the transporter to their storage location would result in radiological exposures to involved workers.

Affected Environment

The release of radioactivity and toxic chemicals to the environment from a DOE facility is an important issue for onsite workers and the public. Since the human environment contains many sources of radioactivity and toxic chemicals, it is essential to understand the sources of these substances and how effectively they are controlled.

Table 5.5.2.1–1 summarizes the major sources of radiation exposure in the vicinity of the Manzano WSA. The average annual probability of contracting a fatal cancer in the State of New Mexico is 1.4×10^{-3}. Using a nominal fatal cancer risk factor of 5×10^{-4} cancer fatalities per person rem and the environmental

TABLE 5.5.2.1–1.—*Major Sources of Radiation Exposure in the Vicinity of the Manzano Weapon Storage Area at Kirtland Air Force Base*

SOURCE OF EXPOSURE	DOSE TO AVERAGE INDIVIDUAL (mrem/year)	PERCENTAGE OF TOTAL EXPOSURE
NATURAL BACKGROUND RADIATION		
Cosmic and external terrestrial	119	
Internal terrestrial	39	
Radon in home	200	
Total natural	358	84.8
MEDICAL RADIATION		
Diagnostic x-rays	39	
Nuclear medicine	14	
Total medical	53	12.6
OTHER SOURCES		
Weapons test fallout	<1	
Consumer and industrial products	10	
Air travel	1	
Nuclear facilities (other than transportation of radioactive materials)	<1	
Manzano/Sandia—environmental radioactivity	4×10^{-8}	
Total other	11	2.6
Total—all sources	422	100

[1]Effective dose equivalent.
Source: NCRP 1987:53

radioactivity data for Manzano/Sandia in Table 5.5.2.1–1, it is calculated that fatal cancers attributable to environmental radioactivity released in the vicinity of the Manzano WSA and SNL constitute an extremely small fraction (<<0.01 percent) of the average yearly fatal cancer probability in the State of New Mexico (Letter 1995).

Figure 5.5.2.1–1 depicts the offsite population within an 80-kilometer (50-mile) radius of the Manzano WSA. Wind speeds and directions in the Manzano WSA vicinity are presented in Figure 5.5.2.1-2. Winds are predominantly southerly during the summer and northerly during the winter.

Impacts of Facility Upgrades

There is no significant impact on human health associated with Manzano facility upgrades. The only upgrade required is to modify storage magazines to accept Stage Right transfer and storage equipment. The facility impact involves modifying floor space to accept Stage Right guide rails and fastening Stage Right attachment fixtures to storage facility walls. These are standard industrial operations that do not expose workers to any special hazards (e.g., radionuclides, toxic chemicals, or high explosives).

Impacts of Storing 20,000 Pits

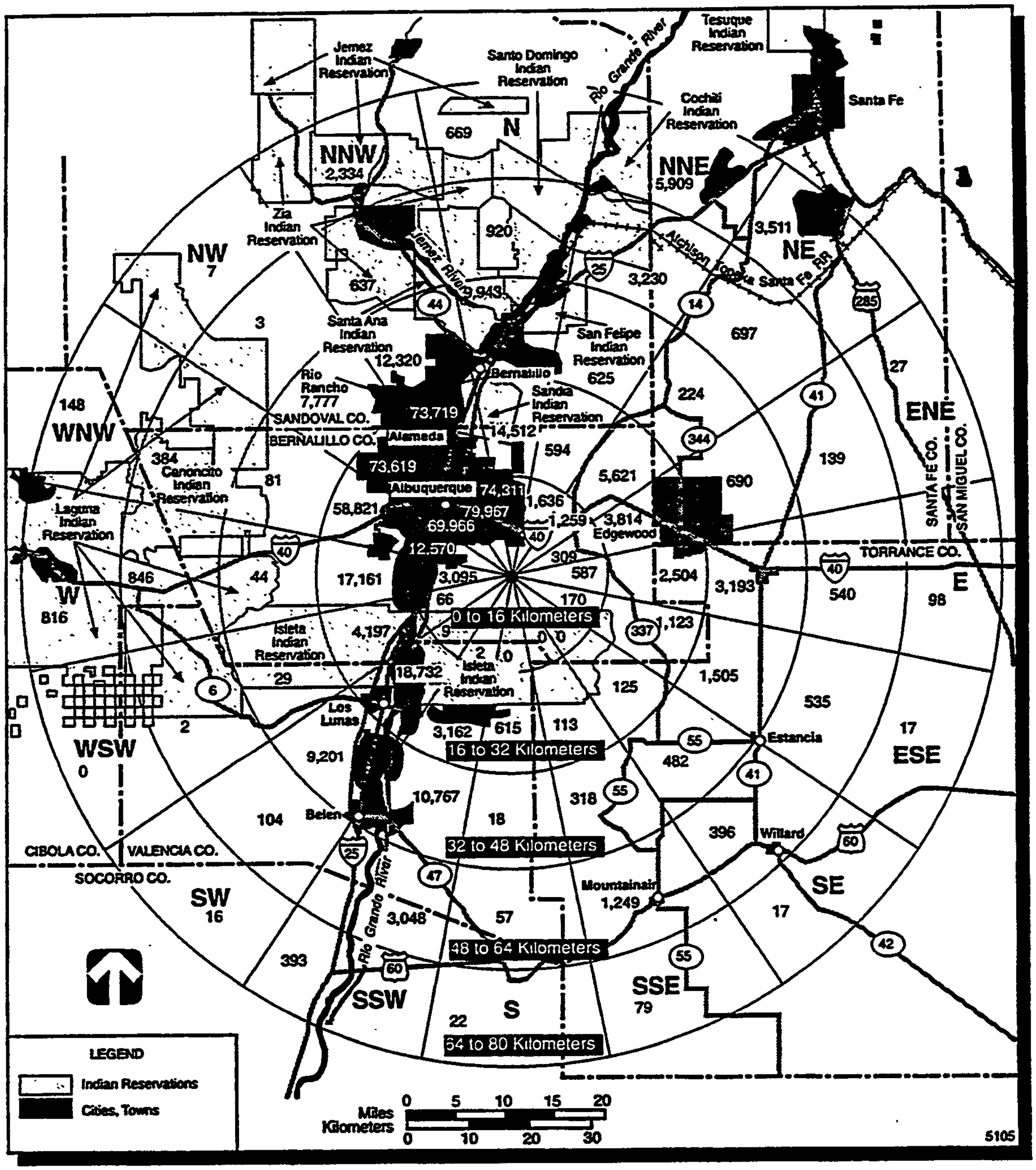
Human health impacts from pit storage activities could potentially result from normal operations and accident scenarios. Impacts from normal operations would be confined to onsite workers. Normal operational impacts result from the unloading of pits from SSTs at the Manzano WSA. Unloading operations would result in radiological exposure to cargo handlers. Based on conservative calculations made for handling of pits at Pantex Plant, the worker doses from unloading of 2,000 pits per year are estimated to be 27 person-rem per year or 270 person-rem for the unloading of 20,000 pits (the maximum number of pits which may be stored at the Manzano WSA).

Once removed from the SSTs, pits would be transferred into the Manzano WSA for storage. Pit transfers within the Manzano WSA would result in radiological exposures to onsite workers handling the pits. The transfer of pits would result in worker doses of less than 2 person-rem per year for handling 2,000 pits and about 13 person-rem for the placement of 20,000 pits. The combined worker dose from unloading and storage of 20,000 pits at the Manzano WSA would be 283 person-rem distributed over the 30 people directly involved in material movement. Assuming that the same 30 people continue to handle 20,000 pits over a period of 10 years and using a dose-to-risk conversion factor of 4×10^{-4} latent cancer fatality (LCF) per person-rem, there would be an additional 0.11 LCF experienced by this group due to radiological exposure from pit handling.

The probability of LCFs from all causes in the general population is estimated at 20 percent, which implies that 6 of 30 workers would develop cancer from all other causes. With an additional risk of 0.11 LCF from pit handling, the total risk of LCFs among workers at the Manzano WSA would increase by 1.8 percent.

Some operational accidents could result in impacts to both onsite workers and the offsite general population. Radiological exposures and the resultant risk of latent cancers have been evaluated.

The Manzano WSA is the candidate facility at KAFB for storing 20,000 pits. The risk screening methodology indicates that the radiological health risk from accidents associated with the storage of 20,000 pits is dominated by handling accidents that could occur when the pits are being transferred from the transporter. A standard tine forklift is likely to be used to remove pit containers from an SST. The probability of a standard tine forklift



SOURCE: UN 1995

FIGURE 5.5.2.1–1.—*Offsite Population in the Vicinity of the Manzano Weapons Storage Area.*

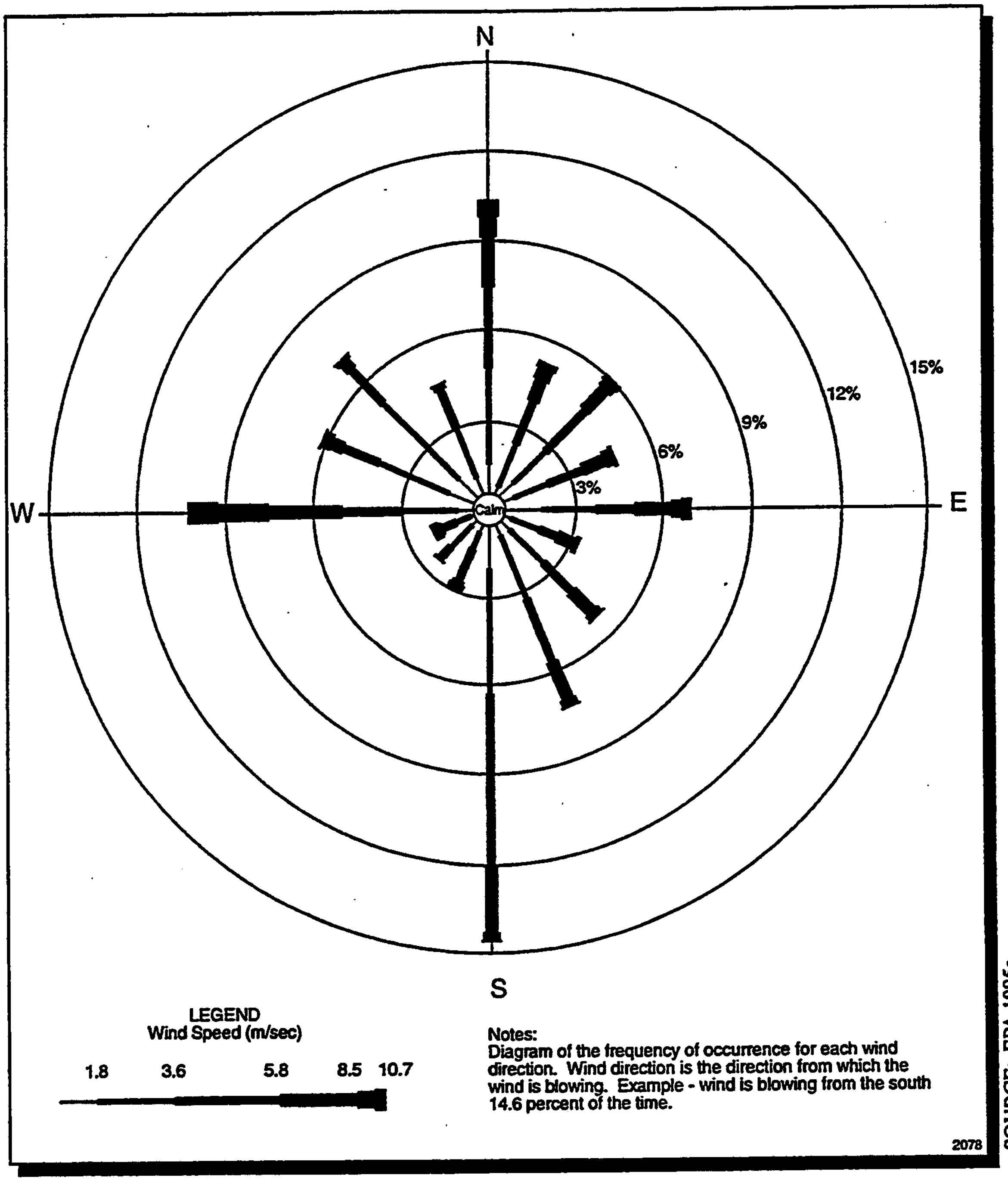


FIGURE 5.5.2.1–2.—*Wind Direction and Speed at Albuquerque International Airport.*

causing a puncture during a single handling operation is in the extremely unlikely range (i.e., 10^{-4} to 10^{-6}).

It is estimated that a forklift puncture of a pit container would release 9.2×10^{-5} curies of plutonium. This is a conservative estimate of the respirable, airborne release caused by a puncture of one shipping container (DOE 1992f:7-39).

Given such a release, an involved worker (the forklift driver) would receive a dose of 6.6 rem, corresponding to an incremental increase in lifetime fatal cancer probability of 2.6×10^{-3}. In addition, a non-involved worker 100 meters (328 feet) downwind along the center line of the plutonium dispersion plume would receive a 5.2×10^{-2} rem exposure, corresponding to an incremental increase in lifetime fatal cancer probability of 2.1×10^{-5}. The maximally exposed member of the public would be expected to receive an exposure of 1.7×10^{-3} rem, corresponding to an incremental increase in lifetime fatal cancer probability of 8.5×10^{-7}. The lifetime fatal cancer probability for an average individual from all other causes is approximately 0.2 (20 percent).

This event would result in an exposure to the public of 4.0×10^{-2} person-rem. Considering the likelihood and consequence of this event, on the average, a member of the public will have an increased annual risk of developing a fatal cancer from this potential accident of 2.6×10^{-14} fatal cancers per year. The annual fatal cancer risk to a person in the State of New Mexico from all other causes is 1.4×10^{-3} fatal cancers per year.

Pit container inventories at the Manzano WSA are expected to be performed using either shielded or automated techniques and equipment. Consequently, these normal operations are not expected to result in any significant radiological exposure to workers.

Other storage activities that may occur within the timeframe evaluated in this EIS include:

- Restacking a limited number of pits to comply with design laboratory temperature requirements.
- A limited number of pit movements and/or instrumentation placements to facilitate third party inspections.

Impacts of these routine activities are also considered to be negligible.

Impacts of Storing of 8,000 Pits

The risks associated with storing 8,000 pits are similar to those of the 20,000-pit storage alternative. If DOE chooses to store 8,000 pits at the Manzano WSA, the total worker doses from unloading operations would be below 113 person-rem over 4 years. This exposure would result in an additional 0.04 LCF from pit handling. With an additional risk of 0.04 latent cancers from pit handling, the total risk of latent cancers among workers at the Manzano WSA would increase by 0.6 percent.

Risk screening methodology also indicates that the risk from storing 8,000 pits in the Manzano WSA is dominated by forklift handling accidents. Note that the risk screening methodology evaluated all potential threats to pit container integrity, such as fire, aircraft crash, earthquakes, flood, and other internal and external events.

The relative risk contribution from earthquakes at the Manzano WSA could not be assessed due to insufficient storage facility fragility data. Since the Type D storage facilities are buried inside solid rock, a breach of a storage and shipping container would not result in a radionuclide release outside the facility as long as the rock overburden remains intact and the doors leading to the storage facility remain closed. Moreover, due to the robust design of the storage and shipping containers, a plutonium release caused by a seismic event is considered not reasonably foreseeable unless part of the rock overburden collapses and impacts a shipping container. Hence, the frequency of a plutonium release from a Manzano Type D storage facility is dependent upon the seismic capacity of the rock overburden.

The impacts of a forklift puncture at Manzano WSA would be the same whether 20,000 or 8,000 pits are stored at the site.

5.5.2.2 *Environmental Justice*

Affected Environment

The Manzano WSA is located on KAFB, which is adjacent to the southeastern city limits of Albuquerque, in central New Mexico. Besides the Air Force and other Department of Defense facilities, KAFB is also the location of various DOE operations, including SNL. Nearly 20,000 military and civilian personnel work on the base (KAFB 1995). In order to identify the target populations covered by Executive Order 12898, an 80-kilometer (50-mile) radius circle centered on the Manzano WSA was overlaid on 1990 Census tract maps. The communities that lie within the 80-kilometer (50-mile) circle, hereafter called the Manzano Region of Influence (ROI), are shown in Figure 5.5.2.2–1.

Population. According to the 1990 Census, there were 606,446 persons within the Manzano ROI. White persons comprised 55 percent of the population, Hispanics were the second largest group with 37 percent, and American Indians accounted for just over 4 percent of the total population. Indian Reservations and trust lands belonging to 10 Native American tribes are located within the Manzano ROI, and approximately half of the American Indians counted in the area in 1990 resided on Indian land. Blacks, Asians, Pacific Islanders and other racial groups totaled less than 4 percent of the total population in 1990 (UN 1995).

Most of the population in the Manzano ROI resides in various cities, towns and Census Designated Places. Albuquerque is the most populous community with 384,736 persons or 63 percent of the total population within the Manzano ROI in 1990. An unincorporated area known as the South Valley, located immediately southwest of Albuquerque and due west of KAFB, is the second largest community in the area with a 1990 population of 35,701. More than 70 percent of residents in the South Valley were Hispanics. Rio Rancho, northwest of Albuquerque in southcentral Sandoval County, is third largest with 32,505 persons in 1990.

North and south of Albuquerque, along the Rio Grande River, are a number of towns and villages, most with primarily Hispanic populations: Belen (5,960 persons in 1990, 67 percent Hispanic), Bernalillo (5,960 persons, 75 percent Hispanic), Bosque Farms (3,791 persons, 25 percent Hispanic), Corrales (5,453 persons, 27 percent Hispanic), Los Chaves (3,872 persons, 49 percent Hispanic), Los Lunas (6,013 persons, 58 percent Hispanic), Tome-Adelino (1,695 persons, 65 percent Hispanic) and Valencia (3,917 persons, 47 percent Hispanic) (NM Cen 1992:Table 6). Most of these communities are also characterized by fairly large low-income populations. For example, Belen had 28 percent of its population below the poverty level, Bernalillo had 24 percent below the poverty level, Los Chaves had 19 percent below the poverty level, Los Lunas had 25 percent below the poverty level, and Valencia had 15 percent below the poverty level (NM Cen 1993:Table 203).

There are also nine primarily American Indian communities in the Manzano ROI. A major portion of the northern boundary of the Isleta Indian Reservation borders the southern boundary of KAFB, but the Isleta people (2,699 in 1990) primarily live near the Rio Grande River, several miles from the KAFB boundary. In the Sandoval County portion of the Manzano ROI are seven additional Indian Reservations with persons residing in dense settlements

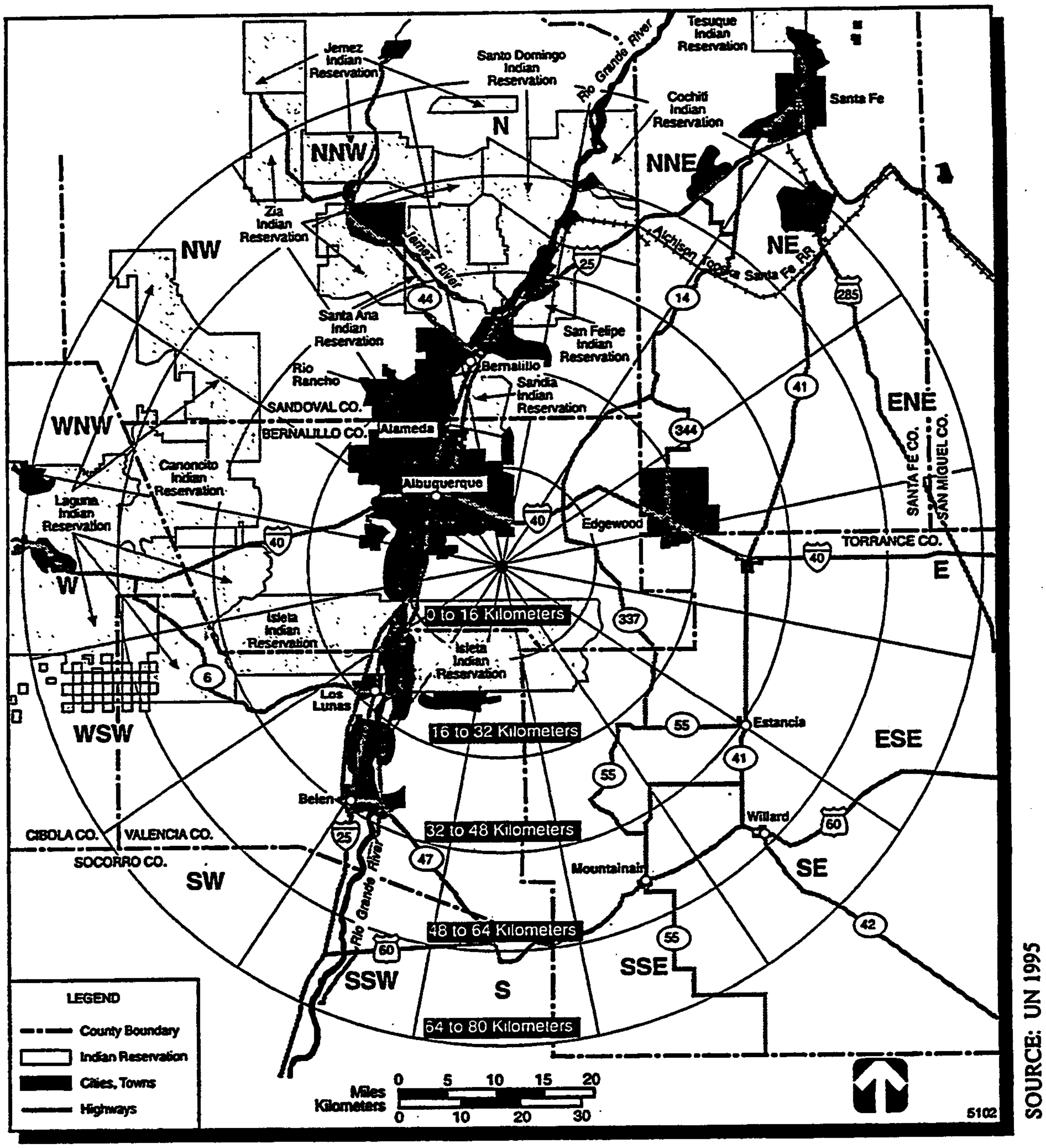


FIGURE 5.5.2.2–1.—*The Manzano WSA Region of Influence.*

known as Pueblos: Sandia Pueblo with 358 Indian residents in 1990; Santa Ana Pueblo with 481 Indian residents; San Felipe Pueblo with 1,859 Indian residents; Santo Domingo Pueblo with 2,947 Indian residents; Cochiti Pueblo with 666 Indian residents; Zia Pueblo with 637 Indian residents; and Jemez Pueblo with 1,738 Indian residents. In the northwest corner of Bernalillo County is the Canoncito Navajo Reservation, a satellite of the main Navajo Reservation, with 1,060 Indian residents counted in 1990 (NM Cen 1991:Table 17).

The most notable socioeconomic characteristic of these communities is their large numbers of low-income persons. The percentage of persons below the poverty level based on 1989 incomes found on these reservations were: Isleta, 27; Sandia, 19; Santa Ana, 13; San Felipe, 42; Santo Domingo, 34; Cochiti, 25; Zia, 33; Jemez, 37; and Canoncito, 60 (NM Cen 1993:Table 229).

Minority Population. Figure 5.5.2.2–2 shows 1990 Census tracts within the Manzano ROI. The tracts are shaded if minority populations comprised 25 percent or more of the populations in 1990 or if 25 percent or more of the persons in a tract were below the poverty level based on their incomes in 1989. The 25 percent threshold levels for minority or low-income persons are based on the working definitions contained in the notice of the Environmental Protection Agency's Office of Environmental Justice (59 FR 192).

Virtually every tract in the Manzano ROI had a population in 1990 in which at least 25 percent of persons were minority or non-Whites. The major exceptions were the southern-most tract in Santa Fe County, four tracts in Rio Rancho in southcentral Sandoval County, and 25 tracts located primarily in the northeastern quadrant of Albuquerque, including the Four-Hills Tract located just north of the Manzano WSA.

Low-Income Population. Low-income persons were not nearly as prevalent in the Manzano ROI in 1990 as were minority persons. High levels of poverty found in American Indian communities account for the shaded tracts in rural Sandoval County, eastern Cibola County, and western and southern Bernalillo County. The tracts shaded for low-income persons in rural Socorro, Valencia, Torrance and San Miguel Counties are also areas with largely Hispanic populations. In the Albuquerque area, high poverty levels were found primarily in the southern half of the city, with the greatest concentration of low-income persons situated in the southwest quadrant, in the unincorporated area known as the South Valley, with its 73 percent Hispanic population (NM Cen 1992:Table 6).

Impacts of Storing 20,000 Pits

Because the interim storage of pits at KAFB would not require any construction activities and because all facility modifications would take place inside existing facilities, impacts to the natural environment would be minimal. Under normal operating conditions, there would be minor increases in air pollutants associated with vehicles used during pit storage activities. Also, a minor increase in particulate matter of aerodynamic diameter less than 10 micrometers concentrations would be expected. These increases are associated with the operation of forklifts which are used to move the pits from the unloading area to the storage area.

These impacts are not likely to affect the surrounding population. Radiological releases from normal pit storage operations would have no measurable effect on an individual occupying a position near the KAFB boundary for an entire year. Levels at the site boundary would be indistinguishable from natural background radiation. No adverse health effects would be expected among the general public, including minority and low-income populations, as a result of normal storage operations.

An abnormal event, such as accidental puncture of a storage container by a forklift, has the

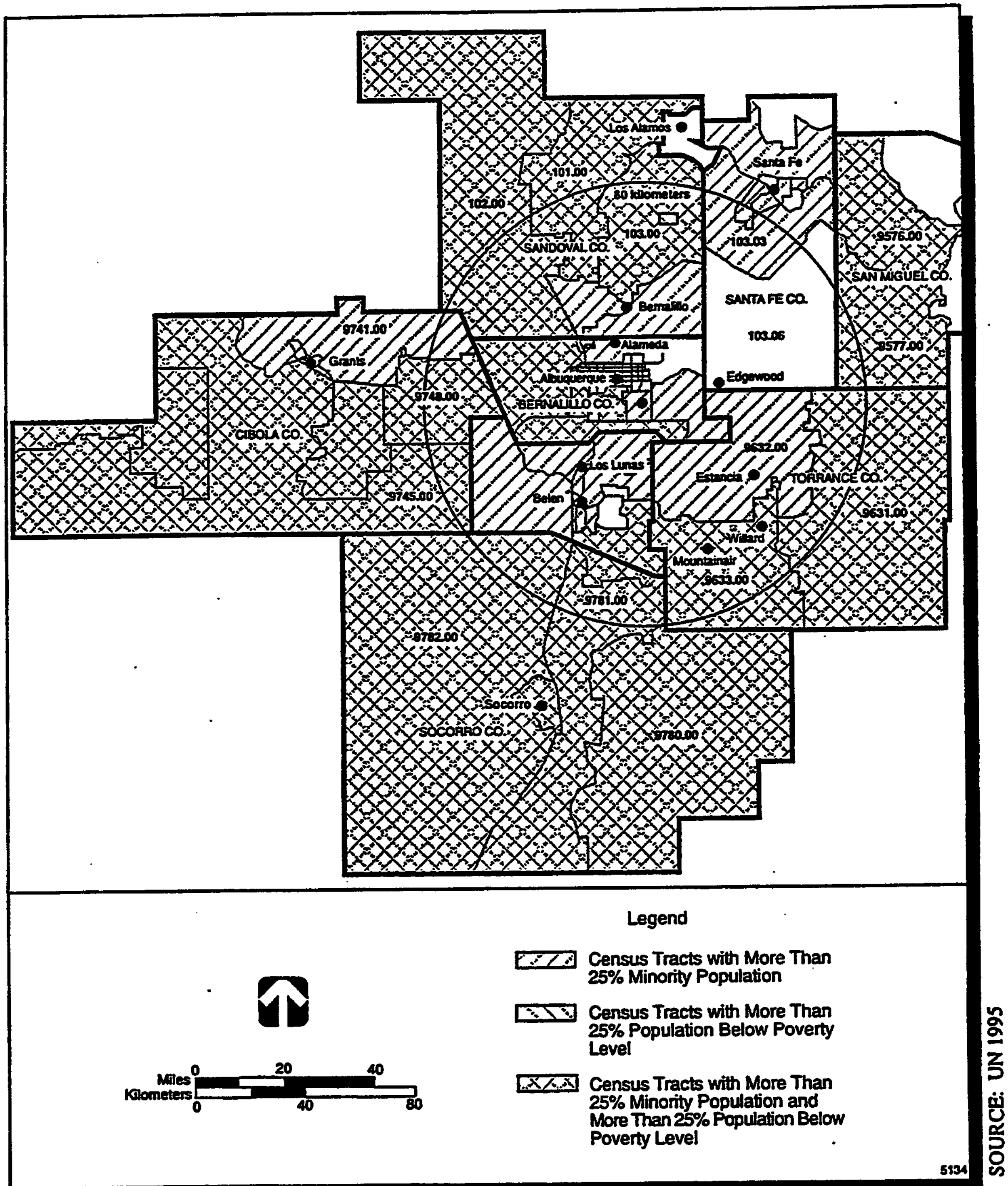


FIGURE 5.5.2.2–2.—*Minority and Low-Income Populations in the Manzano WSA Region of Influence.*

potential of exposing the general public to radiation. The analysis in section 5.5.2.1, Human Health, indicates that the risk to the public from such an accident would be negligible. With no measurable impacts on the general population, the minority and low-income populations would not be disproportionately impacted.

Impacts of Storing 8,000 Pits

The human health impact of storing 8,000 pits at the Manzano WSA would be lower than those identified for the storage of 20,000 pits. No significant adverse impacts are expected, and minority and low-income populations would not be disproportionately impacted.

5.5.2.3 *Air Quality*

Affected Environment

The Manzano WSA at KAFB is located in Bernalillo County, which is situated in the Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region 152. The Manzano WSA lies outside the City of Albuquerque and is classified as "better than national standards" for sulfur dioxide (SO_2), "unclassifiable/ attainment" for ozone (O_3), "unclassifiable" for particulate matter, "cannot be classified or better than national standards" for nitrogen dioxide (NO_2), "attainment for CO, and "not designated" for lead. For CO, Bernalillo County has not had a violation during the past 3 years. As of July 15 1996, the Environmental Protection Agency redesignated Bernallilo County from nonattainment to attainment for CO. The nearest Prevention of Significant Deterioration Class I area to the Manzano WSA is the Bandelier Wilderness, approximately 80 kilometers (50 miles) to the north. The Manzano WSA has no emission sources subject to Prevention of Significant Deterioration requirements.

Impacts of Facility Upgrades

Project-related air quality impacts can be divided into two distinct categories. The first category is short-term construction-related impacts. The second category of impacts is characterized as long-term operations impacts. Long-term impacts would occur once construction is completed and the facility is in operation.

Facility upgrades would not be required at the Manzano WSA. Therefore, there would be no air quality impacts related to construction activities.

Impacts of Storing 20,000 Pits

There are no direct criteria pollutant emissions from the pits during storage. Indirect pollutant emissions would be produced from the exhausts of the vehicles used by employees used to commute to and from work. Also, exhaust emissions from the SSTs used to transport the pits from Pantex Plant to the Manzano WSA would contribute a small amount of pollution to the overall pollutant burden in Bernalillo County, New Mexico.

The calculation of emission rates of exhaust pollutants from employee and pit delivery vehicles was made based on emission factors obtained from the EPA Mobile Source Emission Factor Model (MOBILE 5a). The following assumptions were used in calculating the exhaust pollutant emissions:

- 120 vehicles would be used by security employees (365 days per year).
- 30 vehicles would be used by operations staff employees (255 days per year).
- Average round-trip commute distance: 48 kilometers (30 miles).
- Pit delivery truck round-trip distance in Bernalillo County: 80 kilometers (50 miles).

Table 5.5.2.3–1 presents the estimated annual pollutant emissions from employee and pit delivery vehicles. A comparison of these emissions with those in Bernalillo County is also provided in the table.

Table 5.5.2.3–1 shows that the resulting increase in the CO emission due to storage of pits at the Manzano WSA would be 0.08 percent. Also, these emissions from mobile sources would be distributed over a relatively large area. The increases in the ambient concentrations would, therefore, probably not be detectable. Bernalillo County was in a maintenance for attainment area for CO, and has recently been designated an attainment area for CO. Nor would these negligible increases cause any violations of the National Ambient Air Quality Standards for the other criteria pollutants. The air quality impacts resulting from the long-term storage of pits at the Manzano WSA would therefore be negligible.

Impacts of Storing 8,000 Pits

Pollutant emission resulting from the storage of 8,000 pits would be less than those resulting from the storage of 20,000 pits. Since the air quality impacts from the storage of 20,000 pits were found to be negligible, the air quality impacts resulting from the storage of 8,000 pits would also be negligible.

General Conformity Determination

The EPA published the General Conformity Rule 40 CFR parts 6, 51, and 93 on November 30, 1993 to implement section 176(c) of the *Clean Air Act* as amended in 1990. This section requires that Federal action conform to the appropriate State Implementation Plan. Conformity, as defined in the *Clean Air Act*, is conformity to the State Implementation Plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of such standards.

A formal conformity determination is required for federal actions occurring in nonattainment areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified annual de minimis (threshold) values. Because O_3 is a secondary pollutant, the conformity determination for O_3 uses the precursor emissions of volatile organic compounds (VOCs) and NO_2 as surrogate pollutants. The de minimis thresholds are presented in Table 5.5.2.3–2.

TABLE 5.5.2.3–1.—*Pollutant Emission Rates Related to Storage of Pits at the Manzano Weapons Storage Area (metric tons [tons] per year)*

SOURCE	POLLUTANT EMISSION RATE		
	CO	NO_2	VOC
Employee Vehicles	19.94 (21.98)	3.62 (3.99)	2.08 (2.80)
Pit Delivery Vehicle	0.04 (0.04)	0.05 (0.06)	0.01 (0.01)
Total	19.98 (22.02)	3.67 (4.05)	2.09 (2.31)
Bernalillo County (1993)	26303 (29458)		
% of County Emission	0.08		

NA - Emission factors not available.

TABLE 5.5.2.3–2.—*De Minimis Thresholds*

CRITERIA POLLUTANT	DEGREE OF NONATTAINMENT	METRIC TONS (tons/year)
Ozone (VOCs and NO_2)	Serious Severe Extreme Other ozone nonattainment areas (outside of ozone transport region)	45.4 (50) 22.7 (25) 9.1 (10) 90.7 (100)
VOCs	Marginal/moderate nonattainment (within ozone transport region)	45.4 (50)
NO_2	Marginal/moderate nonattainment (within ozone transport region)	90.7 (100)
Carbon monoxide (CO)	All	90.7 (100)
Particulate matter (PM_{10})	Moderate Serious	90.7 (100) 63.5 (70)
Sulfur/nitrogen dioxide (SO_2/NO_2)	All	90.7 (100)
Lead (Pb)	All	22.7 (25)

Since the Manzano WSA was in a maintenance for attainment area for CO, the de minimis value for CO was 90.7 metric tons (100 tons) per year. As shown in Table 5.5.2.3–1, the emission rate for CO is well below the de minimis value. Therefore, a general conformity analysis is not required for the Manzano WSA. Further, the County has recently been designated attainment area for CO.

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CHAPTER 6

Environmental Compliance Requirements for Implementing the Proposed Action and the Alternatives

CHAPTER 6
ENVIRONMENTAL COMPLIANCE REQUIREMENTS FOR IMPLEMENTING THE PROPOSED ACTION AND THE ALTERNATIVES

Chapter 6 describes the environmental compliance requirements for implementing the Proposed Action and Alternatives. These include mention of applicable Federal and State laws as well as identification of agencies with regulatory purview over actions that would result from the Department's Record of Decision that will follow the completion of this EIS.

6.1 INTRODUCTION AND PURPOSE

This chapter provides information concerning the environmental standards and statutory requirements that relate to continuing operations at Pantex Plant. It presents some of the more important regulatory requirements associated with the Proposed Action by identifying the applicable environmental statutes, regulations, and approval requirements. The requirements are found in Federal and State statutes, regulations, permits, approvals, and consultations, as well as in the Executive and DOE orders, Consent orders, Federal Facility Agreements, Federal Facility Compliance Agreements, and Agreements-in-Principle. The status of consultations required by some statutes is documented, and potential new permits required by the Proposed Action are listed. In addition, this chapter provides historical background on environmental protection at Pantex Plant and alternative sites, identifies potential new permits that may be required, and explains the concept of shared Federal and State enforcement.

6.2 BACKGROUND

Since Pantex Plant was constructed during the 1940's and 1950's, before the advent of current environmental and worker health requirements, operational safety and national security requirements were the dominant factors in the design and operation of its facilities. With the emergence of environmental and health-related issues and the enactment of environmental and worker health programs, DOE shifted many of its resources into programs designed to achieve compliance with all applicable Federal, State, and local requirements. Today, many government agencies at the Federal, State, and local levels have regulatory authority over Pantex Plant operations due to compliance agreements between DOE and regulators.

6.3 ENVIRONMENTAL REQUIREMENTS

Section 6.3.1 discusses the major Federal and State statutes, regulations, and orders associated with this EIS. Section 6.3.2 summarizes consultations that have taken place. Finally, section 6.3.3 identifies existing permits obtained for Pantex Plant operations and highlights potential permits in support of certain projects at Pantex Plant during the EIS timeframe.

6.3.1 Environmental Statutes, Orders, and Agreements

The *Atomic Energy Act of 1954* (42 U.S.C. 2011) authorized the Atomic Energy Commission to establish standards to protect health and minimize dangers to life or property.

As a successor agency to the AEC, DOE has inherited these responsibilities. Other Federal environmental statutes and regulations have been established to protect the environment and to control the generation, handling, treatment, storage, and disposal of hazardous materials and waste substances. Table 6.3.1–1 (all tables are presented at the end of this chapter) lists the Federal environmental statutes, regulations, and Executive orders applicable to Pantex Plant. It also identifies the associated permit, approval, and consultation requirements generally required to site, construct, or operate the facilities discussed in this EIS. DOE is committed to fully complying with all applicable environmental statutes, regulatory requirements, and Executive and internal orders; many of these requirements and standards are established through DOE orders. Table 6.3.1–2 lists selected DOE orders that apply to all sites; however, they may affect each site differently.

DOE has entered into agreements with some regulatory agencies on behalf of Pantex Plant facilities. These agreements normally establish a schedule for achieving full compliance with regulations at Pantex Plant. Table 6.3.1–3 lists Texas State environmental statutes, regulations, and orders.

6.3.2 Environmental Consultations

The *National Environmental Policy Act* (NEPA) requires the proponent to involve a number of Federal, State, and local agencies with jurisdiction over various aspects of the Proposed Action and Alternatives to be consulted. The *Endangered Species Act* (16 U.S.C. 1531) and *National Historic Preservation Act* (16 U.S.C. 470) require consultation in regard to endangered species, critical habitat, and prehistoric and historic resources. Chapter 9 lists Federal and State agencies that have been offered an opportunity to comment on the Draft EIS. Appendix J contains letters pertaining to *Endangered Species Act* and *National Historic Preservation Act* consultations, together with others providing comments on the Draft EIS.

6.3.3 Environmental Permits

Pantex Plant has applied for various air, solid waste, and water permits in accordance with the Federal and State regulatory requirements outlined in Tables 6.3.1–1 and 6.3.1–3. Section 6.4 summarizes the status of permits and other important regulatory issues at Pantex Plant Site. The status of regulatory issues at alternative interim pit storage sites is briefly summarized in section 6.5.

6.4 Environmental Regulatory Setting at Pantex Plant

In 1989, the Secretary of Energy invited the host State of each DOE facility to independently determine and verify any impacts of plant operations to the environment. In response to this initiative, DOE entered into an Agreement-in-Principle with the State of Texas to focus on waste management, emergency response, and environmental monitoring. DOE provides required information to the State of Texas, and the State conducts sampling and research activities. DOE also issued a Grant-in-Aid for the hydrogeologic characterization studies at Pantex Plant. The plant provides office space for TNRCC officials who are assigned to this site.

Generally, Pantex Plant operations are currently in full compliance with applicable Federal and State regulations. However, since this facility existed prior to the promulgation of many current environmental laws and regulations, both the Environmental Protection Agency (EPA) and the State of Texas have allowed DOE to continue operations while taking actions to achieve full compliance with all applicable environmental regulatory requirements.

On May 31, 1994, EPA announced in the *Federal Register* that, effective June 30, 1994, Pantex Plant would be listed on the National Priorities List as a Superfund site pursuant to the provision of the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (59 FR 27989). This determination was based on the presence of contamination due to past practices. Pantex Plant officials, TNRCC, and EPA Region 6 are in the process of developing a Federal Facility Compliance Agreement to address Pantex Plant Superfund issues (Pantex 1995a:15-4).

Section 107 of CERCLA provides for the designation of Federal and State trustees who are responsible for assessing damages for injury to, destruction of, and loss of natural resources. As Pantex Plant's primary Federal Natural Resource Trustee, DOE has participated with various Federal and State Trustees including the U.S. Fish and Wildlife Service, the U.S. Geological Survey, TNRCC, and the Texas General Land Office (DOE 1996f:12). As completion of the Federal Facility Agreement for the Pantex Plant approaches, consultation will increase.

6.4.1 Air

The Burning Ground is the term used to describe 17 thermal treatment units. These units are used to treat, demilitarize, and sanitize explosives, explosive components, and explosive materials. The Burning Ground is operated under *Resource Conservation and Recovery Act* (RCRA) (42 U.S.C. 6901) interim status and a written grant of authority from TNRCC.

6.4.2 Water

Since 1980, pursuant to the Texas Water Code, TNRCC has permitted the plant to discharge its wastewater under a Wastewater No Discharge Permit (Permit Number 02296), which allows wastewater discharges not going to "Waters of the State." In 1980, the State did not consider playas to be "Waters of the State," and, on December 26, 1990, DOE filed a permit application to modify its permit. The permit application was resubmitted in May 1992, at the request of TNRCC, to change the permit from a No Discharge to a Discharge Permit. EPA Region 6 National Pollutant Discharge Elimination System (NPDES) Permit No. TX-0107107 and TNRCC Permit 02296, as amended, authorize the plant to discharge to the waters of the United States and Texas, under specified effluent limitations and monitoring requirements.

6.4.3 Land

Pantex Plant currently operates RCRA units under its Hazardous Waste Permit and under Interim Status. On April 25, 1991, TNRCC and EPA issued a permit to Pantex Plant to store containers and tanks and to treat hazardous waste in tanks and containers. The permit specifically excluded 17 RCRA units at the Burning Ground, but continued Interim Status of those units. Explosive waste and explosive-contaminated waste are thermally treated at the Burning Ground, which operates as a RCRA Interim Status unit and under a written Grant of Authority from TNRCC. In November 1991, DOE formally submitted a request to TNRCC for a Class 3 Modification to add the units at the Burning Ground to the permit. Pursuant to the public notice published on October 31, 1991, interested parties requested a hearing before a hearing examiner on the permit. On May 31, 1992, the TNRCC Office of Air Quality recommended draft hazardous waste permit provisions for the Burning Ground. TNRCC, DOE, and parties to the hearing process are continuing discussions on terms of the proposed permit modification.

EPA issued DOE a draft RCRA Administrative Order of Consent in September 1989 requiring Pantex Plant to conduct a RCRA Facility Investigation (RFI) to identify, assess, and correct actual and potential threats to human health or the environment resulting from the release of hazardous wastes or constituents at 144 solid waste management units (SWMUs) (Pantex 1996:15). In 1991, the RFI was incorporated into the hazardous waste permits (TWC 1991:Attachments C-G). The RFI has completed the initial investigation for 70 percent of the SWMUs (PC 1995r; DOE 1994x). Based on RFI results and recommendations, corrective measures will be evaluated and conducted at certain SWMU sites following the necessary approval. A Pantex Plant citizens advisory board has been created to provide stakeholders with information on environmental restoration activities, and also to serve as a forum to address their environmental concerns.

On October 3, 1995, TNRCC approved the Pantex Plant Site Treatment Plan-Compliance Plan and Agreed Order pursuant to the *Federal Facility Compliance Act of 1992* (42 U.S.C. 6961) (FFCA) (DOE 1995x). The Agreed Order and Site Treatment Plan-Compliance Plan establish schedules for development of treatment technologies for low-level mixed waste subject to Land Disposal Restrictions.

6.5 Pit Storage Sites

Tables 6.5–1 through 6.5–4 identify selected environmental statutes, regulations, and orders for states in which the four candidate sites for pit storage are located. Most of the candidate sites' operations are currently in compliance with applicable Federal and State regulations. Since many of the sites' facilities existed prior to the promulgation of many current environmental laws and regulations, EPA and the respective states have allowed DOE to continue most operations while taking actions to achieve full compliance with all applicable environmental regulatory requirements.

Kirtland Air Force Base (KAFB) is the only alternative storage site candidate that has RCRA Part B Permits issued to non-DOE agencies. The New Mexico Environment Department and EPA Region 6 have issued RCRA Part B Permits to the 377th Air Base Wing (the host Air Force element), in addition to those issued to DOE's Kirtland Area Office and Sandia National Laboratories. If DOE selects KAFB's Manzano Weapons Storage Area as a pit storage site, a decision would have to be made on whether to use KAFB, Sandia National Laboratories, or another DOE organization to handle hazardous, mixed, or radioactive wastes associated with the Pit Storage Relocation Alternative. New permits, or permit modifications, could be required. A Memorandum of Understanding (in consultation with regulators) would presumably be developed to address interagency environmental and other issues.

The final decision to issue a new permit or modify existing permits rests primarily with the New Mexico Environment Department. DOE expects at a minimum, language changes modifying existing RCRA Part B permits and identification of responsible parties in areas of site ownership, on-going solid waste management unit investigations and clean-ups, and waste management operations. Since no additional RCRA storage, treatment, or disposal facilities would be required to manage less than 1 cubic meter (1.3 cubic yards) per year of mixed waste and hazardous waste, the modifications are expected to be considered Class 1 as defined by 40 CFR 270 criteria.

Since the Hanford Site, Savannah River Site, Nevada Test Site, and Sandia National Laboratories each manage low-level mixed waste and hazardous waste, no impacts to the current waste management operations are expected from the small volumes routinely generated during pit storage activities (DOE 1995). Low-level mixed wastes would be managed in accordance with site-specific FFCA Site Treatment Plan–Compliance Plan and Site Agreed Order.

TABLE 6.3.1–1.—***Federal Environmental Statutes, Regulations, and Orders Applicable to Pantex Plant***

RESOURCE CATEGORY	STATUTE/ REGULATION/ ORDER	CITATION	RESPONSIBLE AGENCY	EIS-LEVEL POTENTIAL APPLICABILITY: PERMITS, APPROVALS, CONSULTATIONS, AND NOTIFICATIONS
Air Resources	*Clean Air Act* (CAA), as amended	42 U.S.C. §§7401 et seq.	EPA	Requires sources to meet standards and obtain permits to satisfy: National Ambient Air Quality Standards (NAAQS), Standards of Performance for New Stationary Sources, National Emission Standards for Hazardous Air Pollutants (NESHAP), and Prevention of Significant Deterioration (PSD).
	National Ambient Air Quality Standards/State Implementation Plans	42 U.S.C. §§7409 et seq.	EPA	Requires compliance with primary and secondary ambient air quality standards governing SO_2, NO_x, CO, O_3, Pb, and PM_{10} and emission limits/reduction measures designated in each State.
	Standards of Performance for New Stationary Sources	42 U.S.C. §7411	EPA	Establishes control/emission standards and record keeping requirements for new or modified sources specifically addressed by a standard.
	National Emission Standards for Hazardous Air Pollutants	42 U.S.C. §7412	EPA	Requires sources to comply with emission levels of hazardous air pollutants; may require a preconstruction approval, depending on the process being considered and the level of emissions that will result from the new or modified source.
	Prevention of Significant Deterioration	42 U.S.C. §§7470 et seq.	EPA	Requires comprehensive preconstruction review and the application of Best Available Control Technology to major stationary sources (emissions of 100 tons/year) and major modifications; requires a preconstruction review of air quality impacts and the issuance of a construction permit from the responsible State agency setting forth emission limitations to protect the Prevention of Significant Deterioration increment.
Acoustics	Noise Control Act of 1972	42 U.S.C. §§4901 et seq.	EPA	Requires facilities to maintain noise levels that do not jeopardize the health and safety of the public.
Water Resources	*Clean Water Act* (CWA)	33 U.S.C. §§1251 et seq.	EPA	Requires EPA or State-issued permits and compliance with provisions of permits regarding discharge of effluents to surface waters.

TABLE 6.3.1–1.—*Federal Environmental Statutes, Regulations, and Orders Applicable to Pantex Plant*-Continued

RESOURCE CATEGORY	STATUTE/ REGULATION/ ORDER	CITATION	RESPONSIBLE AGENCY	EIS-LEVEL POTENTIAL APPLICABILITY: PERMITS, APPROVALS, CONSULTATIONS, AND NOTIFICATIONS
Water Resources (cont'd)	NPDES Permit No. TX0107107	33 U.S.C. §1342	EPA Region 6	Authorizes Pantex Plant to discharge to the waters of the United States, under specified effluent limitations and monitoring requirements.
	Dredged or Fill Material-(section 404 of CWA)/ *Rivers and Harbors Appropriations Act of 1899*	33 U.S.C. §1344/33 U.S.C. §§401 et seq.	U.S. Army Corps of Engineers	Requires permits to authorize the discharge of dredged or fill material into navigable waters or wetlands and to authorize certain structures or work in or affecting navigable waters.
	Safe Drinking Water Act (SDWA)	42 U.S.C. §§300f et seq.	EPA	Requires permits for construction/operation of underground injection wells and subsequent discharging of effluents to ground aquifers.
	Executive Order 11988: Floodplain Management	3 CFR, 1977 Comp., p. 117	Water Resources Council, Federal Emergency Management Agency, Council on Environmental Quality (CEQ)	Requires consultation if project impacts a floodplain.
	Executive Order 11990: Protection of Wetlands	3 CFR, 1977 Comp., p. 121	U.S. Army Corps of Engineers/U.S. Fish and Wildlife (FWS)	Requires Federal agencies to avoid the long and short term adverse impacts associated with destruction or modification of wetlands.
	Compliance with Floodplain/ Wetlands Environmental Review Requirements	10 CFR 1022	DOE	Requires DOE to comply with all applicable floodplain/wetlands environmental review requirements.

TABLE 6.3.1–1.—*Federal Environmental Statutes, Regulations, and Orders Applicable to Pantex Plant*-Continued

RESOURCE CATEGORY	STATUTE/ REGULATION/ ORDER	CITATION	RESPONSIBLE AGENCY	EIS-LEVEL POTENTIAL APPLICABILITY: PERMITS, APPROVALS, CONSULTATIONS, AND NOTIFICATIONS
Soil Resources	RCRA/ Hazardous and Solid Waste Amendments of 1984	42 U.S.C. §§6901 et seq./PL 98-616	EPA	Requires proper management and, in some cases, permits for current operations involving hazardous waste and remediation of contamination from past activities (not addressed by CERCLA); changes to site hazardous waste operations could require amendments to RCRA hazardous waste permits involving public hearings.
	CERCLA/ *Superfund Amendments and Reauthorization Act of 1986* (SARA)	42 U.S.C. §§9601 et seq./PL 99-499	EPA	Requires cleanup and notification if there is a release or threatened release of a hazardous substance; requires DOE to pursue Interagency Agreements with EPA and State to control the cleanup of each DOE site on the National Priorities List (NPL).
	Community Environmental Response Facilitation Act	PL 102-426	EPA	Amends CERCLA (40 CFR 300) to establish a process for identifying, prior to the termination of Federal activities, property that does not contain contamination. Requires prompt identification of parcels that will not require remediation to facilitate the transfer of such property for economic redevelopment purposes.
	Farmland Protection Policy Act of 1981	7 U.S.C. §§4201 et seq.	Natural Resource Conservation Service	DOE shall avoid any adverse effects to prime and unique farmlands.
	Federal Facility Compliance Act of 1992	42 U.S.C. §6961	States	Eliminates RCRA waiver of sovereign immunity for Federal facilities and requires DOE to develop plans and enter into agreements with States as to specific management actions for specific mixed waste streams (e.g., New Mexico Unilateral FFC Order).
Biotic Resources	*Fish and Wildlife Coordination Act*	16 U.S.C. §§661 et seq.	FWS	Requires consultation on the possible effects on wildlife if there is construction, modification, or control of bodies of water in excess of 10 acres in surface area.
	Bald and Golden Eagle Protection Act	16 U.S.C. §§668 et seq.	FWS	Consultations should be conducted to determine if any protected birds are found to inhabit the area. If so, DOE must obtain a permit prior to moving any nests due to mission requirements.
	Migratory Bird Treaty Act	16 U.S.C. §§703 et seq.	FWS	Requires consultation to determine if there are any impacts on migratory bird populations due to mission requirements. If so, DOE will develop mitigation measures to avoid adverse effects.

TABLE 6.3.1–1.—*Federal Environmental Statutes, Regulations, and Orders Applicable to Pantex Plant*-Continued

RESOURCE CATEGORY	STATUTE/ REGULATION/ ORDER	CITATION	RESPONSIBLE AGENCY	EIS-LEVEL POTENTIAL APPLICABILITY: PERMITS, APPROVALS, CONSULTATIONS, AND NOTIFICATIONS
Biotic Resources (cont'd)	*Endangered Species Act of 1973*	16 U.S.C. §§1531 et seq.	USFWS/National Marine Fisheries Service	Requires consultation to identify endangered or threatened species and their habitats, assess DOE impacts thereon, obtain necessary biological opinions and, if necessary, develop mitigation measures to reduce or eliminate adverse effects of construction or operation.
Cultural Resources	*National Historic Preservation Act of 1966*, as amended	16 U.S.C. §§470 et seq.	Advisory Council on Historic Preservation	DOE shall consult with the State Historic Preservation Office (SHPO) prior to construction to ensure that no historic properties will be affected.
	Archeological and Historical Preservation Act of 1974	16 U.S.C. §§469 et seq.	DOI	DOE shall obtain authorization for any disturbance of archeological resources.
	Archeological Resources Protection Act of 1979	16 U.S.C. §§470aa et seq.	DOI	DOE shall obtain authorization for any excavation or removal of archeological resources.
	American Indian Religious Freedom Act of 1978	42 U.S.C. §1996	DOI	DOE shall consult with local Native American Indian tribes prior to construction to ensure that their religious customs, traditions, and freedoms are preserved.
	Native American Graves Protection and Repatriation Act of 1990	25 U.S.C. §3001	DOI	DOE shall consult with local Native American Indian tribes prior to, and during as necessary, construction to guarantee that Native American human remains are not disturbed.
	Executive Order 11593: Protection and Enhancement of the Cultural Environment	3 CFR 154, 1971-1975 Comp., p. 559	DOI	DOE shall aid in the preservation of historic and archeological data that may be lost during construction activities.
Worker Safety and Health	*Occupational Safety and Health Act* (OSHA)	5 U.S.C. §5108	OSHA	Agencies shall comply with all applicable worker safety and health legislation (including guidelines of 29 U.S.C. §660) and prepare, or have available, Material Safety Data Sheets.
	Hazard Communication Standard	29 CFR 1910.1200	OSHA	DOE shall ensure that its workers are informed of, and trained to handle, all chemical hazards in the workplace.

TABLE 6.3.1–1.—*Federal Environmental Statutes, Regulations, and Orders Applicable to Pantex Plant*-Continued

RESOURCE CATEGORY	STATUTE/ REGULATION/ ORDER	CITATION	RESPONSIBLE AGENCY	EIS-LEVEL POTENTIAL APPLICABILITY: PERMITS, APPROVALS, CONSULTATIONS, AND NOTIFICATIONS
Other	*Atomic Energy Act of 1954*	42 U.S.C. §2011	DOE	DOE shall follow its own standards and procedures to ensure the safe operation of its facilities.
	NEPA	42 U.S.C. §§4321 et seq.	CEQ	DOE shall comply with NEPA implementing procedures in accordance with 10 CFR 1021.
	Toxic Substances Control Act (TSCA)	15 U.S.C. §§2601 et seq.	EPA	DOE shall comply with inventory reporting requirements and chemical control provisions of TSCA to protect the public from the risks of exposure to chemicals; TSCA imposes strict limitations on use and disposal of PCB-contaminated equipment.
	Hazardous Materials Transport Action Act	49 U.S.C. §§1801 et seq.	DOT	DOE shall comply with the requirements governing hazardous materials and waste transportation.
	Hazardous Materials Transportation Uniform Safety Act of 1990	49 U.S.C. §1801	DOT	Restricts shippers of highway route-controlled quantities of radioactive materials to use only permitted carriers.
	Emergency Planning and Community Right-To-Know Act of 1986	42 U.S.C. §§11001 et seq.	EPA	Requires the development of emergency response plans and reporting requirements for chemical spills and other emergency release, and imposes right-to-know reporting requirements covering storage and use of chemicals which are reported in toxic chemical release forms.
	Pollution Prevention Act of 1990	42 U.S.C. 11001-11050	EPA	Establishes a national policy that pollution should be reduced at the source and requires a toxic chemical source reduction and recycling report for an owner or operator of a facility required to file an annual toxic chemical release form under section 313 of SARA.

TABLE 6.3.1–1.—*Federal Environmental Statutes, Regulations, and Orders Applicable to Pantex Plant*-Continued

RESOURCE CATEGORY	STATUTE/ REGULATION/ ORDER	CITATION	RESPONSIBLE AGENCY	EIS-LEVEL POTENTIAL APPLICABILITY: PERMITS, APPROVALS, CONSULTATIONS, AND NOTIFICATIONS
Other (cont'd)	Executive Order 12843: Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances	April 21, 1993	EPA	Requires Federal agencies to minimize procurement of ozone depleting substances and conform their practices to comply with Title VI of CAA Amendments reference stratospheric ozone protection and to recognize the increasingly limited availability of Class I substances until final phaseout.
	Executive Order 12856: Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements	August 3, 1993	EPA	Requires Federal agencies to achieve 50% reduction of agency's total releases of toxic chemicals to the environment and offsite transfers, to prepare a written facility pollution prevention plan not later than 1995, and to publicly report toxic chemicals entering any waste stream from Federal facilities, including any releases to the environment, and to improve local emergency planning, responses and accident notification.
	Executive Order 12873: Federal Acquisition, Recycling, and Waste Prevention	October 20, 1993	EPA	Requires Federal agencies to develop affirmative procurement policies and establishes a shared responsibility between the system program manager and the recycling community to effect use of recycled items for procurement.
	Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	February 11, 1994	EPA	Requires Federal agencies to identify and address as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.
	Executive Order 12088: Federal Compliance with Pollution Control Standards	3 CFR, 1978 Comp., p. 243	Office of Management and Budget (OMB)	Requires Federal Agency landlords to submit to OMB an annual plan for the control of environmental pollution and to consult with EPA and State agencies regarding the best techniques and methods.

TABLE 6.3.1–1.—*Federal Environmental Statutes, Regulations, and Orders Applicable to Pantex Plant*-Continued

RESOURCE CATEGORY	STATUTE/ REGULATION/ ORDER	CITATION	RESPONSIBLE AGENCY	EIS-LEVEL POTENTIAL APPLICABILITY: PERMITS, APPROVALS, CONSULTATIONS, AND NOTIFICATIONS
Other (cont'd)	Executive Order 11514: Protection and Enhancement of Environmental Quality	3 CFR, 1966-1970 Comp., p. 902	CEQ	Requires Federal Agencies to demonstrate leadership in achieving the environmental quality goals of NEPA; provides for DOE consultation with appropriate Federal, State, and local agencies in carrying out their activities as they affect the environment.
	Nuclear Waste Policy Act of 1982	42 U.S.C. §§10101 et seq.	EPA	DOE shall dispose of radioactive waste per standards of 40 CFR 191.
	Low-Level Radioactive Waste Policy Act	42 U.S.C. §§2021b-2021d	Nuclear Regulatory Commission	DOE shall dispose of LLW per compacts of the states in which it operates.

TABLE 6.3.1–2.—*Selected DOE Environment, Safety, and Health Orders*

DOE ORDER	ORDER TITLE
451.1	National Environmental Policy Act Compliance Program
5400.1	General Environmental Protection Program
5400.5	Radiation Protection of the Public and the Environment
5480.1B	Environment, Safety, and Health Program for Department of Energy Operations
5480.19	Conduct of Operations Requirements for DOE Facilities
5480.21	Unreviewed Safety Questions
5480.22	Technical Safety Requirements
5480.23	Nuclear Safety Analysis Reports
5482.1B	Environment, Safety, and Health Appraisal Program
5530.1A	Accident Response Group
5530.4	Aerial Measuring System
5630.11B	Safeguards and Security Program
5630.12A	Safeguards and Security Inspection and Assessment Program
5632.1C	Protection and Control of Safeguards and Security Interests
5700.6C	Quality Assurance
5820.2A	Radioactive Waste Management

TABLE 6.3.1–3.—*Texas State Environmental Statutes, Regulations, and Orders*

RESOURCE CATEGORY	LEGISLATION	CITATION	RESPONSIBLE AGENCY	POTENTIAL APPLICABILITY/ PERMITS
Air Resources	Texas Air Pollution Control Regulations	TX Admin. Code, Title 30, Chapter 101-125, 305	TNRCC (effective 9/1/93)	Permit required prior to construction or modification of an air contaminant source.
Water Resources	Texas Water Quality Standards	TX Admin. Code, Title 30, Chapter 305, 308-325	TNRCC (effective 9/1/93)	Permit required prior to construction or modification of a water discharge source.
	Texas Consolidated Permit Rules	TX Admin. Code, Title 30	TNRCC (effective 9/1/93)	Permit required prior to construction or modification of a water discharge source.
	Texas Water Quality Acts	TX Admin. Code, Title 30, Chapter 290	TNRCC (effective 9/1/93)	Permit required prior to construction or modification of a water discharge source affecting a public water supply.
Soil Resources	Texas Underground Storage Tanks Rules	TX Admin. Code, Title 30, Chapter334	TNRCC (effective 9/1/93)	Permit required prior to construction or modification of an underground storage tank.
	Texas Solid Waste Management Regulations	TX Admin. Code, Title 30, Chapter 305, 335	TNRCC (effective 9/1/93)	Permit required prior to construction or modification of a solid waste disposal facility.
	Texas Solid Waste Disposal Act	TX Statutes, Article 4477-7	TNRCC (effective 9/1/93)	Permit required prior to construction or modification of a solid waste disposal facility.
Biotic Resources	Texas Parks and Wildlife Regulations	TX Parks and Wildlife Code, Chapters 67, 68, & 88	TX Parks and Wildlife Department	Permit required by anyone who possesses, takes, or transports endangered, threatened, or protected plants or animals.
Cultural Resources	Antiquities Code of Texas	TX Statutes, Volume 17, Article 6145	TX Historical Commission	Permit required for the examination or excavation of sites and the collection or removal of objects of antiquity.
Worker Safety and Health	No State-level legislation identified			

TABLE 6.5–1.—*Nevada State Environmental Statutes, Regulations, and Orders Applicable to the Nevada Test Site*

RESOURCE CATEGORY	LEGISLATION	CITATION	RESPONSIBLE AGENCY	POTENTIAL APPLICABILITY/ PERMITS
Air Resources	Nevada Air Pollution Control Law	NV Statutes, Title 40	NV State Environmental Commission	Permit required prior to construction or modification of an air contaminant source.
	Nevada Air Quality Regulations	NV Admin. Code, Chapter 445	NV State Environmental Commission	Permit required prior to the construction or modification of an air contaminant source.
Water Resources	Nevada Water Pollution Control Law	NV Statutes, Title 40, Chapter 445	NV Department of Environmental Protection	Permit required prior to construction or modification of a water discharge source.
	Nevada Water Pollution Control Regulations	NV Admin. Code, Chapter 445	NV Department of Environmental Protection	Permit required prior to construction or modification of a water discharge source.
Soil Resources	Nevada Underground Storage Tank Rules	NV Admin. Code, Chapter 459	NV Department of Environmental Protection	Permit required prior to construction or modification of an underground storage tank.
	Nevada Solid Waste Disposal Law	NV Statutes, Title 40, Chapter 444	NV Department of Environmental Protection	Permit required prior to construction or modification of a solid waste disposal facility.
	Nevada Solid Waste Disposal Regulations	NV Admin. Code, Chapter 44	NV Department of Environmental Protection	Permit required prior to construction or modification of a solid waste disposal facility; permit for septage hauling may be required.
	Nevada Hazardous Waste Disposal Law	NV Statutes, Title 40, Chapter 459	NV Department of Environmental Protection	Permit required prior to construction or modification of a hazardous waste disposal facility.
	Nevada Hazardous Waste Facility Regulations	NV Admin. Code, Chapter 444	NV Department of Environmental Protection	Permit required prior to construction or modification of a hazardous waste disposal facility.
Biotic Resources	*Nevada Non-Game Species Act*	NV Admin. Code, Title 45, Chapter 503	NV Department of Wildlife	Consult with NV Department of Wildlife and minimize impact.
Cultural Resources	Historic Preservation and Archaeology Regulations	NV Statutes, Title 26, Chapter 381-383	NV Advisory Board for Historic Preservation and Archaeology	Permit required prior to the investigation, exploration, or excavation of an historic or prehistoric site.

TABLE 6.5–2.—*South Carolina State Environmental Statutes, Regulations, and Orders Applicable to the Savannah River Site*

RESOURCE CATEGORY	LEGISLATION	CITATION	RESPONSIBLE AGENCY	POTENTIAL APPLICABILITY/ PERMITS
Air Resources	*South Carolina Pollution Control Act*/ South Carolina Air Pollution Control Regulations and Standards	SC Code, Title 48, Chapter 1	SC Department of Health and Environmental Control (SCDHEC)	Permit required prior to construction or modification of an air contaminant source.
	South Carolina Atomic Energy & Radiation Control Act	SC Code, Title 13, Chapter 7	SCDHEC	Establishes standards for radioactive air emissions.
Water Resources	*South Carolina Pollution Control Act*	SC Code, Title 48, Chapter 1	SCDHEC	Permit required prior to construction or modification of a water discharge source.
	South Carolina Water Quality Standards	SC Code, Title 61, Chapter 68	SCDHEC	Permit required prior to construction or modification of a water discharge source.
	South Carolina Safe Drinking Water Act	SC Code, Title 44, Chapter 55	SCDHEC	Establishes drinking water standards.
Soil Resources	*South Carolina Underground Storage Tanks Act*	SC Code, Title 44, Chapter 2	SCDHEC	Permit required prior to construction or modification of an underground storage tank.
	South Carolina Solid Waste Regulations	SC Code, Title 61, Chapter 60	SCDHEC	Permit required to store, collect, dispose, or transport solid wastes.
	South Carolina Industrial Solid Waste Disposal Site Regulations	SC Code, Title 61, Chapter 66	SC Pollution Control Authority	Permit required for industrial solid waste disposal systems.
	South Carolina Hazardous Waste Management Act	SC Code, Title 44, Chapter 56	SCDHEC	Permit required to operate, construct, or modify a hazardous waste treatment, storage, or disposal facility.
	South Carolina Solid Waste Management Act	SC Code, Title 44, Chapter 96	SCDHEC	Establishes standards to treat, store, or dispose of solid waste.

TABLE 6.5–2.—*South Carolina State Environmental Statutes, Regulations, and Orders Applicable to the Savannah River Site*-Continued

RESOURCE CATEGORY	LEGISLATION	CITATION	RESPONSIBLE AGENCY	POTENTIAL APPLICABILITY/ PERMITS
Biotic Resources	*South Carolina Nongame and Endangered Species Conservation Act*	SC Code, Title 50, Chapter 15	SC Wildlife and Marine Resources Department	Consult with SC Wildlife and Marine Resources Department and minimize impact.
Cultural Resources	South Carolina Institute of Archaeology and Anthropology	SC Code, Title 60, Chapter 13-210	SC State Historic Preservation Office	Consult with SC Historic Preservation Office and minimize impact.
Worker Safety and Health	No State-level legislation identified			

TABLE 6.5–3.—*Washington State Environmental Statutes, Regulations, and Orders Applicable to the Hanford Site*

RESOURCE CATEGORY	LEGISLATION	CITATION	RESPONSIBLE AGENCY	POTENTIAL APPLICABILITY/ PERMITS
Air Resources	*Washington State Clean Air Act*	WA State regulations (WAC 246-247)	WA State Department of Health, Division of Radiation Protection	Permit required to construction or modification of stacks emitting radiation.
	Nuclear Energy and Radiation Act	WA State regulations (WAC 402-80)	WA State Department of Health, Division of Radiation Protection	Monitoring and enforcement of air quality and emission standards for radionuclides.
Water Resources	*Washington Water Pollution Control Act*	WA State regulations (WAC 173-201, 173-216, 173-218, 173-220)	WA State Department of Health	Establishes water quality standards, a State waste discharge program, an underground injection control program, and a NPDES permit program.
	Washington Water Well Construction Act	WA State regulations (WAC 173-160)	WA State Department of Ecology	Minimum standards for construction and maintenance of water wells.
Soil Resources	*Washington Solid Waste Management, Recovery and Recycling Act*	WA State regulations (WAC 173-304)	WA State Department of Health	Minimum functional standards for solid waste handling; management of PCB waste.
	Washington Hazardous Waste Management Act	WA State regulations (WAC 173-303)	WA State Department of Health	Dangerous waste regulations.
	Nuclear Energy and Radiation Act	WA State regulations (WAC 402-61)	WA State Department of Health	Licensing requirements for land disposal of radioactive waste.
Biotic Resources	*Washington State Endangered Species Act*	WAC 232-12-014	WA State Department of Fish and Wildlife	Consult with WA State Department of Wildlife to minimize impact.
Worker Safety and Health	*Nuclear Energy and Radiation Act*	WA State regulations (WAC 402-24)	WA State Department of Health	Standards for protection against radiation.

TABLE 6.5–4.—*New Mexico State Environmental Statutes, Regulations, and Orders Applicable to the Manzano Weapons Storage Area at Kirtland Air Force Base*

RESOURCE CATEGORY	LEGISLATION	CITATION	RESPONSIBLE AGENCY	POTENTIAL APPLICABILITY/ PERMITS
Air Resources	*New Mexico Air Quality Control Act*	NM Stat., Title 74, Article 2	NM Environmental Department	Required prior to the construction of modification of an air contaminant source
	New Mexico Air Quality Standards and Regulations	NM Air Quality Control Regs., §100	NM Environmental Department	Required prior to the construction of modification of an air contaminant source
Water Resources*	*New Mexico Water Quality Act*	NM Stat., Title 74, Article 6	NM Water Quality Control Com.	Required prior to the construction or modification of a water discharge source
	New Mexico Water Quality Regulations	NM Water Regulations	NM Water Quality Control Com.	Required prior to the construction or modification of a water discharge source
Biotic Resources	*New Mexico Wildlife Conservation Act*	NM Fish and Game Regulations	NM Department of Fish and Game	Consult with NM Department of Fish and Game and minimize impact
Waste Management	*New Mexico Solid Waste Act*	NM Stat., Chap. 74, Article 8	NM Environmental Department	Required prior to the construction or modification of a solid waste disposal facility
	New Mexico Sold Waste Management Regulations	NM Solid Waste Management Regs.	NM Environmental Department	Required prior to the construction or modification of a solid waste disposal facility
	New Mexico Hazardous Waste Management Regulations	NM Solid Waste Management Regs.	NM Environmental Department	Required prior to the construction or modification of a solid waste disposal facility
Chemical and Material Storage	New Mexico Underground Storage Tank Regulations	NM Underground Storage Tank Regulations	NM Environmental Department	Required to comply with tank requirements prior to the construction or modification of an underground storage tank

*In addition to these statues and regulations, the Isleta Pueblo, which is located along the Rio Grande River downstream of KAFB, has received EPA approval to establish water quality standards under the treatment of State designation.

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CHAPTER 7

References

CHAPTER 7
REFERENCES

Chapter 7 provides a list of all references cited in volumes I and III of this EIS. The list is organized in alphanumeric order. References that begin with a number (e.g., "10 CFR 20", "40 CFR 50") are listed first, followed in alphabetic order by references beginning with a letter (e.g., DOE 1990a, EPA 1992g).

10 CFR 71 — DOE, Nuclear Regulatory Commission, Packaging and Transporting of Radioactive Material, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, January 1, 1992.

10 CFR 100 Part A — DOE, Nuclear Reactor Commission, Reactor Site Criteria, *Code of Federal Regulations,* Office of the Federal Register National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

10 CFR 1021 — DOE, National Environmental Policy Act Implementing Procedures, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

10 CFR 1022 — DOE, Compliance with Floodplain/Wetlands Environmental Review Requirements, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

10 CFR 835 — DOE, Occupational Radiation Protection, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

14 CFR 150 — FAA, DOT, Airport Noise Compatibility Planning, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

15 U.S.C. 2601 — *Toxic Substances Control Act*, 15 United States Code, Section 2601.

16 U.S.C. 1531 — *Endangered Species Act of 1973*, 16 United States Code, Section 1531.

16 U.S.C. 470 — *National Historic Preservation Act of 1966*, 16 United States Code, Section 470.

16 U.S.C. 661 — *Fish and Wildlife Coordination Act*, 16 United States Code, Section 661.

29 CFR 1904 — DOL, Recording and Reporting Occupational Injuries and Illnesses, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.

29 CFR 1910	DOL, Occupational Safety and Health Standards, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
29 CFR 1960	DOL, Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington DC.
30 TAC 319.29	*Quality Levels for Inland Waters*, Texas Administrative Code, Title 30, Chapter 319.29.
30 TAC 335	*Texas Solid Waste Management Regulations,* Texas Administrative Code, Title 30, Chapter 335, Effective September 1, 1993.
30 TAC 370	*Texas Surface Water Quality Standards*, Texas Administrative Code, Title 30, Chapter 370.
36 CFR 60	DOI, National Park Service, National Register of Historic Places, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1994.
36 CFR 800	DOI, National Park Service, Advisory Council on Historic Preservation, Protection of Historic and Cultural Properties, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1993.
40 CFR 58.13	EPA, Designation of Ambient Air Quality Surveillance, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
40 CFR 61	EPA, Protection of the Environment: National Emissions Standards for Hazardous Air Pollutants, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 81	EPA, Designation of Areas for Air Quality Planning Purposes, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1500	EPA, Purpose, Policy and Mandate, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1501	EPA, NEPA and Agency Planning, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.

40 CFR 1502	EPA, Environmental Impact Statement, *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1503	EPA, Commenting, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1504	EPA, Predecision Referrals to the Council of Proposed Federal Actions Determined to be Environmentally Unsatisfactory, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1505	EPA, NEPA and Agency Decisionmaking, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1506	EPA, Other Requirements of NEPA, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1507	EPA, Agency Compliance, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 1508	EPA, Terminology and Index, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 260-280	EPA, Solid Wastes, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
40 CFR 261	EPA, Identification and Listing of Hazardous Waste, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 264	EPA, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Location Standards for Floodplains, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.

40 CFR 270	EPA, Administered Permit Programs: The Hazardous Waste Permit Program, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
40 CFR 50	EPA, Protection of the Environment: National Primary and Secondary Ambient Air Quality Standards, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1992.
40 CFR 51	EPA, Implementation Plans, Requirements for Preparation, Adoption, and Submittal, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1994.
40 CFR 52.21	EPA, Approval and Promulgation of Implementation Plans, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
40 CFR 6	EPA, Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1994.
40 CFR 81	EPA, Designation of Areas for Air Quality Planning Purposes *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1994.
40 CFR 93	EPA, Determining Conformity of Federal Actions to State or Federal Implementation Plans, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1994.
42 U.S.C. 2011	*Atomic Energy Act*, 42 United States Code, Section 2011.
42 U.S.C. 2121	*The Public Health and Welfare, Authority of Commission, (Subchapter VII Military Application of Atomic Energy)*, 42 United States Code, Section 2121.
42 U.S.C. 4341	*NEPA - National Environmental Policy Act of 1975*, 42 United States Code, Section 4341.
42 U.S.C. 6901	*RCRA/Hazardous and Solid Waste Amendments of 1984*, 42 United States Code, Section 6901.
42 U.S.C. 6961	*Federal Facilities Compliance Act of 1992*, 42 United States Code, Section 6961.

42 U.S.C. 7401	*Clean Air Act of 1990*, 42 United States Code, Section 7401.
42 U.S.C. 9601	*Comprehensive Environmental Response, Compensation and Liability, Hazardous Substances Release Liability Compensation*, 42 United States Code, Section 9601.
42 U.S.C. 9608	*CERCLA/Superfund Amendments and Reauthorization Act of 1986 (SARA)*, 42 United States Code, Section 9608.
42 U.S.C. 11001	*Emergency Planning and Community Right-to-Know Act*, 42 United States Code, Section 11001.
43 CFR 10	DOI, Public Lands: Interior, Native American Graves Protection and Reparation Act, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
44 FR 1022	DOE, Compliance with Floodplain/Wetlands Environmental Review Requirements, *Federal Register*, Washington, DC, March 7, 1979.
49 CFR Parts 171-180	DOT, Hazardous Materials Regulations, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
49 CFR 177	DOT, Carriage by Public Highway, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
5 U.S.C. 5108	*Occupational Safety and Health Act*, 5 United States Code, Section 5108.
59 FR 192	Solicitation Notice for Fiscal Year (FY) 1995 Environmental Justice Small Grants to Community Based/Grassroot's Organizations and Tribal Governments, *Federal Register*, Washington, DC, October 5, 1994.
59 FR 3674	Finding of No Significant Impact Interim Storage of Plutonium Components at the Pantex Plant, *Federal Register*, Washington, DC, January 26, 1994.
59 FR 26635	Notice of Intent to Prepare an Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, *Federal Register*, Washington, DC.
59 FR 27989	National Priorities List, Final Rule Update 12, USEPA Region 6, Hazardous Waste Management Division, *Federal Register*, Washington, DC, May 31, 1994.
60 FR 31291	Stockpile Stewardship and Management PEIS, *Federal Register*, Washington, DC, June 14, 1995.

60 FR 32661	Amended Notice of Intent to Prepare an Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, *Federal Register*, Washington, DC, June 23, 1995.
60 FR 54069	Finding of No Significant Impact for the Environmental Assessment for the Interim Storage of Enriched Uranium at the Y-12 Plant, *Federal Register*, Washington, DC, September 14, 1995.
61 FR 7596	Notice of Review, Endangered and Threatened Wildlife and Plants: Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species, *Federal Register*, Washington, DC, February 28, 1996.
61 FR 15232	Notice of Availability, Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, *Federal Register*, Washington, DC, April 5, 1996.
61 FR 20944	Federal Emergency Management Agency, Federal Radiological Emergency Response Plan, Operational Plan, *Federal Register*, Washington, DC, May 8, 1996.
61 FR 36222	DOE, NEPA Implementing Procedures, *Federal Register*, Washington, DC, July 9, 1996.
7 CFR 657	DOA, Prime and Unique Farmlands, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
7 CFR 658	DOA, Farmland Protection Policy Act, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
7 U.S.C. 4201	*Farmland Protection Policy Act*, 7 United States Code, Section 4201.
ACC 1996	"Chamber Quarterly," 2nd Quarter, Amarillo Chamber of Commerce, Amarillo, TX, 1996.
ACGIH 1994	*1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, American Conference of Governmental Industrial Hygienists, Cincinnati, OH, 1994.
Acquavella 1985	Acquavella, J.F., L.D. Wiggs, R.J. Waxweller, et al., "Mortality Among Workers at the Pantex Plant Weapons Facility," *Health Physics*, Volume 48, 1985.
AEDC 1993	Amarillo Economic Development Corporation, *Study Shows Pantex Plant Contributes 12,000 Jobs and $1 Billion in Annual Expenditures to Amarillo Area Economy*, Amarillo, TX, August 3, 1993.

AGT 1986 — Amarillo Globe Times, "DOE Purchase Will Open N-Dump Gate," pg. 1, December 23, 1986.

Argonne 1995 — Argonne National Laboratory, *A Cultural Resources Inventory of the Manzano Storage Area, Kirtland AFB, Bernalillo County, NM, Part I: Pre Cold War Resources,* prepared for the 377th ABW/EM, Albuquerque, NM, July 31, 1995.

Argonne 1995a — Argonne National Laboratory and Battelle Memorial Institute, *Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant,* sponsored by the U.S. Department of Energy, Argonne, IL, November 1995.

ASME 1994 — *Quality Assurance Requirements for Nuclear Facility Applications,* ASME NQA-1-1994 Edition, The American Society of Mechanical Engineers, New York, NY, 1994.

Battelle 1992 — Battelle Pantex and Mason & Hanger-Silas Mason Co., Inc., *Pantex Plant Site Environmental Report for Calendar Year 1991,* prepared by Environmental Monitoring Section, Environmental Protection Department, Environment, Safety, and Health Division, Battelle Pantex and Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, December 1992.

Battelle 1993 — Phagan, C.J., *Situation Summary, Pantex Archaeological Compliance,* Battelle Pantex, Amarillo, TX, 1993.

Battelle 1994 — Battelle Pantex, *Pantex Plant Zone 4 West Characterization Survey,* Radiation Safety Department, Battelle Pantex, Amarillo, TX, May 3, 1994.

Battelle 1995 — Battelle, *Draft Reference Document for the Hazardous Waste Treatment and Processing Facility,* Version 1.0, prepared for the Pantex Plant, Amarillo, TX, April 1995.

Battelle 1995a — Battelle, *Demonstration of In Situ Biodegradation Technologies on Chemical High-Explosives Compounds for Pantex Plant, Amarillo, TX,* by Battelle, Columbus, OH, May 24, 1995.

Battelle 1996 — Battelle Pantex, Environmental Restoration Department, *Environmental Restoration, Task 4,* Subcontract No. CFF000001, Letter with attachments to Roger K. Soderberg from Philip Jagucki, Columbus, OH, June 4, 1996.

Battelle 1996a — Battelle Pantex, Environmental Restoration Department, *Internal Draft Two-dimensional Groundwater Flow Model and Design Tool for Evaluation of Remedial Options for Perched Groundwater at Pantex Plant,* Subcontract No. CFF000001, Amarillo, TX, February 2, 1996.

Battelle 1996b — Battelle Pantex, *Archaeological Sites at Pantex Plant National Register Eligibility and Management,* prepared for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, June 1996.

Blume 1976	*Seismic Hazard and Building Structure Behavior of the Pantex Facility*, prepared for U.S. Energy Research and Development Administration, Amarillo Area Office by URS/John A. Blume & Associates, San Francisco, CA, April 1976.
Bolen 1979	Bolen, E.G., C.D. Simpson, and F.A. Stormer, *Playa Lakes: Threatened Wetlands on the Southern Great Plains,* paper presented at the 31st Annual Meeting, Great Plains Agricultural Council, Ft. Collins, CO, June 18-21, 1979.
Calabrese 1991	Calabrese, E.J., and E.M. Kenyon, *Air Toxics and Risk Assessments*, Lewis Publishers, Inc., Chelsea, MI, 1991.
Carr 1992	Carr, B.H., *Pantex History 1942 to 1992*, prepared for U.S. Department of Energy and Mason & Hanger-Silas Mason Co., Inc., at the Pantex Plant, 1992.
Census 1992	Bureau of the Census, *1990 Census of Population General Population Characteristics, Metropolitan Areas,* 1990 CP-1-1B, Tables 2 and 5, U.S. Department of Commerce, Economics and Statistical Administration, Bureau of the Census, Washington, DC, 1992.
Census 1993	Bureau of the Census, *1990 Census of Population Social and Economic Characteristics, Metropolitan Areas,* 1990 CP-2-1B, Tables 3, 34, 37 and 38, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, November 1993.
CEQ 1996	*Guidance for Addressing Environmental Justice Under the National Environmental Policy Act,* Draft CEQ Guidance, Council on Environmental Quality, Washington, DC, April 15, 1996.
ChemRisk 1994	*Project Task 8 Report Dose Assessment for Historical Contaminant Releases from Rocky Flats,* prepared for the Colorado Department of Public Health and Environment, Denver, CO, by ChemRisk, Alameda, CA, September 1994.
City 1989	City of Amarillo, *Comprehensive Plan,* Amarillo, TX, 1989.
City 1994	City of Amarillo, *Comprehensive Annual Financial Report, October 1, 1993 through September 30, 1994*, Amarillo, TX, 1994.
City 1994a	City of Albuquerque, *Albuquerque International Sunport, Annual Report, Sunport to the Southwest*, Albuquerque, NM, 1994.
County 1994a	Carson County, *County Auditors Annual Financial Report for the Year October 1, 1993 through September 30, 1994,* Carson, TX, October 21, 1994.
County 1994b	Potter County, *Comprehensive Annual Financial Report for Year Ended September 30, 1994,* Amarillo, TX, 1994.

County 1994c	Randall County, *Comprehensive Annual Financial Report, Fiscal Year Ended September 30, 1994*, TX, 1994.
County 1994d	Armstrong County, *Annual Financial Report for Year Ended December 31, 1994*, TX, 1994.
Cress 1980	Cress-Bandy & Associates, Inc., Aviation Consultants, Amarillo International Airport, *Environmental Impact Assessment Report for Pantex Plant Site*, Appendix I-1, Amarillo, TX, 1980.
CSU 1976	*International Biome Project, Pantex Plant 1970-1976*, prepared by Natural Resource Geology Laboratory, Colorado State University, Ft. Collins, CO, 1976.
Davis 1989	Davis, S.D., W.D. Pennington, and S.M. Carlson, *A Compendium of Earthquake Activity in Texas*, Texas Bureau of Economic Geology, University of Texas, Austin, TX, 1989.
DHEC 1992	DHEC, *1991 Air Pollution Measurements of the South Carolina Air Quality Surveillance Network*, prepared by the South Carolina Department of Health and Environmental Control, Columbia, SC, 1992.
DHEC 1993	DHEC, *1992 South Carolina Air Quality Annual Report*, Volume XII, prepared by the South Carolina Department of Health and Environmental Control, Columbia SC, 1993.
DHEC 1994	DHEC, *1993 Air Pollution Measurements of the South Carolina Air Quality Surveillance Network*, prepared by the South Carolina Department of Health and Environmental Control, Columbia, SC, 1994.
Dierauf 1994	Dierauf, L.A., "Wildlife in the Playas: Environmental Challenges and Solutions," paper presented at the *Proceedings of the Playa Basin Symposium*, May 1994.
DOE 1977	DOE, *Final Environmental Impact Statement High Performance Fuel Laboratory, Hanford Reservation, Richland, WA*, prepared by Energy Research and Development Administration, for the U.S. Department of Energy, 1977.
DOE 1983	DOE, *Area Geological Characterization Report for the Palo Duro and Dalhart Basins, TX*, prepared under Contract DOE/C4/101-40-1, by Stone and Webster Engineering Corporation, for the U.S. Department of Energy, Office of Civilian Radioactive Waste Management, 1983.
DOE 1983a	DOE, *Final Environmental Impact Statement, Pantex Plant Site, Amarillo, Texas*, DOE/EIS-0098, U.S. Department of Energy, Washington, DC, October 1983.

DOE 1986 — DOE, *Environmental Assessment Tritium Loading Facility*, DOE/EA-0297, Unique Document No. SAC 200071840000, U.S. Department of Energy, Assistant Secretary for Defense Programs, March 1986.

DOE 1986a — DOE, *Environmental Assessment, Yucca Mountain Site*, prepared under Contract DOE/RW-0073, by Nevada Research and Development Area, for the U.S. Department of Energy, Washington, DC, 1986.

DOE 1986b — DOE, *Preliminary Safety Analysis Report, Device Assembly Facility, Nevada Test Site*, U.S. Department of Energy, January 1986.

DOE 1987 — DOE, *Environmental Survey Preliminary Report, Hanford Site, Richland, WA*, prepared under Contract DOE/EH/OEV-05-P, by Environment Safety and Health, Office of Environmental Audit, U.S. Department of Energy, Washington, DC, August 1987.

DOE 1988 — DOE, *Health Physics Manual of Good Practices for Uranium Facilities*, prepared under Contract DE-AC07-76IDO1570 by Idaho National Engineering Laboratory for the U.S. Department of Energy, June 1988.

DOE 1988a — DOE, *Site Characterization Plan Overview Yucca Mountain Site, Nevada Research and Development Area, Nevada*, DOE/FW 0198, U.S. Department of Energy, Office of Civilian Radioactive Waste Management, Washington, DC, December 1988.

DOE 1990 — DOE, *Waste Isolation Pilot Plant: Final Supplement Environmental Impact Statement*, prepared under Contract DOE/EIS-0026-FS, for the U.S. Department of Energy, Washington, DC, 1990.

DOE 1990a — DOE, *Final Environmental Impact Statement Continued Operation of K-, L-, and P-Reactors, Savannah River Site, Aiken, SC*, DOE/EIS-0147, U.S. Department of Energy, Washington, DC, December 1990.

DOE 1990b — DOE, *Groundwater Protection Management Program Plan*, prepared by Mason & Hanger-Silas Mason Co., Inc., Environmental Protection Department, Environment, Safety & Health Division, for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, May 8, 1990.

DOE 1991 — DOE, *Health Physics Manual of Good Practices for Tritium Facilities*, prepared by EG&G Mound Applied Technologies, Miamisburg, OH, for the U.S. Department of Energy, Assistant Secretary for Environment, Safety and Health, December 1991.

DOE 1991a — DOE, *Nuclear Weapons Complex Reconfiguration Study*, DOE/DP-0083, U.S. Department of Energy, Washington, DC, January 1991.

DOE 1991b — Pantex Plant and Panhandle 2000 Task Force, *Panhandle 2000: Pantex Nuclear Weapons Complex Reconfiguration Proposal, Volume 4:* Environment, Safety and Health, U.S. Department of Energy, Amarillo, TX, May 1991.

DOE 1992	DOE, *U.S. Department of Energy Radiological Control Manual*, U.S Department of Energy, Assistant Secretary for Environment, Safety, and Health, Washington, DC, June 1992.
DOE 1992a	DOE, *Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements,* Revision 1, NVO-325, prepared by U.S. Department of Energy, Nevada Field Office and Reynolds Electrical & Engineering Co., Inc., Waste Management Department, June 1992.
DOE 1992b	DOE, *Safety Evaluation Report DP SER 92-1, Interim Storage and Staging Activities, Pantex Plant Zone 4 West,* prepared by the Technical Safety Review Panel, U.S. Department of Energy, December 1992.
DOE 1992d	Holz, Barbara A., *Desert Research Institute, Cultural Resources Reconnaissance, Short Report SR052692-1*, NTS Project 924912, prepared under Contract DE-AC08-90NV10845 for the U.S. Department of Energy, Nevada Field Office, Las Vegas, NV, July 1992.
DOE 1992e	DOE, *Hanford Site Environmental Report 1991*, U.S. Department of Energy, Richland, WA, June 1992.
DOE 1992f	DOE, *Final Safety Analysis Report Pantex Plant Zone 4 Magazines Staging and Interim Storage for Nuclear Weapons and Components*, prepared by Mason and Hanger-Silas Mason Co., Inc., for the U.S. Department of Energy, Amarillo, TX, December 1992.
DOE 1992g	DOE, *Socioeconomic Characteristics of Selected Counties and Communities Adjacent to the Savannah River Site*, prepared by the U.S. Department of Energy, Savannah River Field Office, Aiken, SC, July 1992.
DOE 1992h	Everline, C.J., *Plutonium Storage Requirements Alternatives Identification Risk Goals and Methodology*, SCIE–DOE–505–92, for the U.S. Department of Energy, November 9, 1992.
DOE 1993	DOE, *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements,* Office of NEPA Oversight, U.S. Department of Energy, May 1993.
DOE 1993a	Huang, J.C., and P. Hang, *Impact of the New (1987-1991) SRS Meteorological Database on AXAIR89Q Dose Calculations (U),* prepared under Contract WSRC-RP-93-551 by Westinghouse Savannah River Company, Savannah River Technology Center, Aiken, SC, for the U.S. Department of Energy, September 1993.
DOE 1993b	Johnston, M.C., and J.K. Williams, *Floristic Survey Pantex Plant Site, Carson County, Texas 1993*, prepared under Contract FFP009901 by Environmental Consulting, Austin, TX, for the U.S. Department of Energy, Amarillo, TX, December 1993.

DOE 1993c	Cushing, C.E., R.R. Mazaika, and R.C. Phillips. *Ecological Investigations at the Pantex Plant Site, 1992,* prepared under Contract DE-AC06-76RLO 1830, by Pacific Northwest Laboratory, Richland, WA, PNL-8810 UC-702, for the U.S. Department of Energy, September 1993.
DOE 1993d	DOE, *Nonnuclear Consolidation Environmental Assessment,* Volume I, prepared under Contract DOE/EA-0792 by the U.S. Department of Defense, Office of Defense Programs, Deputy Assistant Secretary for Weapons Complex Reconfiguration, Washington, DC, June 1993.
DOE 1993f	DOE, *Environmental Assessment Natural Resource Management Activities at the Savannah River Site,* DOE/EA-0826, prepared by the Savannah River Operations Office, Environmental and Laboratory Programs Division, for the U.S. Department of Energy, July 1993.
DOE 1993g	DOE, *Technical Information Package, Proposal for Reconfiguration of Nuclear Weapons Complex at the Nevada Test Site,* Volume 4, submitted by the U.S. Department of Energy, Nevada Operations Office, to the U.S. Department of Energy, Deputy Assistant Secretary, Office of Weapons Complex Reconfiguration, Washington, DC, September 15, 1993.
DOE 1993h	DOE, *Environmental Restoration and Waste Management Site Specific Plan Fiscal Years 1994-1998,* prepared under Contract DOE/NV-336 by the U.S. Department of Energy, Nevada Field Office, January 1993.
DOE 1994	DOE, *Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Storage Level at the Y-12 Plant,* DOE/EA-0929, U.S. Department of Energy, Oak Ridge, TN, September 1994.
DOE 1994a	DOE, *Interim Guidance Document for Pantex Plant Playas,* prepared by D.F. Triebel, D.J. Ferguson, V. Loucks, G.W. Gabert, and L.D. Tilton of the Amarillo Area Office Playa Vicinity Land Management Team for the U.S. Department of Energy, December 1994.
DOE 1994aa	DOE, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities,* prepared under Contract DOE-STD-1020-94, for the U.S. Department of Energy, Washington, DC, April 1994.
DOE 1994b	Mason & Hanger-Silas Mason Co., Inc., *1993 Environmental Report for Pantex Plant,* DOE/AL/65030-9413 UC-702, prepared under Contract DE-AC09-91AL65030 by Battelle Pantex and Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, for U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, June 1994.
DOE 1994bb	DOE, *FMEF Feasibility Assessment for Plutonium Storage,* prepared for the U.S. Department of Energy, February 23, 1994.

DOE 1994c — DOE, *Pantex Plant Draft Site Treatment Plan*, prepared by Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, for the U.S. Department of Energy, August 1994.

DOE 1994cc — DOE, *Department of Energy Plutonium ES&H Vulnerability Assessment*, Pantex Site Assessment Team Report, Pantex Plant, Amarillo, TX, July 29, 1994.

DOE 1994d — DOE, *Annual Report on Waste Generation and Waste Minimization Progress 1991-1992*, DOE/S-0105, U.S. Department of Energy, February 1994.

DOE 1994e — Mazeroll, A.I., L.S. Boatman, and L.H. Boomershine, *Herpetofaunal Survey Pantex Plant Site, Carson County, Texas 1994*, prepared under Contract FFP019934 by EnviroCon, Canyon, TX, for the U.S. Department of Energy, August 1994.

DOE 1994f — DOE, *Pantex Plant FY 1994 Site Development Plan*, prepared under Contract DE-AC04-91AL-65030 by Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, for the U.S. Department of Energy, March 1994.

DOE 1994g — Seyffert, K.D., *Checklist of Birds, Pantex Plant Site, Carson County, Texas 1994*, Report, prepared under Contract FFP016902, for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, June 1994.

DOE 1994h — DOE, *Groundwater Protection Management Program Plan*, prepared under Contract DE-AC04-91AL65030 by Mason & Hanger-Silas Mason Co., Inc., Environmental Protection Department, Environment, Safety and Health Division, for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, March 1994.

DOE 1994i — DOE, *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Draft Environmental Impact Statement*, Volume I, Appendix A, prepared under Contract DOE/EIS-0203-D, by the Hanford Site Spent Nuclear Fuel Management Program, for the U.S. Department of Energy, Office of Environmental Management, Idaho Operations Office, June 1994.

DOE 1994j — DOE, *Pantex Plant FY 1996 CAMP Report Capital Asset Management Process* prepared under Contract DE-AC04-91AL-65030 by Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX for the U.S. Department of Energy, April 1994.

DOE 1994k — Rylander, M.K., *Resident and Migratory Animals Survey Pantex Plant Site, Carson County, Texas 1994*, prepared under Contract FFP011684 by Department of Biological Sciences, Texas Tech University, Lubbock, TX, for the U.S. Department of Energy, August 1994.

DOE 1994l — DOE, *Final Supplemental Environmental Impact Statement, Defense Waste Processing Facility*, prepared under Contract DOE/EIS-0082-S, for the U.S. Department of Energy, Savannah River Site, Aiken, SC, November 1994.

DOE 1994m — DOE, *National Pollutant Discharge Elimination System Permit Application*, prepared by Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, August 1994.

DOE 1994n — DOE, *Draft Phase I Report and Phase II Work Plan: Expedited Site Characterization for the DOE Pantex Zone 12 Groundwater Investigations*, Version 00, prepared under Contract W-31-109-Eng-38, by Environmental Research Division, Argonne National Lab, Argonne, IL, for the U.S. Department of Energy, Assistant Secretary for Environmental Management, Washington, DC, September 1994.

DOE 1994nn — DOE, *Draft Work Plan Phase I and Phase II Expedited Site Characterization for the DOE Pantex Zone 12 Groundwater Investigation*, prepared under Contract W-31-109-Eng-38, by Environmental Research Design, Argonne National Lab, Argonne, Ill., for the U.S. Department of Energy, Assistant Secretary for Environmental Management, Washington, DC, April 1994.

DOE 1994o — DOE, *Draft Programmatic Environmental Impact Statement for Tritium Supply and Recycling*, Volume I, prepared under Contract DOE/EIS-0161 by Tetra Tech, Inc., Alexandria, VA, for the U.S. Department of Energy, December 5, 1994.

DOE 1994p — PNL, *Hanford Site Environmental Report for Calendar Year 1993*, prepared under Contract DE-AC06-76RLO-1830 by Pacific Northwest Laboratory, Richland, WA, managed by Battelle Memorial Institute for the U.S. Department of Energy, June 1994.

DOE 1994q — DOE, *Hanford Remedial Action, Draft Environmental Impact Statement*, Volume 1 of 2, prepared under Contract DOE/DEIS-0222 by the U.S. Department of Energy, September 26, 1994.

DOE 1994r — PNL, *Hanford Site National Environmental Policy Act (NEPA) Characterization*, Revision 6, prepared under Contract DE-AC06-76RLO 1830 by Pacific Northwest Laboratory, Richland, WA, managed by Battelle Memorial Institute for the U.S. Department of Energy, August 1994.

DOE 1994s — DOE, *Environmental Assessment for Device Assembly Facility Operations, Nevada Test Site, Nye County, NV*, Pre-Approval Draft, prepared by Raytheon Services, NV, Lockheed Environmental Systems and Technologies Company, for the U.S. Department of Energy, March 1994.

DOE 1994t — DOE, *Nevada Operations Office - Annual Site Environmental Report 1993*, DOE/ NV/11432-123, prepared by Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV, for the U.S. Department of Energy, Nevada Operations Office, September 1994.

DOE 1994u — DOE, *DOE Standard, Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities*, prepared under Contract Number DOE-STD-1020-94 by the U.S. Department of Energy, April 1994.

DOE 1994v — DOE, *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Draft Environmental Impact Statement*, Volume I, Appendix C and F, prepared under Contract DOE/EIS-0203-D, by the Nevada Test Site and Oak Ridge Reservation Spent Nuclear Fuel Management Programs, for the U.S. Department of Energy, Office of Environmental Management, Idaho Operations Office, June 1994.

DOE 1994w — DOE, *Environmental Assessment for Interim Storage of Plutonium Components at Pantex and Department of Energy Response to Comments on the Pre-Approval Environmental Assessment and the Revised Pre-Approval Environmental Assessment and Public Meeting*, Volume I, DOE/EA-0812, prepared by the U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office and Pantex Plant, January 1994.

DOE 1994x — DOE, *Amended Charter: Environmental Management Site Specific Advisory Board*, U.S. Department of Energy, June 10, 1994.

DOE 1994y — DOE, *Implementation Plan for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, Environmental Impact Study*, Revision 0, prepared under Contract DOE/EIS-0225-IP, for the U.S. Department of Energy, Washington, DC, December 1994.

DOE 1994z — DOE, *Risk Reduction Rule Guidance for Pantex Plant RCRA Facility Investigations, Draft Final*, prepared by U.S. Army Corps of Engineers, Tulsa District and Mason & Hanger-Silas Mason Co., Inc./Battelle Pantex for the U.S. Department of Energy, Amarillo Area Office, Environmental Restoration Program, April 1994.

DOE 1995 — DOE, *Draft Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*, Volume I of IV, prepared under Contract DOE/EIS-0200-D for the U.S. Department of Energy, Office of Environmental Management, August 1995.

DOE 1995a — DOE, *Revised Land Use Census Pantex Plant*, prepared under Contract FFP 021977, by Burns & McDonnell, Kansas City, MO, managed by Mason & Hanger-Silas Mason Co., Inc., for the U.S. Department of Energy, June 1995.

DOE 1995b — Battelle Pantex and Mason & Hanger-Silas Mason Co., Inc., *1994 Environmental Report for the Pantex Plant*, DOE/AL/65030-9506, prepared under Contract DE-AC04-91AL65030, by Environmental Protection Department, Environment, Safety, and Health Division, for U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, June 1995.

DOE 1995c — DOE, *Floodplain Delineation Report for Pantex Plant*, prepared by the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, for the U.S. Department of Energy, January 1995.

DOE 1995d — DOE, *Natural Resource Management Plan for Pantex Plant, Amarillo, TX*, prepared for the U.S. Department of Energy, January 5, 1995.

DOE 1995e — DOE, *Facility Action Plan*, prepared by Mason & Hager-Silas Mason Co., Inc., Battelle Pantex, U.S. Army Corps of Engineers and the U.S. Department of Energy, Amarillo Area Office for the U.S. Department of Energy, Albuquerque Operations Office, January 1995.

DOE 1995f — DOE, *Draft Final Report: Phase II Expedited Site Characterization for the DOE Pantex Zone 12 Groundwater Investigation*, prepared under Contract W-31-109-Eng-38, by Environmental Research Division Argonne National Lab, Argonne, IL, for the U.S. Department of Energy, Assistant Secretary for Environmental Management, Washington, DC, July 1995.

DOE 1995g — DOE, *Nuclear Explosives Facilities Final Safety Analysis Report Nuclear Explosives Bays Module (Buildings 12-64, 12-84, 12-99, 12-104)*, Revision 1, Draft 2, U.S. Department of Energy, Albuquerque Operations Office, December 1994.

DOE 1995h — DOE, *Summary Report of the Overflight Working Group on Recommended Measures to Reduce Overflights of the Pantex Plant*, prepared by the Office of the Deputy Assistant Secretary for Military Application and Stockpile Support, U.S. Department of Energy, February 1995.

DOE 1995i — DOE, *Fault Identification Study for the Pantex Plant*, DOE/AL/65030-9512, prepared under Contract DE-AC04-91AL-65030 by Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, for the U.S. Department of Energy, April 1995.

DOE 1995j — DOE, *FY 1995 Pantex Plant Site Development Plan*, prepared under Contract DE-AC04-91AL-65030, by Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, for the U.S. Department of Energy, 1995.

DOE 1995k — DOE, *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling*, Volume I, prepared under Contract DOE/EIS-0161, by Tetra Tech, Inc., Alexandria, VA, for the U.S. Department of Energy, October 1995.

DOE 1995l — DOE, *Draft Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel*, Contact DOE/EIS-0218D, U.S. Department of Energy, March 1995.

DOE 1995m	DOE, *Savannah River Site Waste Management Draft Environmental Impact Statement*, Volume I and II, prepared under Contract DOE/EIS-0217D by the U.S. Department of Energy, Savannah River Operations Office, Aiken, SC, January 1995.
DOE 1995n	Woodward, B.D., R.B. Hunter, P.D. Greger and M.B. Saethre, *1994 Baseline Biological Studies for the Device Assembly Facility at the Nevada Test Site*, prepared under Contract DE-AC08-94-NV11432 by Reynolds Electrical & Engineering, Co., Inc., for the U.S. Department of Energy, February 1995.
DOE 1995p	DOE, *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement*, Volume I, Appendix A and F, prepared under Contract DOE/EIS-0203-F, by the Hanford Site Spent Nuclear Fuel Management Program, for the U.S. Department of Energy, Office of Environmental Management, Idaho Operations Office, April 1995.
DOE 1995q	DOE, *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling,* Volume II, prepared under Contract DOE/EIS-0161, by Tetra Tech, Inc., Alexandria, VA, for the U.S. Department of Energy, October 1995.
DOE 1995r	DOE, *Draft Final Report: Phase II Expedited Site Characterization for the DOE Pantex Zone 12 Groundwater Investigation*, prepared under Contract W-31-109-Eng-38, by Environmental Research Division Argonne National Lab, Argonne, IL, for the U.S. Department of Energy, Assistant Secretary for Environmental Management, Washington, DC, April 1995.
DOE 1995s	DOE, *Storage and Disposition of Weapons-Usable Fissile Materials PEIS No Action Data Call, Hanford Site*, prepared by Tetra Tech, Inc., Alexandria, VA, for the U.S. Department of Energy, Office of Fissile Materials Disposition, January 1995.
DOE 1995u	DOE, *Interim Guidance Document for Pantex Plant Playas,* prepared by U.S. Department of Energy, Amarillo Area Office, Playa Vicinity Land Management Team, 1995.
DOE 1995v	DOE, *Finding of No Significant Impact Interim Storage of Enriched Uranium Above The Maximum Historical Level at the Y-12 Plant, Oak Ridge, TN,* prepared for the U.S. Department of Energy, September 14, 1995.
DOE 1995w	DOE, Programmatic Environmental Impact Statement, "The Waste Management PEIS and the Pantex Plant," Information Brochure, 1995.
DOE 1995x	*Pantex Plant Federal Facility Compliance Act Compliance Plan,* September 1995 (approved on October 3, 1993).

DOE 1995y	DOE, *Basis for Interim Operation Evaluation Report, DOE Order 5480.22, Technical Safety Requirements, DOE Order 5480.23, Nuclear Safety Requirements, Pantex,* prepared by the Pantex Plant, Risk Management Department, Amarillo, TX, for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, November 1995.
DOE 1995z	DOE, *Draft DOE Standard, Accident Analysis for Aircraft Crash into Hazardous Facilities,* SAFT-0030, prepared under Contract DOE-STD-3014-96, for the U.S. Department of Energy, Washington, DC, July, 1995.
DOE 1996	DOE, *Preliminary Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste,* Volume II of IV, prepared under Contract DOE/EIS-0200-D for the U.S. Department of Energy, Office of Environmental Management, September 1996.
DOE 1996a	DOE, *Concurrence Draft, Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement,* Volumes I–III, prepared under Contract DOE/EIS-0229-D for the Office of Fissile Materials Disposition, U.S. Department of Energy, September 1996.
DOE 1996b	DOE, *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management,* Vol. I, prepared under Contract DOE/EIS-0236 for the U.S. Department of Energy, August 1996.
DOE 1996c	DOE, *Draft Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada,* Vol. I, Chapters 1-9, Part A, prepared under Contract DOE/EIS-0243 for the U.S. Department of Energy, January, 1996.
DOE 1996d	DOE, *Biological Assessment of the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components,* prepared under Contract DE:96:53580\DE:96:53579 by the Environmental Protection Department, Environment, Safety and Health Division, Battelle Pantex, Mason and Hanger-Silas Mason Co., Inc., for the U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, April 26, 1996.
DOE 1996e	DOE, *Charting the Course The Future Use Report,* Office of Environmental Management, Office of Field Management, U.S. Department of Energy, Washington, DC, April 1996.
DOE 1996f	Battelle Pantex and Mason & Hanger-Silas Mason Co., Inc., *1995 Environmental Report for the Pantex Plant,* DOE-AL-65030-9602, prepared under Contract DE-AC04-91AL65030, by the Environmental Protection Department, Environment, Safety and Health Division, for the U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, May 1996.

DOE 1996g	DOE, *Draft DOE Standard, Accident Analysis for Aircraft Crash Into Hazardous Facilities*, SAFT-0030 prepared under Contract DOE-STD-3014-96 for the U.S. Department of Energy, Washington, DC, July 1996.
DOE 1996h	DOE, *Land Facility Use Planning,* DOE P 430.1, U.S. Department of Energy, Office of Field Management, Washington, DC, July 9, 1996.
DOE 1996i	DOE, *Safety Evaluation Report for the Pantex Nuclear Explosives Bays Safety Analysis Report*, U.S. Department of Energy, Washington, DC, September 1996.
DOE 1996j	DOE, *Concurrence Draft, Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement,* Summary, prepared under contract DOE/EIS-0229, for the Office of Fissile Materials Disposition, U.S. Department of Energy, September, 1996.
DOE Order 151.1	DOE, Comprehensive Emergency Management System, Washington DC, September 25, 1995.
DOE Order 231.1	DOE, Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities, Washington, DC, June 22, 1983.
DOE Order 232.1	DOE, Occurrence Reporting and Processing of Operations Information, Washington, DC, September 25, 1995.
DOE Order 440.1	DOE, Worker Protection Management for DOE Federal and Contractor Employees, Washington, DC, September 30, 1995.
DOE Order 451.1	DOE, National Environmental Policy Act Compliance Program, Washington, DC.
DOE Order 5400.4	DOE, Comprehensive Environmental Response, Compensation and Liability Act Requirements, Washington, DC, October 6, 1989.
DOE Order 5400.5	DOE, Radiation Protection of the Public and the Environment, Washington, DC, January 7, 1993.
DOE Order 5480.1B	DOE, Environment Safety and Health Program for Department of Energy, Operations, Washington, DC, September 23, 1986.
DOE Order 5480.11	DOE, Radiation Protection for Occupational Workers, Washington, DC, June 17, 1992.
DOE Order 5480.23	DOE, Nuclear Safety Analysis Reports, Washington, DC, Effective Date, March 10, 1994.
DOE Order 5700.6C	DOE, Quality Assurance, Washington, DC, August 21, 1991.

DOE Order 5820.2A	DOE, Radioactive Waste Management, Washington, DC, September 26, 1988.
DOE Order 6430.1A	DOE, General Design Criteria, Washington, DC, April 6, 1989.
DOE Order N441.1	DOE, Radiological Protection for DOE Activities, Washington, DC, September 30, 1995.
DOL nd	Department of Labor, *No. 764 Producer Price Indexes, by Stage of Processing: 1950 to 1992*, Producer Price Indexes, Monthly and Annually, U.S. Bureau of Labor Statistics, Washington, DC.
DOT 1985	Department of Transportation, *National Air Traffic Training Program, Cooperative Education Student Reference Manual, Module B Course 55322, Aircraft Identification,* Appendix 1, MB-SRM-2, Federal Aviation Administration, April 1985.
Drake 1994	Drake, James R., *Aircraft Impacts Effects on Weapons Storage Facilities Final Report,* prepared for Logicon by R&D Associates, Los Angeles, CA, March 1994.
DRI nd	Desert Research Institute, *Cultural Resources Reconnaissance*, Short Report, Report No. SR090584-1, Reno, NV.
EG&G 1992	EG&G, Energy Measurements, *Biological Resources Preactivity Survey Report for P Tunnel Annex and Exploratory Drill Hole*, Santa Barbara Operations, Santa Barbara, CA, 1992.
EO 11988	Office of the Federal Register, National Archives and Records Administration, *Floodplain Management, Codification of Presidential Proclamations and Executive Orders*, Executive Order 11988, Government Printing Office, Washington, DC, April 13, 1945–January 20, 1989.
EO 12196	Office of the Federal Register, National Archives and Records Administration, *Occupational Safety and Health Act of 1970*, Executive Order 12196, Government Printing Office, Washington, DC.
EO 12898	Office of the Federal Register, National Archives and Records Administration, *Proposed Environmental Justice Strategy, Office of Economic Impact and Diversity,* Executive Order 12898, Government Printing Office, Washington, DC, December 11, 1994.
EO 12902	Office of the Federal Register, National Archives and Records Administration, *Energy Efficiency and Water Conservation at Federal Facilities*, Executive Order 12902, Government Printing Office, Washington, DC, March 8, 1994.
EPA 1985	EPA, *Superfund Handbook: Dust Control at Hazardous Waste Sites*, EPA-5402-85-003, U.S. Environmental Protection Agency, Cincinnati, OH, 1985.

EPA 1988	EPA, *National Emissions Data System,* Computer Printout, U.S. Environmental Protection Agency, Research Triangle Park, NC, September 1988.
EPA 1994	EPA, *Users Guide to Mobile 5 (Mobile Source Emission Factor Model)* EPA-AA-AQAB-94-01, Office of Air and Radiation, Office of Mobile Sources, Ann Arbor, MI, May 1994.
EPA 1995	EPA, *Risk Based Concentration Table,* prepared by the U.S. Environmental Protection Agency, Region III, Philadelphia, PA, March 7, 1995.
EPA 1995a	EPA, *Support Center for Regulatory Air Models, Bulletin Board System* (SCRAM), U.S. Environmental Protection Agency, 1995.
EPA 1995b	EPA, *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources*, Fifth Edition, AP-42, Office of Air and Radiation, Research Triangle Park, NC, January 1995.
EPA 1996	EPA, *Authorization to Discharge Wastes Under the National Pollutant Discharge Elimination System,* Permit No. TX0107107, U.S. Environmental Protection Agency, Region 6, Effective June 1, 1996.
EPA 1996a	EPA, *Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis*, Review Draft, U.S. Environmental Protection Agency, Washington, DC, July 12, 1996.
Fluor 1994	Fluor Daniel, *P-Tunnel Key Plan for NTS Feasibility Assessment*, prepared for the Department of Energy, December 14, 1994.
Foth 1984	Foth, Henry, *Fundamentals of Soil Science,* published by John Wiley & Sons, Canada, 1984.
GA Cen 1992	Bureau of the Census, *1990 Census of Population General Population Characteristics-Georgia,* Tables 1, 6, 7 and 8, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1992.
GA Cen 1993	Bureau of the Census, *1990 Census of Social and Economic Characteristics-Georgia,* Table 145, 178, 203, Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1993.
GE 1975	General Electric Company, *Radioisotopic Thermoelectric Generator (RTG) Safety Analysis Report,* Pinellas Plant, FL, December 15, 1975.
Geiger 1992	Geiger, H.J., et al., *Dead Reckoning, a Critical Review of the Department of Energy's Epidemiological Research,* by the Physicians Task Force on the Health Risks of Nuclear Weapons Production, Physicians for Social Responsibility, Washington, DC, 1992.

GSA 1995 — General Services Administration, National Capital Region, *Preliminary Final Environmental Impact Statement,* Volume I, Washington, DC, April 7, 1995.

Gustavson 1980 — Gustavson, T.C., et al., *Regional Dissolution of Permian Salt in the Anadarko, Dalhart, and Palo Duro Basins of the Texas Panhandle*, Report of Investigations No. 106, Texas Bureau of Economic Geology, University of Texas at Austin, Austin, TX, 1980.

Gustavson 1981 — Gustavson, T.C., W.W. Simpkins, A.B. Alhades, and A.D. Hoadley, *Impact of Evaporite Dissolution and Collapse on Highways and Other Cultural Features in the Texas Panhandle and Eastern New Mexico,* prepared under Contract DE-AC97-80ET46615, by the Texas Bureau of Economic Geology, University of Texas, Austin, TX, for the U.S. Department of Energy, 1981.

Gustavson 1994 — Gustavson, T.C., V.T. Holiday and S.D. Hovorka, "Development of Playa Basins, Southern High Plains, Texas and New Mexico," in *Proceedings of the Playa Basin Symposium*, edited by L. V. Urban and A. W. Wyatt, Texas Tech University, Lubbock, TX, 1994.

Haukos 1994 — Haukos, D.A., and L.M. Smith, *The Importance of Playa Wetlands to Biodiversity of the Southern High Plains, Landscapes and Urban Planning*, Vol. 28, 1994.

Haukos 1995 — Haukos, D.A., *Playa Habitat Evaluation*, Report by D.A. Haukos, U.S. Fish and Wildlife Service, Region 2, submitted to the Pantex Plant for the U.S. Department of Energy, Amarillo, TX, June 16, 1995.

ICRP 1991 — International Commission of Radiological Protection, *1990 Recommendations of the International Commission of Radiological Protection*, Publication 60, Annals of the ICRP, Volume 21, Number 1-3, New York, NY, 1991.

Jacobs 1993 — Pantex Plant, *Natural Phenomena Hazards Assessment for the Pantex Plant, Amarillo, TX,* prepared under Contract 05-G010-S-91-0211 Task 35 by Jacobs Engineering Group, Inc., Albuquerque, NM in conjunction with Ogden Environmental and Energy Services, Co., Albuquerque, NM, for the Pantex Plant, Amarillo, TX, October 1993.

Jacobs 1993a — Pantex Plant, *Chemical High Explosives Hazards Assessments for the Pantex Plant*, prepared under subcontract No. 05-G010-S-91-0211, Task 33, by Jacobs Engineering Group, Inc., with Ogden Environmental and Energy Services, Co., Albuquerque, NM, for the Pantex Plant, Amarillo, TX, October 1993.

Jacobs 1993b — Pantex Plant, *Recalculation of Potential Deposition Levels and Dose Exposure Levels for the Pantex Radiological Hazards Assessment for the Pantex Plant*, prepared under subcontract No. 05-G010-S-91-0211, Task 34, by Jacobs Engineering Group, Inc., Albuquerque, NM, in conjunction with Ogden Environmental and Energy Services, Co., Albuquerque, NM, for the Pantex Plant, Amarillo, TX, October 1993.

Johnston 1995 — Johnston, Marshall C. *Floristic Survey of the Pantex Plant Site Carson County, Texas 1995*, prepared for the U.S. Department of Energy, by Marshall C. Johnston, Ph.D., Environmental Consulting, Austin, TX, October 1995.

KAFB 1993 — Los Alamos Technical Associates, Inc., *Phase I Environmental Baseline Survey Manzano Weapons Storage Area*, F29601-89-C-0079, prepared for the Kirtland Air Force Base Research Facilities Engineering Division and Phillips Laboratory, August 1993.

KAFB 1995 — Kirtland Air Force Base, *The Economic Resource Impact Statement, Fiscal Year 1994*, Office of Program Integration, Comptroller Division, 377th Air Base Wing, AFMC Albuquerque, NM, 1995.

LANL 1982 — Wenzel, W. J., et al., *Supplemental Documentation for an Environmental Impact Statement Regarding the Pantex Plant, Agricultural Food Chain Radiological Assessment*, Los Alamos National Laboratory, Los Alamos, NM, December 1982.

LANL 1992 — Los Alamos National Laboratory, *Potential Ogalalla Aquifer Impacts of a Hypothetical Plutonium Dispersal Accident in Zone 4 of the Pantex Plant*, Los Alamos, NM, November 1992.

Legacy 1994 — Stricker, N.F., and R.M. Poet, *Historic Resources Survey of World War II Era Structures and Foundations at Pantex Plant, Amarillo, Texas*, prepared under Contract FFP011167, Packet 1, Final Report, Legacy Research Associates, Corvallis, OR, May 28, 1994.

Legacy 1994a — Stricker, N.F., and R.M. Poet, *Historic Resources Survey of World War II Era Structures and Foundations at Pantex Plant, Amarillo, Texas*, prepared under Contract FFP011167, Packet 2 and 3 Final Report, Legacy Research Associates, Corvallis, OR, May 24, 1994.

Letter 1992 — Harlow, David, "Biological Opinion on Nevada Test Site Activities," Letter from David Harlow, Field Supervisor, U.S. Fish and Wildlife Service, Reno Field Office, to Nick Aquilina, Manager, U.S. Department of Energy Nevada Operations Office, Las Vegas, NV, May 20, 1992.

Letter 1994 — O'Leary, H., "Finding of No Significant Impact at Pantex Plant," Letter from Hazel O'Leary, The Secretary of Energy, Washington, DC, to Governor Ann Richards, Austin, TX, January 19, 1994.

Letter 1995	Athas, William, "Epidemiological Information for the Pantex EIS," Letter from William Athas, Cancer Epidemiologist, State of New Mexico Department of Health, to Nan Founds, U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, July 6, 1995.
Letter 1996	Johnson, Jerry, "Biological Assessment Consultation," Letter from Jerry S. Johnson, Assistant Area Manager for Projects and Environmental Management, U.S. Department of Energy, Amarillo Area Office, to Robert Short, Field Supervisor, U.S. Fish and Wildlife Service, Amarillo, TX, May 9, 1996.
Letter 1996a	Short, Robert, "Biological Assessment Consultation," Letter from Robert Short, Field Supervisor, U.S. Fish and Wildlife Service, to Jerry Johnson, Assistant Area Manager for Projects and Environmental Management, U.S. Department of Energy, Amarillo Area Office, Arlington, TX, May 29, 1996.
LLNL 1988	McCann, M.W., and A.C. Boissonnade, *Natural Phenomena Hazards Modeling Project: Preliminary Flood Hazards Estimates for Screening Department of Energy Sites: Albuquerque Operations Office*, prepared under Contract UCRL-21045, managed by Lawrence Livermore National Laboratory, Livermore, CA, for the U.S. Department of Energy, Office of the Assistant Secretary for Environment, Safety and Health, Office of Nuclear Safety, Washington, DC, May 1988.
LLNL 1995	Sutcliffe, W.O., et al., *A Perspective on the Dangers of Plutonium*, prepared under Contract UCRL-JC-118825, by Lawrence Livermore National Laboratory, Livermore, CA, April 14, 1995.
Manzano 1994	Manzano Mountain Weapons Storage Area—Inventory, Albuquerque, NM, May, 1994.
Mariah 1992	Acklen, J.C., *Archaeological Letter Report for Cultural Resources Investigations Conducted in Association with the Ditches and Playa Program at the Pantex Plant Near Amarillo, TX*, Mariah Associates, May 1992.
McNally 1995	*Road Atlas, U.S., Canada, Mexico*, Rand McNally and Company, Chicago, IL, 1995.
MH 1981	Hughes, J.T., and R.D. Speer, *An Archaeological Survey of the Pantex Plant, Carson County, Texas*, Purchase Order No. F9544000, prepared by Consulting Archaeologists, managed by Mason & Hanger-Silas Mason Co., Inc., for the U.S. Department of Energy, July 1981.
MH 1991	Mason & Hanger-Silas Mason Co., Inc., *Pantex Plant Site Environmental Report for Calendar Year 1990*, MHSMP-91-06, prepared under Contract DE-AC04-76DP-00487, by Environmental Monitoring Section, Environmental Protection Department, Environment, Safety, and Health Division, Amarillo, TX, July 1991.

MH 1995 Mason & Hanger-Silas Mason Co., Inc., *Final Wetland Delineation Pantex Lake and Playas 1,2,3, and 4,* prepared by Herrera Environmental Consultants, Inc., Seattle, WA, June 1995.

MH 1995a Mason & Hanger-Silas Mason Co., Inc., *Treatability Study Test Plan for Groundwater Pump and Treat/Soil Vapor Extraction System, Pantex Zone 12 Treatability Study,* Task Order #: BOA 003001, Amarillo, TX, July 27, 1995.

MH 1995b Largent, F.B., *A Cultural Resources Survey of 2,400 Acres at the U.S. Department of Energy Pantex Plant, Carson County, Texas,* by Geo Marine, Inc., Plano, Texas for Mason & Hanger-Silas Mason Co., Inc., Amarillo, TX, Report No. 87, March 1995.

MH 1995c Mason & Hanger-Silas Mason Co., Inc., *Off Site Observation Borings Cockrell and Crawford Ranch Preliminary Data Package Pantex Zone 12 Treatability Study*, Task Order #: BOA 003001, Amarillo, TX, December 15, 1995.

MH1995d Mason & Hanger-Silas Mason Co. Inc., *Notification of Treatability Study Base Hydrolysis of Explosives*, prepared for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, June 1995.

MH 1996 Mason & Hanger-Silas Mason Co., Inc., *Draft Final Work Plan Pantex Plant Ditches Interim Corrective Measures Hot Spot Removal*, prepared by S.M. Stoller Corp., Boulder, CO, May 15, 1996.

MH 1996a Mason & Hanger-Silas Mason Co., Inc., *Final Work Plan for Zone 12 Groundwater Protection Project*, prepared by e^2M, San Antonio, TX, April 12, 1996.

MH 1996b Mason & Hanger-Silas Mason Co., Inc., "Pantexan," Volume 43, Issue 5, prepared for the Employees at the U.S. Department of Energy's Pantex Plant, Amarillo, TX, May 1996.

MH 1996c Mason & Hanger-Silas Mason Co., Inc., *Spraying of Agricultural Chemicals at Pantex by Texas Tech Research Farms,* Plant Standard STD-7030, Mason & Hanger-Silas Mason Co., Inc., Pantex Plant, Amarillo, TX, February 24, 1994, Revision in Progress, 1996.

NAP 1990 *Health Effects of Exposure to Low Levels of Ionizing Radiation Beir V*, National Academy Press, Washington, DC, 1990.

NAS 1977 *Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Evaluation of Environmental Impact of Noise*, National Academy of Sciences, Washington, DC, 1977.

NCRP 1987 National Council on Radiation Protection and Measurements, *Ionizing Radiation Exposure of the Population of the United States,* Report No. 93, 1987.

NHP 1995	Mehlhop, P., and E. DeBruin, *Threatened and Endangered Species Survey of Kirtland Air Force Base, NM*, prepared by New Mexico Natural Heritage Program, 1995.
MH 1996d	Mason & Hanger Corporation, *Justification for Continued Operation of Buildings 12–44, Cells 2–6; 12–85; 12–96; and 12–98, Cells 1–4 with Potential for Higher Offsite Release Consequences,* PX-JCO-96-002, Revision 1, July 25, 1996.
NIOSH 1994	*NIOSH Pocket Guide to Chemical Hazards*, U.S. Department of Human Services, Public Health Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Washington, DC, 1994.
NM Cen 1991	Bureau of the Census, *1990 Census Summary Population and Housing Characteristics-New Mexico*, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1991.
NM Cen 1992	Bureau of the Census, *1990 Census of Population General Population Characteristics-New Mexico*, Table 6, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1992.
NM Cen 1993	Bureau of the Census, *1990 Census of Social and Economic Characteristics-New Mexico*, Table 203, 229, 145, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1993.
NRC 1977	NRC, *Final Environmental Impact Statement on the Transportation of Radioactive Material by Air and Other Modes,* prepared under Contract NUREG-0170, U.S. Nuclear Regulatory Commission, Washington, DC, 1977.
NRC 1985	NRC, *An Approach to the Quantification of Seismic Margins in Nuclear Power Plants,* UCID-20444, prepared under Contract NUREG/CR-4334 by Lawrence Livermore National Laboratory for the U.S. Nuclear Regulatory Commission, August 1985.
NV Cen 1992	Bureau of the Census, *1990 Census of Population General Population Characteristics-Nevada,* Tables 1, 2, 5, 6, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1992.
NV Cen 1993	Bureau of the Census, *1990 Census of Social and Economic Characteristics, Nevada,* Table 145, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1993.

OR Cen 1992 — Bureau of the Census, *1990 Census of Population General Population Characteristics–Oregon*, Table 6, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1992.

Pantex 1989 — Pantex Plant, *RCRA Facility Assessment Visual Site Inspection Report,* EPA ID Number TX4890110527, prepared by A.T. Kearney, Inc., Redwood City, CA, and The Earth Technology Corporation for the Environmental Protection Agency, Region VI, Dallas, TX, March 1989.

Pantex 1991 — Pantex Plant, *Pantex Index of Buildings,* Amarillo, TX, January 7, 1991.

Pantex 1992 — Pantex Plant, *Contractors Safety and Health Program Brochure*, prepared by the Safety Department, Amarillo, TX, September 1992.

Pantex 1993 — Pantex Plant, *Chemical High Explosives Hazards Assessment for the Pantex Plant, Amarillo, TX*, prepared by Jacobs Engineering Group, Inc., Albuquerque, NM in conjunction with Ogden Environmental and Energy Services Company, Albuquerque, NM, for Pantex Plant, Amarillo, TX, October 1993.

Pantex 1993a — *Pantex Plant, Final Safety Analysis Report Pantex Plant Building 12-104A, (Weapons Special Purpose Bay Replacement Complex),* Amarillo, TX, September 1993.

Pantex 1993b — Pantex Plant, *Final Environmental Assessment Hazardous Waste Treatment and Processing Facility*, prepared for the U.S. Department of Energy, Albuquerque Operations Office by Pantex Plant, Amarillo, TX, September 1993.

Pantex 1994 — Pantex Plant, *On-Site Transportation Safety Risk Assessment,* Amarillo, TX, 1994.

Pantex 1994a — Pantex Plant, *Environmental Restoration Program, Solid Waste Management Unit Reference Guide,* prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1994.

Pantex 1994b — Pantex Plant, *Final Safety Analysis Report Pantex Plant Building 12-42, South Vault (Tritium Staging Facility),* Amarillo, TX, March 1994.

Pantex 1994c — Pantex Plant, *EIS News*, Newsletter, Amarillo, TX, May 1994.

Pantex 1994d — Pantex Plant, *Pantex Radiological Control Manual*, MNL-RS-0001, Pantex Plant, Amarillo, TX, June 1, 1994.

Pantex 1995 — Pantex Plant, *Basis for Interim Operation for the Non-Nuclear Facilities*, Draft 3, prepared by Pantex Plant, Amarillo, TX, September 1995.

Pantex 1995a — Pantex Plant, *Zone 4 Aircraft Crash - New Information*, PX-USQD-94-45, prepared by Pantex Plant, Amarillo, TX, January 6, 1995.

Pantex 1995g	Pantex Plant, *Pantex Plant Federal Facility Compliance Act Background Information*, Draft, March 1995.
Pantex 1995i	Pantex Plant, *Exceeding Expected Content in Vault Building 12-42 South Vault (SRD), Pantex 1995*, PX-USQD-95-13, Amarillo TX, 1995.
Pantex 1995j	Pantex Plant, *Basis for Interim Operation for the Pantex Plant, Amarillo, TX*, Revision 3, prepared by Pantex Plant, Risk Management Department, Amarillo, TX, June 1995.
Pantex 1995k	Pantex Plant, *Draft Aquifer Pumping Test Report for Groundwater Pump and Treat/Soil Vapor Extraction System, Pantex Zone 12 Treatability Study*, HC-30678 Basic Ordering Agreement, prepared by Pantex Plant, Environmental Restoration Program, Amarillo, TX, November 9, 1995.
Pantex 1996	Pantex Plant, *Environmental Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1996.
Pantex 1996a	Pantex Plant, *Safety Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1996.
Pantex 1996b	Pantex Plant, *Programmatic Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1996.
Pantex 1996c	Pantex Plant, *1995 Environmental Report for Pantex Plant, DOE/AL/65030-9602*, prepared by the Environmental Protection Department, Environment, Safety and Health Division, Amarillo, TX, May 1996.
Pantex 1996d	Pantex Plant, *Pantex Area Groundwater Wells*, Amarillo, TX, February 7, 1996.
Pantex 1996e	Pantex Plant, *Draft Final Cross Section 3-3'*, Amarillo, TX, July 15, 1996.
Pantex 1996f	Pantex Plant, *Federal Facility Compliance Act, Compliance Plan, Annual Update*, U.S. Department of Energy, Albuquerque Operations, Amarillo Area Office, Amarillo, TX, August 1996.
PC 1993	Johnson, G., Pantex Plant is Not Adversely Affecting Listed Species or Critical Habitat, Letter from Gerry Johnson, DOE, Amarillo Area Office, Amarillo, TX, to Bob Short, Fish and Wildlife Service, Arlington, TX, November 23, 1993.
PC 1994	Ecklund, B., Department of Energy, Pantex Plant Current Emission Inventory, Letter from Bart Ecklund, Radian Corporation, Austin, TX, to Robert Roulston, Pantex, Amarillo, TX, December 5, 1994.

PC 1994a	Jones, R., Water Supply of Pantex Plant, Memo-record of conversation from Rebecca Jones, Tetra Tech, Inc., Amarillo, TX, with George Rose of Battelle Pantex, TX, December 7, 1994.
PC 1994b	Petraglia, J., Hazard Cargo Information-Ross Air, EIS request for information, supplied by J. Petraglia, Battelle Pantex, November 29, 1994.
PC 1994c	Longmire, Paul A., Warhead Interim Storage Alternative, Fax from Paul A. Longmire, Manager, Stockpile Reduction Program, Sandia National Laboratories, to Harry T. Season, Jr., Director, Weapons Program Division, DOE/AL, August 19, 1994.
PC 1995	Battelle Pantex, Copies of Latest Draft Permits (RCRA, Water, NPDES), EIS request for information supplied by Battelle Pantex, May 1, 1995.
PC 1995a	Longmire, P.A., Warhead Interim Storage Alternative, Letter from Paul A. Longmire, Sandia National Laboratories, Albuquerque, NM, to Harry T. Season, Jr., U.S. Department of Energy, Albuquerque Operations Office, August, 19, 1995.
PC 1995b	Brennan, J.L., Feasibility Design Report NTS Storage Plant Drawings, Letter from J.L. Brennan, Fluor Daniel, Inc., Irvine, CA, to Andre Cygelman,U.S. Department of Energy, Washington, DC, June 1, 1995.
PC 1995c	Dukelow, J.S., Battelle Pacific Northwest Laboratories, Wind Direction and Speed Data Request for the Savannah River Site, to J. Bolin, Scientech, May 31, 1995. (Wind Rose created by Tetra Tech)
PC 1995d	Rose, G., Maximum Flows From Buildings 12-43, 12-121, 12-73, and 11-50, Fax from G. Rose, Battelle Pantex, to G. Greenly, Battelle Pantex, TX, March 21, 1995.
PC 1995e	Hall, T.F., *Explosives and Demolitions*, FM5-25, Headquarters, Department of the Army, March 1985, EIS request for information, text excerpt provided by T.F. Hall, Tetra Tech, Inc., to Bret Simpkins, Tetra Tech, Inc., Amarillo, TX, October 13, 1995.
PC 1995f	Buck, K., Battelle Pacific Northwest Laboratories, Wind Direction and Speed Data Request for the Hanford Site, to J. Bolin, Scientech, May 16, 1995. (Wind Rose created by Tetra Tech)
PC 1995g	Banner, E., Data Needs for the New Projects at Pantex Plant EIS request for information supplied by E. Banner and M. Lincoln, Battelle Pantex, Amarillo, TX, May 17, 1995.
PC 1995h	Petraglia, J., Onsite-Transportation, EIS request for information supplied by J. Petraglia, Battelle Pantex, TX, January 6, 1995.

PC 1995i	Brady, R., PM-20 Chromium Concentrations, EIS request for information, table supplied by R. Brady, Pantex Plant Amarillo, TX, to Kathy Monks, Tetra Tech, Inc., Albuquerque, NM, October 5, 1995.
PC 1995j	Greenly, G., Waste Generated in "Normal" Activities in Zone 4 West (Stage Right), EIS request for information supplied by George Greenly, Pantex Plant Amarillo, TX, to Rebecca Jones, Tetra Tech, Inc., Amarillo, TX, May 31, 1995.
PC 1995k	Lincoln, M., Radiation Safety, EIS request for information from Michelle Lincoln, Battelle Pantex, TX, March 29, 1995.
PC 1995m	Founds, N., Courier Radiation Dosimetry, EIS request for information supplied by Nan Founds, DOE, Albuquerque Office, TR-115, May 1, 1995.
PC 1995n	Lincoln, M., and J. Petraglia, Types of Containers Used to Ship Waste Off-Site; Number of Shipments Per Year and Volume of LLW & MW, EIS request for information supplied by Michelle Lincoln and Jeff Petraglia, Battelle Pantex, TX, May 1995.
PC 1995o	Faich, R., Industrial Classification of Amarillo Area Workers, Telephone Conversation from Ron Faich, Tetra Tech, Inc. Albuquerque, NM, to Duane Adcock, Amarillo Area Office, Amarillo, TX, January 25, 1995.
PC 1995p	McBride, D., Number of Depleted Uranium Shipments Per Year for the Past Five Years, and Descriptions of Types of Shipments, Destination and Form of DU, EIS request for information supplied by Dave McBride, Battelle Pantex, TX, February 23, 1995.
PC 1995q	Petraglia, J., Dose Rates, EIS request for information supplied by J. Petraglia, Battelle Pantex, TX, January 3, 1995.
PC 1995r	McBride D., EIS request for information support by Dave McBride, Battelle Pantex, TX, April 11, 1995.
PC 1995s	Donahoe S., Site Specific, Risk Based Screening Levels for Pantex Plant Site Vegetation, Memorandum from Sean Donahoe and Sharon Thoms of Tetra Tech, Inc., Fairfax, Virginia to George Pratt and Bill Johns of Tetra Tech, Inc., Albuquerque, NM, March 31, 1995.
PC 1995u	Johnson, J.S., Word changes to the Surface Water Discharge Permits Section of the Pantex Plant Draft Environmental Impact Statement, Letter from Jerry Johnson, DOE Amarillo Area Office, Amarillo, TX, to Kathy Monks, Tetra Tech, Inc., Albuquerque, NM, November 17, 1995.
PC 1995v	Nicholas, J., Pantex Plant Budget Data, Contact report from conference calls between Nan Founds, Department of Energy, Albuquerque Operations Office, Raj Mathur, Tetra Tech, Inc., Albuquerque Office, and Jim Nicholas, Pantex Plant, May 31 and June 1, 1995.

PC 1996 — Finton, C., Estimated Groundwater Flow Velocities/Travel Times, Internal Battelle memo from Chris Finton Battelle Memorial Institute, Columbus, OH, through Tony Biggs, Battelle Pantex, Amarillo, TX, January 31, 1996.

PC 1996a — Summary: Perched Aquifer Velocity Gradients, Internal memo from e^{2}M, San Antonio, TX, to Battelle Pantex, Amarillo, TX, February 1, 1996.

PC 1996b — Rogers, J., ADS Summary, Internal memo from Jim Rogers, Department of Energy Amarillo Area Office, Amarillo, TX, to Vicki Battley, Department of Energy Amarillo Area Office, Amarillo, TX, March 12, 1996.

PC 1996c — Williams, C. E., Estimated Pumping by Crop for Carson County, Fax response to request for information, Panhandle Groundwater Conservation District, White Deer, TX, May 30, 1996.

PC 1996d — Loucks-Hickman, V.D., Fish at Pantex Plant, Memorandum from Vicki D. Loucks-Hickman, Battelle Pantex, to George Pratt, Tetra Tech, Inc., Albuquerque, NM, June 18, 1996.

PC 1996e — Jones, F., Mixed LLW Shipment to Envirocare in June, 1996, Telephone conversation from Fritz Jones, Battelle Pantex, to Jim Bartosch, Tetra Tech, Inc., Albuquerque, NM, July 17, 1996.

PC 1996f — Bowman, W.A., LLMW as of December 1995, Fax from William A. Bowman, Battelle Pantex, to Francis R. Jones, Pantex PO-ESHI, June 28,1996.

PC 1996g — Johnson, J., Notification of Intended Waste Storage and Recycling Activities in Building 12-19E, Letter from Jerry Johnson, DOE Amarillo Area Office, Amarillo, TX to Texas Natural Resource Conservation Commission, Austin, TX, April 11, 1996.

PC 1996h — FAA-Amarillo ATCT, Instrument Operations, EIS request for information supplied by FAA-Amarillo ATCT to Jeff Petraglia, Tetra Tech Inc., Washington, DC, June 1996.

PC 1996i — Glover, J., Input for Pantex Plant EIS Document, Internal memorandum from Jeff Glover, Pantex, Risk Management, to Steve Young, Pantex Risk Management, Amarillo, TX, August 6, 1996.

PC 1996j — Trembley, N., FAA Traffic Control Tower Information, Fax from Nancy Trembley, Office of Aviation Policy Plans, and Management Analysis APO-110, to Davin Greenly, Tetra Tech, Inc., Amarillo, TX, May 14, 1996.

PC 1996k — Matthews, R.S., Building Blueprint, Fax from R.S. Matthews, Savannah River Site, NMP Planning, to Jeff Petraglia, Tetra Tech, Inc., August 1, 1996.

PC 1996l — Bowman, A., Identification of Alcohols, Pantex EIS request for information supplied by Alan Bowman, to Raji Sinha, Tetra Tech, Inc., Albuquerque, NM, July 12, 1996.

PC 1996m — Sims, B., TNRCC Fact Sheet, Fax from Barry Sims, Scientech, Inc., Amarillo, TX, to Kathy Monks, Tetra Tech, Inc., Albuquerque, NM, July 18, 1996.

PC 1996n — Ferguson, D., Environmental Impact Statement Response to TNRCC Comments, Fax from Dan Ferguson, Department of Energy, Amarillo Area Office, to Kathy Monks, Tetra Tech, Inc., Albuquerque, NM, July 18, 1996.

PC 1996o — Booker, J.D., List of Approved Agricultural Chemicals for the 1996–97 Growing Season, Fax from J. D. Booker, Battelle Pantex, Amarillo, TX, of a letter from Jerry Johnson, U.S. Department of Energy, Amarillo Area Office, to Jeffery Johnson, Texas Tech University, Lubbock, TX, dated May 24, 1996.

PC 1996p — McBride, D., Color Maps for the Various Flow Systems at Pantex Plant, Support request from Dave McBride, Battelle Pantex, TX, to Jason Moore, Tetra Tech, Inc., Albuquerque, NM, August 20, 1996.

PC 1996q — Erb, W.W., "Draft" Portrayal of the Landfills at Pantex Plant, Support request from W.W. Erb, Pantex Plant, to Dave McBride, Battelle Pantex, Amarillo, TX, September 3, 1996.

PC 1996s — Spisak, T., U.S. Department of Interior's Bureau of Mines Helium Operations, Telephone conversation from Tim Spisak, Chief of Planning, U.S. Department of the Interior/Bureau of Land Management, to Ev Avara, Tetra Tech, Inc., Amarillo, TX, September 1996.

PC 1996t — Taylor, A., Bell Helicopter Plant - Amarillo Operations, Telephone Conversation from Alan Taylor, Assistant City Manager of Amarillo, to Ev Avara, Tetra Tech, Inc., Amarillo, TX, September 1996.

PC 1996v — McBride, D., Irrigation Water Used by Texas Tech University, EIS request for information supplied by Dave McBride, Battelle Pantex, Amarillo, TX, September 19, 1996.

PC 1996w — Weems, J., Excerpts from the Firing Sites RCRA Facility Investigation Report complied by Morrison Knudsen in December 1995, Fax from Johnny Weems, Battelle Pantex, Amarillo, TX, to Raji Sinha, Tetra Tech, Inc., Albuquerque, NM, July 1, 1996.

PC 1996x — Guelker, J., Monitoring Wells in the Area of Playa 4, Personal communication with Johnny Guelker, Pantex Plant Environmental Restoration Team Lead, through Jerry Johnson, Department of Energy, Amarillo Area Office, Amarillo, TX, July 26, 1996.

PC 1996y — Peterson, J.B., Impact of H.R. 4168 *Helium Privatization Act of 1996* on Bureau on Land Management, Helium Operations, Fax from Joseph B. Peterson, Helium Field Operations, Amarillo, TX, to Lisa Johns, Tetra Tech, Inc., Albuquerque, NM, October 22, 1996.

Perryman 1993	Perryman Consultants, Inc., "Analysis Shows Pantex Plant Adds a Billion in Revenue and Thousands of Jobs to Amarillo Economy," Press Release, 1993.
PGCD 1995	*Rules of Panhandle Groundwater Conservation District No. 3,* Panhandle Groundwater Conservation District No. 3, White Deer, TX, July 19, 1995.
PL 91-596	Occupational Safety and Health Act of 1970, Public Law 91-596.
PL 102-484	National Defense Authorization Act of 1993, Public Law 102-484.
PL 101-510	Defense Base Closure and Realignment Act of 1990, Public Law 101-510, November 5, 1990.
PNL 1988	PNL, *Health Physics Manual of Good Practices for Plutonium Facilities,* PNL-6534, Pacific Northwest Laboratory, Richland, WA, May 1988.
Raytheon 1995	Raytheon Services, *Safety Analysis Report for the Device Assembly Facility at the Nevada Test Site,* DAF SAR-001-193-5394C, March 1995.
Reed 1995	Reed, J.W., *Airblast Predictions for Pantex Explosion Operations (Draft)* JWR Inc., Albuquerque, NM, June 30, 1995.
Ross 1994	*Transportation Evaluation Report for Ross Aviation, Inc.,* prepared for the U.S. Department of Energy Albuquerque Operations Office, by Ross Aviation, Inc., Albuquerque, NM, February 1, 1994.
Scanlon 1994	Scanlon, B.R., et al., Evidence for Focused Recharge Beneath Playas in the Southern High Plains, Texas, paper presented at the *Proceedings of the Playa Basin Symposium,* May 1994.
SC Cen 1992	Bureau of the Census, *1990 Census of Population General Population Characteristics-South Carolina,* Tables 1, 6, 7 and 8, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1992.
SC Cen 1993	Bureau of the Census, *1990 Census of Social and Economic Characteristics-South Carolina,* Table 145, 178, 203, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1993.
SEN 35-91	"Nuclear Safety Policy Notice" Sen-35-91, Secretary of Energy, U.S. Department of Energy, Washington, DC, September 9, 1991.
Smith 1994	Smith, L.M, The Role of Playas in Wildlife Management, paper presented at the *Proceedings of the Playa Basin Symposium,* May 1994.
SNL 1989	Sandia National Laboratories, *Site Development Plan,* Albuquerque, NM, April 1989.

SNL 1993 — *Sandia National Laboratories, New Mexico, Environmental Baseline Update*, SAND92-7339, prepared under Contract DE-AC04-76DP00789, by IT Corporation, Albuquerque, NM and Consensus Planning, Inc./Zephyr Design, Albuquerque, NM, managed by Sandia National Laboratories, Albuquerque, NM and Livermore, CA for the U.S. Department of Energy, January 1993.

SNL 1994 — Sandia National Laboratories, *Warhead Interim Storage Alternative Considerations for Using the Device Assembly Facility (DAF) at the Nevada Test Site for Interim Storage*, Albuquerque, NM, August 19, 1994.

SNL 1994a — Phillips, J.S., et al., *Determination of the Influence Factors and Accident Rates for the Armored Tractor/Safe Secure Trailer*, SAND93-0111, Sandia National Laboratories, April 1994.

SNL 1994b — Clauss, D.B., et al., *A Statistical Description of the Types of Severities of Accidents Involving Tractor Semi-Trailers*, SAND93-2580, Sandia National Laboratories, June 1994.

Stoller 1996 — *Draft Final Work Plan Pantex Plant Ditches Interim Corrective Measures Hot Spot Removal*, prepared for Mason & Hanger-Silas Mason Co., Inc., prepared by the S.M. Stoller Corporation, Boulder, CO, May 15, 1996.

TBEG 1982 — Texas Bureau of Economic Geology, *Geology and Geohydrology of the Palo Duro Basin, Texas Panhandle, A Report on the Progress of Nuclear Waste Isolation Feasibility Studies (1981)*, Geological Circular 82-7, prepared for the U.S. Department of Energy, Office of Nuclear Waste Isolation, by the Texas Bureau of Economic Geology, University of Texas, Austin, TX, 1982.

TBEG 1988 — Nativ, R., *Hydrogeology and Hydrochemistry of the Ogalalla Aquifer, Southern High Plains, Texas Panhandle and Eastern New Mexico*, Report of Investigation No. 177, prepared by the Texas Bureau of Economic Geology, University of Texas, Austin, TX, 1988.

TBEG 1989a — Budnik, Roy T., *Tectonic Structures of the Palo Duro Basin, Texas Panhandle,* prepared by the Texas Bureau of Economic Geology, University of Texas, Austin, TX, 1989.

TBEG 1994 — Mullican, W.F., III, A.E. Fryer and N.D. Johns, *Vertical Transport of Contaminants through Perched Aquifers to the Ogalalla Aquifer, Pantex Plant Area, Southern Plains, Texas,* prepared by the Texas Bureau of Economic Geology, University of Texas, Austin, TX, 1994.

TBEG 1994a — Paine, J., *Shallow Seismic Data Acquisition, Processing, and Interpretation at Pantex Lake, Carson County, Texas*, Texas Bureau of Economic Geology, Milestone Report Activity 2, Supplement to Scope of Work, 1992-93, University of Texas, Austin, TX, 1994.

TBEG 1995 Texas Bureau of Economic Geology, *Summary Hydrogeologic Assessment DOE Pantex Plant, Carson County, TX*, University of Texas, Austin, TX, May 1995.

TBEG 1995a Texas Bureau of Economic Geology, *Milestone Report on Potentiometric Surfaces and Vertical Hydraulic Conductivity Measurements for Perched Aquifers at the Pantex Plant, Carson County, Texas*, (Activity No. 4 of Appendix C. Supplement Scope of Work, 1993-1994), University of Texas, Austin TX, January 1995.

TDH 1994 Texas Department of Health, *Study of Cancer in Selected Counties Near the Pantex Nuclear Weapons Plant*, Cancer Registry Division, Austin, TX, June 24, 1994.

TEC 1995 Texas Employment Commission, *1994 Labor Force Estimates for the Amarillo Metropolitan Statistical Area*, prepared by Economic Research and Analysis Department in cooperation with the U.S. Department of Labor, Austin, TX, 1995.

TIE 1996 *Technical Information Exchange on Draft Environmental Impact Statement for the Continued Operations of the Pantex Plant and Associated Storage of Nuclear Weapon Components*, Transcript from afternoon session, page 81, Amarillo, TX, June 25, 1996.

TNRCC 1993 Texas Natural Resource Conservation Commission, *Permit to Dispose of Wastes Under Provisions of Chapter 26 of the Texas Water Code, Permit No. 02296*, Corresponds to NPDES Permit No. TX0107107, September 1993.

TNRCC 1993a Texas Natural Resource Conservation Commission, *Air Quality Modeling Guidelines,* Modeling Division, Austin, TX, December, 1993.

TNRCC 1993b Texas Natural Resource Conservation Commission, *Pantex Nuclear Weapons Facility Ambient Air Monitoring Quarterly Report April-June 1993*, Austin, TX, October 1993.

TNRCC 1993c Texas Natural Resource Conservation Commission, *Pantex Nuclear Weapons Facility Ambient Air Monitoring Quarterly Report July-September 1993*, December 1993.

TNRCC 1994 Texas Natural Resource Conservation Commission, *1993 Annual Waste Summary Report,* Austin, TX, 1994.

TNRCC 1994b Texas Natural Resource Conservation Commission, *Monitoring Operations Division, Smarter Air Monitoring for Texas*, Austin, TX, November 1994.

TNRCC 1994c Texas Natural Resource Conservation Commission, *Pantex Nuclear Weapons Facility Ambient Air Monitoring Quarterly Report January-March 1994*, June 1994.

TNRCC 1995a — Texas Natural Resource Conservation Commission, *Fact Sheet for Permit to Dispose of Wastes Under Provisions of Chapter 26 of the Texas Water Code*, Permit No. 02296 (Renewal), July 26, 1995.

TNRCC 1995b — Texas Natural Resource Conservation Commission, *Modeling Analysis of the Pantex Plant Amarillo, Texas*, Austin, TX, June 1995.

TNRCC 1995c — Texas Natural Resource Conservation Commission, *Pantex Nuclear Weapons Facility Ambient Air Monitoring Annual 1994 Report*, Monitoring Operations Division, September 1995.

TNRCC 1994d — Texas Natural Resource Conservation Commission, *Pantex Nuclear Weapons Facility Ambient Air Monitoring Annual Report*, Austin, TX, September, 1995.

TNRCC 1996 — Texas Natural Resource Conservation Commission, *(Draft Revision) Permit for Industrial Solid Waste Management Site*, Permit No. HW-50284, Austin, TX, February 1996.

TNRCC 1996a — Texas Natural Resource Conservation Commission, *Effective Screening Levels (ESLs)*, Modeling Division, Austin, TX, April 15, 1996.

TNRCC 1996b — Texas Natural Resource Conservation Commission, *Permit to Dispose of Wastes Under Provisions of Chapter 26 of the Texas Water Code, Permit No. 02296*, Corresponds to NPDES Permit No. TX0107107, effective June 14, 1996.

TNRCC 1996c — Texas Natural Resource Conservation Commission, *Class 3 MOD; Permit HW50284, Wastewater Treatment Facility issued pursuant to Chapter 26 of the Texas Water Code*, Texas Natural Resource Conservation Commission, Austin, TX, February 27, 1996.

TNRCC 1996d — Texas Natural Resource Conservation Commission, *Pantex Nuclear Weapons Facility Ambient Air Monitoring Quarterly Report, July-September 1995*, March 1996.

TNRCC 1996e — Texas Natural Resource Conservation Commission, *Pantex Nuclear Weapons Facility Ambient Air Monitoring Quarterly Report*, October-December 1995, June 1996.

TPW 1992 — Texas Parks and Wildlife Department, *Texas Threatened and Endangered Species*, Endangered Resources, Austin, TX, January 1992.

TPW 1993 — Texas Parks and Wildlife Department, *Special Plant List*, Texas Natural Heritage Program, Austin, TX, October 1993.

TSDC 1994 — Texas State Data Center, *Estimates of the Total Populations of Counties and Places in Texas*, Table 1, prepared by the Department of Rural Sociology, Texas Agricultural Experiment Station, Texas A&M University, College Station, TX, November 1994.

TT 1995 — *Quality Assurance Program Plan*, TTAL, QA-95-001, prepared by Tetra Tech, Inc., Albuquerque, NM, for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, March 1995.

TTU 1988 — Bolen, E.G., and D.L. Flores, *Prairie Wetlands of West Texas: The History and Ecology of Playa Lakes*, Texas Tech University, Lubbock, TX, 1988.

TTU 1994 — Greer, James Dupree, *Comparison of Infiltration and Evaporation Volumes for the Five Pantex Playa Lakes,* a master report prepared by Texas Tech University, Lubbock, TX, July 25, 1994.

TTU 1994a — Pezzolesi, T.P., *Nutrient and Heavy Metal Cycling in a Playa Lake Wetland Receiving Wastewater,* Texas Tech University, Lubbock, TX, 1994.

TWC 1991 — Texas Water Commission, *Permanent Rule Change Chapter 307 Texas Surface Water Quality Standards 307.2-307.10,* Effective July 1991.

TWC 1991a — Texas Water Commission, *Permit for Industrial Solid Waste Management Site*, Permit No. HW-50284, Austin, TX, April 1991.

TWD 1991 — Texas Water Development Board, *Surveys of Irrigation in Texas 1958, 1964, 1969, 1974, 1979, 1984, and 1989*, Report 329, prepared by the Soil Conservation Service, U.S. Department of Agriculture, Texas State Soil & Water Conservation Board, and Texas Water Development Board, Austin, TX, January 1991.

TWD 1993 — Peckham, D.S., and J.B. Ashworth, *The High Plains Aquifer System of Texas, 1980 to 1990 Overview and Projections,* Draft, prepared by Texas Water Development Board, Austin, TX, September 1993.

TX Cen 1952 — Bureau of the Census, *1950 Census of Agriculture, Counties and State Economic Areas–Texas,* Volume 1, Part 26, Tables 1,4,5, and 6, U.S. Department of Commerce, Washington, DC, 1952.

TX Cen 1961 — Bureau of the Census, *1960 Census of Population, Characteristics of the Population–Texas*, Volume 1, Part 45, Table 6, U.S. Department of Commerce, Bureau of the Census, Washington, DC, 1961.

TX Cen 1967 — Bureau of the Census, *1964 Census of Agriculture, Statistics for the State and Counties–Texas,* Volume 1, Part 37, Tables 1,5 and 11, U.S. Department of Commerce, Washington, DC, 1964.

TX Cen 1972 — Bureau of the Census, *1969 Census of Agriculture, Texas,* Volume 1, Part 37, Tables 1, 3, 13, U.S. Department of Commerce, Washington, DC, 1972.

TX Cen 1973 — Bureau of the Census, *1970 Census of Population, Characteristics of the Population–Texas*, Volume 1, Part 45, Table 9, U.S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census, Washington, DC, 1973.

TX Cen 1981 — Bureau of the Census, *1978 Census of Agriculture, State and County Data–Texas,* Tables 1, 3, 11; U.S. Department of Commerce, Washington, DC, 1981.

TX Cen 1982 — Bureau of the Census, *1980 Census of Population, General Population Characteristics–Texas,* Table 14, U.S. Department of Commerce, Bureau of the Census, Washington, DC, 1982.

TX Cen 1989 — Bureau of the Census, *1987 Census of Agriculture, State and County Data–Texas,* Volume 1, Part 43, Tables 1, 16, U.S. Department of Commerce, Washington, DC, 1989.

TX Cen 1992 — Bureau of the Census, *1990 Census of Housing, General Housing Characteristics–Texas,* 1990 CH-1-45, Tables 49, 50, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, October 1992.

TX Cen 1992a — Bureau of the Census, *1990 Census of Population General Population Characteristics–Texas,* 1990 CP-1-45, Tables 1, 2, 5, and 6, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, June, 1992.

TX Cen 1993 — Bureau of the Census, *1990 Census of Population, Social and Economic Characteristics–Texas,* 1990 CP-2-45, Tables 3, 144, 145, 146, 147, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, September 1993.

TX Cen 1993a — Bureau of the Census, *1990 Census of Population and Housing, Population and Housing Characteristics for Census Tracts and Block Numbering Areas, Outside Metropolitan Areas–Texas,* Tables 8, 19, CPH-3-45, U.S. Department of Commerce, Washington, DC, 1993.

TX Cen 1993b — Bureau of the Census, *Detailed Housing Characteristics–Texas,* 1990 Census, Table 66, U.S. Department of Commerce, Washington, DC, 1993.

TX Cen 1993c — Bureau of the Census, *1990 Census of Population and Housing, Population and Housing Characteristics for Census Tracts and Block Numbering Areas, Amarillo, Texas Metropolitan Statistical Area,* Tables 8 and 19, CPH-3-66, U.S. Department of Commerce, Washington, DC, 1993.

TX Cen 1993d — Bureau of the Census, *1990 Census of Population and Housing, Population and Housing Unit Counts–Texas,* 1990 CPH-2-45, Table 4, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, March 1993.

TX Cen 1994 — Bureau of the Census, *1992 Census of Agriculture-Texas, State and County Data,* Tables 1, 14, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1994.

TX Cen 1994a — Bureau of the Census, *1992 County Business Patterns-Texas*, CBP-92-45, U.S. Department of Commerce, Economics and Statistics Administration Bureau of the Census, Washington, DC, October 1994.

TX Cen 1996 — Bureau of the Census, *1990 and 1995 State and County Population–Texas*, http:\\www.census.gov, downloaded off the Internet, September 18, 1996.

TX Cen 1996a — Bureau of the Census, *Population Estimates for Metropolitan Areas (MAs) Outside of New England, July 1, 1990 to July 1, 1995, Texas*, http:\\www.census.gov, downloaded off the Internet, September 19, 1996.

UN 1995 — Nevada Small Business Development Center, Bureau of Business and Economic Research, College of Business Administration, University of Nevada, Reno, NV, 1995.

USAF 1978 — U.S. Department of the Air Force, the Army, and the Navy, *Environmental Protection, Planning the Noise Environment*, AFM 19-10, TM 5-803-2 NAVFAC P-970, Washington, DC, 1978.

USAF 1979 — U.S. Department of the Air Force, *Flooded Areas Arroyo del Coyote, Kirtland Air Force Base* (topographic map), 1979.

USAF 1993 — U.S. Department of the Air Force, *Draft Environmental Impact Statement, Disposal and Reuse of Bergstrom Air Force Base, Texas*, Bergstrom Air Force Base, TX, January 1993.

USAF 1993a — U.S. Department of the Air Force, *Consolidation of Phillips Laboratory Split Directories KAFB, New Mexico, Environmental Assessment*, Albuquerque, NM, July 1993.

USAF 1994 — Earth Tech, Inc., *Environmental Assessment, Transportation and Storage of Rocket Systems, Launch Program Solid Rocket Motors, Kirtland AFB, NM*, prepared for the U.S. Department of the Air Force, July 1994.

USCOE 1987 — *Corps of Engineers Wetlands Delineation Manual*, Wetlands Research Program Technical Report, Y-87-1, AD/A176 734, U.S. Army Corps of Engineers, Waterways Experiment Station, Environmental Laboratory, Vicksburg, MS, 1987.

USCOE 1994 — Largent, F.B., Jr., and F. Winchell, et al., *A Cultural Resources Survey of 4,200 Acres at the U.S. Department of Energy Pantex Plant Facility, Carson County, Texas*, prepared under Contract DACW56-92-D-0010, by Geo-Marine, Inc., Plano, TX, for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, July 1994.

USCOE 1994a — Radian Corporation, *Preliminary Recommendations Memorandum for Flow System No. 1, Pantex RCRA Facility Investigation Ditches and Playas, ADS 1216*, Volume 1 of 3, prepared under Contract RCN269-045-19-01 for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, March 1994.

USCOE 1994b — Winchell, F., and F.B. Largent, Jr., et al., *Test Excavations of 23 Archaeological Sites at the U.S. Department of Energy Pantex Plant Facility, Carson County, TX, Draft*, Report No. 73, prepared by Geo-Marine, Inc., Plano, TX for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, May 1994.

USCOE 1994c — Radian Corporation, *Preliminary Recommendations Memorandum for Flow System No. 5, Pantex RCRA Facility Investigation Ditches and Playas*, ADS 1216, prepared under Contract RCN-269-045-19-01 for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, January 1994.

USCOE 1995 — IT Corporation, *Draft Final RCRA Facility Investigation Report for the Burning Grounds Assessment ADS 1232 (AL-PX-01) U.S. Department of Energy Pantex Plant, Amarillo, Texas,* Project No. 448109, prepared by IT Corporation, Austin, Texas, for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, May 1995.

USCOE 1995a — U.S. Army Corps of Engineers, *Groundwater Assessment, Monitoring Quarterly Report, November 1994 Sampling Round, Preliminary Data Package,* prepared for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, May 1995.

USCOE 1995b — U.S. Army Corps of Engineers, Tulsa District, *Pantex Plant Well Location Map*, prepared by J. Martell and D. Wilkins, Tulsa, OK, February 2, 1995.

USCOE 1995c — U.S. Army Corps of Engineers, *Wetland Inventory Survey, Kirtland Air Force Base,* Albuquerque, NM, 1995.

USCOE 1995e — IT Corporation, *RCRA Facility Investigation Report for the Miscellaneous Chemical Spills/Releases ADS 1198 (AL-PX-12) U.S. Department of Energy Pantex Plant, Amarillo Texas,* prepared by IT Corporation, Austin, Texas, for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, August 1995.

USCOE 1995f — Radian Corporation, *Draft RFI Report Pantex RCRA Facility Investigation AL-PX-8 Ditches and Playas, ADS 1216,* Volume 1 of 5, prepared by Radian Corporation, Austin, Texas, for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, September 11, 1995.

USDA 1962 — Jacquot, L.L., *Soil Survey, Carson County, Texas,* U.S. Department of Agriculture, Soil Conservation Service in cooperation with the Texas Agriculture Experiment Station, Washington, DC, July 1962.

USDA 1981 — *Pullman Soils: Distribution, Importance, Variability, and Management,* Texas Agricultural Station, College Station, TX, in cooperation with the U.S. Department of Agriculture, Agricultural Research Service and Soil Conservation Service, 1981.

USGS 1973	U.S. Geological Survey, *Sevenmile Basin Quadrangle Texas 7.5 Minute Series Topographic Map,* U.S. Department of Interior, Denver, CO, 1953, Photorevised 1967 and 1973.
USGS 1976	Bedinger, M.S., and R.T. Sniegocki, *Summary Appraisals of the Nations Ground-Water Resources, Arkansas-White-Red Region,* USGS Professional Paper 813-H, U.S. Geological Survey, U.S. Department of Interior, Washington, DC, 1976.
WA Cen 1991	Bureau of the Census, *1990 Census of Population and Housing, Summary Population and Housing Characteristics,* Washington, Table 17, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1991.
WA Cen 1992	Bureau of the Census, *1990 Census of Population General Population Characteristics-Washington,* Table 6, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1992.
WA Cen 1993	Bureau of the Census, *1990 Census Social and Economic Characteristics-Washington,* Table 145, 229, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington, DC, 1993.
Weiner 1991	Weiner, R. F., P.A. LaPlante, J.P. Hageman, "An Approach to Assessing the Impacts of Incident-Free Transportation of Radioactive Materials: II Highway Transportation," *Risk Analysis*, Vol. II, No. 4, pp. 661-666, 1991.
WHC 1986	Westinghouse Hanford Company, *Fuel Cycle Plant-Final Safety Analysis Report,* prepared under Contract DE-AC06-76FF02170.39, for the U.S. Department of Energy, 1986.
WHC 1991	Westinghouse Hanford Company, *Aircraft Hazards to the Fast Flux Test Facility*, Richland, WA, November 1991.
WSRC 1994	Westinghouse Savannah River Company, *Savannah River Site Environmental Report for 1993*, WSRC-TR-94-075, prepared under Contract DE-AC09-89SR18035, for the U.S. Department of Energy, Savannah River Site, Aiken, SC, 1994.
WTU 1995	Blair, Kathleen B., *Swift Fox Survey at Pantex Plant Site, Carson County Texas*, Contract No. DE-AC04-94AL98863, Subcontract No. 030651, prepared by Kathleen B. Blair, West Texas A&M University, Canyon, Texas, for the U.S. Department of Energy, September 1995.
WTU 1996	Blair, Kathleen B., *Swift Fox (Vuipes Veiox) Live Trapping at Pantex Plant Site,* Carson County Texas, Contract No. DE-AC04-94AL98863, Subcontract No. 030651, prepared by Kathleen B. Blair, West Texas A&M University, Canyon, TX, for the U.S. Department of Energy, July 15, 1996.

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CHAPTER 8

List of Preparers

CHAPTER 8
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CHAPTER 9

List of Agencies, Organizations, and Individuals to Whom Copies of this EIS are Sent

CHAPTER 9
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Citizens for Environmental Justice, GA
Georgia Conservancy, GA
NAACP-Augusta Branch, GA
Metro Augusta Chamber of Commerce, GA
Savannah Citizens for Clean Air, GA
United Way of Aiken, GA

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Americans for Indian Opportunity, NM
Citizens for Alternatives to Radioactive Dumping, NM
Concerned Citizens for Nuclear Safety, NM
Greater Albuquerque Chamber of Commerce, NM
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League of Women Voters, NM
Los Alamos Study Group, NM
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Nevada

The American Peace Test, NV
The Nevada Desert Experience, NV
Nevada Nuclear Waste Study Committee, NV
Nevada Nuclear Waste Task Force, NV
Nevadans for Peace, NV
Nevada Test Site Contractors Association, NV

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Environmental Defense Fund Inc., NY
National Audubon Society, NY
Natural Resources Defense Council, Inc., NY

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Northwest Environmental Advocates, OR

South Carolina

Citizens for Nuclear Technology Awareness, SC
Energy Research Foundation, SC
NAACP-Aiken, SC

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American Environmental Health Studies Project, TN
Citizens for Better Health, TN
Citizens for National Security, TN
Ducks Unlimited Inc., TN
East TN Economic Development, TN
Foundation for Global Sustainability, TN
League of Women Voters, TN
Metro Augusta Chamber of Commerce, TN
Nashville Peace Action, TN
Oak Ridge Environmental Health Studies Project, TN
Oak Ridge Environmental Quality Advisory Board
Oak Ridge Chamber of Commerce, TN
Oak Ridge Environmental Peace Alliance, TN
Save Our Cumberland Mountains, TN

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Operation Commonsense, TX
Panhandle 2000, TX
Panhandle Area Neighbors and Landowners, TX
Pantex Plant Citizens Advisory Board, TX
The Peace Farm, TX
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National Water Resources Association, VA

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CHAPTER 10

Glossary

CHAPTER 10
GLOSSARY

This glossary lists terms of art or scientific expression that may not be familiar to some readers of this document. Should a reader need a definition for a term that is not in this list, please contact the Department of Energy, Albuquerque Operations Office, at the address shown on the cover page of this document.

Accident sequence: An initiating event followed by system failures or operator errors that can result in significant core damage, confinement system failure, and/or radionuclide releases.

Acute exposure: The exposure incurred during and shortly after a radiological release. Generally, the period of acute exposure ends when long-term interdiction is established, as necessary. For convenience, the period of acute exposure is normally assumed to end 1 week after the inception of a radiological accident.

Advisory Council on Historic Preservation: A 19-member body appointed to advise the President and Congress in the coordination of actions by Federal agencies on matters relating to historic preservation.

Air Quality Control Region: An interstate area designated by the Environmental Protection Agency for the attainment and maintenance of National Ambient Air Quality Standards.

Air quality standards: The level of pollutants in the air prescribed by regulations that may not be exceeded during a specified time in a defined area.

AL–R8 Pit Packaging: Currently the primary container used at Pantex Plant for pit staging. All AL–R8 containers are constructed of 18-gauge carbon steel. Each AL–R8 container contains Celotex (high-density cane-fiber pressboard) insulation. These containers do not possess an inner containment vessel.

Alluvial deposits: Deposits of earth, sand, gravel, and other materials carried by moving surface water deposited at points of weak water flow.

Ambient air: Ambient air is that portion of the atmosphere, external to the buildings, to which the general public has access.

Ambient sound: At a specified time, the all-encompassing sound associated with a given environment, being usually a composite of sound from many sources at many directions, near and far, including the specified sound source(s) of interest.

Aquatic biota: The sum total of living organisms within any designated aquatic area.

Aquifer: Rock or sediment in a formation, group of formations, or part of a formation that is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.

Aquitard: A less-permeable geologic unit in a stratigraphic sequence. The unit is not permeable enough to transmit significant quantities of water. Aquitards separate aquifers.

Archaeological sites (resources): Any location where humans have altered the terrain or discarded artifacts during either prehistoric or historic times.

Artifact: An object produced or shaped by human workmanship of archaeological or historical interest.

As low as reasonably achievable: A concept applied to the quantity of radioactivity released in routine operation of a nuclear system or facility, including "anticipated operational occurrences." It takes into account the state of technology, economics of improvements in relation to benefits to public health and safety, and other societal and economic considerations in relation to the use of nuclear energy in the public interest.

Assembly: The process of putting together a nuclear weapon or nuclear weapon component. This process takes place at Pantex Plant.

Atmospheric dispersion: The process of air pollutants being dispersed into the atmosphere. This occurs by the wind that carries the pollutants away from their source and by turbulent air motion that results from solar heating of the Earth's surface and air movement over rough terrain and surfaces.

Attainment area: An area considered to have air quality as good as or better than the National Ambient Air Quality Standards as defined in the *Clean Air Act.* An area may be an attainment area for one pollutant and a non-attainment area for others.

Background Noise: The total acoustical and electrical noise from all sources in a measurement system that may interfere with the production, transmission, time averaging, measurement, or recording of an acoustical signal.

Background radiation: Ionizing radiation present in the environment from cosmic rays and natural sources in the Earth; background radiation varies considerably with location.

Biological dose: The radiation dose absorbed in biological material measured in rem or millirem (one-thousandth of a rem).

Biomass: Literally, "living weight", refers to mass having its origin as living organisms (i.e., plants or animals).

Biota: Living organisms including plants and animals.

Blackwater Draw Formation: Quaternary formation consisting primarily of pedogenically modified eolian sands and silts interbedded with numerous caliche layers. The Blackwater Draw Formation overlies the Tertiary Ogallala Formation at Pantex Plant.

Burning Ground: The place at Pantex Plant where high explosive(s) (HE) are burned in trays. They are defined as Trays Hemisphere, Trays wet HE, and Trays HE.

Burning Ground upgrade: A facility that will be used to decontaminate the high explosive-contaminated components.

Caliche: Gravel, sand, or desert debris cemented by porous calcium carbonate; also the calcium carbonate itself. Found in Mexico and Southwest U.S., calcium carbonate precipitated as surface or near-surface crusts by the evaporation of moisture in the pore spaces of soils.

Cancer: The name given to a group of diseases characterized by uncontrolled cellular growth with cells having invasive characteristics such that the disease can transfer from one organ to another.

Canned Subassemblies: A component in certain nuclear explosives that may contain natural, depleted, or highly enriched uranium.

Capable fault: A fault that has exhibited one or more of the following characteristics (10 CFR 100, Appendix A): 1) Movement at or near the ground surface at least once within the past 35,000 years or movement of a recurring nature within the past 500,000 years, 2) macro-seismicity instrumentally determined with records of sufficient precision to demonstrate a direct relationship with the fault, or 3) a structural relationship to a capable fault according to characteristics (1) or (2) of this paragraph such that movement on one could be reasonably expected to be accompanied by movement on the other.

Carbon adsorption: A unit physiochemical process in which organic and certain inorganic compounds in a liquid stream are absorbed on a bed of activated carbon; used in water or waste purification and chemical processing.

Chronic exposure: Low-level radiation exposure incurred over a long time period due to residual contamination. Exposure concentration for the chronic standard is less than that of the acute standard.

Cladding: A metal coating bonded onto another metal.

Climatology: The science that deals with climates and investigates their phenomena and causes.

Code of Federal Regulations: All Federal regulations in force are published in codified form in the Code of Federal Regulations.

Community (biotic): All plants and animals occupying a specific area under relatively similar conditions.

Conceptual design: Efforts to develop a project scope that will satisfy program needs; ensure project feasibility and attainable performance levels of the project for Congressional consideration; develop project criteria and design parameters for all engineering disciplines; and identify applicable codes and standards, quality assurance requirements, environmental studies, construction materials, space allowances, energy conservation features, health and safety, safeguards, security requirements, and any other features or requirements necessary to describe the project.

Confined aquifer: A permeable geological unit with an upper boundary that is at a pressure higher than atmospheric pressure.

Conglomerate: A rock that contains rounded rock fragments or pebbles cemented together by another mineral substance.

Conservation Reserve Program: A Federal program which requires land owners to plant croplands with grass and leave uncropped for 10 years. Agricultural Stabilization and Conservation Service administers the program.

Consumptive water use: The difference in the volume of water withdrawn from a body of water and the amount released back into the body of water.

Conex box: A large metal container constructed of carbon steel used for storing waste in the interim period before shipment offsite. Each measures 2.5 x 2.5 x 12 meters (8 x 8 x 40 feet) with a capacity of 72 cubic meters (94 cubic yards).

Cretaceous: The geologic period making up the end of the Mesozoic Era, dating from approximately 144 million to 66 million years ago.

Criteria pollutant: Six air pollutants for which National Ambient Air Quality Standards are established by the Environmental Protection Agency: sulfur dioxide, nitric oxides, carbon monoxide, ozone, particulate matter-10 (smaller than 10 microns in diameter), and lead.

Critical habitat: Defined in the *Endangered Species Act of 1973* as "specific areas within the geographical area occupied by [an endangered or threatened] species..., essential to the conservation of the species and which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species... that are essential for the conservation of the species."

Cultural Resources: Districts, sites, structures, and objects and evidence of some importance to a culture, a subculture, or a community for scientific, traditional, religious, and other reasons. These resources and relevant environmental data are important for describing and reconstructing past lifeways, for interpreting human behavior, and for predicting future courses of cultural development.

Curie: A unit of radioactivity equal to 37 billion disintegrations per second; also a quantity of any nuclide or mixture of nuclides having 1 curie of radioactivity.

Day-night average sound (total): The sound exposure for a 24-hour calendar day calculated by adding the sound exposure obtained during the daytime (0700–2200 hours) to 10 times the sound exposure obtained during the nighttime (000–0700 and 2200–2400 hours).

Day-night sound exposure level (total): Ten times the common logarithm of the ratio of the (total) day-night sound exposure to the reference sound exposure (E0) of 400 micropascals-squared seconds ($400mPa^2s$). Measured in decibel (dB).

Decay (radioactive): The decrease in the amount of any radioactive material with the passage of time, due to the spontaneous transformation of an unstable nuclide into a different nuclide or into a different energy state of the same nuclide; the emission of nuclear radiation (alpha, beta, or gamma radiation) is part of the process.

Decibel: A unit of sound measurement. In general, a sound doubles in loudness for every increase of 10 decibels.

Decibel, A-weighted: A unit of weighted sound pressure level measured by the use of a metering characteristic and the "A" weighting specified by the American National Standard Institute (S1.4-1971[R176]).

Decontamination: The removal of radioactive or chemical contamination from facilities, equipment, or soils by washing, heating, chemical or electrochemical action, mechanical cleaning, or other techniques.

Demilitarization: An irreversible modification or destruction of a weapons component or part of a component to the extent required to prevent use in its original weapon purpose.

Depleted uranium: Uranium whose content of the isotope uranium-235 is less than 0.7 percent, which is the uranium-235 content of naturally occurring uranium.

Deposition: In geology, the laying down of potential rock-forming materials; sedimentation. In atmospheric transport, the settling out on ground and building surfaces of atmospheric aerosols and particles ("dry deposition") or their removal from the air to the ground by precipitation ("wet deposition" or "rainout").

Dismantlement: The process of taking apart a nuclear weapon or nuclear weapon component. This process takes place at Pantex Plant.

Dockum Group: Triassic sedimentary rocks that underlie the Ogallala Formation at Pantex Plant. The Dockum Group rocks consist of shale, clayey siltstone, and sandstone.

Dose: The energy imparted to matter by ionizing radiation. The unit of absorbed dose is the rad.

Dose equivalent: The product of absorbed dose in rad (or gray) and the effect of this type of radiation in tissue and a quality factor. Dose equivalent is expressed in units of rem or Sievert, where 1 rem equals 0.01 Sievert. The dose equivalent to an organ, tissue, or the whole body will be that received from the direct exposure plus the 50-year committed dose equivalent received from the radionuclides taken into the body during the year.

Dosimeter: A small device (instrument) carried by a radiation worker that measures cumulative radiation dose (e.g., film badge or ionization chamber).

Drainage basin: An aboveground area that supplies the water to a particular stream.

Drawdown: The height difference between the natural water level in a formation and the reduced water level in the formation caused by the withdrawal of groundwater.

Drinking-water standards: The prescribed level of constituents or characteristics in a drinking water supply that cannot be exceeded legally.

Ecosystem: Living organisms and their nonliving (abiotic) environment functioning together as a community.

Effluent: A gas or fluid discharged into the environment.

Emission standards: Legally enforceable limits on the quantities and/or kinds of air contaminants that can be emitted into the atmosphere.

Environmental Restoration (ER) program: Program at Pantex Plant responsible for investigation and remediation of Solid Waste Management Units (SWMUs).

Eolian: Pertaining to the wind; especially said of such deposits as loess and dune sand, of sedimentary structures such as wind-formed ripple marks, or of erosion and deposition accomplished by the wind.

Ephemeral stream: A stream that flows only after a period of heavy precipitation.

Epicenter: The point on the Earth's surface directly above the focus of an earthquake.

Epidemiology: The science concerned with the study of events that determine and influence the frequency and distribution of disease, injury, and other health-related events and their causes in defined human population.

Equivalent sound (pressure) level (L_{eq}): The equivalent steady sound level that, if continuous during a specified time period, would contain the same total energy as the actual time-varying sound. For example, L_{eq} (1-h) and L_{eq} (24-h) are the 1-hour and 24-hour equivalent sound level, respectively.

Exceedance level: Sometimes used instead of the term "percentile level".

Exposure limit: The level of exposure to a hazardous chemical (set by law or a standard) at which or below which adverse human health effects are not expected to occur: 1) reference dose is the chronic exposure dose (mg/kg/day) for a given hazardous chemical at which or below which adverse human non-cancer health effects are not expected to occur. 2) Reference concentration is the chronic exposure concentration (mg/m^3) for a given hazardous chemical at which or below which adverse human non-cancer health effects are not expected to occur.

Facultative species: Plant species that are more or less equally likely to occur in wetlands or uplands (i.e., a species that is classified as facultative would be found in wetlands from 33 percent and 66 percent of the time). (Symbol used for these plants is FAC).

Fault: A fracture or a zone of fractures within a rock formation along which vertical, horizontal, or transverse slippage has occurred. A normal fault occurs when the hanging wall has been depressed in relation to the footwall. A reverse fault occurs when the hanging wall has been raised in relation to the footwall.

Fissile material: Plutonium-239, uranium-233, uranium-235, or any material containing any of the foregoing.

Floodplain: The lowlands adjoining inland and coastal waters and relatively flat areas, including at a minimum that area inundated by a 1-percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical action floodplain is defined as the 500-year (0.2 percent) floodplain.

H-gear: Short for "Handling Gear". A container-like structure constructed at a metal frame, possibly containing casters. All have provisions for forklift tines or towing. There are many different sizes for different weapons systems. Some H-gear is for fully assembled weapons. This H-gear cradles the weapon around its mid-section

Hazardous material: A material, including a hazardous substance, as defined by 49 CFR 171.8 which poses a risk to health, safety, and property when transported or handled.

Hazardous waste: Defined by 40 CFR Part 261, as any material that (a) is a solid waste and (b) is a listed hazardous waste (Subpart D), or (c) exhibits any of the characteristics of ignitibility, corrosivity, reactivity, or toxicity (Subpart C).

High explosive: Any chemical compound or mechanical mixture which, when subjected to heat, impact, friction, shock, or other suitable initiation stimulus undergoes a very rapid chemical change with the evolution of large volumes of highly heated gases that exert pressure in the surrounding medium. Defined by 40 CFR Part 261.23 as any material that exhibits the characteristic of reactivity.

Highly enriched uranium: Uranium in which the abundance of the isotope uranium-235 is increased well above normal (naturally occurring) levels.

Hydraulic conductivity: A coefficient describing the rate at which water can move through a permeable medium.

Hydrostratigraphic unit: A formation, part of a formation, or a group of formations in which there are similar hydrologic characteristics that allow for a grouping into aquifers and associated confining layers.

Infrastructure: The basic services, facilities and equipment needed for the functioning and growth of an area.

Injection wells: A well that takes water from the surface into the ground, either through gravity of by mechanical means.

Insolation: A word contracted from the phrase incoming solar radiation that refers, in general, to solar radiation received at the earth's surface. Insolation on a horizontal surface is measure in langleys (1 langley = 1 gram calorie per square centimeter).

Interfluvial: Falling in the area between two streams.

Intersite: Transportation activities involving offsite activities.

Invertebrate: Animals characterized by not having a backbone or spinal column, including a wide variety of organisms such as insects, spiders, worms, clams, crayfish, etc.

Intrasite: Transportation activities occurring solely within the boundaries of a facility.

Isolated Occurrence: A grouping of less than ten artifacts or a single undatable feature. These often consists of redeposited material of questionable locational context that are not related to nearby archaeological sites.

Isotope: Nuclei of the same element with different numbers of neutrons are isotopes of the element. For example, oxygen has 3 stable isotopes containing 8, 9, and 10 neutrons.

Kennedy Kit: Container primarily used for onsite transport at tritium reservoirs. It is a light sheet metal briefcase style container measuring 12" x 10" x 8" with a methane foam liner.

Lacustrine: Found or formed in lakes; also, a type of wetland situated on or near a lake.

Lithic: A stone artifact that has been modified or altered by human hands.

Low-Income population: A population that is classified by the U.S. Bureau of the Census as having an aggregated mean income level for a family of four that correlates to $13,359, adjusted through the poverty index using a standard of living percentage change where applicable, and whose composition is at least 25 percent of the total population of a defined area or jurisdiction.

Llano Estacado: Spanish for "staked plain", used to refer to the Southern High Plains in Texas and New Mexico.

Loam: A rich, permeable soil composed of a mixture of clay, silt, sand, and organic matter.

Low-level mixed waste: Waste containing both radionuclides as defined by the *Atomic Energy Act*, and hazardous constituents as defined by 42 U.S.C. 6901 et seq. and 40 CFR 261.

Low-level waste: Waste that contains radioactivity but is not classified as high-level waste, transuranic waste, spent nuclear fuel, or "11e(2) by-product material" as defined by DOE Order 5820.2A, Radioactive Waste Management. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of transuranic waste is less than 100 nanocuries per gram. Some low-level waste is considered classified because of the nature of the generating process and/or constituents, because the waste would tell too much about the process.

Magazine: A warehouse where explosives and ammunition are stored.

Mammal: Animals in the class Mammalia that are distinguished by having self regulating body temperature, hair, and in females, milk-producing mammary glands to feed their young.

Maximum contaminant level: The maximum permissible level of a contaminant in water delivered to any user of a public water system. Maximum contaminant levels are enforceable standards.

Megawatt: A unit of power equal to 1 million watts. Megawatt thermal is commonly used to define heat produced, while megawatt electric defines electricity produced.

Minority Population: A population that is classified by the U.S. Bureau of the Census as African American, Hispanic American, Asian and Pacific American, American Indian, Eskimo, Aleut, and other non-White persons, whose composition is at least 25 percent of the total population of a defined area or jurisdiction.

Meteorology: The science dealing with the atmosphere and its phenomena, especially as relating to weather.

Migration: The natural movement of a material through the air, soil, or groundwater; also, seasonal movement of animals from one area to another.

Mitigation: The alleviation of adverse impacts on cultural resources by avoidance through project redesign or project relocation, by protection, or by adequate scientific study.

National Ambient Air Quality Standards: Air quality standards established by the *Clean Air Act*, as amended. The primary National Ambient Air Quality Standards are intended to protect the public health with an adequate margin of safety, and the secondary National Ambient Air Quality. Standards are intended to protect the public welfare from any known or anticipated adverse effects of a pollutant.

National Emission Standards for Hazardous Air Pollutants: A set of National emission standards for listed hazardous pollutants emitted from specific classes or categories of new and existing sources. These standards were implemented in the *Clean Air Act Amendments of 1977.*

National Pollutant Discharge Elimination System (NPDES) Permit: Federal regulation (40 CFR Parts 122 and 125) that requires permits for the discharge of pollutants from any point source into the waters of the U.S. regulated through the *Clean Water Act*, as amended.

National Register of Historic Places: A list maintained by the Secretary of the Interior of districts, sites, buildings, structures, and objects of prehistoric or historic local, state, or National significance. The list is expanded as authorized by Section 2(b) of the *Historic Sites Act of 1935* (16 U.S.C. 462) and Section 101(a)(1)(A) of the *National Historic Preservation Act of 1966*, as amended.

Native American: A tribe, people, or culture that is indigenous to the U.S.

Noise: Unwanted or undesirable sound, usually characterized as being so loud as to interfere with, or be inappropriate to, normal activities such as communication, sleep, study or recreation. (See background noise.)

Non-criteria pollutant: A pollutant with an effects screening level guideline. Some non-criteria pollutant have a state standard as well.

Nonattainment area: An air quality control region (or portion thereof) in which the Environmental Protection Agency has determined that ambient air concentrations exceed National Ambient Air Quality Standards for one or more criteria pollutants.

Nuclear weapon: Device with a nuclear component that can produce damage to material and injury or death to personnel upon detonation or ignition.

Obligate species: Plant species that almost always occur in wetlands (i.e., greater than 99 percent of the time).

Occupational Safety and Health Administration: Oversees and regulates workplace health and safety, created by the *Occupational Safety and Health Act of 1970.*

Ogallala Formation: Tertiary formation consisting of gravel, sand, silt, and clay. The principal geologic unit in the High Plains aquifer, comprises the Ogallala aquifer in the Texas Panhandle, the primary source of groundwater in the region. The top of the Ogallala Formation in large areas of Texas and New Mexico consists of a resistant caliche layer. The Ogallala Formation at Pantex overlies the Triassic Dockum Group strata and underlies the Quaternary Blackwater Draw Formation.

Offsite: Outside the Pantex Plant Site boundary.

Onsite: Within the Pantex Plant Site boundary.

Ozone: The triatomic form of oxygen; in the stratosphere, ozone protects the Earth from the sun's ultraviolet rays, but in lower levels of the atmosphere ozone is considered an air pollutant.

Paleontology: The study of fossils.

Pattern (Aircraft operations): The path followed by an aircraft in the course of one landing and take-off combination. An open pattern is one in which an aircraft arrives in the airport traffic, lands, takes off and leaves the airport traffic. A closed pattern is one in which an aircraft performs touch-and-go landing and take-off one or more times, as in training flights.

Perched aquifer: Groundwater separated from the underlying main body of groundwater, or aquifer, by unsaturated rock.

Peripheral zone: The zone surrounding the playas which is just higher in elevation than the playa floor.

Permeability: The ability of rock or soil to transmit a fluid.

Permian: The last period of the Paleozoic era (after the Pennsylvanian) thought to have covered the span of time between 280 and 225 million years ago; also, the corresponding system of rocks. It is named after the province of Perm, Russia, where rocks of this age were first studied.

Person-rem: The unit of collective radiation dose commitment to a given population; the sum of the individual doses received by a population segment.

Pit: An assembly at the center of a nuclear device containing a sub-critical mass of fissionable material.

Playa: A term used in the southwestern U.S. for a dry, barren area in the lowest part of an undrained desert basin, underlain by clay, silt, or sand, and commonly by soluble salts. It may be marked by an ephemeral lake.

Plume: The elongated pattern of contaminated air or water originating at a point source, such as a smokestack or a hazardous waste disposal site.

Plutonium: A heavy, radioactive, metallic element with the atomic number 94. It is produced artificially in a reactor by bombardment of uranium which neutrons and is used in the production of nuclear weapons.

Pollution prevention: Involves recycling or reduction of any hazardous substance, pollutant, or contaminate before generation.

Potable: Suitable for drinking.

Potentiometric surface: An imaginary surface defined by the level that water will rise to in a tightly-cased well.

Prehistoric: Of, relating to, or existing in times antedating written history. Prehistoric cultural resources are those that antedate written records of the human cultures that produced them.

Programmatic Agreement: A proposed document outlining specific plans for the interim management of cultural resources at Pantex Plant until a comprehensive, long-term Cultural Resource Management Plan is implemented. The parties to the agreement will be the U.S. Department of Energy, the President's Advisory Council on Historic Preservation, and the Texas State Historic Preservation Office.

Pullman soil series: Silty clay loams; soils found in the interplaya areas at Pantex Plant.

Quaternary: The second period of the Cenozoic era, following the Tertiary; also, the corresponding system of rocks. It began two to three Ma and extends to the present. It consists of two epochs, the Pleistocene and the Holocene.

Radiation: The emitted particles or photons from the nuclei of radioactive atoms. Some elements are naturally radioactive; others are induced to become radioactive by bombardment in a reactor. Naturally occurring radiation is indistinguishable from induced radiation.

Radioactive: The state of emitting radiation energy in forms of waves (rays) or particles.

Radioactive waste: Materials from nuclear operations that are radioactive or are contaminated with radioactive materials, and for which use, reuse, or recovery are impractical.

Radioactivity: The spontaneous decay or disintegration of unstable atomic nuclei, accompanied by the emission of radiation.

Radioisotopic Thermoelectric Generators: A small, self-contained, sealed source of thermally produced electricity that is used in the assembly and dissambly of nuclear weapon system.

Radon: A heavy gaseous, radioactive element with a half life of about 4 days.

Randall soil series: Clay soils present in the playa bottoms at Pantex Plant.

Raptor: Birds of prey including various types of hawks, falcons, eagles, vultures, and owls.

Rem: The quantity of absorbed ionizing radiation that has the same biological effect as 1 roentgen of high voltage x-ray radiation.

Remediation: The process, or a phase in the process, of rendering radioactive, hazardous, or low-level mixed waste environmentally safe, whether through processing, entombment, or other methods.

Residual sound: At a specified time, the all-encompassing sound, being usually a composite of sound from many sources at many directions, near and far, remaining at a given position in a given situation when all uniquely identifiable discrete sound sources are eliminated, rendered insignificant, or otherwise not included. Residual sound may be approximated by the percentile sound level exceeded during 90–95 percent of the measurement period.

Risk: A quantitative or qualitative expression of possible loss that considers both the probability that a hazard will cause harm and the consequences of that event.

Risk assessment (chemical or radiological): The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific chemical or radiological pollutants.

Safety Analysis Report: A safety document providing a concise but complete description and safety evaluation of a site, design, normal and emergency operation, potential accidents, predicted consequences of such accidents, and the means proposed to prevent such accidents or mitigate their consequences. A safety analysis report is designated as final when it is based on final design information. Otherwise, it is designated as preliminary.

Safe Secure Tractor Trailer (SST): A specially designed trailer for transporting nuclear weapons or nuclear weapon components.

Sanitization: A process of destroying or removing classified or other controlled matter, as defined by the *Atomic Energy Act*.

Saturated zone: The zone in which the voids in the rock or soil are filled with water at a pressure greater than atmospheric pressure. The water table is the top of the saturated zone in an unconfined aquifer.

Sedimentation: The process of deposition of sediment, especially by mechanical means from a state of suspension in water.

Seismic: Pertaining to any earth vibration, especially an earthquake.

Seismic zone: An area defined by the Uniform Building Code (1991), designating the amount of damage to be expected as the result of earthquakes. The U.S. is divided into six zones: (1) Zone 0—no damage; (2) Zone 1—minor damage; corresponds to intensities V and VI of the modified Mercalli intensity scale; (3) Zone 2A—moderate damage; corresponds to intensity VII of the modified Mercalli intensity scale (Eastern U.S.); (4) Zone 2B—slightly more damage than 2A (Western U.S.); (5) Zone 3—major damage; corresponds to intensity VII and higher of the modified Mercalli intensity scale; and (6) Zone 4—areas within Zone 3 determined by proximity to certain major fault systems.

Seismicity: The tendency for the occurrence of earthquakes.

Socioeconomics: The social and economic condition in the study area.

Solid Waste Management Unit: Any unit from which hazardous constituents may migrate, as defined by the *Resource Conservation and Recovery Act.* A designated area that is or is suspected to be the source of a release of hazardous material into the environment that will require investigation and/or corrective action.

Sound level: Ten times the common logarithm of the square of the ratio of the frequency-weighted (and time-averaged) sound pressure to the reference sound pressure of 20 micropascals. Measured in decibel (dB). (See sound pressure.)

Sound pressure: Root mean square of the instantaneous sound pressures in a stated frequency band and during a specified time interval, unless another time-averaging process is indicated. Measured in Pascals (Pa). Instantaneous sound pressure is the total instantaneous pressure in a stated frequency band at a point in the presence of a sound wave minus the atmospheric static pressure at that point.

Sound receptor: A location, activity, person, or animal that is exposed, or potentially exposed, to acoustic energy.

Staging: Holding or storing an item temporarily between process steps.

Stratigraphic: Of, relating to, or determined by stratigraphy; the superposition of layers (soil, rock, and other materials) often observed at archaeological sites.

Stratigraphy: Division of geology dealing with the definition and description of rocks and soils, especially sedimentary rocks.

Threatened or Endangered species: Animals, birds, fish, plants, or other living organisms threatened with extinction by man-made or natural changes in their environment. Requirements for declaring species endangered are contained in the *Endangered Species Act of 1973*.

Threshold limit values: The recommended concentrations of contaminants workers may be exposed to according to the American Council of Governmental Industrial Hygienists.

Transmissivity: A measure of a water-bearing unit's capacity to transmit fluid: the product of the thickness and the average hydraulic conductivity of a unit. Also, the rate at which water is transmitted through a strip of an aquifer of a unit width under a unit hydraulic gradient at a prevailing temperature and pressure.

Transuranic (TRU) waste: Waste, without regard to source or form, that is contaminated with alpha-emitting radionuclides of atomic number greater than 92 (uranium) and with half-lives greater than 20 years in concentrations greater than 100m nanocuries per gram.

Treatment, storage, and disposal facility: Any facility that has been permitted by Federal and state regulations to treat, store, or dispose of hazardous waste.

Traditional Cultural Property/Use Area: Areas of significance to the beliefs, customs, and practices of a community of people that have been passed down through generations.

Tritium: A radioactive isotope of the element hydrogen with two neutrons and one proton. Common symbols for the isotope are H–3 and T.

Vertebrate: Animals that are members of the subphylum Vertebrata, including the fishes, amphibians, reptiles, birds, and mammals, all of which are characterized by having a segmented bony or cartilaginous spinal column.

Waste acceptance criteria: Requirements established by treatment, storage, and disposal facilities for the acceptance of waste into the facility.

Waste generator: Any individual or group of individuals that generate radioactive, mixed, hazardous, or other types of wastes at Pantex Plant.

Waste Minimization: Refers to a practice that reduces the environmental or health hazards associated with hazardous wastes, pollutants, or contaminants after generation.

Water Table: Water under the surface of the ground occurs in two zones, an upper unsaturated zone and the deeper saturated zone. The boundary between the two zones is the water table.

Weapon Component: An item in a nuclear weapon that can be either an assembly or individual subset of an assembly. Component can be used interchangeably with "part" or "assembly".

Wetland: Land or areas exhibiting hydric soil concentrations, saturated or inundated soil during some portion of the year, and plant species tolerant of such conditions.

CHAPTER 11

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CHAPTER 11
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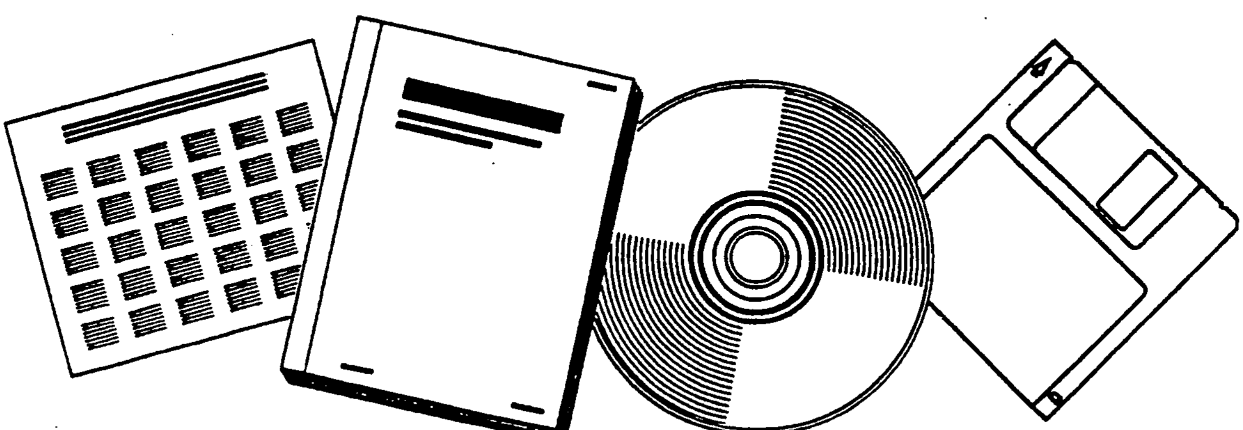
FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPON COMPONENTS: VOLUME 2, APPENDIXES

USDOE, WASHINGTON, DC (UNITED STATES)

NOV 1996



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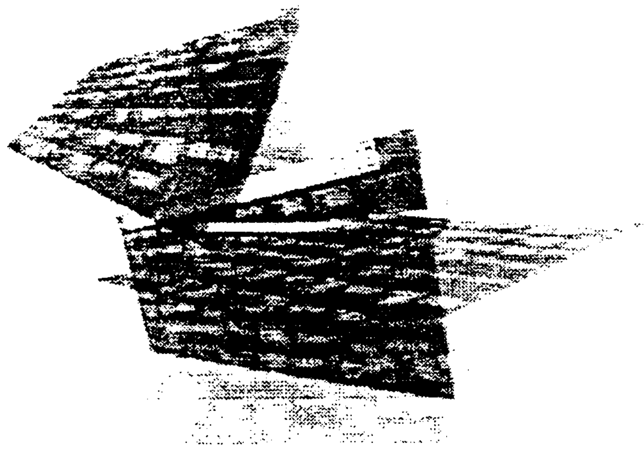

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Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components

Volume II–Appendixes

U.S. Department of Energy
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Washington, DC 20585

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Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components

Volume II–Appendixes

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November 1996

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LIST OF ACRONYMS AND ABBREVIATIONS

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ACRONYMS AND ABBREVIATIONS

ADROIT	Analysis of Dispersal Risk Occurring in Transportation
AGV	Automated Guided Vehicle
AL	Albuquerque Operations Office
ALARA	As Low as Reasonably Achievable
AOC	Area of Concern
AQCR	Air Quality Control Region
ASER	Annual Site Environmental Report
AT&SF RR	Atchison, Topeka and Santa Fe Railroad
BG	Burning Ground
BGU	Burning Ground Upgrade
BNA	Block Numbering Area
BN&SF RR	Burlington Northern and Santa Fe Railroad
BOD	Biological Oxygen Demand
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAMS	Continuous Air Monitoring Systems
CDP	Census Designated Place
CDR	Conceptual Design Report
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant(s) of Concern
COD	Chemical Oxygen Demand
COE	U.S. Army Corps of Engineers
COPC	Contaminant(s) of Potential Concern
CRM	Cultural Resource Management
CRMP	Cultural Resource Management Plan
CSA	Canned Subassembly
CWA	Clean Water Act
CY	Calendar Year
DAF	Device Assembly Facility
DCG	Derived Concentration Guidelines
D&D	Decontamination and Decommissioning
DNL	Day-Night Average Sound Level
DOC	Department of Commerce

DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
DOT	Department of Transportation
DPTRA	Defense Programs Transportation Risk Analysis
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ER	Environmental Restoration
ERAD	Explosive Release Atmospheric Dispersion
ERPG	Emergency Response Planning Guidelines
ES&H	Environment, Safety, and Health
ESL	Effects Screening Level
FAA	Federal Aviation Administration
FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Act
FM	Farm-to-Market Road
FMEF	Fuels and Materials Examination Facility
FPPA	Farmland Protection Policy Act
FWS	Fish and Wildlife Service
FY	Fiscal Year
Ga	Gauge
GAd	Gross Alpha—dissolved
GAs	Gross Alpha—suspended
GBd	Gross Beta—dissolved
GBs	Gross Beta—suspended
GPS	Global Positioning System
HAP	Hazardous Air Pollutant
HE	High Explosive
HEPA	High Efficiency Particulate Air
H-Gear	Weapons-Specific Handling Gear
HVAC	heating, ventilation, and air conditioning
HLW	High-Level Waste
HPCAF	Health Physics Calibration and Acceptance Facility
HW	Hazardous Waste
HWTPF	Hazardous Waste Treatment and Processing Facility
ICM	Interim Corrective Measure

IHE	Insensitive High Explosive
ILS	Instrument Landing System
IO	Isolated Occurrence
ISC	Industrial Source Complex
ISCLT2	Industrial Source Complex Long Term, Version 2
ISCST2	Industrial Source Complex Short Term, Version 2
JTA	Joint Test Assembly
KAFB	Kirtland Air Force Base
LANL	Los Alamos National Laboratory
LCF	Latent Cancer Fatality
LDR	Land Disposal Restrictions
L_{eq}	Equivalent Sound Level
LLNL	Lawrence Livermore National Laboratory
LLMW	Low-Level Mixed Waste
LLW	Low-Level Radioactive Waste
LWR	Light Water Reactor
MACCS	Melcor Accident Consequence Code System
MACT	Maximum Achievable Control Technology
MCAF	Materials Compatibility Assurance Facility
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MEOI	Maximally Exposed Offsite Individual
MOBILE 5a	Mobile Source Emission Factor Model, Version 5a
MOU	Memorandum of Understanding
MR	Modified Richmond
MSA	Metropolitan Statistical Area
MTU	Mobile Treatment Unit
NAAQS	National Ambient Air Quality Standards
NDEF	Nondestructive Evaluation Facility
NDRC	National Defense Research Committee
NE	Northeast
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFA	No Further Action
NHPA	National Historic Preservation Act
NHW	Nonhazardous Waste
NIOSH	National Institute for Occupational Safety and Health

NLR	Noise Level Reduction
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NTS	Nevada Test Site
NW	Northwest
OB/OD	Open Burning/Open Detonation
O&I	Operations & Inspection
OMB	Office of Management and Budget
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
OSTP	Old Sewage Treatment Plant
OU	Operable Unit
PA	Programmatic Agreement
PBX	Plastic Bonded Explosives
PEIS	Progammatic Environmental Impact Statement
PIDAS	Perimeter Intrusion Detection and Alarm System
PL	Public Law
PPOA	Pollution Prevention Opportunity Assessment
PP/WM	Pollution Prevention/Waste Minimization
PRG	Preliminary Remediation Goal
PQL	Practical Quantification Limit
PSD	Prevention of Significant Deterioration
RAMS	Radar Aircraft Monitoring System
RBC	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROD	Record of Decision
ROI	Region of Influence
RRS	Risk Reduction Standard
RTG	Radioisotopic Thermoelectric Generator
SAC	Steel Arch Construction
SAR	Safety Analysis Report
SARA	Superfund Amendments and Reauthorization Act
SCDHEC	South Carolina Department of Health and Environmental Control

SDWA	Safe Drinking Water Act
SF	Slope Factor
SHPO	State Historic Preservation Office
SNL	Sandia National Laboratories
SNM	Special Nuclear Material
SPF	Standard Project Flood
SRS	Savannah River Site
SST	Safe Secure Tractor Trailer
STAR	Stability Array
STP	Site Treatment Plan
SVOC	Semivolatile Organic Compound
SWDA	Solid Waste Disposal Act
SWMU	Solid Waste Management Unit
T&E	Threatened and Endangered
TAC	Texas Administrative Code
TACB	Texas Air Control Board
TBEG	Texas Bureau of Economic Geology
TDS	Total Dissolved Solids
TNRCC	Texas Natural Resources Conservation Commission
TOX	Total Organic Halogen
TRU	Transuranic
TSCA	Toxic Substances Control Act
TSD	Transportation Safeguards Division
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TTU	Texas Tech University
UST	Underground Storage Tank
U.S.	United States
U.S.C.	United States Code
UTL	Upper Tolerance Limit
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
VORTAC	Very High Frequency Omni-Directional Radio Range with Tactical Air Navigation
WAC	Waste Acceptance Criteria
WSA	Weapons Storage Area
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

CHEMICALS AND UNITS OF MEASURE

BGY	billion gallons per year
°C	degrees Celsius
Ci	Curie
CCl_4	carbon tetrachloride
CO	carbon monoxide
CFC	chlorofluorocarbons
CFC-12	dichlorodifluoromethane
CFC-113	trichlorotrifluoroethane
cm	centimeter
D	deuterium
d	day
dB	decibel
dBA	decibel A-weighted scale
dBC	decibel C-weighted scale
DCE	1, 2-dichloroethylene
DDT	dichlorodiphenyltrichloroethane
DU	depleted uranium
°F	degrees Fahrenheit
ft	feet
ft^2	square feet
ft^3	cubic feet
ft^3/s	cubic feet per second
g	gram
gal	gallon
gpd	gallons per day
g/sec	gram per second
HCFC-22	chlorodifluoromethane
HCl	hydrochloric acid
HEU	highly enriched uranium
HF	hydrogen fluoride
HMX	high melt explosive
hr	hour
Hz	Hertz
in	inch

K	kelvin
kg	kilogram
km	kilometer
km^2	square kilometers
km/hr	kilometers per hour
kV	kilovolt
kVA	kilovoltampere
kW	kilowatt
kWh	kilowatt hour
lb	pound
lb/hr	pounds per hour
lb/yr	pounds per year
L	Liter
Li	lithium
LX	press-moldable HMX
M	million
m	meter
m^2	square meters
m^3	cubic meters
mCi	millicurie (one-thousandth of a Curie)
mCi/g	millicurie per gram
mCi/ml	millicurie per milliliter
mg	milligram (one-thousandth of a gram)
mg/L	milligram per liter
MGD	million gallons per day
MGY	million gallons per year
mi	miles
ml	milliliter
MOX	mixed oxide
mph	miles per hour
mrem	millirem (one-thousandth of a rem)
mrem/yr	millirem per year
m/sec	meters per second
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatthour

MWt	megawatt thermal
N	nitrogen
nCi	nanocurie (one-billionth of a Curie)
nCi/g	nanocuries per gram
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
O_3	ozone
P	phosphorous
Pb	lead
PBX	plastic-bonded explosives
PCB	polychlorinated biphenyl
pCi	picocurie (one-trillionth of a Curie)
pCi/g	picocuries per gram
pCi/L	picocuries per liter
PETN	pentaerythritoltetranitrate
pH	hydrogen-ion concentration
PM_{10}	particulate matter of aerodynamic diameter less than 10 micrometers
ppb	parts per billion
ppbv	parts per billion by volume
ppm	parts per million
psi	pounds per square inch
Pu	plutonium
qtr	quarter
RBC	risk based concentrations
RDX	research development explosive
rem	roentgen equivalent man
sec	second
SO_2	sulfur dioxide
SO_x	sulfur oxides
sq	square
T	tritium
TATB	triaminotrinitrobenzene
TCA	1, 1, 1-trichloroethane
TCE	trichloroethene
TNB	trinitrobenzene
TNT	trinitrotoluene

TOC	total organic compounds
TOX	total organic halogen
U	uranium
yd^3	cubic yards
yr	year
µCi	microcurie (one-millionth of a Curie)
µCi/g	microcuries per gram
µg	microgram (one-millionth of a gram)
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter
µm	micron or micrometer (one-millionth of a meter)
µmhos/cm	microhms per centimeter

APPENDIX A

Methodology

APPENDIX A
METHODOLOGY

Introduction

The environmental impact assessment methodologies discussed in this section address the full range of natural and human resources and issue areas pertinent to the continued operations at Pantex Plant. These methodologies are also applicable to the analysis of candidate sites considered for the potential interim storage of pits, as described in chapter 5 of this EIS.

Plant Facilities and Infrastructure

Changes to plant facilities and infrastructure are assessed by comparing the support requirements resulting from the changes in the activity levels at Pantex Plant to projected site infrastructure capacities. These assessments focus on transportation and infrastructure and utilities (including water, wastewater treatment, electricity, and natural gas). Projections of site development plans are used to project site infrastructure conditions. Tables are presented that depict the changes in infrastructure. Where needed, requirements generated by the Proposed Action and Alternatives and mitigation considerations are identified that could reduce impacts due to changes in infrastructure on a site-by-site basis.

Land Resources

Land use changes associated with the changes in the activity levels at Pantex Plant could occur on both the plant site and the surrounding region, and could affect both developed and undeveloped land. The analysis of land use also considers impacts that could result from the activities related to the environmental restoration program and modification of existing facilities or the construction of new facilities on Pantex Plant Site.

The degree to which the alternatives affect future use or development of land at Pantex Plant Site are considered. Land use impacts are assessed based on the extent and type of land that would be affected. The land use analysis also considers potential direct impacts resulting from the incompatibility of land use changes with special-status lands, such as prime and unique farmlands.

Geology and Soils

Geology. Impacts to the geological environment could occur from destruction of or damage to unique geological features and subsidence caused by groundwater withdrawal. The local geology that could affect Pantex Plant operations, including geomorphology, stratigraphy, structural attitude of rocks, and faults and seismicity, are described. The locations of capable faults are identified and an overview of the seismicity of Pantex Plant Site, including the history and significance of earthquakes, along with their intensity and ground acceleration, is presented.

Soils. Soil types at Pantex Plant Site are described. Analysis is provided qualitatively to summarize the potential contaminants of concern in soils at Pantex Plant Site. The analysis describes the potential for contaminating soils and sediments from changing activity levels at Pantex Plant and activities related to the environmental restoration.

Water Resources

The quality and quantity of surface water and groundwater resources are described using available data. Potential effects on surface water and groundwater availability and quality are assessed.

Surface Water. Local surface water resources in the Pantex Plant region and their flow characteristics and relationships are used to describe current conditions. Data used for surface water impact assessments include rates of wastewater discharge from Pantex Plant operations.

The water quality of potentially affected surface water and groundwater is determined by reviewing current monitoring data. Focus is given to parameters that exceed applicable water quality criteria. Surface water quality data and effluent discharge data are compared to U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) permit and TNRCC Wastewater Discharge Permit limits and requirements for Pantex Plant. The performance of Pantex Plant in complying with the permit requirements is presented. The assessment of water quality impacts from wastewater (sanitary and process) and stormwater runoff qualitatively addresses potential impacts to the receiving waters' minimum or average flow, as available and appropriate.

Floodplains are identified to determine whether any of the continuing or proposed operations or facilities are located within a floodplain.

Groundwater. Groundwater resources are analyzed for effects on aquifers, groundwater usage, and groundwater quality within the Pantex Plant Region of Influence (ROI). The affected environment discussion includes a description of the potentially affected hydrogeologic units. The local aquifers are described in terms of the extent, thicknesses, geologic formations, hydraulic properties, and quality of the groundwater. Groundwater recharge areas are also noted. Total baseline groundwater use at the facility is compiled using the best available data.

Available data on existing groundwater quality conditions are compared to Federal and State groundwater quality standards and DOE-derived concentration guidelines for radionuclides and risk reduction standards. Impacts of groundwater withdrawals from activity levels at Pantex Plant are assessed. Impacts are assessed by the degree to which groundwater quality, drawdown of groundwater levels, and groundwater availability to other users would be affected. Impacts on groundwater quality are based on current and anticipated wastewater discharge rates and applicable permit requirements.

Air Quality

Potential effects on the environment associated with air pollutant emissions from normal operations are evaluated for the current activity levels at Pantex Plant. This is assumed to be equivalent to handling 2,000 weapons per year and includes Burning Ground Upgrade operations. The assessment of air quality impacts includes identification of applicable criteria for assessing impacts, the development of emission inventories, and the estimation of air pollutant concentrations.

The assessment of potential impacts to air quality is based on comparison of effects of the Proposed Action and Alternatives with applicable local, State, or National Ambient Air Quality Standards or the potential exceedance of Prevention of Significant Deterioration increments for PM_{10} (particulate matter of aerodynamic diameter less than 10 micrometers), sulfur dioxide, or nitrogen dioxide.

Assessment criteria for pollutants include the EPA primary and secondary ambient air quality standards for criteria pollutants and those established by the State of Texas. The more stringent of either the EPA or State standards serve as the assessment criteria. The assessment criteria for toxic pollutants include guidelines or standards adopted or proposed by the State of Texas.

Ambient air monitoring data are used to determine maximum background concentrations of pollutants for Pantex Plant Site. Baseline concentrations of pollutants are calculated by modeling site emissions during the baseline year. The baseline concentrations are a conservative estimate of pollutant concentrations at Pantex Plant Site during a period considered representative of recent site activity.

Changes in concentrations of pollutants from the changing activity levels at Pantex Plant are calculated by modeling projected site emissions on an annual basis. Those concentrations are then compared to applicable Federal and State standards for air pollutants to provide an estimate of the potential effects on air quality.

.Modeling of site-specific emissions (using the EPA-recommended Industrial Source Complex Short–Term [ISCST2] Model and Long–Term [ISCLT2] Model) was performed in accordance with EPA's *Guideline on Air Quality Models* (EPA–450/2–78–027R).

Major source criteria and hazardous air pollutant emissions were modeled using actual source locations and stack parameters to determine environmental baseline and criteria pollutant concentrations. Onsite and/or representative National Weather Service meteorological data are used to define the dispersion characteristics of the site.

Acoustics

Acoustic impacts are assessed on the basis of potential degree of change in noise levels at sensitive receptors near the Pantex Plant Site boundary with respect to ambient conditions. The analysis uses available information on the potential types of noise sources and the location of Pantex Plant facilities relative to the site boundary and noise-sensitive locations. The potential for exposure of workers to noise and the measures taken to protect worker hearing are included. Quantitative analysis of blast noise from high explosives detonations is provided using an airblast prediction model called BLASTO.

Biotic Resources

Potential impacts to biotic resources are addressed for the following categories: terrestrial resources, wetlands, aquatic resources, and threatened and endangered species. Changing activity levels at Pantex Plant may affect biotic resources as a result of changes in land use and human disturbance and noise. In general, the potential impacts are assessed based on the degree to which various habitats or species could be affected by the changing activity levels at Pantex Plant. Where appropriate, impacts are evaluated with respect to Federal and State protection regulations and standards.

Terrestrial Resources. Potential impacts to terrestrial resources include loss and disturbance of plant and wildlife habitats. The loss of important or sensitive habitats is considered more important than the loss of a regionally abundant type. Impacts to wildlife are based to a large extent on plant community loss, which is closely associated with animal habitat. The disturbance, displacement, or loss of wildlife was also evaluated in accordance with wildlife protection laws such as the *Migratory Bird Treaty Act* and *Bald and Golden Eagle Protection Act.*

Very small concentrations of radionuclides are released to the atmosphere during operations at Pantex Plant. Results of biouptake of radionuclide levels have been identified from monitoring data.

Wetlands. Most impacts from continued operations at Pantex Plant are related to discharge of contaminants to the playas. Other impacts could potentially occur from construction activities conducted outside of wetland areas. No direct loss of wetlands resulting from construction and operation is expected at Pantex Plant Site. Impacts resulting from changing levels of flows are evaluated based on a comparison of expected discharge rates with present stream flow rates.

Aquatic Resources. Aquatic resources could be impacted as a result of sedimentation, increased flows, effluent discharge, and the introduction of thermal or chemical effluents and radionuclides.

Threatened and Endangered Species. Impacts to threatened and endangered species of wildlife and plants, including critical habitat, State-listed species, and species proposed for listing, are determined. A list of species potentially present on Pantex Plant Site is developed using information obtained from the U.S. Fish and Wildlife Service and appropriate State agencies. Impacts are determined in a manner similar to that described for terrestrial and aquatic resources because the sources of potential impacts are similar.

Cultural and Paleontological Resources

Cultural and paleontological resources include prehistoric, historic, World War II, Cold War, Native American, and paleontological resources.

Prehistoric Resources. The affected environment section for prehistoric resources includes a brief overview of the number and types of prehistoric sites at Pantex Plant Site and their status on both the National Register of Historic Places (NRHP) and appropriate State registers. The overview consists of a summary of existing information about prehistoric resources within the site boundary and a discussion of types of sites that are likely to occur.

Impact assessments for prehistoric resources focus mainly on those properties likely to be eligible for the NRHP. Impacts are assessed by considering whether the Proposed Action and Alternatives could substantially add to existing disturbance of resources in the project areas, adversely affect NRHP-eligible resources, or cause loss of or destruction to important prehistoric resources.

Historic, World War II, and Cold War Resources. The affected environment section for historic resources includes a brief overview, the number and types of historic sites at Pantex Plant Site and their status on both the NRHP and appropriate State registers. Impact assessments for historic resources focus mainly on those properties likely to be eligible for the NRHP.

Native American Resources. Native American concerns have been identified through direct consultation with tribal representatives. Impacts to Native American resources are assessed by considering whether the continued operations at Pantex Plant have the potential to affect sites important for their position in the Native American physical universe or belief system.

Paleontological Resources. The affected environment section for paleontological resources includes a description of known paleontological localities and geological formations at Pantex Plant Site that may be fossil bearing. Impact assessments for paleontological resources are based on the numbers and kinds of resources that could be affected as well as the quality of fossil preservation in a given deposit, particularly in deposits with high research potential.

Socioeconomics

This section describes and assesses impacts on local and regional socioeconomic conditions and factors, including population, employment, and income. This EIS assesses the socioeconomic impacts of both changing levels of activity and potential loss of mission at Pantex Plant. Geographically, the potential for socioeconomic effects is greatest in those local jurisdictions that are the residential locations of the majority of Pantex Plant employees. An

ROI, comprised of those local jurisdictions likely to experience the greatest socioeconomic impacts, is defined for Pantex Plant. The evaluation of impacts is based on the degree to which changes in employment and population affect the local economy on an annual basis. The following sections discuss each of the socioeconomic conditions and factors considered.

Employment. The changing level of activities at Pantex Plant would affect employment at the plant. Changes in plant employment would, in turn, directly affect local and regional populations and income. Current employment at Pantex Plant is described as well as projected employment associated with changing levels of activity at the plant. Emphasis is placed on evaluating total direct and indirect employment changes and impacts associated with potential mission relocations.

Income. The regional economy surrounding Pantex Plant is characterized. Emphasis is placed on the measurement of the relative contribution and importance of Pantex Plant's employment payroll and purchases to the economy. Changes to local economic conditions are evaluated based on the changing activity levels at Pantex Plant.

Population. The demographic changes in the region surrounding Pantex Plant are described and assessed. Demographic characteristics are presented for the ROI to support the assessment of socioeconomic impacts. Cumulative population impacts include the population impacts of other DOE actions under consideration.

Intrasite Transportation

The focus of this analysis is on the intrasite transfer and handling of hazardous materials at Pantex Plant. The impact analysis emphasizes the radiological effects from the transportation of radioactive materials. This focus is consistent with *National Environmental Policy Act* guidance and requirements as follows:

- The performance of Pantex Plant-type operations does not require or produce risk-significant quantities in regards to transportation of nonradioactive hazardous materials; therefore, transportation activities involving hazardous materials are small-scale operations that do not have the potential of causing significant damage to the human environment.
- The radiological hazard, not chemical toxicity, is the dominant risk from Pantex Plant-related transportation activities.

The affected environment includes the discussion of frequency and type of movement of materials within the plant boundaries and handling and packaging of materials onsite.

Accidents involving the transportation and handling of radioactive and hazardous material have the potential to lead to human fatalities, excess cancer fatalities, and serious environmental contamination. Normal transport may expose personnel to ionizing radiation. Impact analysis is conducted using Pantex Plant historical records and Safety Analysis Reports. Radiological exposures and excess cancer fatalities are calculated for the workers handling the materials. Impacts to the public outside the Pantex Plant boundaries are not expected from intrasite transfer and handling of radioactive materials.

Waste Management

Wastes generated during the operation of Pantex Plant facilities consist of four primary types: low-level radioactive waste (LLW), low-level mixed waste (LLMW), hazardous waste (HW), and nonhazardous waste.

Pantex Plant provides for the short-term management and onsite storage of wastes, including the means to minimize waste generation, until DOE either disposes of the wastes or places them in long-term storage. To provide a framework for addressing the impacts of waste management for continued operations at Pantex Plant, descriptive information is presented on waste management activities. The volumes of each waste type generated are estimated. These estimates, obtained from the plant, include consideration of concepts for waste minimization. The impact assessment addresses the waste types and waste volumes projected to be generated from the changing activity levels at Pantex Plant. Impacts are assessed in the context of site practices for treatment, storage, and disposal plus the applicable regulatory requirements.

Human Health

Pantex Plant uses a broad variety of processes involving both radioactive and chemical materials that can be hazardous to people who are exposed to them. The degree of hazard is directly related to the types and quantity of the particular radioactive or chemical material to which the person may be exposed. The health effects are determined for the operations at Pantex Plant by identifying the types and quantities of material to which one is exposed, estimating exposures, and calculating the resultant health effects.

The impacts on human health for workers and the public during normal operations and postulated accidents for the various alternatives are assessed. Computer codes are used to simulate the impacts on the health of workers and the public due to normal operations and postulated accidents. These computer codes include: the Melcor Accident Consequence Code System (MACCS) for airborne and liquid radioactive releases where no explosives were involved; and the Explosive Release Atmospheric Dispersion (ERAD) computer code where explosives were involved. Atmospheric dispersion modeling using the ISCST2 Model performed for the air quality analysis is also used in the evaluation of impacts to workers from radiological and hazardous chemicals.

Health Impacts on Plant Workers During Normal Operation. Because radiation workers are individually monitored, experience from past and current operations that are similar to future operations are used to estimate the radiological health impacts to workers. Health impacts from chemicals are discussed qualitatively. Chemical concentrations onsite are compared to published threshold limit values for chemical substances to determine potential human health impacts.

General Health Impacts on the Public During Normal Operation. Public health impacts could result from exposure to radioactive or hazardous chemical materials released during plant operations. The effect is the sum of internal exposure resulting from breathing air, eating food, drinking water, and of external exposure from standing on contaminated ground and being exposed to the air.

Modeling is used to estimate the type and amount of material released and the associated radiological and chemical doses. These doses are converted to health effects using appropriate health risk estimators.

Accident Analysis for Postulated Accident Scenarios. The relative consequences of postulated accidents in the evaluation of each alternative are considered. For the purpose of this assessment, risk is defined as the mathematical product of the probability and consequences of an accident. The specific accidents consider the types and location of facilities. Examples of accidents include those resulting from operator errors, spills, criticality, fire, explosions, common-cause failures, collocated facilities, severe weather, and earthquakes. Transportation and aircraft crash risks are described separately in this EIS.

A risk screening methodology was used to determine the accident scenarios that resulted in the highest combination of frequency and consequence. In all cases, public risk is dominated by the release and dispersion of radionuclides. In those scenarios that involved an explosion, the ERAD computer code was used to model the dispersion and resulting exposure to workers and the public. For nonexplosive scenarios, the MACCS code was used. Results from the computer modeling are radiological doses to the worker and the public. Worker risk is dominated by explosions without an accompanying release of radionuclides (i.e., the greatest risk to the worker is due to high explosive development, manufacture, and testing activities).

In summary, the radiological and hazardous chemical impact estimates presented in this document were obtained by:

- Using the best available data.
- Using state-of-the-art computational tools.
- Considering the processes, events, and accidents that are reasonably foreseeable for Pantex Plant operations.
- Making conservative assumptions when there is doubt about the exact nature of the processes and events taking place.

Aircraft Accidents

A unique and controversial scenario in the accident risk impact assessment is the potential for an aircraft-induced hazardous material dispersal accident. The likelihood and consequence of this accident scenario have been studied extensively since the start of nuclear explosive operations at Pantex Plant, and these studies continue to this day.

At Pantex Plant, data from a Radar Airspace Monitoring System (RAMS) have been utilized to determine the amount, type, and frequency of aircraft movement in proximity to Pantex Plant. The latest DOE Standard methodology (DOE 1996g) is utilized to estimate the likelihood of an aircraft impacting a Pantex Plant facility containing nuclear materials and causing a release (see appendix E). The estimated change in risk, both from the increased storage of components in Zone 4 and from any predicted changes in aircraft operations in proximity to Pantex Plant identified by the Overflight Working Group and committed to by DOE and the Federal Aviation Administration, is discussed.

Human health risks from aircraft-induced radiological releases are assessed using MACCS. The consequence assessment uses such site-dependent factors as meteorology, population distributions, and onsite facility location. The resulting doses are converted to a predicted number of excess cancer fatalities. Air dispersion of radionuclides following an accidental release not explosively initiated is modeled using MACCS, and air dispersion of radionuclides following an accidental release explosively initiated is modeled using the ERAD computer code package.

Intersite Transportation

The intersite transportation assessment focuses primarily on the transport of radioactive material. A transportation baseline, using historical and projected shipment information, is established for evaluating potential environmental impacts. The packaging required for the shipment of pits is described. Risks are calculated for transporting pits and other nuclear weapon components.

The potential environmental impacts of transporting pits and other nuclear weapon components are determined using existing health and accident risk data. For evaluating risk, the following elements are considered: transport mode, weight of material, curies, proximity dose rates (transport index), type of package, number of shipments, and distance.

The Analysis of Dispersal Risk Occurring in Transportation (ADROIT) code is used to evaluate the accident risk posed by the expected transfers of weapons, plutonium, weapons components, and tritium reservoirs. Developed by Sandia National Laboratories for the Defense Programs Transportation Risk Analysis study, the ADROIT code has unique abilities to evaluate the transportation risk from defense program material. This includes the ability to place ERAD data sets within the code for modeling explosively driven events.

Environmental Justice

The potential for disproportionately high and adverse human health or environmental effects on minority and low income populations are evaluated in accordance with Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low Income Populations*. The environmental justice analysis addresses selected demographic characteristics of the Pantex Plant ROI, defined as an 80-kilometer (50-mile) circle centered on Pantex Plant. Similar analyses have also been performed within the ROI for each of the alternate sites considered for interim storage of pits.

The analysis of environmental justice presented in this EIS is based on the definitions of minority and low income populations as contained in the notice for the EPA Office of Environmental Justice (59 FR 192). These definitions call for identification of Census Tracts where 25 percent or more of the persons in 1990 were either minority group members or below poverty level based on their income in 1989. For comparison purposes, definitions of minority and low income populations as provided by the Council on Environmental Quality (CEQ) in August 1995, and also reported in *Guidance for Incorporating Environmental Justice Concerns* in EPA's NEPA Compliance Analysis (EPA 1996a), are also applied to the 1990 Census data and results of both analysis are reported in the EIS.

Cumulative Impacts

Cumulative impacts include the impacts of continued operations at Pantex Plant combined with impacts associated with other reasonably foreseeable projects that could impact the environment at the plant or in the resource-specific ROIs. Although several DOE programs described in section 1.7 of this EIS have the potential to impact the Pantex Plant ROI, sufficient information for incorporation in this document is currently available for only three programs, the Waste Management (WM), Stockpile Stewardship and Management (SSM), and Storage and Disposition of Weapons-Usable Fissile Materials (S&D) programs. Programmatic EISs (PEISs) have been or are being prepared by DOE for each of these programs.

The WM PEIS examines the environmental impacts of managing radioactive and hazardous wastes at DOE Sites throughout the U.S. Pantex Plant was considered one of 17 "major" sites managing DOE wastes. For Pantex Plant, three types of waste were analyzed: LLMW, LLW, and HW. The WM PEIS analyzes the impacts associated with four management alternatives: No Action, Decentralized, Regionalized, and Centralized. The cumulative impacts of the WM program and the alternatives being considered for Pantex Plant operations in this EIS are discussed in each resource section to the extent information is available from the WM PEIS.

The SSM PEIS considered an alternative in which current Pantex Plant operations could be transferred to another site. This Pantex Plant EIS incorporates by reference and summarizes impacts of relocating operations as identified in the SSM PEIS. It is recognized that relocation of operations would involve a transition period during which relocation would occur in a systematic manner, and activities, such as decontamination and decommissioning and environmental restoration, would be accomplished to prepare the Pantex Plant property for disposal. Because a definite schedule for these transition activities is not yet available, it can only be assumed that employment and consumption of utilities at the plant would decline over several years and no sudden impacts would occur.

The S&D PEIS considers activities that would result in storage of inventories of nonsurplus weapons-usable plutonium and highly enriched uranium (HEU); storage of inventories of surplus weapons-usable plutonium and HEU pending disposition; and disposition of surplus weapons-usable plutonium. For storage, the strategy for long-term storage of weapons-usable plutonium and HEU, as well as the storage site(s), would be decided. For disposition, the strategy and technologies for disposition of surplus weapons-usable plutonium would be decided.

The S&D PEIS is considering Pantex Plant for both storage and disposition alternatives. With the S&D PEIS collocation alternative, construction of new storage facilities would be required to store plutonium and HEU at Pantex Plant. For the disposition alternatives, the emphasis at this stage in the NEPA decision process is on choosing the strategy and technology mix rather than the actual site. The evolutionary Light Water Reactor was chosen for the purpose of analysis as the bounding alternative for disposition. Implementation of this disposition alternative may require the construction and operation of one or more light water reactors, a pit disassembly and conversion facility, a plutonium conversion facility, and a mixed oxide fuel fabrication facility. The bounding alternative also assumes that all of the facilities previously mentioned would be collocated at the same site (potentially Pantex Plant).

The collocation storage alternative and the evolutionary Light Water Reactor disposition alternative from the S&D PEIS are discussed in this Pantex Plant EIS, because those alternatives if they occurred at Pantex Plant, could potentially have the greatest impacts to the Pantex Plant Site. It is important to note that these are conservative bounding impacts. The final S&D PEIS will include an alternative that is a refinement of these storage alternatives. As discussed in sections 1.4 and 1.7.3 of volume I of this EIS, the final S&D PEIS will include an alternative under which pits from Rocky Flats Environmental Technology Site (RFETS) could be transferred to Pantex Plant for storage in Zone 4 as early as 1997. The impacts of this alternative are fully accounted for in this EIS because the pits from RFETS could not cause the total number of pits stored in Zone 4 to exceed the storage limit of 20,000 pits analyzed under the Proposed Action. Furthermore, RFETS pits that could come to Pantex Plant would have the same characteristics, as analyzed in the S&D PEIS, as pits currently or previously stored at Pantex Plant. For disposition, further site-specific tiered NEPA documentation may be required, as appropriate, before any specific site is selected. If different alternatives or a site other than Pantex Plant were selected in the Record of Decision (ROD) (and tiered RODs) for the S&D PEIS, then impacts to Pantex Plant from storage and disposition would be reduced and might not occur.

In addition to the DOE programs, information on other Federal, State, or local projects, including private developments, was sought through contacts with Federal and State regulatory agencies, the Amarillo Economic Development Corporation, the Panhandle Municipal Water Authority, and the City of Amarillo.

This effort yielded only one project (future closure of the Helium Plant) that would contribute to the cumulative impacts in the Pantex Plant ROI. The U.S. Bureau of Mines has been operating the Helium Plant in the Amarillo area since the early 1940s. The

Helium Privatization Act of 1996 directs Helium Operations to discontinue production and sale of refined helium by April 1998. The impacts of this action are analyzed in volume I, section 4.11.5, because cumulative impacts of closing or downsizing this facility would be limited to socioeconomic impacts.

APPENDIX B

Air Quality Analysis

APPENDIX B
AIR QUALITY ANALYSIS

B.1 INTRODUCTION

This appendix presents more detailed information on the assessment of the air quality at and in the vicinity of Pantex Plant and the potential impacts associated with the alternatives being evaluated in this EIS.

B.2 OBJECTIVES

The overall objective of the air quality impact analysis is to determine the impact of air pollutant emissions resulting from construction and operation activities under the Proposed Action and Alternatives at Pantex Plant. Local and regional receptors include human beings, vegetation, and materials.

The impact and significance of ambient pollutant concentrations resulting from Pantex Plant emissions were determined by comparing the predicted concentrations with the appropriate Federal or State ambient air quality standards or guidelines. Ambient air quality standards represent the allowable pollutant concentrations at which public health and welfare are protected with a reasonable margin of safety.

Specific objectives include the following:

- Selection of an appropriate air quality dispersion model.
- Use of the model to evaluate maximum pollutant concentrations at the Pantex Plant boundary and residences near the plant boundary resulting from existing emissions and from emissions related to the Proposed Action and Alternatives.
- Estimation of air quality impacts at the plant boundary and at nearby residences.

B.3 METHODOLOGY

B.3.1 Model Selection

Model selection required consideration of the characteristics of Pantex Plant emission sources, terrain in the vicinity of the plant, and land use classification. Because of the large number of sources (over 100) and 90 pollutants, it was determined that a screening model could not be used for this air quality analysis. Screening models are most appropriate for assessing the air quality impacts of a single source with continuous, constant emission rates. Therefore, it was determined that a refined dispersion model would be required. The following attributes are required in the model:

- Accommodate multiple point, area, or volume, and fugitive sources.
- Allow for a sophisticated treatment of building downwash for point sources.
- Predict concentrations for flat and rolling terrain.
- Predict impacts on urban and rural land use classifications.
- Allow input of time-varying emissions rates (e.g., emission rates may vary by season, month, or hour-of-day).

A review of Environmental Protection Agency (EPA)-preferred air quality models listed in the *Guidelines on Air Quality Models (Revised)* (40 CFR, Part 51, Appendix W) indicated that the only model that would meet the above requirements was the Industrial Source Complex Model (ISC2). The model operates in both short-term (ISCST2) and long-term (ISCLT2) modes. ISCST2 can produce short-term concentrations averaged over periods of 1, 2, 3, 4, 6, 8, 12, or 24 hours. ISCLT2 can produce long-term concentrations averaged over a month, season, quarter, or year. ISCST2 can also produce annual concentrations and is often used in air analyses when both short-term and annual average concentrations are required.

B.3.2 Model Description and Application

B.3.2.1 *Model Description*

The ISC2 model is a steady-state Gaussian plume model that can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial source complex. This model can account for the following:

- Settling and dry deposition of particles.
- Downwash.
- Point, area, line, and volume sources.
- Plume rise as a function of downwind distance.
- Multiple point sources.
- Limited terrain adjustment.

The ISC2 model is appropriate for the following regulatory uses:

- Industrial source complexes.
- Rural or urban areas.
- Flat or rolling terrain.
- Transport distance less than 50 kilometers (31 miles).
- One-hour to annual average times.
- Continuous toxic air emissions.

Input data requirements for the ISC2 model are as follows:

- Source data: location, emission rate, physical stack height, stack inside diameter, and stack gas temperature. Optional inputs include source elevation, building dimensions, particle size distribution with corresponding settling velocities, and surface reflection coefficients.
- Meteorological data: ISCST2 requires hourly surface weather data from the preprocessor program RAMMET, which provides hourly stability class, wind direction, wind speed, temperature, and mixing height. For ISCLT2, input includes stability wind rose (stability array [STAR] disk), average afternoon mixing height, average morning mixing height, and average air temperature.
- Receptor data: coordinates and operational ground elevation for each receptor.

For more detailed information concerning the ISC2 model refer to the EPA *Guidelines on Air Quality Models (Revised)* (40 CFR, Part 51, Appendix W).

B.3.2.2 *Model Application*

The air quality dispersion modeling was performed in accordance with the guidance provided in the EPA document *Guidelines on Air Quality Models (Revised)* and the Texas Natural Resources Conservation Commission (TNRCC) document *Air Quality Modeling Guidelines* (40 CFR, Part 51, Appendix W; TNRCC 1993).

The Industrial Source Complex (ISC) dispersion model (Version 93109) was used to estimate all pollutant concentrations.

B.3.3 Land Use Analysis

In this analysis rural dispersion coefficients were used. The selection of rural coefficients was based on the Auer land-use method (Auer 1978). This procedure involves classifying the land use within a 3,000-meter (9,843-foot) radius around the emission source. If urban land use types account for 50 percent or more of the total area, urban dispersion coefficients should be used; otherwise, rural dispersion coefficients should be used. In an earlier land-use analysis performed by the Radian Corporation for Pantex Plant, it was determined that the percentage of urban land-use within 3,000 meters (9,843 feet) was less than 5 percent (Radian 1993:3-1, 5-1). Since the percent of urban land use is less than 50 percent, rural dispersion coefficients were selected.

B.3.4 Meteorological Data

Meteorological data for the ISCST2 model consisted of hourly surface observations and mixing heights obtained from meteorological data recorded at the Amarillo International Airport for calendar year 1988. Meteorological data for the ISCLT2 model consisted of a joint frequency distribution of wind speed, wind direction, and stability class (STAR data). The STAR data were based on 1985 through 1989 surface observations recorded at the Amarillo International Airport. The meteorological data were obtained from TNRCC's bulletin board.

This set of meteorological data was selected because it was specified by TNRCC and was used by the Radian Corporation in modeling emissions from the Pantex Plant Burning Ground. Also, the use of these data would make the site-wide modeling performed for this EIS comparable with the Radian analysis from a meteorological standpoint (Radian 1994).

B.3.5 Emission Source Characteristics

Emission sources are located in several functional areas (some of these are referred to as numbered zones). These areas include a weapons assembly/disassembly zone (Zone 12), a weapons staging area (Zone 4), and an area for experimental explosives development (Zone 11), a drinking water treatment plant, a sanitary wastewater treatment facility, and a vehicle maintenance and administration area (see Figure B.3.5–1).

Other emission sources included an explosive test-firing facility, an open burning ground to burn high explosive(s) (HE) materials, and a Burning Ground Upgrade (BGU) facility for processing explosive-contaminated materials or components. Emission sources also included welding and cutting operations, standby diesel and gasoline engines, and the container storage area where drum sampling and bulk handling of chemicals are performed.

Most of the emissions from Pantex Plant are fugitive emissions, except emissions from Building 16–13. This building was a point source (stack) with the following parameters:

- Height of stack: 19.81 meters (65.0 feet).
- Diameter of the stack: 0.91 meters (3.0 feet).
- Exit Speed: 5.03 meters per second (16.5 feet per second).
- Exit Temperature: 418.76 °K (294.1 °F).

Building 16–13 was the only source at Pantex Plant that required the application of building downwash effects.

As indicated in Tables B.3.6–1 through B.3.6–9, facilities from which fugitive emissions were emitted were treated as volume sources (all tables are presented at the end of this appendix). The emission rates were expressed in grams per second. The release height of the emissions was assumed to be located at one half the building height. Groups of point sources with small emission rates were treated as an area source.

The Burning Ground is an onsite facility used to demilitarize and sanitize explosives components and treat materials contaminated with explosives. The Burning Ground covers approximately 23.5 hectares (58 acres) in the north-central portion of Pantex Plant (see Figure B.3.5–1), and currently includes the firing sites, nine burn trays, three burn pans, two burn cages, and three burn pits. There are no structures at the Burning Ground that could affect the normal dispersion of air pollutants during burning operations (Radian 1993:6-1).

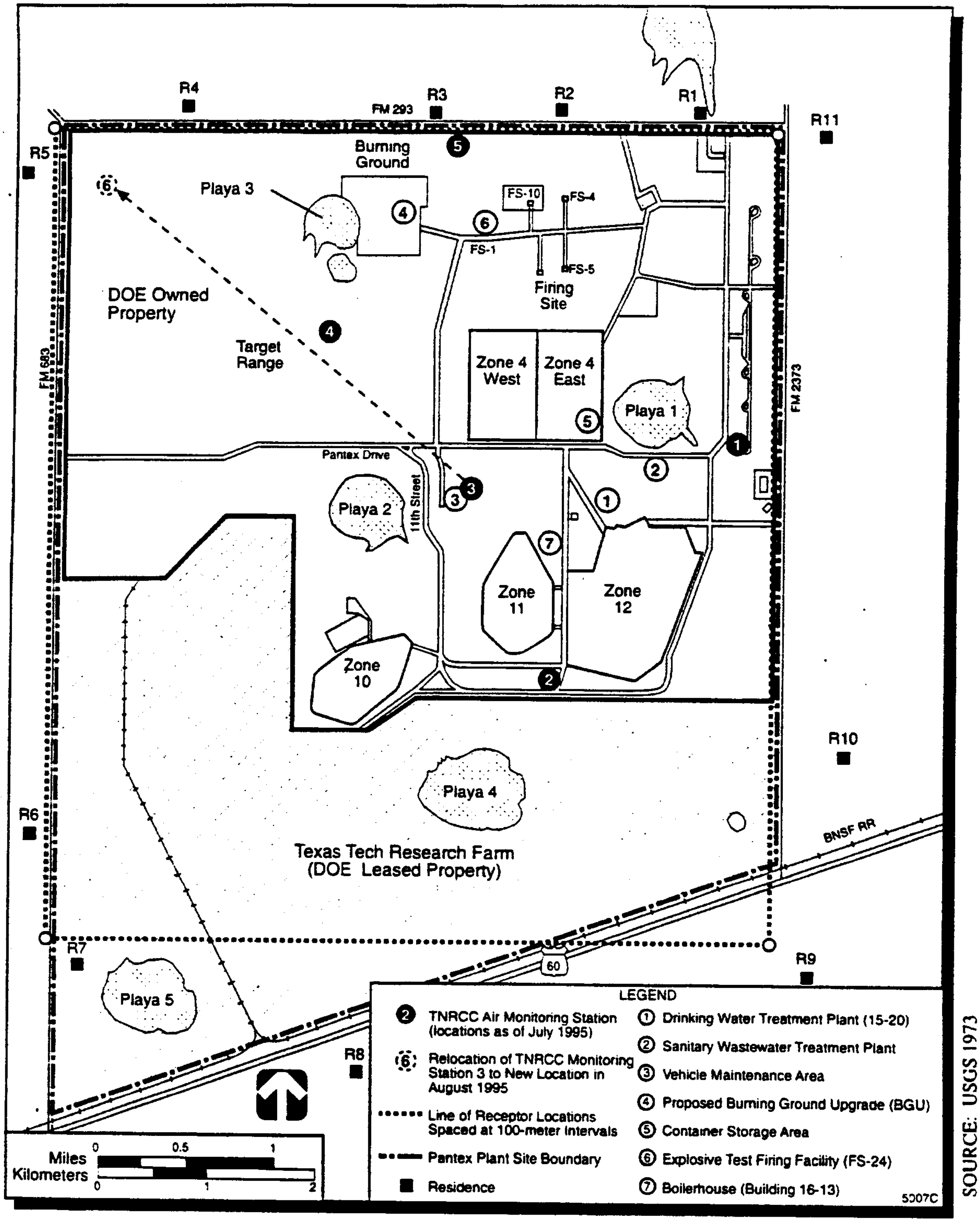

FIGURE B.3.5–1.—*Air Quality Monitoring Stations, Emission Sources, and Receptor Sites at Pantex Plant.*

The emissions from the open burning of HE in the trays were modeled using a "flare" methodology developed by the Radian Corporation and approved by TNRCC (Radian 1993). The input parameters used for the methodology were as follows:

- Flare release height above the ground: 2 meters (6.6 feet).
- Flame temperature: 1900 °K (2961 °F).
- Exit speed: 1.0 meter per second (3.3 feet per second).
- Effective Diameter of flare:
  - 45.4 kilograms (100 pounds) HE: 1.92 meters (6.3 feet).
  - 363 kilograms (800 pounds) HE: 8.66 meters (28.4 feet).

It was assumed that the burning of HE that did not contain fluorides would occur between the hours of 7:00 a.m. and 6:00 p.m. Explosives that contained fluoride would only be burned twice a day, at 11:00 a.m. and 3:00 p.m. It should be noted that not more than three burns can be conducted in a day. Also, there is at least a 3-hour waiting period between any two burns for explosives emitting hydrogen fluoride (HF). Two HE scenarios were modeled: one assumed that 45.4 kilograms (100 pounds) of HE were burned, while the other assumed a burn of 363 kilograms (800 pounds) of HE.

Pantex Plant has a commitment to construct a project called the Burning Ground Upgrade (BGU) to replace the current pit burn operation. This project should be completed in the timeframe analyzed in this EIS. This upgrade will consist of a covered three-sided structure with a fan to exhaust emissions through an elevated stack. The wood currently used as an auxiliary heat source for the pit burn will be replaced by natural gas in the BGU. These changes will improve the dispersion characteristics of emissions from this operation and eliminate the toxic emissions common to wood burning.

The BGU operation was assumed to be a point source (stack) with the following stack parameters:

- Stack height: 12.2 meters (40.0 feet).
- Stack diameter: 0.61 meters (2.0 feet).
- Exit speed: 16.2 meters per second (53.2 feet per second).
- Exit temperature: 388.8 °K (240.0 °F).

Building downwash for the BGU was not required for emissions released through the BGU stack (Radian 1994:6-1). Downwash from the BGU structure was also not a consideration with regard to tray burns (Radian 1994:6-1).

B.3.6 Emission Inventory Scenarios

The basic emission inventory used to derive emission rates for Pantex Plant air quality analysis was developed by the Radian Corporation. This emission inventory included emissions from furnaces, boilers, water heaters, diesel generators and engines, the BGU, tray burns (hemispheres, HE, and wet HE), and the solvent area (sampling and bulk handling). The emission sources used for this site-wide analysis are presented in Tables B.3.6–1 through B.3.6–5.

Tables B.3.6–1 and B.3.6–4 present the estimated emission rates for the criteria pollutants. The estimated emission rates in Table B.3.6–1 were used in modeling the current emissions (Affected Environment), which were assumed to be related to the 2,000 weapons level at Pantex Plant. In addition, emission rates for two other weapons levels (1,000 and 500) were developed. Table B.3.6–4 shows the estimated criteria pollutant emission rates for the BGU.

Pantex Plant personnel provided information regarding facilities whose emissions would change or would remain the same if weapons operations were reduced. The facilities whose emissions would change are indicated with a "W" in the Status column while those remaining the same are indicated with an "S". For those facilities whose emissions would be reduced, it was assumed that the reduction would be in proportion to the weapons operation reduction.

Table B.3.6–2 presents the estimated emission rates for 33 hazardous air pollutants (HAPs), as listed in the *Clean Air Act*, as amended, November 1990 (42 U.S.C. 7401). The emission sources and pollutant emission rates are presented in the same manner as described for Table B.3.6–1.

Table B.3.6–3 presents estimated emission rates for HAPs that are emitted from tray burns of hemispheres, HE, and wet HE. These emission rates are presented in the same manner as described for Table B.3.6–1.

Tables B.3.6–4 and B.3.6–5 present the estimated emission rates for criteria pollutants and HAPs from the BGU. These emissions were not used in modeling the current emission rates (Affected Environment) because the BGU project has not been started but should be completed in the next few years. Therefore, these emissions were included in modeling the emissions for the three weapons levels (2,000, 1,000, and 500) for future operations.

Two scenarios were assumed for modeling the emissions from the trays. One scenario assumed 45.4 kilograms (100 pounds) of HE were burned while the other assumed a burn of 363 kilograms (800 pounds) of HE. For modeling the affected environment, it was assumed that an HE mixture of PBX–9404 and LX–17 was burned. For modeling the emissions from 2,000, 1,000, and 500 weapons levels, it was assumed that a mixture of PBX–9404 and LX–04 was burned. The LX–17 and LX–04 HE were selected because they both emit HF. Although LX–17 is currently burned, it will not be burned during the 10-year period (1997–2007) covered by the EIS. LX–04, however, may continue to be burned during this period.

The emission factors that were used to calculate the emission rates for carbon monoxide (CO), nitrogen dioxide (NO_2), hydrogen chloride (HCl), and HF for these HE mixtures are presented in Table B.3.6–6. The different kinds of HE are mixed to maximize the heat produced by the burning and keep the amount of HF emitted below the regulatory limits. In order to be conservative, the HE mixes modeled in this EIS were chosen for the lowest heat output and highest emission of HF allowed under the regulatory limits. The emission rates for these HE mixtures are presented in Tables B.3.6–7 and B.3.6–8.

A summary of the estimated emission rates for CO, NO_2, PM_{10}, HCl, and HF for the affected environment and the three levels of future operations (2,000, 1,000, and 500 weapons per year) is presented in Table B.3.6–9.

B.3.7 Receptor Locations

A set of discrete receptors was placed at 100-meter (328-foot) intervals at the Pantex Plant boundary. Another set of 11 discrete receptors was established at the locations of the 11 residences which are situated near the Pantex Plant boundary. A grid of offsite receptors was not used since most of the emissions from Pantex Plant sources were released at relatively low heights above the surface. Surface concentrations from low-level releases will be highest near the source and decrease with increasing distance from the source. This concentration decrease with distance is the result of the pollutant cloud being continuously dispersed with increasing distance by atmospheric turbulence.

B.4 Modeling Results

This section presents the results of a conservative modeling of the current environment at Pantex Plant and the impacts associated with activity levels of 2,000, 1,000, and 500 weapons per year.

The model calculates the concentrations at each receptor resulting from the weather conditions for each hour within the year's worth of data (i.e., 8,760 hourly values for each receptor). The model uses meteorological data values that were recorded hourly at the Amarillo airport for an entire year (data was validated by TNRCC). The model returns the single maximum concentration seen by each receptor.

For example, for hourly results this maximum concentration value is associated with a certain hour's weather conditions (e.g., 9:00 a.m. December 3). A different receptor (especially one in a different direction from the source) would have a maximum concentration value returned that might be associated with a different set of meteorological conditions (e.g., 7:00 p.m. July 8). Per the example, the maximum concentration value for residence R5 occurs when a gentle wind blows from the source towards R5, and the maximum concentration value for residence R3 occurs when a gentle wind blows towards R3 (see Figure B.3.5–1). Therefore, it is difficult to discuss the relation between the values for different receptors solely in terms of distance from the source. For calculation of health effects, the maximum concentration hourly value is assumed (for conservatism) to exist at all receptors 24 hours a day 365 days a year.

B.4.1 Affected Environment

The maximum concentration found on the site boundary for each modeled criteria pollutant and each HAP is presented in volume I, Tables 4.7.1.3–4 and 4.7.1.3–5, respectively. The appropriate National Ambient Air Quality Standards (NAAQS) or Effects Screening Levels (ESLs) are also shown in the tables for comparison with the calculated concentration.

As shown in Table 4.7.1.3–4, none of the criteria pollutants are expected to exceed their ambient air quality standards. The emission inventory specified an emission rate for a group of pollutants called alcohols. The alcohol species included in the group were not speciated in the inventory. TNRCC in a modeling analysis of Pantex Plant developed a 1-hour ESL for the group of alcohols (TNRCC 1995b). The calculated maximum 1-hour average concentration at the Pantex Plant boundary for this group of alcohols is the only pollutant concentration that exceeded the guideline ESL (see Table 4.7.1.3–5 in volume I).

The maximum concentrations that were calculated for the 11 residences located near the plant boundary are presented in Table B.4.1–1 (see Figure B.3.5–1 for residence location). Alcohols, modeled as a group, were the only pollutants which exceeded the ESL at a residence. A subsequent review of the inventory of the amounts of the individual alcohols present at the Plant showed that the ESL used in the modeling was excessively conservative. Since the emission rates for the individual alcohols in the group were unknown, an estimation of the maximum fence line concentration for each of the alcohols was calculated based on the ratio of the amount of each alcohol to the total inventory of the group of alcohols present at Pantex Plant (see Table B.4.1–2). None of the individual alcohols were calculated to exceed their respective ESLs at or near the Plant boundary.

It should be noted that the maximum concentration at the residences shown in Table B.4.1–1 may not occur at the same time (day and hour). Since meteorological conditions also vary with time, the concentration values shown in this table cannot be used to determine the spatial variability of the concentrations. In order to determine the spatial variability the concentration would have to be determined simultaneously at all locations.

The modeling results for the current estimated pollutant emissions from Pantex Plant facilities indicate that the air quality at the plant boundary and beyond is not adversely impacted by Pantex Plant operations. The results also support the attainment designations for all criteria pollutants in the Pantex Plant area. The onsite air quality is well within the Threshold Limit Values for the pollutants. The impacts of the onsite air quality to workers are discussed in section 4.14.1.2 of volume I.

B.4.2 Air Quality Impacts

Air quality impacts were developed for three different levels of weapons which were assumed to occur during the analysis period of this EIS. The estimated maximum pollutant concentrations that would occur for each of the three levels of weapons are presented for criteria pollutants and HAPs in volume I, Tables 4.7.2.1–1 and 4.7.2.1–2, respectively. As shown in Table 4.7.2.1–1, concentrations of all the criteria pollutants are expected to be below their respective NAAQS.

As described in the Affected Environment (section B.4.1), only alcohols as a group exceeded the TNRCC ESL (see Table 4.7.2.1–2) for all three weapons levels.

Table B.4.2–1 presents the estimated maximum pollutant concentration on the Pantex Plant boundary for the 2,000 weapons level as a percentage of the NAAQS. The percentages for the 1,000 and 500 weapons levels would be the same or less than those shown in the table. The greatest percentages of the NAAQS were for the 24-hour and annual PM_{10}. The emission resulting from the burning of 45.4 kilograms (100 pounds) of HE resulted in maximum boundary concentrations that represented about 59 percent of the 24-hour average standard and 18 percent of the annual standard. Maximum concentrations from other criteria pollutants represented less than 7 percent of their respective standards.

Although the amount of pollutants released from the 363-kilogram (800-pound) HE burn is greater than the amount released from the 45.4-kilogram (100-pound) HE burn, the concentration of pollutants at the surface produced from the emissions of a 45.5-kilogram (100-pound) HE burn was greater than those produced by a 363-kilogram (800-pound) HE burn. The lower surface concentrations for the 363-kilogram (800-pound) burn are the result of a greater plume rise than occurs for the smaller burn. The higher plume rise is the result of a larger amount of the hot air than the smaller burn. The larger amount of hot air results in increased buoyancy or vertical lift. The dispersion of the pollutants from the larger burn is therefore greater due to this increased buoyancy. The greater dispersion for the larger burn results in lower surface concentrations than the smaller burn.

Table B.4.2–2 contains information for HAPs similar to what was contained in Table B.4.2–1 for criteria pollutants. As shown in Table B.4.2–2, alcohols were estimated to be 95 percent over the 30-minute average ESL. All other HAPs are expected to be below their ESLs. The next highest concentration was produced by emission of HF resulting from the burning of 45.4 kilograms (100 pounds) of HE. It represented about 85 percent of the 3-hour average HF standard. Other HAPs which were more than 50 percent of the respective ESLs were nickel, HCl, methylene chloride, carbon disulfide, and silver.

Table B.4.2–3 presents the estimated maximum pollutant concentrations that could occur at the 11 residences near the Pantex Plant boundary. Maximum pollutant concentrations for each of the three weapons levels (2,000, 1,000, and 500) are shown. Alcohols, modeled as a group, exceeded the 30-minute average ESL at the Pantex Plant boundary, and at residence R10 for all three levels of operations. All of the other pollutant concentrations at the 11 residences were estimated to be below their respective ESLs. Since the maximum concentrations for air pollutants listed in the TNRCC's list (volume I, Tables 4.7.2.1-1 and 4.7.2.1-2) are all below their respective ESLs at the fence line for the 2,000 weapons level, they will not have any impact at the fence line or residences for the 1,000 and 500 weapons levels.

Since violations of the NAAQS or the TNRCC ESLs would not occur at any of the 11 residences (sensitive receptors) near the plant boundary for any of the proposed levels of weapons operations, local air quality impacts would be negligible. In addition, since the emissions from Pantex Plant would contribute only a very small amount to the overall pollution burden in Carson County and the surrounding counties, regional air quality impacts would also be expected to be negligible.

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
80	10-2	W	V	CO	264828	3909243	4.00E-02	5.04E-03	1.40E+01	2.02E-04	2.52E-03	1.26E-03
180	11-2 Water Heaters, Natural Gas	S	V	CO	266711	3910086	2.09E-02	2.63E-03	5.04E+01	7.26E-04	2.63E-03	2.63E-03
164	11-27 Furnaces, Natural Gas	S	V	CO	266716	3910060	1.14E-02	1.44E-03	2.76E+01	3.97E-04	1.44E-03	1.44E-03
165	11-29 Furnaces, Natural Gas	S	V	CO	266739	3910123	1.33E-02	1.68E-03	3.22E+01	4.64E-04	1.68E-03	1.68E-03
166	11-30 Furnaces, Natural Gas	S	V	CO	266620	3910690	2.29E-03	2.89E-04	5.60E+00	8.06E-05	2.89E-04	2.89E-04
158	11-36 Boiler, Natural Gas	S	V	CO	266281	3910425	2.90E-03	3.65E-04	2.04E+01	2.94E-04	3.65E-04	3.65E-04
34	11-38	W	V	CO	266270	3910207	2.30E-02	2.90E-03	1.90E+00	2.74E-05	1.45E-03	7.25E-04
159	11-43 Boiler, Natural Gas	S	V	CO	266465	3910193	1.02E-02	1.29E-03	7.12E+01	1.03E-03	1.29E-03	1.29E-03
181	11-48 Water Heaters, Natural Gas	S	V	CO	266556	3910123	6.10E-03	7.69E-04	1.48E+01	2.13E-04	7.69E-04	7.69E-04
172	12-100 Furnaces, Natural Gas	S	V	CO	267312	3910811	6.95E-03	8.76E-04	1.66E+01	2.39E-04	8.76E-04	8.76E-04
173	12-101 Furnaces, Natural Gas	S	V	CO	267788	3910873	7.71E-03	9.71E-04	1.86E+01	2.68E-04	9.71E-04	9.71E-04
174	12-102 Furnaces, Natural Gas	S	V	CO	267715	3910718	9.52E-03	1.20E-03	2.30E+01	3.31E-04	1.20E-03	1.20E-03
175	12-106 Furnaces, Natural Gas	S	V	CO	267688	3910796	9.14E-03	1.15E-03	2.24E+01	3.23E-04	1.15E-03	1.15E-03
176	12-106A Furnaces, Natural Gas	S	V	CO	267675	3910761	1.36E-02	1.71E-03	3.32E+01	4.78E-04	1.71E-03	1.71E-03
177	12-107 Furnaces, Natural Gas	S	V	CO	267692	3910852	1.90E-02	2.39E-03	4.54E+01	6.54E-04	2.39E-03	2.39E-03
178	12-112 Furnaces, Natural Gas	S	V	CO	267223	3910963	6.67E-03	8.40E-04	1.62E+01	2.33E-04	8.40E-04	8.40E-04
187	12-112 Water Heaters, Natural Gas	S	V	CO	267223	3910963	1.41E-03	1.78E-04	3.40E+00	4.90E-05	1.78E-04	1.78E-04
19	12-13 Paper Incinerator	W	V	CO	267993	3910661	2.10E+00	2.65E-01	3.75E+02	5.40E-03	1.32E-01	6.62E-02

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
168	12-028 Furnaces, Natural Gas	S	V	CO	267788	3910703	4.57E-03	5.76E-04	1.12E+01	1.61E-04	5.76E-04	5.76E-04
169	12-36 Furnaces, Natural Gas	S	V	CO	267393	3911010	7.62E-03	9.60E-04	1.84E+01	2.65E-04	9.60E-04	9.60E-04
170	12-39 Furnaces, Natural Gas	S	V	CO	267378	3910887	1.90E-03	2.39E-04	4.60E+00	6.62E-05	2.39E-04	2.39E-04
185	12-39 Water Heaters, Natural Gas	S	V	CO	267378	3910887	6.10E-03	7.69E-04	1.48E+01	2.13E-04	7.69E-04	7.69E-04
171	12-39A Furnaces, Natural Gas	S	V	CO	267350	3910889	4.38E-03	5.52E-04	1.04E+01	1.50E-04	5.52E-04	5.52E-04
182	12-5 Water Heaters, Natural Gas	S	V	CO	267872	3910891	1.09E-02	1.37E-03	2.64E+01	3.80E-04	1.37E-03	1.37E-03
70	12-5B	W	V	CO	267785	3910973	NA	NA	2.93E+01	4.22E-04	2.11E-04	1.05E-04
167	12-6 Furnaces, Natural Gas	S	V	CO	267846	3910820	1.52E-03	1.92E-04	3.60E+00	5.18E-05	1.92E-04	1.92E-04
183	12-6 Water Heaters, Natural Gas	S	V	CO	267846	3910820	4.19E-03	5.28E-04	1.02E+01	1.47E-04	5.28E-04	5.28E-04
9	12-68	W	V	CO	267845	3910587	NA	NA	5.20E+03	7.49E-02	3.74E-02	1.87E-02
184	12-7 Water Heaters, Natural Gas	S	V	CO	267827	3910839	1.52E-03	1.92E-04	3.60E+00	5.18E-05	1.92E-04	1.92E-04
186	12-75 Water Heaters, Natural Gas	S	V	CO	267279	3910707	2.55E-02	3.21E-03	6.16E+01	8.87E-04	3.21E-03	3.21E-03
188	16-10 Water Heaters, Natural Gas	S	V	CO	265891	3911244	1.90E-02	2.39E-03	4.60E+01	6.62E-04	2.39E-03	2.39E-03
189	16-12 Water Heaters, Natural Gas	S	V	CO	268836	3911272	5.09E-02	6.41E-03	1.23E+02	1.77E-03	6.41E-03	6.41E-03
190	16-15 Water Heaters, Natural Gas	S	V	CO	265822	3911413	5.90E-02	7.43E-03	1.43E+02	2.06E-03	7.43E-03	7.43E-03
22	16-7	W	V	CO	263889	3912006	1.70E+00	2.14E-01	8.40E+02	1.21E-02	1.07E-01	5.36E-02
21	16-8	W	V	CO	266975	3911176	1.70E+00	2.14E-01	8.40E+02	1.21E-02	1.07E-01	5.36E-02
157	4-20 Boiler, Natural Gas	S	V	CO	266070	3912231	3.19E-02	4.02E-03	0.00E+00	0.00E+00	4.02E-03	4.02E-03
161	9-4 Furnaces, Natural Gas	S	V	CO	263530	3909933	2.38E-02	3.00E-03	5.80E+00	8.35E-05	3.00E-03	3.00E-03

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
162	9-5 Furnaces, Natural Gas	S	V	CO	263502	3909982	2.38E-02	3.00E-03	5.80E+00	8.35E-05	3.00E-03	3.00E-03
163	9-6 Furnaces, Natural Gas	S	V	CO	263407	3910183	2.38E-02	3.00E-03	5.80E+00	8.35E-05	3.00E-03	3.00E-03
2	Diesel Engines	S	A	CO	267138	3910516	8.26E+01	1.04E+01	4.38E+03	6.31E-02	1.04E+01	1.04E+01
82	FS-10	S	V	CO	266525	3914304	5.70E+00	7.18E-01	0.00E+00	0.00E+00	7.18E-01	7.18E-01
73	FS-10 (9404)	S	V	CO	266525	3914304	NA	NA	1.87E+01	2.69E-04	2.69E-04	2.69E-04
72	FS-10 (LX10)	S	V	CO	266525	3914304	NA	NA	1.87E+01	2.69E-04	2.69E-04	2.69E-04
101	FS-10 (RDX)	S	V	CO	266525	3914304	NA	NA	1.00E-01	1.44E-06	1.44E-06	1.44E-06
78	FS-10 (TATB)	S	V	CO	266525	3914304	NA	NA	1.39E+01	2.00E-04	2.00E-04	2.00E-04
67	FS-22	S	V	CO	266603	3913623	2.00E-01	2.52E-02	2.18E+01	3.14E-04	2.52E-02	2.52E-02
65	FS-22 (XTX)	S	V	CO	266603	3913623	NA	NA	2.10E+01	3.02E-04	3.02E-04	3.02E-04
134	FS-23	S	V	CO	266926	3913964	1.88E-04	2.37E-05	0.00E+00	0.00E+00	2.37E-05	2.37E-05
66	FS-24	S	V	CO	266094	3914090	1.20E+00	1.51E-01	2.22E+01	3.20E-04	1.51E-01	1.51E-01
74	FS-24 (TATB)	S	V	CO	266094	3914090	NA	NA	1.95E+01	2.81E-04	2.81E-04	2.81E-04
50	FS-4	S	V	CO	266879	3914306	1.23E+01	1.55E+00	6.29E+01	9.06E-04	1.55E+00	1.55E+00
15	Gasoline Engines	S	A	CO	267272	3910461	NA	NA	1.51E+03	2.17E-02	2.17E-02	2.17E-02
1	Natural Gas Boilers (16-13)	S	P	CO	266865	3910813	3.60E+00	4.54E-01	1.55E+04	2.24E-01	4.54E-01	4.54E-01
3	Natural Gas Engines	S	A	CO	267138	3910516	2.38E+00	3.00E-01	1.26E+03	1.81E-02	3.00E-01	3.00E-01
14	Standby Diesel Generators (12-108)	S	A	CO	267507	3910490	1.92E+01	2.42E+00	6.91E+02	9.95E-03	2.42E+00	2.42E+00
	Total for CO						1.33E+02	1.68E+01	3.18E+04	4.58E-01	1.65E+01	1.63E+01
80	10-2	W	V	Lead	264828	3909243	4.40E-04	5.54E-05	1.50E-01	2.16E-06	2.77E-05	1.39E-05

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
80	10-2	W	V	Lead	264828	3909243	4.40E-04	5.54E-05	1.50E-01	2.16E-06	2.77E-05	1.39E-05
22	16-7	W	V	Lead	263889	3912006	1.70E-02	2.14E-03	8.40E+00	1.21E-04	1.07E-03	5.36E-04
22	16-7	W	V	Lead	263889	3912006	1.70E-02	2.14E-03	8.40E+00	1.21E-04	1.07E-03	5.36E-04
21	16-8	W	V	Lead	266975	3911176	1.70E-02	2.14E-03	8.40E+00	1.21E-04	1.07E-03	5.36E-04
21	16-8	W	V	Lead	266975	3911176	1.70E-02	2.14E-03	8.40E+00	1.21E-04	1.07E-03	5.36E-04
21	16-8	W	V	Lead	266975	3911176	1.70E-02	2.14E-03	8.40E+00	1.21E-04	1.07E-03	5.36E-04
21	16-8	W	V	Lead	266975	3911176	1.70E-02	2.14E-03	8.40E+00	1.21E-04	1.07E-03	5.36E-04
Total for Lead							3.44E-02	4.34E-03	1.70E+01	2.44E-04	2.17E-03	1.08E-03
80	10-2	W	V	NO_2	264828	3909243	1.30E-04	1.64E-05	4.00E-02	5.76E-07	2.88E-07	1.44E-07
180	11-2 Water Heaters, Natural Gas	S	V	NO_2	266711	3910086	1.04E-01	1.31E-02	2.52E+02	3.63E-03	1.31E-02	1.31E-02
164	11-27 Furnaces, Natural Gas	S	V	NO_2	266716	3910060	5.71E-02	7.19E-03	1.38E+02	1.99E-03	7.19E-03	7.19E-03
165	11-29 Furnaces, Natural Gas	S	V	NO_2	266739	3910123	6.67E-02	8.40E-03	1.61E+02	2.32E-03	8.40E-03	8.40E-03
166	11-30 Furnaces, Natural Gas	S	V	NO_2	266620	3910690	1.14E-02	1.44E-03	2.80E+01	4.03E-04	1.44E-03	1.44E-03
158	11-36 Boiler, Natural Gas	S	V	NO_2	266281	3910425	1.46E-02	1.84E-03	1.02E+02	1.47E-03	1.84E-03	1.84E-03
34	11-38	W	V	NO_2	266270	3910207	1.50E-03	1.89E-04	1.20E-01	1.73E-06	8.64E-07	4.32E-07
159	11-43 Boiler, Natural Gas	S	V	NO_2	266465	3910193	5.10E-02	6.43E-03	3.56E+02	5.13E-03	6.43E-03	6.43E-03
181	11-48 Water Heaters, Natural Gas	S	V	NO_2	266556	3910123	3.05E-02	3.84E-03	7.40E+01	1.07E-03	3.84E-03	3.84E-03
172	12-100 Furnaces, Natural Gas	S	V	NO_2	267312	3910811	3.48E-02	4.38E-03	8.30E+01	1.20E-03	4.38E-03	4.38E-03
173	12-101 Furnaces, Natural Gas	S	V	NO_2	267788	3910873	3.86E-02	4.86E-03	9.30E+01	1.34E-03	4.86E-03	4.86E-03
174	12-102 Furnaces, Natural Gas	S	V	NO_2	267715	3910718	4.76E-02	6.00E-03	1.15E+02	1.66E-03	6.00E-03	6.00E-03

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
175	12-106 Furnaces, Natural Gas	S	V	NO_2	267688	3910796	4.57E-02	5.76E-03	1.12E+02	1.61E-03	5.76E-03	5.76E-03
176	12-106A Furnaces, Natural Gas	S	V	NO_2	267675	3910761	6.79E-02	8.56E-03	1.66E+02	2.39E-03	8.56E-03	8.56E-03
177	12-107 Furnaces, Natural Gas	S	V	NO_2	267692	3910852	9.52E-02	1.20E-02	2.27E+02	3.27E-03	1.20E-02	1.20E-02
178	12-112 Furnaces, Natural Gas	S	V	NO_2	267223	3910963	3.33E-02	4.20E-03	8.10E+01	1.17E-03	4.20E-03	4.20E-03
187	12-112 Water Heaters, Natural Gas	S	V	NO_2	267223	3910963	7.05E-03	8.88E-04	1.70E+01	2.45E-04	8.88E-04	8.88E-04
179	12-113 Furnaces, Natural Gas	S	V	NO_2	267365	3910842	3.10E-02	3.91E-03	7.50E+01	1.08E-03	3.91E-03	3.91E-03
19	12-13 Paper Incinerator	W	V	NO_2	267993	3910661	6.30E-01	7.94E-02	1.13E+02	1.62E-03	8.10E-04	4.05E-04
168	12-28 Furnaces, Natural Gas	S	V	NO_2	267788	3910703	2.29E-02	2.89E-03	5.60E+01	8.06E-04	2.89E-03	2.89E-03
169	12-36 Furnaces, Natural Gas	S	V	NO_2	267393	3911010	3.81E-02	4.80E-03	9.20E+01	1.32E-03	4.80E-03	4.80E-03
170	12-39 Furnaces, Natural Gas	S	V	NO_2	267378	3910887	9.50E-03	1.20E-03	2.30E+01	3.31E-04	1.20E-03	1.20E-03
185	12-39 Water Heaters, Natural Gas	S	V	NO_2	267378	3910887	3.05E-02	3.84E-03	7.40E+01	1.07E-03	3.84E-03	3.84E-03
171	12-39A Furnaces, Natural Gas	S	V	NO_2	267350	3910889	2.19E-02	2.76E-03	5.20E+01	7.49E-04	2.76E-03	2.76E-03
182	12-5 Water Heaters, Natural Gas	S	V	NO_2	267872	3910891	5.43E-02	6.84E-03	1.32E+02	1.90E-03	6.84E-03	6.84E-03
70	12-5B	W	V	NO_2	267785	3910973	NA	NA	1.35E+02	1.94E-03	9.72E-04	4.86E-04
167	12-6 Furnaces, Natural Gas	S	V	NO_2	267846	3910820	7.60E-03	9.58E-04	1.80E+01	2.59E-04	9.58E-04	9.58E-04
183	12-6 Water Heaters, Natural Gas	S	V	NO_2	267846	3910820	2.10E-02	2.65E-03	5.10E+01	7.34E-04	2.65E-03	2.65E-03
9	12-68	W	V	NO_2	267845	3910587	NA	NA	2.10E+03	3.02E-02	1.51E-02	1.32E-03
184	12-7 Water Heaters, Natural Gas	S	V	NO_2	267827	3910839	7.60E-03	9.58E-04	1.80E+01	2.59E-04	9.58E-04	9.58E-04
186	12-75 Water Heaters, Natural Gas	S	V	NO_2	267279	3910707	1.28E-01	1.61E-02	3.08E+02	4.44E-03	1.61E-02	1.61E-02
188	16-10 Water Heaters, Natural Gas	S	V	NO_2	265891	3911244	9.50E-02	1.20E-02	2.30E+02	3.31E-03	1.20E-02	1.20E-02

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
189	16-12 Water Heaters, Natural Gas	S	V	NO_2	268836	3911272	2.55E-01	3.21E-02	6.15E+02	8.86E-03	3.21E-02	3.21E-02
190	16-15 Water Heaters, Natural Gas	S	V	NO_2	265822	3911413	2.95E-01	3.72E-02	7.14E+02	1.03E-02	3.72E-02	3.72E 02
22	16-7	W	V	NO_2	263889	3912006	5.00E-03	6.30E-04	2.60E+00	3.74E-05	1.87E-05	9.36E-06
21	16-8	W	V	NO_2	266975	3911176	5.00E-03	6.30E-04	2.60E+00	3.74E-05	1.87E-05	9.36E-06
161	9-4 Furnaces, Natural Gas	S	V	NO_2	263530	3909933	1.19E-02	1.50E-03	2.90E+01	4.18E-04	1.50E-03	1.50E-03
162	9-5 Furnaces, Natural Gas	S	V	NO_2	263502	3909982	1.19E-02	1.50E-03	2.90E+01	4.18E-04	1.50E-03	1.50E-03
163	9-6 Furnaces, Natural Gas	S	V	NO_2	263407	3910183	1.19E-02	1.50E-03	2.90E+01	4.18E-04	1.50E-03	1.50E-03
2	Diesel Engines	S	A	NO_2	267138	3910516	3.52E+02	4.44E+01	1.87E+04	2.69E-01	4.44E+01	4.44E+01
82	FS-10	S	V	NO_2	266525	3914304	5.10E-01	6.43E-02	4.10E+00	5.90E-05	6.43E-02	6.43E-02
73	FS-10 (9404)	S	V	NO_2	266525	3914304	NA	NA	1.60E+00	2.30E-05	2.30E-05	2.30E-05
72	FS-10 (LX10)	S	V	NO_2	266525	3914304	NA	NA	1.14E+00	1.64E-05	1.64E-05	1.64E-05
67	FS-022	S	V	NO_2	266603	3913623	1.00E-02	1.26E-03	2.00E-01	2.88E-06	1.44E-06	7.20E-07
65	FS-022 (XTX)	S	V	NO_2	266603	3913623	NA	NA	1.40E+00	2.02E-05	2.02E-05	2.02E-05
134	FS-023	S	V	NO_2	266926	3913964	1.14E-05	1.44E-06	NA	NA	1.44E-06	1.44E-06
66	FS-024	S	V	NO_2	266094	3914090	7.00E-02	8.82E-03	2.00E-01	2.88E-06	8.82E-03	8.82E-03
15	Gasoline Engines	S	A	NO_2	267272	3910461	NA	NA	3.91E+01	5.63E-04	5.63E-04	5.63E-04
1	Natural Gas Boilers (16-13)	S	P	NO_2	266865	3910813	2.18E+01	2.75E+00	6.22E+04	8.96E-01	2.75E+00	2.75E+00
3	Natural Gas Engines	S	A	NO_2	267138	3910516	1.85E+01	2.33E+00	9.75E+03	1.40E-01	2.33E+00	2.33E+00

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
14	Standby Diesel Generators (12-108)	S	A	NO_2	267507	3910490	1.08E+02	1.36E+01	3.69E+03	5.31E-02	1.36E+01	1.36E+01
Total for NO_2							5.03E+02	6.20E+01	1.01E+05	1.46E+00	6.35E+01	6.34E+01
180	11-02 Water Heaters, Natural Gas	S	V	PM_{10}	266711	3910086	2.61E-03	3.29E-04	6.30E+00	9.07E-05	3.29E-04	3.29E-04
164	11-027 Furnaces, Natural Gas	S	V	PM_{10}	266716	3910060	1.43E-03	1.80E-04	3.45E+00	4.97E-05	1.80E-04	1.80E-04
165	11-029 Furnaces, Natural Gas	S	V	PM_{10}	266739	3910123	1.67E-03	2.10E-04	4.03E+00	5.80E-05	2.10E-04	2.10E-04
166	11-30 Furnaces, Natural Gas	S	V	PM_{10}	266620	3910690	2.85E-04	3.59E-05	7.00E-01	1.01E-05	3.59E-05	3.59E-05
158	11-36 Boiler, Natural Gas	S	V	PM_{10}	266281	3910425	4.00E-04	5.04E-05	1.50E-01	2.16E-06	5.04E-05	5.04E-05
34	11-38	W	V	PM_{10}	266270	3910207	2.10E-03	2.65E-04	2.70E-01	3.89E-06	1.32E-04	6.62E-05
159	11-43 Boiler, Natural Gas	S	V	PM_{10}	266465	3910193	1.20E-03	1.51E-04	8.90E+00	1.28E-04	1.51E-04	1.51E-04
181	11-48 Water Heaters, Natural Gas	S	V	PM_{10}	266556	3910123	7.61E-04	9.59E-05	1.85E+00	2.66E-05	9.59E-05	9.59E-05
172	12-100 Furnaces, Natural Gas	S	V	PM_{10}	267312	3910811	8.69E-04	1.09E-04	2.08E+00	3.00E-05	1.09E-04	1.09E-04
173	12-101 Furnaces, Natural Gas	S	V	PM_{10}	267788	3910873	9.64E-04	1.21E-04	2.33E+00	3.36E-05	1.21E-04	1.21E-04
174	12-102 Furnaces, Natural Gas	S	V	PM_{10}	267715	3910718	1.19E-03	1.50E-04	2.88E+00	4.15E-05	1.50E-04	1.50E-04
175	12-106 Furnaces, Natural Gas	S	V	PM_{10}	267688	3910796	1.14E-03	1.44E-04	2.80E+00	4.03E-05	1.44E-04	1.44E-04
176	12-106A Furnaces, Natural Gas	S	V	PM_{10}	267675	3910761	1.70E-03	2.14E-04	4.15E+00	5.98E-05	2.14E-04	2.14E-04
177	12-107 Furnaces, Natural Gas	S	V	PM_{10}	267692	3910852	2.38E-03	3.00E-04	5.68E+00	8.18E-05	3.00E-04	3.00E-04
47	12-111	W	V	PM_{10}	267983	3910838	8.00E-02	1.01E-02	1.30E+00	1.87E-05	5.04E-03	2.52E-03
178	12-112 Furnaces, Natural Gas	S	V	PM_{10}	267223	3910963	8.33E-04	1.05E-04	2.03E+00	2.92E-05	1.05E-04	1.05E-04
187	12-112 Water Heaters, Natural Gas	S	V	PM_{10}	267223	3910963	1.76E-04	2.22E-05	4.30E-01	6.19E-06	2.22E-05	2.22E-05

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
179	12-113 Furnaces, Natural Gas	S	V	PM_{10}	267365	3910842	7.73E-04	9.74E-05	1.88E+00	2.71E-05	9.74E-05	9.74E-05
19	12-13 Paper Incinerator	W	V	PM_{10}	267993	3910661	1.47E+00	1.85E-01	2.63E+02	3.78E-03	9.26E-02	4.63E-02
48	12-16	W	V	PM_{10}	267803	3910653	6.00E-01	7.56E-02	1.36E+01	1.96E-04	3.78E-02	1.89E-02
99	12-024	W	V	PM_{10}	267616	3910122	4.90E-03	6.17E-04	2.10E-01	3.02E-06	3.09E-04	1.54E-04
168	12-028 Furnaces, Natural Gas	S	V	PM_{10}	267788	3910703	2.71E-04	3.41E-05	1.40E+00	2.02E-05	3.41E-05	3.41E-05
169	12-36 Furnaces, Natural Gas	S	V	PM_{10}	267393	3911010	9.52E-04	1.20E-04	2.30E+00	3.31E-05	1.20E-04	1.20E-04
170	12-39 Furnaces, Natural Gas	S	V	PM_{10}	267378	3910887	2.38E-04	3.00E-05	5.80E-01	8.35E-06	3.00E-05	3.00E-05
185	12-39 Water Heaters, Natural Gas	S	V	PM_{10}	267378	3910887	7.61E-04	9.59E-05	1.85E+00	2.66E-05	9.59E-05	9.59E-05
171	12-39A Furnaces, Natural Gas	S	V	PM_{10}	267350	3910889	5.47E-04	6.89E-05	1.30E+00	1.87E-05	6.89E-05	6.89E-05
182	12-5 Water Heaters, Natural Gas	S	V	PM_{10}	267872	3910891	1.36E-03	1.71E-04	3.30E+00	4.75E-05	1.71E-04	1.71E-04
70	12-5B	W	V	PM_{10}	267785	3910973	NA	NA	9.61E+00	1.38E-04	6.92E-05	3.46E-05
167	12-6 Furnaces, Natural Gas	S	V	PM_{10}	267846	3910820	1.90E-04	2.39E-05	4.50E-01	6.48E-06	2.39E-05	2.39E-05
183	12-6 Water Heaters, Natural Gas	S	V	PM_{10}	267846	3910820	5.23E-04	6.59E-05	1.28E+00	1.84E-05	6.59E-05	6.59E-05
9	12-68	W	V	PM_{10}	267845	3910587	NA	NA	1.05E+02	1.51E-03	7.56E-04	3.78E-04
184	12-7 Water Heaters, Natural Gas	S	V	PM_{10}	267827	3910839	1.90E-04	2.39E-05	4.50E-01	6.48E-06	2.39E-05	2.39E-05
186	12-75 Water Heaters, Natural Gas	S	V	PM_{10}	267279	3910707	3.19E-03	4.02E-04	7.70E+00	1.11E-04	4.02E-04	4.02E-04
188	16-10 Water Heaters, Natural Gas	S	V	PM_{10}	265891	3911244	2.38E-03	3.00E-04	5.75E+00	8.28E-05	3.00E-04	3.00E-04
189	16-12 Water Heaters, Natural Gas	S	V	PM_{10}	268836	3911272	6.37E-03	8.03E-04	1.54E+01	2.22E-04	8.03E-04	8.03E-04
190	16-15 Water Heaters, Natural Gas	S	V	PM_{10}	265822	3911413	7.38E-03	9.30E-04	1.78E+01	2.56E-04	9.30E-04	9.30E-04
22	16-7	W	V	PM_{10}	263889	3912006	8.30E-04	1.05E-04	4.20E-01	6.05E-06	5.23E-05	2.61E-05

TABLE B.3.6–1.—*Estimated Emission Rates from Facility-Wide Criteria Pollutants for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
21	16-8	W	V	PM$_{10}$	266975	3911176	8.30E-04	1.05E-04	4.20E-01	6.05E-06	5.23E-05	2.61E-05
161	9-4 Furnaces, Natural Gas	S	V	PM$_{10}$	263530	3909933	2.97E-04	3.74E-05	7.30E-01	1.05E-05	3.74E-05	3.74E-05
162	9-5 Furnaces, Natural Gas	S	V	PM$_{10}$	263502	3909982	2.97E-04	3.74E-05	7.30E-01	1.05E-05	3.74E-05	3.74E-05
163	9-6 Furnaces, Natural Gas	S	V	PM$_{10}$	263407	3910183	2.97E-04	3.74E-05	7.30E-01	1.05E-05	3.74E-05	3.74E-05
2	Diesel Engines	S	A	PM$_{10}$	267138	3910516	2.52E+01	3.18E+00	1.33E+03	1.92E-02	3.18E+00	3.18E+00
67	FS-022	S	V	PM$_{10}$	266603	3913623	NA	NA	1.20E+00	1.73E-05	1.73E-05	1.73E-05
66	FS-024	S	V	PM$_{10}$	266094	3914090	NA	NA	1.20E+00	1.73E-05	1.73E-05	1.73E-05
15	Gasoline Engines	S	A	PM$_{10}$	267272	3910461	NA	NA	2.47E+00	3.56E-05	3.56E-05	3.56E-05
69	Grinding	S	A	PM$_{10}$	265639	3910957	NA	NA	2.50E+01	3.60E-04	3.60E-04	3.60E-04
1	Natural Gas Boilers (16-13)	S	P	PM$_{10}$	266865	3910813	9.00E-01	1.13E-01	2.23E+03	3.21E-02	1.13E-01	1.13E-01
14	Standby Diesel Generators (12-108)	S	A	PM$_{10}$	267507	3910490	1.20E+00	1.51E-01	4.32E+01	6.22E-04	1.51E-01	1.51E-01
106	Welding & Cutting	S	V	PM$_{10}$	265639	3910957	NA	NA	1.66E+02	2.39E-03	2.39E-03	2.39E-03
Total for PM$_{10}$							2.95E+01	3.72E+00	4.30E+03	6.20E-02	3.58E+0	3.52E+0

[a] Letter designates change in emissions. S for static emissions or no change with time and W for change associated with change in weapons program.
[b] Letter designates source modeling category. V = volume source, A = area source, P = point source.
[c] Emissions inventory listed for 2,000 Weapons Scenario (PC 1994). For ISCST2 and ISCLT2 modeling, the emission rates (lb/hr and lb/yr, respectively) were converted to g/sec.
[d] Emissions inventory listed for 1,000 and 500 Weapons Scenarios have been assumed to be a linear regression (PC 1994).
NA - Emission rate was not quantified for modeling.
Source: PC 1994; calculated values.

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants[1] for 2,000, 1,000, and 500 Weapons Scenarios*

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES X, UTM (meters)	COORDINATES Y, UTM (meters)	AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c] (lb/hr)	AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c] (g/sec)	AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c] (lb/yr)	AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c] (g/sec)	1,000 WEAPONS SCENARIO[d] (g/sec)	500 WEAPONS SCENARIO[d] (g/sec)
				CAS No.: 79005								
235	Drum Sampling - Building Area 1	W	A	1,1,2-trichloroethane	267209	3912603	1.01E+00	1.27E-01	8.34E+00	1.20E-04	6.36E-02	3.18E-02
				CAS No.: 106990								
2	Diesel Engines	S	A	1,3-butadiene	267138	3910516	1.98E+00	2.49E-01	1.05E+02	1.51E-03	2.49E-01	2.49E-01
14	Standby Diesel Generators (12-108)	S	A	1,3-butadiene	267507	3910490	2.33E-01	2.94E-02	8.40E+00	1.21E-04	2.94E-02	2.94E-02
70	12-5B	W	V	1,3-butadiene	267785	3910973	2.17E-02	2.73E-03	7.60E-01	1.09E-05	1.36E-03	6.82E-04
	Total for 1,3-butadiene						2.23E+00	2.82E-01	1.14E+02	1.64E-03	2.80E-01	2.79E-01
				CAS No.: 79469								
235	Drum Sampling - Building Area 1	W	A	2- nitropropane	267209	3912603	5.00E-01	6.30E-02	3.76E+00	5.41E-05	3.15E-02	1.58E-02
				CAS No.: No Number								
204	12-19 North Rotoclone	S	V	Alcohols	267680	3910275	6.50E+00	8.19E-01	2.60E+03	3.74E-02	8.19E-01	8.19E-01
235	Bulk Transport-Building Area 1	W	A	Alcohols	267209	3912603	4.37E+00	5.51E-01	1.10E+01	1.58E-04	2.75E-01	1.38E-01
235	Drum Sampling-Building Area 1	W	A	Alcohols	267209	3912603	1.51E+00	1.90E-01	1.40E-01	2.02E-06	9.51E-02	4.76E-02
	Total for alcohols						1.24E+01	1.56E+00	2.61E+03	3.76E-02	1.19E+00	1.00E+00
				CAS No.: 71432								
180	11-2 Water Heaters, Natural Gas	S	V	Benzene	266711	3910086	2.21E-04	2.78E-05	5.36E-01	7.72E-06	2.78E-05	2.78E-05
164	11-27 Furnaces, Natural Gas	S	V	Benzene	266716	3910060	1.21E-04	1.52E-05	2.92E-01	4.20E-06	1.52E-05	1.52E-05
165	11-29 Furnaces, Natural Gas	S	V	Benzene	266739	3910123	1.41E-02	1.78E-03	3.41E-01	4.91E-06	1.78E-03	1.78E-03
166	11-30 Furnaces, Natural Gas	S	V	Benzene	266620	3910690	NA	NA	6.00E-02	8.64E-07	8.64E-07	8.64E-07
158	11-36 Boiler, Natural Gas	S	V	Benzene	266281	3910425	3.20E-05	4.03E-06	2.16E-01	3.11E-06	4.03E-06	4.03E-06
159	11-43 Boiler, Natural Gas	S	V	Benzene	266465	3910193	1.08E-04	1.36E-05	7.55E-01	1.09E-05	1.36E-05	1.36E-05
181	11-48 Water Heaters, Natural Gas	S	V	Benzene	266556	3910123	6.48E-05	8.16E-06	1.57E-01	2.26E-06	8.16E-06	8.16E-06
42	11-51	W	V	Benzene	266292	3910088	2.40E-05	3.02E-06	5.00E-02	7.20E-07	1.51E-06	7.56E-07
172	12-100 Furnaces, Natural Gas	S	V	Benzene	267312	3910811	7.37E-05	9.29E-06	1.76E-01	2.53E-06	9.29E-06	9.29E-06
173	12-101 Furnaces, Natural Gas	S	V	Benzene	267788	3910873	8.18E-05	1.03E-05	1.97E-01	2.84E-06	1.03E-05	1.03E-05

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants*[1] *for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
174	12-102 Furnaces, Natural Gas	S	V	Benzene	267715	3910718	1.01E-04	1.27E-05	2.44E-01	3.51E-06	1.27E-05	1.27E-05
175	12-106 Furnaces, Natural Gas	S	V	Benzene	267688	3910796	9.69E-05	1.22E-05	2.37E-01	3.41E-06	1.22E-05	1.22E-05
176	12-106A Furnaces, Natural Gas	S	V	Benzene	267675	3910761	1.44E-04	1.81E-05	3.52E-01	5.07E-06	1.81E-05	1.81E-05
177	12-107 Furnaces, Natural Gas	S	V	Benzene	267692	3910852	2.02E-04	2.55E-05	4.81E-01	6.93E-06	2.55E-05	2.55E-05
178	12-112 Furnaces, Natural Gas	S	V	Benzene	267223	3910963	7.06E-05	8.90E-06	1.72E-01	2.48E-06	8.90E-06	8.90E-06
187	12-112 Water Heaters, Natural Gas	S	V	Benzene	267223	3910963	1.48E-05	1.86E-06	3.60E-02	5.18E-07	1.86E-06	1.86E-06
179	12-113 Furnaces, Natural Gas	S	V	Benzene	267365	3910842	6.56E-05	8.27E-06	1.59E-01	2.29E-06	8.27E-06	8.27E-06
168	12-28 Furnaces, Natural Gas	S	V	Benzene	267788	3910703	4.84E-05	6.10E-06	1.19E-01	1.71E-06	6.10E-06	6.10E-06
169	12-36 Furnaces, Natural Gas	S	V	Benzene	267393	3911010	8.08E-05	1.02E-05	1.95E-01	2.81E-06	1.02E-05	1.02E-05
170	12-39 Furnaces, Natural Gas	S	V	Benzene	267378	3910887	2.02E-05	2.55E-06	4.88E-02	7.03E-07	2.55E-06	2.55E-06
185	12-39 Water Heaters, Natural Gas	S	V	Benzene	267378	3910887	6.48E-05	8.16E-06	1.57E-01	2.26E-06	8.16E-06	8.16E-06
171	12-39A Furnaces, Natural Gas	S	V	Benzene	267350	3910889	4.64E-05	5.85E-06	1.10E-01	1.58E-06	5.85E-06	5.85E-06
182	12-5 Water Heaters, Natural Gas	S	V	Benzene	267872	3910891	1.15E-04	1.45E-05	2.80E-01	4.03E-06	1.45E-05	1.45E-05
70	12-5B	W	V	Benzene	267785	3910973	2.43E-02	3.06E-03	8.50E-01	1.22E-05	1.53E-03	7.65E-04
167	12-6 Furnaces, Natural Gas	S	V	Benzene	267846	3910820	1.61E-05	2.03E-06	3.80E-02	5.47E-07	2.03E-06	2.03E-06
183	12-6 Water Heaters, Natural Gas	S	V	Benzene	267846	3910820	4.44E-05	5.59E-06	1.08E-01	1.56E-06	5.59E-06	5.59E-06
9	12-68	S	V	Benzene	267845	3910587	4.00E-04	5.04E-05	1.60E+00	2.30E-05	5.04E-05	5.04E-05
184	12-7 Water Heaters, Natural Gas	S	V	Benzene	267827	3910839	1.60E-05	2.02E-06	3.80E-02	5.47E-07	2.02E-06	2.02E-06
186	12-75 Water Heaters, Natural Gas	S	V	Benzene	267279	3910707	2.70E-04	3.40E-05	6.52E-01	9.39E-06	3.40E-05	3.40E-05
188	16-10 Water Heaters, Natural Gas	S	V	Benzene	265891	3911244	2.02E-04	2.55E-05	4.88E-01	7.03E-06	2.55E-05	2.55E-05
189	16-12 Water Heaters, Natural Gas	S	V	Benzene	268836	3911272	5.40E-04	6.80E-05	1.30E+00	1.87E-05	6.80E-05	6.80E-05
190	16-15 Water Heaters, Natural Gas	S	V	Benzene	265822	3911413	6.24E-04	7.86E-05	1.51E+00	2.17E-05	7.86E-05	7.86E-05
161	9-4 Furnaces, Natural Gas	S	V	Benzene	263530	3909933	2.52E-05	3.18E-06	6.16E-02	8.87E-07	3.18E-06	3.18E-06
162	9-5 Furnaces, Natural Gas	S	V	Benzene	263502	3909982	2.52E-05	3.18E-06	6.16E-02	8.87E-07	3.18E-06	3.18E-06
163	9-6 Furnaces, Natural Gas	S	V	Benzene	263407	3910183	2.52E-05	3.18E-06	6.16E-02	8.87E-07	3.18E-06	3.18E-06
2	Diesel Engines	S	A	Benzene	267138	3910516	2.25E+00	2.84E-01	1.19E+02	1.71E-03	2.84E-01	2.84E-01

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants[1] for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
235	Drum Sampling - Building Area I	W	A	Benzene	267209	3912603	5.10E-01	6.43E-02	8.42E+00	1.21E-04	3.21E-02	1.61E-02
15	Gasoline Engines	S	A	Benzene	267272	3910461	2.65E-02	3.34E-03	9.00E-01	1.30E-05	3.34E-03	3.34E-03
1	Natural Gas Boilers (16-13)	S	P	Benzene	266865	3910813	1.92E-02	2.42E-03	5.00E+01	7.20E-04	2.42E-03	2.42E-03
14	Standby Diesel Generators (12-108)	S	A	Benzene	267507	3910490	2.58E-01	3.25E-02	9.30E+00	1.34E-04	3.25E 02	3.25E-02
	Total for Benzene						3.11E+00	3.91E-01	1.99E+02	2.91E-03	3.58E-01	3.41E-01
					CAS No.: 75150							
235	Drum Sampling - Building Area I	W	A	Carbon Disulfide	267209	3912603	1.32E+00	1.66E-01	5.96E+01	8.59E-04	8.32E-02	4.16E-02
					CAS No.: 56235							
235	Drum Sampling - Building Area I	W	A	Carbon Tetrachloride	267209	3912603	1.15E+00	1.45E-01	3.44E+01	4.95E-04	7.25E-02	3.62E-02
					CAS No.: 108907							
235	Bulk Transport - Building Area I	W	A	Chlorobenzene	267209	3912603	7.10E-01	8.95E-02	8.56E-01	1.23E-05	4.47E-02	2.24E-02
235	Drum Sampling - Building Area I	W	A	Chlorobenzene	267209	3912603	4.30E-01	5.42E-02	3.08E+00	4.44E-05	2.71E 02	1.35E-02
	Total for Chlorobenzene						1.14E+00	1.44E-01	3.94E+00	5.67E-05	7.18E-02	3.59E-02
					CAS No.: 7440473							
80	10-2	W	V	Chromium	264828	3909243	2.00E-07	2.52E-08	0.00E+00	0.00E+00	1.26E-08	6.30E-09
22	16-7	W	V	Chromium	263889	3912006	6.60E-06	8.32E-07	3.40E-03	4.90E-08	4.16E-07	2.08E-07
21	16-8	W	V	Chromium	266975	3911176	6.60E-06	8.32E-07	3.40E-03	4.90E-08	4.16E-07	2.08E-07
	Total for Chromium						1.34E-05	1.69E-06	6.80E-03	9.79E-08	8.44E-07	4.22E-07

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants*[1] *for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
				CAS No.: 1319773								
235	Drum Sampling - Building Area 1	W	A	Cresols	267209	3912603	3.00E-02	3.78E-03	1.10E-01	1.58E-06	1.89E-03	9.45E-04
235	Drum Sampling - Building Area 1	W	A	Cresylic Acid	267209	3912603	3.00E-01	3.78E-02	1.10E-01	1.58E-06	1.89E-02	9.45E-03
				CAS No.: 68122								
201	11-36 Vent Scrubber	S	V	Dimethylformamide	266281	3910425	2.66E+05	3.91E+06	2.05E+00	2.58E-01	3.91E+06	3.91E+06
202	11-36 Waste Trailer 1	S	V	Dimethylformamide	266460	3910139	2.66E+05	3.91E+06	2.00E-02	2.52E-03	3.91E+06	3.91E+06
203	11-36 Waste Trailer 3	S	V	Dimethylformamide	266281	3910425	2.66E+05	3.91E+06	2.00E-02	2.52E-03	3.91E+06	3.91E+06
	Total for Dimethylformamide						7.99E+05	1.17E+07	2.09E+00	2.63E-01	1.17E+07	1.17E+07
				CAS No.: No Number								
235	Bulk Transport - Building Area 1	W	A	Ester Glycol Ethers	267209	3912603	1.50E+00	1.89E-01	1.83E+00	2.64E-05	9.45E-02	4.73E-02
235	Drum Sampling - Building Area 1	W	A	Ester Glycol Ethers	267209	3912603	3.00E-01	3.78E-02	6.00E-02	8.64E-07	1.89E-02	9.45E-03
	Total for Ester Glycol Ethers						1.80E+00	2.27E-01	1.89E+00	2.72E-05	1.13E-01	5.67E-02
				CAS No.: 141-78-6								
204	12-19 North Rotoclone	S	V	Ethyl Acetate	267680	3910275	6.70E+01	8.44E+00	1.08E+04	1.55E-01	8.44E+00	8.44E+00
205	12-19 Fugitives	S	V	Ethyl Acetate	267680	3910275	9.10E+00	1.15E+00	1.60E+03	2.30E-02	1.15E-01	1.15E+00
235	Bulk Transport - Building Area 1	W	A	Ethyl Acetate	267209	3912603	1.10E+01	1.39E+00	1.37E+01	1.97E-04	6.95E-01	3.47E-01
235	Drum Sampling - Building Area 1	W	A	Ethyl Acetate	267209	3912603	2.48E+01	3.12E-01	1.09E+01	1.57E-04	1.56E-01	7.80E-02
	Total for Ethyl Acetate						8.96E+01	1.13E+01	1.24E+04	1.79E-01	1.04E+01	1.00E+01
				CAS No.: 100414								
235	Bulk Transport - Building Area 1	W	A	Ethyl Benzene	267209	3912603	1.48E+00	1.86E-01	1.85E+00	2.66E-05	9.32E-02	4.66E-02
235	Drum Sampling - Building Area 1	W	A	Ethyl Benzene	267209	3912603	3.40E-01	4.28E-02	1.48E+00	2.13E-05	2.14E-02	1.07E-02
	Total for Ethyl Benzene						1.82E+00	2.29E-01	3.33E+00	4.80E-05	1.15E-01	5.73E-02
				CAS No.: 107062								
235	Drum Sampling - Building Area 1	W	A	Ethylene Dichloride	267209	3912603	5.60E-01	7.06E-02	2.93E+00	4.22E-05	3.53E-02	1.76E-02

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants*[1] *for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
					CAS No.: 50000							
180	11-2 Water Heaters, Natural Gas	S	V	Formaldehyde	266711	3910086	4.42E-04	5.57E-05	1.07E+00	1.54E-05	2.21E-04	2.21E-04
164	11-27 Furnaces, Natural Gas	S	V	Formaldehyde	266716	3910060	2.42E-04	3.05E-05	5.85E-01	8.42E-06	1.21E-04	1.21E-04
165	11-29 Furnaces, Natural Gas	S	V	Formaldehyde	266739	3910123	2.83E-04	3.57E-05	6.83E-01	9.84E-06	1.42E-04	1.42E-04
166	11-30 Furnaces, Natural Gas	S	V	Formaldehyde	266620	3910690	4.84E-05	6.10E-06	1.18E-01	1.70E-06	2.42E-05	2.42E-05
158	11-36 Boiler, Natural Gas	S	V	Formaldehyde	266281	3910425	6.40E-05	8.06E-06	4.33E-01	6.24E-06	3.20E-05	3.20E-05
159	11-43 Boiler, Natural Gas	S	V	Formaldehyde	266465	3910193	2.16E-04	2.72E-05	1.51E+00	2.17E-05	1.08E-04	1.08E-04
181	11-48 Water Heaters, Natural Gas	S	V	Formaldehyde	266556	3910123	1.30E-04	1.64E-05	3.14E-01	4.52E-06	6.50E-05	6.20E-05
172	12-100 Furnaces, Natural Gas	S	V	Formaldehyde	267312	3910811	1.47E-04	1.85E-05	3.52E-01	5.07E-06	7.35E-05	7.35E-05
173	12-101 Furnaces, Natural Gas	S	V	Formaldehyde	267788	3910873	1.64E-04	2.07E-05	3.94E-01	5.67E-06	8.20E-05	8.20E-05
174	12-102 Furnaces, Natural Gas	S	V	Formaldehyde	267715	3910718	2.02E-04	2.55E-05	4.88E-01	7.03E-06	1.01E-04	1.01E-04
175	12-106 Furnaces, Natural Gas	S	V	Formaldehyde	267688	3910796	1.94E-04	2.44E-05	4.75E-01	6.84E-06	9.70E-05	9.70E-05
176	12-106A Furnaces, Natural Gas	S	V	Formaldehyde	267675	3910761	2.88E-04	3.63E-05	7.04E-01	1.01E-05	1.44E-04	1.44E-04
177	12-107 Furnaces, Natural Gas	S	V	Formaldehyde	267692	3910852	4.04E-04	5.09E-05	9.62E-01	1.39E-05	2.02E-04	2.02E-04
178	12-112 Furnaces, Natural Gas	S	V	Formaldehyde	267223	3910963	1.41E-04	1.78E-05	3.43E-01	4.94E-06	7.05E-05	7.05E-05
187	12-112 Water Heaters, Natural Gas	S	V	Formaldehyde	267223	3910963	2.96E-05	3.73E-06	7.20E-02	1.04E-06	1.48E-05	1.48E-05
179	12-113 Furnaces, Natural Gas	S	V	Formaldehyde	267365	3910842	1.31E-04	1.65E-05	3.18E-01	4.58E-06	6.55E-05	6.55E-05
168	12-28 Furnaces, Natural Gas	S	V	Formaldehyde	267788	3910703	9.69E-05	1.22E-05	2.37E-01	3.41E-06	4.85E-05	4.85E-05
169	12-36 Furnaces, Natural Gas	S	V	Formaldehyde	267393	3911010	1.62E-04	2.04E-05	3.90E-01	5.62E-06	8.10E-05	8.10E-05
170	12-39 Furnaces, Natural Gas	S	V	Formaldehyde	267378	3910887	4.03E-05	5.08E-06	9.76E-02	1.41E-06	2.02E-05	2.02E-05
185	12-39 Water Heaters, Natural Gas	S	V	Formaldehyde	267378	3910887	1.30E-04	1.64E-05	3.14E-01	4.52E-06	6.50E-05	6.50E-05
171	12-39A Furnaces, Natural Gas	S	V	Formaldehyde	267350	3910889	9.28E-05	1.17E-05	2.20E-01	3.17E-06	4.64E-05	4.64E-05
182	12-5 Water Heaters, Natural Gas	S	V	Formaldehyde	267872	3910891	2.30E-04	2.90E-05	5.60E-01	8.06E-06	1.15E-04	1.15E-04
167	12-6 Furnaces, Natural Gas	S	V	Formaldehyde	267846	3910820	3.22E-05	4.06E-06	7.60E-02	1.09E-06	1.61E-05	1.61E-05
183	12-6 Water Heaters, Natural Gas	S	V	Formaldehyde	267846	3910820	8.88E-05	1.12E-05	2.16E-01	3.11E-06	4.44E-05	4.44E-05
9	12-68	W	V	Formaldehyde	267845	3910587	8.00E-04	1.01E-04	3.20E+00	4.61E-05	5.04E-05	2.52E-05

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants*[1] *for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
184	12-7 Water Heaters, Natural Gas	S	V	Formaldehyde	267827	3910839	3.20E-05	4.03E-06	7.60E-02	1.09E-06	4.03E-06	4.03E-06
186	12-75 Water Heaters, Natural Gas	S	V	Formaldehyde	267279	3910707	5.41E-04	6.82E-05	1.30E+00	1.87E-05	6.82E-05	6.82E-05
188	16-10 Water Heaters, Natural Gas	S	V	Formaldehyde	265891	3911244	4.04E-04	5.09E-05	9.76E-01	1.41E-05	5.09E-05	5.09E-05
189	16-12 Water Heaters, Natural Gas	S	V	Formaldehyde	268836	3911272	1.08E-03	1.36E-04	2.61E+00	3.76E-05	1.36E-04	1.36E-04
190	16-15 Water Heaters, Natural Gas	S	V	Formaldehyde	265822	3911413	1.25E-03	1.58E-04	3.02E+00	4.35E-05	1.58E-04	1.58E-04
161	9-4 Furnaces, Natural Gas	S	V	Formaldehyde	263530	3909933	5.04E-05	6.35E-06	1.23E-01	1.77E-06	6.35E-06	6.35E-06
162	9-5 Furnaces, Natural Gas	S	V	Formaldehyde	263502	3909982	5.04E-05	6.35E-06	1.23E-01	1.77E-06	6.35E-06	6.35E-06
163	9-6 Furnaces, Natural Gas	S	V	Formaldehyde	263407	3910183	5.04E-05	6.35E-06	1.23E-01	1.77E-06	6.35E-06	6.35E-06
1	Natural Gas Boilers (16-13)	S	P	Formaldehyde	266865	3910813	3.84E-02	4.84E-03	9.90E+01	1.43E-03	4.84E-03	4.84E-03
Total for Formaldehyde							4.67E-02	5.88E-03	1.21E+02	1.75E-03	7.32E-03	7.30E-03
CAS No.: 7439976												
30	12-5	W	V	Mercury	267872	3910891	2.50E-09	3.15E-10	1.30E-06	1.87E-11	3.15E-10	1.58E-10
CAS No.: 67561												
201	11-36 Vent Scrubber	S	V	Methanol	266281	3910425	1.82E+01	2.29E+00	2.40E+03	3.46E-02	2.29E+00	2.29E+00
202	11-36 Waste Trailer 1	S	V	Methanol	266281	3910425	1.10E-01	1.39E-02	0.00E+00	0.00E+00	1.39E-02	1.39E-02
203	11-36 Waste Trailer 3	S	V	Methanol	266281	3910425	1.10E-01	1.39E-02	4.00E+00	5.76E-05	1.39E-02	1.39E-02
235	Drum Sampling-Building Area 1	W	A	Methanol	266632	3912603	1.24E+00	1.56E-01	7.40E+00	1.07E-04	7.81E-02	3.91E-02
Total for Methanol							1.97E+01	2.48E+00	2.41E+03	3.47E-02	2.40E+00	2.36E+00
CAS No.: 78933												
16	11-9	W	V	Methyl Ethyl Ketone	266515	3910714	1.56E-01	1.97E-02	1.08E+02	1.56E-03	9.83E-03	4.91E-03
29	12-104	W	V	Methyl Ethyl Ketone	267265	3910216	2.29E-02	2.89E-03	1.56E+01	2.25E-04	1.44E-03	7.21E-04
12	12-110	W	V	Methyl Ethyl Ketone	268036	3910814	1.21E+00	1.52E-01	6.31E+02	9.09E-03	7.62E-02	3.81E-02
205	12-19 Fugitives	S	V	Methyl Ethyl Ketone	267680	3910275	4.60E+00	5.80E-01	1.00E+03	1.44E-02	5.80E-01	5.80E-01

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants*[1] *for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
204	12-19 North Rotoclone	S	V	Methyl Ethyl Ketone	267680	3910275	2.20E+01	2.77E+00	6.20E+03	8.93E-02	2.77E+00	2.77E+00
37	12-19E	W	V	Methyl Ethyl Ketone	267680	3910275	2.71E+01	3.41E+00	7.30E+03	1.05E-01	1.71E+00	8.54E-01
53	12-25	W	V	Methyl Ethyl Ketone	267589	3910055	3.00E-01	3.78E-02	9.00E+00	1.30E-04	1.89E-02	9.45E-03
23	12-34SS	W	V	Methyl Ethyl Ketone	267785	3910292	3.46E-04	4.36E-05	5.20E-02	7.49E-07	2.18E-05	1.09E-05
43	12-41	W	V	Methyl Ethyl Ketone	267503	3909659	2.70E+00	3.40E-01	2.52E+01	3.63E-04	1.70E-01	8.51E-02
45	12-44	W	V	Methyl Ethyl Ketone	267410	3909939	1.94E-02	2.44E-03	1.68E+01	2.42E-04	1.22E-03	6.11E-04
30	12-5	W	V	Methyl Ethyl Ketone	267872	3910891	8.40E-05	1.06E-05	1.80E-01	2.59E-06	5.29E-06	2.65E-06
32	12-64	W	V	Methyl Ethyl Ketone	267315	3910068	2.88E-02	3.63E-03	1.80E+01	2.59E-04	1.81E-03	9.07E-04
27	12-82	W	V	Methyl Ethyl Ketone	267294	3909766	8.31E-02	1.05E-02	4.83E+01	6.96E-04	5.24E-03	2.62E-03
25	12-84	W	V	Methyl Ethyl Ketone	267203	3910117	1.30E-01	1.64E-02	7.62E+01	1.10E-03	8.19E-03	4.10E-03
61	12-85	W	V	Methyl Ethyl Ketone	267227	3910032	4.80E-03	6.05E-04	3.25E+00	4.68E-05	3.02E-04	1.51E-04
35	12-86	W	V	Methyl Ethyl Ketone	267055	3909814	1.30E-02	1.64E-03	3.36E+01	4.84E-04	8.19E-04	4.10E-04
58	12-98	W	V	Methyl Ethyl Ketone	267111	3910056	4.80E-03	6.05E-04	5.02E+00	7.23E-05	3.02E-04	1.51E-04
38	12-99	W	V	Methyl Ethyl Ketone	267092	3909967	1.29E-02	1.63E-03	1.01E+01	1.45E-04	8.13E-04	4.06E-04
20	16-4	W	V	Methyl Ethyl Ketone	265854	3911416	1.09E+00	1.37E-01	3.48E+01	5.01E-04	6.87E-02	3.43E-02
235	Bulk Transport - Building Area 1	W	A	Methyl Ethyl Ketone	267209	3912603	1.08E+01	1.36E+00	2.72E+01	3.92E-04	6.80E-01	3.40E-01
235	Drum Sampling - Building Area 1	W	A	Methyl Ethyl Ketone	267209	3912603	2.16E+00	2.72E-01	1.90E+01	2.74E-04	1.36E-01	6.80E-02
Total for Methyl Ethyl Ketone							7.24E+01	9.13E+00	1.56E+04	2.24E-01	6.24E+00	4.79E+00
CAS No.: 108101												
235	Drum Sampling - Building Area 1	W	A	Methyl Isobutyl Ketone	267209	3912603	2.60E-01	3.28E-02	1.36E+00	1.96E-05	1.64E-02	8.19E-03
CAS No.: 75092												
205	12-19 Fugitives	S	V	Methylene Chloride	267680	3910275	5.40E+00	6.80E-01	2.40E+02	3.46E-03	6.80E-01	6.80E-01
204	12-19 North Rotoclone	S	V	Methylene Chloride	267680	3910275	1.50E+00	1.89E-01	2.00E+01	2.88E-04	1.89E-01	1.89E-01
235	Drum Sampling - Building Area 1	W	A	Methylene Chloride	267209	3912603	3.88E+00	4.89E-01	1.41E+02	2.04E-03	2.44E-01	1.22E-01

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants[1] for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
235	Drum Sampling - Building Area 1	W	A	Methylene Chloride	267209	3912603	2.36E+00	2.97E-01	1.24E+01	1.78E-04	1.49E-01	7.43E-02
	Total for Methylene Chloride						1.31E+01	1.66E+00	4.14E+02	5.96E-03	1.26E+00	1.07E+00
				CAS No.: 98953								
235	Drum Sampling - Building Area 1	W	A	Nitrobenzene	267209	3912603	3.00E-02	3.78E-03	1.10E-01	1.58E-06	1.89E-03	9.45E-04
				CAS No.: 127184								
235	Drum Sampling - Building Area 1	W	A	Tetrachloroethylene			1.03E+00	1.30E-01	1.42E+01	2.04E-04	6.49E-02	3.24E-02
				CAS No.: 108883								
36	11-17	W	V	Toluene	266460	3910139	2.88E-03	3.63E-04	1.50E-01	2.16E-06	1.81E-04	9.07E-05
71	11-17S	W	V	Toluene	266521	3910149	4.30E-01	5.42E-02	4.30E+00	6.19E-05	2.71E-02	1.35E-02
180	11-2 Water Heaters, Natural Gas	S	V	Toluene	266711	3910086	1.11E-04	1.40E-05	2.68E-01	3.86E-06	1.40E-05	1.40E-05
164	11-27 Furnaces, Natural Gas	S	V	Toluene	266716	3910060	6.06E-05	7.64E-06	1.46E-01	2.10E-06	7.64E-06	7.64E-06
165	11-29 Furnaces, Natural Gas	S	V	Toluene	266739	3910123	7.07E-05	8.91E-06	1.71E-01	2.46E-06	8.91E-06	8.91E-06
166	11-30 Furnaces, Natural Gas	S	V	Toluene	266620	3910690	1.21E-05	1.52E-06	2.96E-02	4.26E-07	1.52E-06	1.52E-06
10	11-36	S	V	Toluene	266281	3910425	4.14E-01	5.22E-02	2.00E+03	2.88E-02	5.22E-02	5.22E-02
158	11-36 Boiler, Natural Gas	S	V	Toluene	266281	3910425	1.60E-05	2.02E-06	1.08E-01	1.56E-06	2.02E-06	2.02E-06
201	11-36 VentScrubber	S	V	Toluene	266281	3910425	3.45E+01	4.35E+00	1.66E+03	2.39E-02	4.35E+00	4.35E+00
202	11-36 Waste Trailer 1	S	V	Toluene	266281	3910425	5.00E-02	6.30E-03	1.00E+01	1.44E-04	6.30E-03	6.03E-03
203	11-36 Waste Trailer 3	S	V	Toluene	266281	3910425	5.00E-02	6.30E-03	4.00E+00	5.76E-05	6.30E-03	6.30E-03
18	11-36P	S	V	Toluene	266287	3910490	4.00E+00	5.04E-01	3.60E+02	5.18E-03	5.04E-01	5.04E-01
64	11-38S	W	V	Toluene	266246	3910196	6.00E-01	7.56E-02	1.10E+00	1.58E-05	3.78E-02	1.89E-02
159	11-43 Boiler, Natural Gas	S	V	Toluene	266465	3910193	5.40E-05	6.80E-06	3.77E-01	5.43E-06	6.80E-06	6.80E-06
181	11-48 Water Heaters, Natural Gas	S	V	Toluene	266556	3910123	3.24E-05	4.08E-06	7.84E-02	1.13E-06	4.08E-06	6.80E-06
42	11-51	W	V	Toluene	266292	3910088	6.92E-03	8.72E-04	1.44E+01	2.07E-04	4.36E-04	2.18E-04
16	11-9	W	V	Toluene	266515	3910714	4.46E-01	5.62E-02	5.81E+01	8.37E-04	2.81E-02	1.41E-02
172	12-100 Furnaces, Natural Gas	S	V	Toluene	267312	3910811	3.68E-05	4.64E-06	8.80E-02	1.27E-06	4.64E-06	4.64E-06

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants[1] for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
173	12-101 Furnaces, Natural Gas	S	V	Toluene	267788	3910873	4.09E-05	5.15E-06	9.86E-02	1.42E-06	5.15E-06	5.15E-06
174	12-102 Furnaces, Natural Gas	S	V	Toluene	267715	3910718	5.05E-05	6.36E-06	1.22E-01	1.76E-06	6.36E-06	6.36E-06
29	12-104	W	V	Toluene	267265	3910216	1.20E-03	1.51E-04	1.82E+00	2.62E-05	7.56E-05	3.78E-05
175	12-106 Furnaces, Natural Gas	S	V	Toluene	267688	3910796	3.68E-05	4.64E-06	1.19E-01	1.71E-06	4.64E-03	4.64E-03
176	12-106A Furnaces, Natural Gas	S	V	Toluene	267675	3910761	4.09E-05	5.15E-06	1.76E-01	2.53E-06	5.15E-03	5.15E-03
177	12-107 Furnaces, Natural Gas	S	V	Toluene	267692	3910852	5.05E-05	6.36E-06	2.41E-01	3.47E-06	6.36E-03	6.36E-03
12	12-110	W	V	Toluene	268036	3910814	4.12E-01	5.19E-02	2.14E+02	3.08E-03	2.60E-02	1.30E-02
47	12-111	W	V	Toluene	267983	3910838	3.27E-03	4.12E-04	1.70E+00	2.45E-05	2.06E-04	1.03E-04
178	12-112 Furnaces, Natural Gas	S	V	Toluene	267223	3910963	3.53E-05	4.45E-06	8.58E-02	1.24E-06	4.45E-06	4.45E-06
187	12-112 Water Heaters, Natural Gas	S	V	Toluene	267223	3910963	7.40E-06	9.32E-07	1.80E-02	2.59E-07	9.32E-07	9.23E-07
179	12-113 Furnaces, Natural Gas	S	V	Toluene	267365	3910842	3.28E-05	4.13E-06	7.95E-02	1.14E-06	4.13E-06	4.13E-06
48	12-16	W	V	Toluene	267803	3910653	1.02E+00	1.29E-01	1.19E+02	1.71E-03	6.43E-02	3.21E-02
55	12-21	W	V	Toluene	267655	3910218	1.88E-01	2.37E-02	7.20E+00	1.04E-04	1.18E-02	5.92E-03
53	12-25	W	V	Toluene	267589	3910055	3.00E-01	3.78E-02	3.00E-01	4.32E-06	1.89E-02	9.45E-03
168	12-28 Furnaces, Natural Gas	S	V	Toluene	267788	3910703	2.42E-05	3.05E-06	5.94E-02	8.55E-07	3.05E-06	3.05E-06
23	12-34SS	W	V	Toluene	267785	3910292	2.20E-04	2.77E-05	2.60E-02	3.74E-07	1.39E-05	6.93E-06
169	12-36 Furnaces, Natural Gas	S	V	Toluene	267393	3911010	4.04E-05	5.09E-06	9.75E-02	1.40E-06	5.09E-06	5.09E-06
170	12-39 Furnaces, Natural Gas	S	V	Toluene	267378	3910887	1.01E-05	1.27E-06	2.44E-02	3.51E-07	1.27E-06	1.27E-06
185	12-39 Water Heaters, Natural Gas	S	V	Toluene	267378	3910887	3.24E-05	4.08E-06	7.84E-02	1.13E-06	4.08E-06	4.08E-06
171	12-39A Furnaces, Natural Gas	S	V	Toluene	267350	3910889	2.32E-05	2.92E-06	5.51E-02	7.93E-07	2.92E-06	2.92E-06
43	12-41	W	V	Toluene	267503	3909659	2.37E+00	2.99E-01	2.59E+01	3.73E-04	1.49E-01	7.47E-02
45	12-44	W	V	Toluene	267410	3909939	1.90E-03	2.39E-04	1.18E+00	1.70E-05	1.20E-04	5.99E-05
182	12-5 Water Heaters, Natural Gas	S	V	Toluene	267872	3910891	5.76E-05	7.26E-06	1.40E-01	2.02E-06	7.26E-03	7.26E-06
51	12-59	W	V	Toluene	267681	3910660	2.50E-03	3.15E-04	1.30E+00	1.87E-05	1.58E-04	7.88E-05
167	12-6 Furnaces, Natural Gas	S	V	Toluene	267846	3910820	8.06E-06	1.02E-06	1.90E-02	2.74E-07	1.02E-06	1.02E-06

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants*[1] *for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
183	12-6 Water Heaters, Natural Gas	S	V	Toluene	267846	3910820	2.22E-05	2.80E-06	5.40E-02	7.78E-07	2.80E-06	1.02E-06
32	12-64	W	V	Toluene	267315	3910068	2.90E-03	3.65E-04	3.08E+00	4.44E-05	1.83E-04	9.14E-05
9	12-68	W	V	Toluene	267845	3910587	2.00E-04	2.52E-05	8.00E-01	1.15E-05	1.26E-05	6.30E-06
184	12-7 Water Heaters, Natural Gas	S	V	Toluene	267827	3910839	8.00E-06	1.01E-06	1.90E-02	2.74E-07	1.01E-03	1.01E-06
186	12-75 Water Heaters, Natural Gas	S	V	Toluene	267279	3910707	1.35E-04	1.70E-05	3.26E-01	4.69E-06	1.70E-02	1.01E-06
27	12-82	W	V	Toluene	267294	3909766	9.23E-02	1.16E-02	5.30E+01	7.63E-04	5.81E-03	2.91E-03
25	12-84	W	V	Toluene	267203	3910117	8.80E-03	1.11E-03	1.21E+01	1.74E-04	5.54E-04	2.77E-04
61	12-85	W	V	Toluene	267227	3910032	5.00E-04	6.30E-05	1.10E+00	1.58E-05	3.15E-05	1.58E-05
35	12-86	W	V	Toluene	267055	3909814	1.38E-02	1.74E-03	1.08E+01	1.56E-04	8.69E-04	4.35E-04
58	12-98	W	V	Toluene	267111	3910056	3.80E-03	4.79E-04	2.73E+00	3.93E-05	2.39E-04	1.20E-04
38	12-99	W	V	Toluene	267092	3909967	1.38E-02	1.74E-03	7.20E+00	1.04E-04	8.69E-04	4.35E-04
188	16-10 Water Heaters, Natural Gas	S	V	Toluene	265891	3911244	1.01E-04	1.27E-05	2.44E-01	3.51E-06	1.27E-02	1.27E-02
189	16-12 Water Heaters, Natural Gas	S	V	Toluene	268836	3911272	2.70E-04	3.40E-05	6.52E-01	9.39E-06	3.40E-02	3.40E-02
190	16-15 Water Heaters, Natural Gas	S	V	Toluene	265822	3911413	3.12E-04	3.93E-05	7.56E-01	1.09E-05	3.93E-02	3.93E-02
20	16-4	W	V	Toluene	265854	3911416	1.71E+00	2.15E-01	5.76E+01	8.29E-04	1.08E-01	5.39E-02
161	9-4 Furnaces, Natural Gas	S	V	Toluene	263530	3909933	1.26E-05	1.59E-06	3.08E-02	4.44E-07	1.59E-03	1.59E-03
162	9-5 Furnaces, Natural Gas	S	V	Toluene	263502	3909982	1.26E-05	1.59E-06	3.08E-02	4.44E-07	1.59E-03	1.59E-03
163	9-6 Furnaces, Natural Gas	S	V	Toluene	263407	3910183	1.26E-05	1.59E-06	3.08E-02	4.44E-07	1.59E-03	1.59E-03
235	Bulk Transport - Building Area 1	W	A	Toluene	267209	3912603	4.00E+00	5.04E-01	1.01E+01	1.45E-04	2.52E-01	1.26E-01
235	Drum Sampling - Building Area 1	W	A	Toluene	267209	3912603	8.00E-01	1.01E-01	1.00E+01	1.44E-04	5.04E-02	2.52E-02
57	FS-1	S	V	Toluene	265885	3913982	1.88E-01	2.37E-02	6.00E-01	8.64E-06	2.37E-02	2.73E-02
67	FS-22	S	V	Toluene	266603	3913623	1.00E-02	1.26E-03	6.00E-01	8.64E-06	1.26E-03	1.26E-03
134	FS-23	S	V	Toluene	266926	3913964	1.50E-01	1.89E-02	6.00E-01	8.64E-06	1.89E-02	1.89E-02
66	FS-24	S	V	Toluene	266094	3914090	1.00E-02	1.26E-03	6.00E-01	8.64E-06	1.26E-03	1.26E-03
50	FS-4	S	V	Toluene	266879	3914306	9.15E-03	1.15E-03	6.00E-01	8.64E-06	1.15E-03	1.15E-03
15	Gasoline Engines	S	A	Toluene	267272	3910461	4.41E-02	5.56E-03	1.50E+00	2.16E-05	5.56E-03	5.56E-03
1	Natural Gas Boilers (16-13)	S	P	Toluene	266865	3910813	9.60E-03	1.21E-03	2.50E+02	3.60E-03	1.21E-03	1.21E-03
Total for Toluene							5.19E+01	6.54E+00	4.91E+03	7.07E-02	5.88E+00	5.47E+00

TABLE B.3.6–2.—*Estimated Emission Rates from Facility-Wide Hazardous Air Pollutants*[1] *for 2,000, 1,000, and 500 Weapons Scenarios*-Continued

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
					CAS No.: 79016							
235	Drum Sampling - Building Area I	W	A	Trichloroethylene	267209	3912603	2.99E+0	3.77E-01	4.3E+01	6.19E-04	1.88E-01	9.42E-02
					CAS No.: 121448							
201	11-36 Vent Scrubber	S	V	Triethylamine	266281	3910425	8.00E-02	1.01E-02	0.00E+00	0.00E+00	1.01E-02	1.01E-02
					CAS No.: 1330207							
16	11-9	W	V	Xylene	266515	3910714	3.80E-03	4.79E-04	3.79E+00	5.46E-05	2.39E-04	1.20E-04
12	12-110	W	V	Xylene	268036	3910814	6.90E-01	8.69E-02	3.59E+02	5.17E-03	4.35E-02	2.17E-02
43	12-41	W	V	Xylene	267503	3909659	4.65E+00	5.86E-01	3.00E+01	4.32E-04	2.93E-01	1.46E-01
30	12-5	W	V	Xylene	267872	3910891	9.80E-05	1.23E-05	2.10E-01	3.02E-06	6.17E-06	3.09E-06
32	12-64	W	V	Xylene	267315	3910068	6.30E-03	7.94E-04	7.52E+00	1.08E-04	3.97E-04	1.98E-04
27	12-82	W	V	Xylene	267294	3909766	1.80E-03	2.27E-04	1.67E+00	2.40E-05	1.13E-04	5.67E-05
25	12-84	W	V	Xylene	267203	3910117	1.78E-02	2.24E-03	1.13E+01	1.63E-04	1.12E-03	5.61E-04
61	12-85	W	V	Xylene	267227	3910032	1.10E-03	1.39E-04	1.26E+00	1.81E-05	6.93E-05	3.47E-05
35	12-86	W	V	Xylene	267055	3909814	4.50E-03	5.67E-04	3.14E+00	4.52E-05	2.84E-04	1.42E-04
58	12-98	W	V	Xylene	267111	3910056	7.00E-04	8.82E-05	6.40E-01	9.22E-06	4.41E-05	2.21E-05
38	12-99	W	V	Xylene	267092	3909967	1.41E-02	1.78E-03	7.44E+00	1.07E-04	8.88E-04	4.44E-04
20	16-4	W	V	Xylene	265854	3911416	2.52E+00	3.18E-01	5.96E+01	8.58E-04	1.59E-01	7.94E-02
235	Bulk Transport - Building Area I	W	A	Xylene	267209	3912603	1.15E+00	1.45E-01	2.89E+00	4.16E-05	7.25E-02	3.62E-02
235	Drum Sampling - Building Area I	W	A	Xylene	267209	3912603	2.30E-01	2.90E-02	1.43E+00	2.06E-05	1.45E-02	7.25E-03
15	Gasoline Engines	S	A	Xylene	267272	3910461	2.65E-02	3.34E-03	9.00E-01	1.30E-05	3.34E-03	3.34E-03
	Total for Xylene						9.32E+0	1.17E+0	4.91E+02	7.07E-03	5.89E-01	2.96E-01

[a] Letter designates change in emissions. S for static emissions or no change with time and W for change associated with change in weapons program.
[b] Letter designates source modeling category. V = volume source, A = area source, P = point source.
[c] Emissions inventory listed for 2,000 Weapons Scenario (PC 1994). For ISCST2 and ISCLT2 modeling, the emissions rates (lb/hr and lb/yr, respectively) were converted to g/sec.
[d] Emissions inventory listed for 1,000 and 500 Weapons Scenarios have been assumed to be a linear regression (PC 1994).
[1] As listed in the *Clean Air Act*, as amended, Nov 1990 (42 U.S.C. 7401).
CAS No. - Chemical Abstract Service Registry Number.
NA - emission rate was not quantified for modeling.
Note: Pollutants related to burning of explosives are presented in Tables B.3.6–3, B.3.6–4, and B.3.6–5.
Source: PC 1994; calculated values.

TABLE B.3.6-3.—*Estimated Emission Rates for Hazardous Air Pollutants[1] from Open Burning for 2,000, 1,000, and 500 Weapons Scenarios*

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
210	Trays - Hemispheres	S	P	1,3-butadiene	265155	3914252	1.23E-07	1.55E-08	9.58E-06	1.38E-10	1.55E-08	1.55E-08
210	Trays - Hemispheres	S	P	Chromium	265155	3914252	2.13E-02	2.68E-03	3.33E+00	4.80E-05	2.68E-03	2.68E-03
210	Trays - HE	S	P	Dibenzofurans	265155	3914252	2.10E-04	2.65E-05	1.60E-01	2.30E-06	2.65E-05	2.65E-05
210	Trays - Hemispheres	S	P	Formaldehyde	265155	3914252	1.20E-06	1.51E-07	9.36E-05	1.35E-09	1.51E-07	1.51E-07
210	Trays - Hemispheres	S	P	Methyl Cyanide	265155	3914252	1.22E-08	1.54E-09	NA	NA	1.54E-09	1.54E-09
210	Trays - HE	S	P	Naphthalene	265155	3914252	1.20E-03	1.51E-04	9.00E-01	1.30E-05	1.51E-04	1.51E-04
210	Trays - HE	S	P	Phenol	265155	3914252	6.40E-03	8.06E-04	4.90E+00	7.06E-05	8.06E-04	8.06E-04

[a] Letter designates change in emissions. S for static emissions or no change with time and W for change associated with change in weapons program.
[b] Letter designates source modeling category. V = volume source, A = area source, P = point source.
[c] Emissions inventory listed for 2,000 Weapons Scenario (PC 1994). For ISCST2 and ISCLT2 modeling, the emissions rates (lb/hr and lb/yr, respectively) were converted to g/sec.
[d] Emissions inventory listed for 1,000 and 500 Weapons Scenarios have been assumed to be a linear regression (PC 1994).
NA - Emission rate was not quantified for modeling.
[1]As listed in the *Clean Air Act*, as amended, Nov 1990 (42 U.S.C. 7401).
Source: PC 1994; calculated values.

TABLE B.3.6–4.—*Estimated Emission Rates for Criteria Pollutants from the Burning Ground Upgrade for 2,000, 1,000, and 500 Weapons Scenarios*

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
300	BG Upgrade - Components	S	P	CO	265162	3914189	3.15E+01	3.97E+00	2.36E+02	3.40E-03	3.97E+00	3.97E+00
300	BG Upgrade - Pipes	S	P	CO	265162	3914189	3.08E+02	3.88E+01	1.08E+04	1.56E-01	3.88E+01	3.88E+01
300	BG Upgrade	S	P	Lead	265152	3914189	3.25E-01	4.09E-02	3.91E+02	5.63E-03	5.63E-03	5.63E-03
300	BG Upgrade - Components	S	P	NO_2	265162	3914189	9.81E+00	1.24E+00	7.36E+01	1.06E-03	1.06E-03	1.06E-03
300	BG Upgrade - Pipes	S	P	NO_2	265162	3914189	1.05E+02	1.32E+01	2.31E+03	3.33E-02	3.33E-02	3.33E-02
300	BG Upgrade	S	P	SO_2	265162	391418	2.88E-04	3.63E-05	2.16E-01	2.72E-02	3.63E-05	3.63E-05

[a] Letter designates change in emissions. S for static emissions or no change with time and W for change associated with change in weapons program.
[b] Letter designates source modeling category. V = volume source, A = area source, P = point source.
[c] Emissions inventory listed for 2,000 Weapons Scenario (PC 1994). For ISCST2 and ISCLT2 modeling, the emissions rates (lb/hr and lb/yr, respectively) were converted to g/sec.
[d] Emissions inventory listed for 1,000 and 500 Weapons Scenarios have been assumed to be a linear regression (PC 1994).
BG - Burning Ground
Source: PC 1994; calculated values

TABLE B.3.6-5.—*Estimated Emission Rates for Hazardous Air Pollutants from the Burning Ground Upgrade for 2,000, 1,000, and 500 Weapons Scenarios*

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT AND 2,000 WEAPONS SCENARIO[c]				1,000 WEAPONS SCENARIO[d]	500 WEAPONS SCENARIO[d]
					X, UTM (meters)	Y, UTM (meters)	(lb/hr)	(g/sec)	(lb/yr)	(g/sec)	(g/sec)	(g/sec)
300	BG Upgrade	S	P	Chromium	265162	3914189	2.03E-02	2.56E-03	4.68E+00	6.74E-05	2.56E-03	2.56E-03
300	BG Upgrade	S	P	HCl	265162	3914189	1.00E+00	1.26E-01	3.09E+01	4.45E-04	1.26E-01	1.26E-01
300	BG Upgrade	S	P	HCN	265162	3914189	1.21E-04	1.52E-05	4.24E-03	6.11E-08	1.52E-05	1.52E-05
300	BG Upgrade	S	P	HF	265162	3914189	1.06E+00	1.34E-01	4.97E+01	7.16E-04	1.34E-01	1.34E-01
300	BG Upgrade	S	P	Nickel	265162	3914189	3.51E-03	4.42E-04	3.60E-01	5.18E-06	4.42E-04	4.42E-04
300	BG Upgrade	S	P	Titanium	265162	3914189	9.44E-03	1.19E-03	7.08E-02	1.02E-06	1.19E-03	1.19E-03

[a] Letter designates change in emissions. S for static emissions or no change with time and W for change associated with change in weapons program.
[b] Letter designates source modeling category. V = volume source, A = area source, P = point source.
[c] Emissions inventory listed for 2,000 Weapons Scenario (PC 1994). For ISCST2 and ISCLT2 modeling, the emissions rates (lb/hr and lb/yr, respectively) were converted to g/sec.
[d] Emissions inventory listed for 1,000 and 500 Weapons Scenarios have been assumed to be a linear regression (PC 1994).
BG - Burning Ground
Source: PC 1994; calculated values

TABLE B.3.6–6.—*High Explosive Emission Factors*

EXPLOSIVE	POLLUTANTS			
	CO (lb/ton)	NO_2 (lb/ton)	HCl (lb/ton)	HF (lb/ton)
PBX-9404[a]	5.50	37.90	21.88	0.00
LX-17[a]	51.80	139.00	39.38	80.03
LX-04[b]	0.95	25.12	220.80	528.00

[a]Radian 1993
[b]Carter 1978

TABLE B.3.6–7.—*Calculated Emission Rates for Pantex Affected Environment*

EXPLOSIVE	PERCENTAGE BY WEIGHT[a]	POLLUTANTS			
		CO (g/sec)	NO_2 (g/sec)	HCl (g/sec)	HF (g/sec)
PBX-9404	75%	0.0260	0.1780	0.1030	0.0000
LX-17	25%	0.0816	0.2190	0.0621	0.1260
Total	100%	0.1076	0.3970	0.1651	0.1260

[a]Weight is based on 100 lbs.
Note: Emission rates were calculated using emission factors from Table B.3.6–6.
Source: PC 1994

TABLE B.3.6–8.—*Calculated Emission Rates for 2,000, 1,000, and 500 Weapons*

EXPLOSIVE	PERCENTAGE BY WEIGHT[a]	POLLUTANTS			
		CO (g/sec)	NO_2 (g/sec)	HCl (g/sec)	HF (g/sec)
PBX-9404	75%	0.0260	0.1780	0.1030	0.0000
LX-04	25%	0.0015	0.8320	0.0396	0.3480
Total	100%	0.0275	1.0100	0.1426	0.3480

[a]Weight is based on 100 lbs.
Note: Emission rates were calculated using emission factors from Table B.3.6–6.
Source: PC 1994

TABLE B.3.6–9.—*Estimated Pollutant Emission Rates for Criteria and Hazardous Air Pollutants[1] from Open Burning for 2,000, 1,000, and 500 Weapons Scenarios*

SERIAL NO.	FACILITY	STATUS[a]	SOURCE CATEGORY[b]	POLLUTANT	COORDINATES		AFFECTED ENVIRONMENT[c]	2,000 WEAPONS SCENARIO[c]	1,000 WEAPONS SCENARIO[c]	500 WEAPONS SCENARIO[c]
					X, UTM (meters)	Y, UTM (meters)	(g/sec)	(g/sec)	(g/sec)	(g/sec)
210	Trays - Hemispheres	S	P	CO (Criteria)	265155	3914252	1.08E-01	2.75E-02	2.75E-02	2.75E-02
210	Trays - Hemispheres	S	P	NO_2 (Criteria)	265155	3914252	3.97E-01	1.01E+00	1.01E+00	1.01E+00
210	Trays - HE	S	P	PM10 (Criteria)	265155	3914252	1.21E+01	1.21E+01	1.21E+01	1.21E+01
210	Trays - Hemispheres	S	P	HCl (Non-Criteria)	265155	3914252	1.65E-01	1.43E-01	1.43E-01	1.43E-01
210	Trays - Hemispheres	S	P	HF (Non-Criteria)	265155	3914252	1.26E-01	3.48E-01	3.48E-01	3.48E-01

[a] Letter designates change in emissions. S for static emissions or no change with time in weapons program.
[b] Letter designates source modeling category. V = volume source, A = area source, P = point source.
[c] Emissions inventory listed for Affected Environment, 2,000, 1,000, and 500 Weapons Scenarios were calculated from Carter Emission Factors (Carter 1978).
[1] As listed in the Clean *Air Act*, as amended, Nov 1990 (42 U.S.C. 7401).
Note: Values summarized in this table were obtained from Tables B.3.6–7 and B.3.6–8.
Source: PC 1994; calculated values

TABLE B.4.1–1.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants at Local Residences Surrounding the Pantex Plant, ($\mu g/m^3$)*

POLLUTANT	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1,1,2-trichloroethane	Annual	5.50E+01	6.89E-02	3.32E-02	1.43E-02	3.69E-03	2.25E-03	2.10E-03	2.19E-03	3.19E-03	4.99E-03	7.55E-03	4.82E-02
	30-min	5.50E+02	1.72E+01	2.26E+00	1.52E+00	1.16E+00	1.09E+00	1.27E+00	9.87E-01	1.07E+00	1.08E+00	1.82E+00	1.03E+01
1,3-butadiene - 45.4 kg (100 lb) HE	Annual	1.10E+01	1.89E-03	1.71E-03	7.64E-04	5.40E-03	3.70E-04	3.40E-04	2.50E-04	8.60E-04	9.10E-04	2.38E-03	2.10E-03
	30-min	1.10E+02	8.85E-01	9.75E-01	5.51E-01	4.96E-01	5.54E-01	4.57E-01	3.27E-01	1.27E+00	6.54E-01	1.85E+00	6.81E-01
1,3-butadiene - 363 kg (800 lb) HE	Annual	1.10E+01	1.89E-03	1.71E-03	7.64E-04	5.40E-03	3.70E-04	3.40E-04	2.50E-04	8.60E-04	9.10E-04	2.38E-03	2.10E-03
	30-min	1.10E+02	8.85E-01	9.75E-01	5.51E 01	4.96E-01	5.54E-01	4.57E-01	3.27E-01	1.27E+00	6.54E-01	1.85E+00	6.81E-01
2-nitropropane	Annual	5.00E+00	2.57E-02	2.39E-02	1.04E-02	2.53E-03	1.23E-03	1.20E-03	1.14E-03	2.15E-03	2.21E-03	4.12E-03	1.72E-02
	30-min	5.00E+01	3.14E+00	2.95E+00	1.04E+00	6.37E-01	4.52E-01	5.60E-01	3.30E-01	2.49E+00	5.37E-01	1.03E+00	4.06E+00
Alcohols[a]	Annual	NA	4.41E-01	3.71E-01	1.86E-01	5.86E-02	3.36E-02	2.71E-02	2.91E-02	5.51E-02	9.87E-02	2.60E-01	3.26E-01
	30-min	1.00E+02	3.71E+01	3.48E+01	2.78E+01	1.35E+01	1.27E+01	1.20E+01	2.30E+01	2.94E+01	3.73E+01	1.12E+02	4.79E+01
Benzene	Annual	3.00E+00	3.59E-02	3.19E-02	1.53E-02	4.86E-03	2.76E-03	2.74E-03	2.50E-03	5.99E-03	7.54E-03	1.49E-02	2.65E-02
	30-min	7.50E+01	3.22E+00	3.04E+00	1.12E+00	7.72E-01	6.38E-01	6.83E-01	6.56E-01	2.55E+00	1.85E+00	2.76E+00	4.16E+00
Carbon Disulfide	Annual	3.00E+00	6.78E-02	6.32E-02	2.76E+00	6.70E-02	3.26E-03	3.17E-03	3.01E-02	5.69E-03	5.85E-03	1.09E-02	4.53E-02
	30-min	3.00E+01	8.33E+00	7.81E+00	2.76E+00	1.68E+00	1.19E+00	1.48E+00	8.73E-01	6.59E+00	1.42E+00	2.71E+00	1.08E+01
Carbon Tetrachloride	Annual	1.30E+01	5.92E-02	5.52E-02	2.41E-02	5.85E-03	2.84E-03	2.77E-03	2.63E-03	4.96E-03	5.10E-03	9.51E-03	3.95E-02
	30-min	1.26E+02	7.26E+00	6.81E+00	2.41E+00	1.47E+00	1.04E+00	1.29E+00	7.62E-01	5.75E+00	1.24E+00	2.37E+00	9.37E+00
Chlorobenzene	Annual	4.60E+01	5.87E-02	5.48E-02	2.39E-02	5.81E-03	2.82E-03	2.75E-03	2.61E-03	4.92E-03	5.07E-03	9.44E-03	3.93E-02
	30-min	4.60E+02	7.21E+00	6.77E+00	2.39E+00	1.46E+00	1.03E+00	1.28E+00	7.56E-01	5.71E+00	1.23E+00	2.35E+00	9.31E+00
Chromium - 45.4 kg (100 lb) HE	Annual	1.00E-01	9.00E-05	4.30E-04	1.22E-03	1.00E-04	4.00E-05	3.00E-05	3.00E-04	3.00E-05	2.00E-05	4.00E-05	6.00E-05
	30-min	1.00E+00	3.08E 02	4.06E-02	7.38E-02	3.01E-02	2.17E-02	1.12E-02	1.17E-02	9.15E-03	1.29E-02	1.60E 02	2.05E-02
Chromium - 363 kg (800 lb) HE	Annual	1.00E-01	3.00E-05	7.00E-05	8.00E-05	2.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05	1.00E-05	1.00E-05	2.00E-05
	30-min	1.00E+00	4.38E-03	5.21E-03	5.96E 03	3.58E-03	2.73E-03	1.93E-03	2.84E-03	3.88E-03	4.17E-03	4.31E-03	4.70E 03
CO - 45.4 kg (100 lb) HE	1-hour	4.00E+04[b]	2.27E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.95E+01	2.76E+01	6.01E+01	7.49E+01	1.17E+02	1.39E+02
	8 hour	1.00E+04[b]	5.22E+01	8.19E+01	2.26E+01	8.29E+00	6.75E+00	9.28E+00	6.11E+00	9.09E+00	1.32E+01	2.49E+01	1.73E+01
CO - 363 kg (800 lb) HE	1-hour	4.00E+04[b]	2.27E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.95E+01	2.76E+01	6.01E+01	7.49E+01	1.17E+02	1.39E+02
	8-hour	1.00E+04[b]	5.22E+01	8.19E+01	2.26E+01	8.29E+00	6.25E+00	9.28E+00	6.11E+00	9.09E+00	1.32E+01	2.49E+01	1.73E+01

TABLE B.4.1–1.—*Estimated Maximum Concentrations of Hazardous Air*[1] *and Criteria Pollutants at Local Residences Surrounding the Pantex Plant, (μg/m³)*-Continued

POLLUTANT	AVG. TIME	NAAQS OR ESL μg/m³	RESIDENCE										
			1	2	3	4	5	6	7	8	9	10	11
Cresols	Annual	NA	1.24E-03	1.16E-03	5.00E-04	1.20E-04	6.00E-05	6.00E-05	6.00E-05	1.00E-04	1.10E-04	2.00E-04	2.00E-04
	30-min	5.0E+00	1.52E-01	1.43E-01	5.05E-02	3.08E-02	2.18E-02	2.71E-02	1.59E-02	1.21E-01	2.50E-02	4.96E-02	1.96E-01
Cresylic Acid	Annual	NA	1.50E-03	1.44E-03	6.30E-04	1.50E-04	7.00E-05	7.00E-05	7.00E-05	1.30E-04	1.30E-04	2.50E-03	1.00E-03
	30-min	5.0E+00	1.89E-01	1.78E-01	6.28E-02	3.83E-02	2.72E-02	3.37E-02	1.99E-02	1.50E-01	3.23E-02	6.17E-02	2.44E-01
Dibenzofurans - 45.4 kg (100 lb) HE	Annual	NA	0.00E+00	0.00E+00	1.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	30-min	NA	3.00E-04	4.00E-04	7.30E-04	3.00E-04	2.10E-04	1.10E-04	1.20E-04	9.00E-05	1.30E-04	1.60E-04	2.00E-04
Dibenzofurans - 363 kg (800 lb) HE	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	30-min	NA	4.00E-05	6.00E-05	6.00E-05	4.00E-05	3.00E-05	2.00E-05	3.00E-05	4.00E-05	4.00E-05	4.00E-05	4.00E-05
Dimethylformamide	Annual	3.00E+01	3.44E-02	3.44E-02	2.96E-02	1.64E-02	1.11E-02	5.42E-03	7.13E-03	1.62E-02	1.75E-02	2.67E-02	3.09E-02
	30-min	3.00E+02	6.82E+00	8.30E+00	8.52E+00	3.13E+00	5.90E+00	6.70E+00	6.23E+00	6.06E+00	7.08E+00	1.41E+00	7.15E+00
Ethyl Glycol Ethers	Annual	NA	1.08E-01	1.01E-01	4.39E-02	1.01E-02	5.18E-03	5.05E-03	4.79E-03	9.05E-03	9.32E-03	1.73E-02	7.22E-02
	30-min	NA	1.32E+01	1.24E+01	4.39E+00	2.68E+00	1.91E+00	2.36E+00	1.39E+00	1.05E+01	2.26E+00	4.32E+00	1.71E+01
Ethyl Acetate	Annual	1.44E+03	2.31E+00	1.68E+00	1.02E+00	4.05E+00	2.56E-01	1.84E-01	2.14E-01	4.06E-01	9.91E-01	4.32E+00	1.71E+01
	30-min	1.44E+04	2.48E+02	2.95E+02	2.89E+02	1.53E+02	1.46E+02	1.37E+02	2.61E+02	1.55E+02	3.94E+02	1.26E+03	3.67E+02
Ethyl Benzene	Annual	4.34E+02	9.35E-02	8.72E-02	3.80E-02	9.24E-03	4.49E-03	4.37E-03	4.15E-03	7.84E-03	8.07E-03	1.50E-02	6.25E-02
	30-min	2.00E+03	1.15E+01	1.08E+01	3.80E+00	2.32E+00	1.65E+00	2.04E+00	1.20E+00	9.09E+00	1.96E+00	3.74E+00	1.48E+01
Ethylene Dichloride	Annual	4.00E+00	2.88E-02	2.69E-02	1.17E-02	2.85E-03	1.38E-03	1.35E-03	1.28E-03	2.41E-03	2.48E-03	4.63E-03	1.93E-02
	30-min	1.60E+02	3.53E+00	3.32E+00	1.17E+00	7.15E-01	5.07E-01	6.29E-01	3.71E-01	2.80E+00	6.03E-01	1.15E+00	4.56E+00
Formaldehyde - 45.4 kg (100 lb) HE	Annual	1.50E+00	7.10E-04	7.70E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.90E-04	2.70E-04	5.30E-04	6.20E-04
	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	4.01E-02	3.56E-02	4.74E-02	3.40E-02	6.32E-02	8.43E-02	7.87E-02
Formaldehyde - 363 kg (800 lb) HE	Annual	1.50E+00	7.10E-04	7.70E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.90E-04	2.70E-04	5.30E-04	6.20E-04
	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	4.01E-02	3.56E-02	4.74E-02	3.40E-02	6.32E-02	8.43E-02	7.87E-02
HCl - 45.4 kg (100 lb) HE	Annual	1.00E-01	3.47E-02	2.81E-02	5.06E-02	6.00E-03	4.00E-03	5.20E-03	5.28E-03	7.53E-03	3.47E-03	4.28E-03	7.85E-03
	30-min	7.50E+01	1.71E+00	2.57E+00	4.04E+00	1.85E+00	1.34E+00	9.51E-01	8.24E-01	9.45E-01	8.58E-01	2.07E+00	1.23E+00
HCl - 363 kg (800 lb) HE	Annual	1.00E-01	1.11E-02	1.76E-02	3.28E-02	4.04E-03	1.83E-03	1.23E-03	1.08E-03	1.39E-03	6.80E-04	1.05E-03	2.15E-03
	30-min	7.50E+01	8.43E-01	2.30E+00	2.94E+00	1.76E+00	1.34E+00	6.90E-01	4.05E-01	3.33E-01	2.22E-01	6.83E-01	5.46E-01
HF - 45.4 kg (100 lb) HE	3-hour	4.90E+00	1.35E-01	4.09E-01	1.03E+00	3.89E-01	1.66E-01	1.76E-01	1.03E-01	8.48E-02	3.35E-02	4.56E-02	1.34E-01
	12-hour	3.68E+00	3.37E-02	1.02E-01	2.57E-01	1.06E-01	4.16E-02	4.39E-02	2.58E-02	2.12E-02	8.38E-03	5.70E-02	3.36E-02
	24-hour	2.86E+00	1.68E-02	6.05E-03	1.54E-01	7.58E-02	2.08E-02	2.63E-02	1.34E-02	1.06E-02	4.19E-03	1.14E-02	1.68E-02

TABLE B.4.1–1.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants at Local Residences Surrounding the Pantex Plant, (µg/m³)*-Continued

POLLUTANT	AVG. TIME	NAAQS OR ESL µg/m³	RESIDENCE										
			1	2	3	4	5	6	7	8	9	10	11
HF - 363 kg (800 lb) HE	3-hour	4.90E+00	5.07E-02	7.44E-02	8.56E-02	5.61E-02	4.03E-02	2.46E-02	2.07E-02	2.12E-02	2.73E-02	2.53E-02	3.92E-02
	12-hour	3.68E+00	1.27E-02	1.86E-02	2.14E-02	1.40E-02	1.01E-02	6.15E-03	5.27E-03	6.87E-03	6.82E-03	6.23E-03	9.81E-03
	24-hour	2.86E+00	6.34E-03	1.59E-02	1.20E-02	9.35E-03	5.26E-03	3.81E-03	3.09E-03	4.63E-03	3.41E-03	3.16E-03	5.53E-03
Lead	1st Qtr	1.50E+00[a]	5.20E-04	6.80E-04	6.00E-04	2.80E-04	2.40E-04	2.00E-04	1.70E-04	2.20E-04	3.90E-04	6.10E-04	5.50E-04
	2nd Qtr	1.50E+00[a]	3.10E-04	6.50E-04	6.20E-04	6.40E-04	3.90E-04	1.20E-04	1.60E-04	1.40E-04	1.60E-04	2.70E-04	3.10E-04
	3rd Qtr	1.50E+00[a]	1.06E-03	1.29E-03	1.07E-03	8.30E-04	3.00E-04	1.10E-04	1.20E-04	1.30E-04	1.00E-04	2.20E-04	6.20E-04
	4th Qtr	1.50E+00[a]	6.80E-04	7.80E-04	6.40E-04	5.40E-04	1.70E-04	2.10E-04	1.40E-04	2.40E-04	2.40E-04	5.80E-04	6.40E-04
Mercury	Annual	5.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	30-min	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	24-hour	2.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methanol	Annual	2.62E+02	3.64E-01	4.42E-01	2.84E-01	1.50E-01	1.00E-01	5.04E-02	6.52E-02	1.47E-01	1.58E-01	2.44E-01	3.12E-01
	30-min	2.62E+03	6.17E+01	7.29E+01	7.45E+01	2.73E+01	5.16E+01	5.86E+01	5.45E+01	5.40E+01	6.19E+01	1.23E+02	6.25E+01
Methyl Cyanide - 4.54 kg (100 lb) HE	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	30-min	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Cyanide - 363 kg (800 lb) HE	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	30-min	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Ethyl Ketone	Annual	5.90E+02	1.36E+00	8.24E-01	6.38E-01	2.83E-01	1.83E-01	1.27E-01	1.48E-01	2.83E-01	6.75E-01	1.87E+00	1.20E+00
	30-min	3.90E+03	1.85E+02	1.98E+02	2.03E+02	1.09E+02	1.05E+02	9.84E+01	1.88E+02	1.14E+02	2.75E+02	8.98E+02	2.77E+02
Methyl Isobutyl Ketone	Annual	2.05E+02	1.53E-01	1.43E-02	6.22E-03	1.51E-03	7.30E-04	7.20E-04	6.80E-04	1.28E-03	1.32E-03	2.46E-03	1.10E-02
	30-min	2.05E+03	1.88E+00	1.76E+00	6.22E-01	3.80E-01	2.69E-01	3.34E-01	1.97E-01	1.49E+00	3.21E-01	6.12E-01	2.42E+00
Methylene Chloride	Annual	2.60E+01	4.67E-01	3.92E-01	1.97E-01	6.21E-02	3.56E-02	2.87E-02	3.08E-02	5.84E-02	1.05E-01	2.75E-01	3.45E-01
	30-min	2.60E+02	3.93E+01	3.69E+01	2.90E+01	1.39E+01	1.32E+01	1.24E+01	2.36E+01	3.11E+01	3.77E+01	1.15E+02	5.07E+01
Naphthalene - 45.4 kg (100 lb) HE	Annual	5.00E+01	1.00E-05	2.00E-05	7.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	30-min	4.40E+02	1.73E-03	2.28E-03	4.16E-03	1.70E-03	1.30E-03	6.30E-04	6.60E-04	5.20E-04	7.30E-04	9.00E-04	1.16E-03
Naphthalene - 363 kg (800 lb) HE	Annual	5.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	30-min	4.40E+02	2.50E-04	2.90E-04	3.40E-04	2.00E-04	1.20E-03	1.10E-04	1.60E-04	2.20E-04	2.30E-04	2.40E-04	2.60E-04
Nitrobenzene	Annual	5.00E+00	1.54E-03	1.44E-03	6.30E-04	1.50E-04	7.00E-05	7.00E-05	7.00E-05	1.30E-04	1.30E-04	2.50E-04	1.03E-03
	30-min	2.40E+01	1.89E-01	1.78E-01	6.28E-02	3.83E-02	2.72E-02	3.37E-02	1.99E-02	1.50E-01	3.23E-02	6.17E-02	2.45E-01

TABLE B.4.1–1.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants at Local Residences Surrounding the Pantex Plant, ($\mu g/m^3$)*-Continued

POLLUTANT	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE										
			1	2	3	4	5	6	7	8	9	10	11
NO_2 - 45.4 kg (100 lb) HE	Annual	1.00E+02[b]	2.46E-01	3.15E-01	4.76E-01	9.53E-02	6.04E-02	5.25E-02	5.24E-02	9.41E-02	8.79E-02	1.65E-01	1.99E-01
NO_2 - 363 kg (800 lb) HE	Annual	1.00E+02[b]	2.18E-01	3.06E-01	2.56E-01	8.29E-02	5.21E-02	3.37E-02	3.14E-02	5.93E-02	7.30E-02	1.46E-01	1.71E-01
Phenol - 45.4 kg (100 lb) HE	Annual	1.90E+01	3.00E-05	1.30E-04	3.70E-04	3.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05
	30-min	1.54E+02	9.25E-03	1.22E-02	2.22E-02	9.05E-03	6.53E-03	3.37E-03	3.51E-03	2.75E-03	3.89E-03	4.82E-03	6.17E-03
Phenol - 363 kg (800 lb) HE	Annual	1.90E+01	1.00E-05	2.00E-05	2.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	1.00E-05
	30-min	1.54E+02	1.32E-03	1.57E-03	1.79E-03	1.08E-03	8.20E-04	5.80E-04	8.50E-04	1.17E-03	1.25E-03	1.30E-03	1.41E-03
PM_{10} - 45.4 kg (100 lb) HE	Annual	5.00E+01[b]	6.87E-01	2.13E+00	5.64E+00	5.19E-01	2.13E-01	1.51E-01	1.52E-01	2.11E-01	2.38E-01	4.39E-01	5.22E-01
	24-hour	1.50E+02[b]	8.85E+00	2.17E+01	5.36E+01	1.26E+01	1.03E+01	3.14E+00	3.32E+00	2.41E+00	3.16E+00	6.07E+00	5.00E+00
PM_{10} - 363 kg (800 lb) HE	Annual	5.00E+01[b]	4.05E-01	5.08E-01	4.70E-01	1.27E-01	7.98E-02	9.08E-02	9.28E-02	1.55E-01	1.78E-01	3.43E-01	3.62E-01
	24-hour	1.50E+02[b]	1.89E+00	3.92E+00	4.68E+00	2.19E+00	1.49E+00	1.48E+00	1.82E+00	1.45E+00	2.47E+00	4.70E+00	3.26E+00
Tetrachloroethylene	Annual	3.40E+01	5.29E-02	4.94E-02	2.15E-02	5.23E-03	2.54E-03	2.48E-03	2.35E-03	4.44E-03	4.57E-03	8.51E-03	3.54E-03
	30-min.	3.40E+02	6.50E+00	6.10E+00	2.15E+00	1.31E+00	9.32E-01	1.16E+00	6.80E-01	5.14E+00	1.10E+00	2.11E+00	8.34E-01
Toluene	Annual	1.88E+02	1.15E+00	1.18E+00	7.49E-01	3.79E-01	2.50E-01	1.33E-01	1.66E-01	3.61E-01	4.34E-01	6.78E-01	9.50E-01
	30-min	1.88E+03	1.39E+02	1.62E+02	1.63E+02	7.34E+01	1.16E+02	1.25E+02	1.20E+02	1.17E+02	1.35E+02	2.69E+02	1.45E+02
Trichloroethylene	Annual	1.35E+02	1.53E-01	1.43E-01	6.24E-02	1.52E-02	7.36E-03	6.82E-03	1.28E-02	1.32E-02	2.47E-02	1.03E-01	1.12E-01
	30-min.	1.35E+03	1.88E+00	1.77E+01	6.24E+00	8.81E+00	2.70E+00	3.35E+00	1.98E+00	1.49E+01	3.21E+00	1.14E+00	1.43E+01
Triethylamine	Annual	4.00E+00	1.32E-03	1.68E-03	1.14E-03	6.30E-03	4.30E-04	2.10E-04	6.20E-04	1.03E-03	1.19E-02	1.00E-05	2.00E-05
	30-min.	4.00E+01	2.61E-01	3.19E-01	3.27E-01	1.20E-01	2.26E-01	2.57E-01	2.39E-01	2.32E-01	2.72E-01	5.40E-01	2.74E-01
Xylene	Annual	4.34E+02	2.23E-01	2.03E-01	1.48E-01	6.11E-02	3.43E-02	2.66E-02	2.39E-02	4.68E-02	9.84E-02	1.52E-01	1.83E-01
	30-min	3.70E+03	1.57E+01	4.59E+01	1.85E+01	1.73E+01	7.96E+00	1.22E+01	1.12E+01	1.11E+01	2.85E+01	5.51E+01	2.33E+01

[a]Alcohols - Alcohols is the only pollutant which exceeded the ESL at the fence line. Therefore, modeling results were also reported for all the residences for alcohols.
[b]Indicates a NAAQS. Other values are ESLs.
[1]As listed in the *Clean Air Act*, as amended, Nov 1990 (42 U.S.C. 7401).
NA - An ESL has not been established by TNRCC.
Note: Table shows the results (maximum concentrations at residences) from models ISCST2 and ISCLT2.
Sources: TNRCC 1993a; TNRCC 1996a

TABLE B.4.1–2.—*Calculated Concentrations of Individual Alcohols Based on Percentage of Inventory*

ALCOHOLS	TOTAL QUANTITIES (GALLONS)	PERCENT OF INVENTORY (GALLONS)	PRORATED CONCEN-TRATIONS (μg/m^3)	1-HOUR ESL (μg/m^3)	PERCENT OF ESL
Gelvatol 9000	3.12E+01	1.78	3.46	NA	NA
1-butanol/ N-butyl Alcohol	1.18E+01	6.72E-01	1.31	7.60E+02	0.2
2-methyl 1-propanol	3.50E-01	2.00E-02	3.89E-02	NA	NA
2-propanol/ Isopropyl Alcohol	1.11E+03	6.30E+01	1.23E+02	7.86E+03	1.6
Methanol / Methyl Alcohol	4.56E+02	2.60E+01	5.07E+01	2.62E+03	1.9
Ethyl Alcohol	1.07E+02	6.11	1.19E+01	1.88E+04	0.1
1-propanol/ Propyl Alcohol/n-propyl Alcohol	2.94E+01	1.68	3.27	4.92E+03	0.1
Cetyl Alcohol/ 1-hexadecanol	3.40	1.94E-01	3.78E-01	NA	NA
TERT-AMYL Alcohol	3.20	1.82E-01	3.56E-01	8.30E+02	0.0
Triton X-100	1.30	7.41E-02	1.44E-01	6.00E+02	0.0
1-tetradecanol	2.24E-01	1.28E-02	2.49E-02	NA	NA
Cinnamyl Alcohol	1.79E-01	1.02E-02	1.99E-02	NA	NA
Elvanol Polyvinyl Alcohol	2.60E-01	1.48E-02	2.89E-02	NA	NA
1-octanol	1.00	5.70E-02	1.11E-01	1.01E+02	0.1
2-butanol/SEC-Butyl Alcohol	1.72	9.82E-02	1.91E-01	3.03E+03	0.0
WABCOL Alcohol Prep Pad	7.46E-01	4.25E-02	8.29E-02	NA	NA
Phenolphthalein Indicator	1.00E-01	5.70E-03	1.11E-02	NA	NA
2-pentanol	6.61E-01	3.77E-02	7.35E-02	NA	NA
Cyclohexanol	1.25E-01	7.13E-03	1.39E-02	6.01E+03	0.0
Total	1.75E+03	—	—	—	—

Source: PC 1996l

TABLE B.4.2–1.—*Percentage of the NAAQS Consumed by the Estimated Maximum Criteria Pollutant Concentration at Pantex Plant Boundary (2,000 Weapons)*

POLLUTANT	AVERAGING TIME	NAAQS μg/m³	MAXIMUM CONCENTRATION AT BOUNDARY μg/m³	PERCENT OF NAAQS
CO - 45.4 kg (100 lb) HE	1-hour	4.00E+04	9.24E+02	2.3
	8-hour	1.00E+04	1.61E+02	1.6
CO - 363 kg (800 lb) HE	1-hour	4.00E+04	9.24E+02	2.3
	8-hour	1.00E+04	1.61E+02	1.6
CO - BGU	1-hour	4.00E+04	2.90E+03	7.3
	8-hour	1.00E+04	6.02E+02	6.0
Lead	1st Qtr	1.50	1.02E-03	0.1
	2nd Qtr	1.50	9.64E-04	0.1
	3rd Qtr	1.50	1.58E-03	0.1
	4th Qtr	1.50	9.50E-03	0.6
Lead - BGU	1st Qtr	1.50	2.28E-02	1.5
	2nd Qtr	1.50	6.62E-02	4.4
	3rd Qtr	1.50	9.36E-02	6.2
	4th Qtr	1.50	4.14E-02	2.8
NO_2 - 45.4 kg (100 lb) HE	Annual	1.00E+02	2.15	2.1
NO_2 - 363 (800 lb) HE	Annual	1.00E+02	6.39E-01	0.6
NO_2 - BGU	Annual	1.00E+02	5.42E-01	0.5
PM_{10} - 45.4 kg (100 lb) HE	Annual	5.00E+01	8.73	17.5
	24-hour	1.50E+02	8.85E+01	59.0
PM_{10} - 363 kg (800 lb) HE	Annual	5.00E+01	1.51	3.0
	24-hour	1.50E+02	2.24E+01	14.9
SO_2 - BGU	Annual	8.00E+01	0.00[a]	0.0[b]
	24-hour	3.65E+02	2.00E-05	0.0[b]
	3-hour	1.30E+03	8.00E-05	0.0[b]
	30-min	1.02E+03	1.60E-04	0.0[b]

[a]The ISCST2 air quality model returns a value of 0.00 for any concentration equal to or less than 1.00×10^{-5} μg/m³ (i.e. less than one ten millionth of a part per billion or less than the ten parts per quadrillion.

[b]Percent of NAAQS is shown as zero, as it is below 0.05.

Note: Table shows the results (maximum concentrations at boundary) from models ISCST2 and ISCLT2.

Source: TNRCC 1993a

TABLE B.4.2–2.—*Percentage of the TNRCC ESL Consumed by the Estimated Maximum Concentration of Air Pollutants at Pantex Plant Boundary (2,000 Weapons)*

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM CONCENTRATION AT BOUNDARY $\mu g/m^3$	PERCENT OF ESL
***Clean Air Act* Listed Air Pollutants**				
1,1,2-trichloroethane	Annual	5.50E+01	8.07E-02	0.1
	30-min	5.50E+02	1.73E+01	3.2
1,3-butadiene - 45.4 kg (100 lb) HE	Annual	1.10E+01	9.09E-03	0.1
	30-min	1.10E+02	3.76	3.4
1,3-butadiene - 363 kg (100 lb) HE	Annual	1.10E+01	9.09E-03	0.1
	30-min	1.10E+02	3.76	3.4
2-nitropropane	Annual	5.00	3.56E-02	0.7
	30-min	5.00E+01	8.55	17.1
Alcohols	Annual	NA	7.01E-01	—
	30-min	1.00E+02	1.95E+02	195.0
Benzene	Annual	3.00	5.47E-02	1.8
	30-min	7.50E+01	1.94E+01	25.9
Carbon Disulfide	Annual	3.00	9.39E-02	3.1
	30-min	3.00E+01	2.26E+01	75.3
Carbon Tetrachloride	Annual	1.30E+01	8.19E-02	0.6
	30-min	1.26E+02	1.97E+01	15.6
Chlorobenzene	Annual	4.60E+01	8.13E-02	0.2
	30-min	4.60E+02	1.95E+01	4.3
Chromium - 45.4 kg (100 lb) HE	Annual	1.00E-01	1.91E-03	1.9
	30-min	1.00	9.72E-02	9.7
Chromium - 363 kg (800 lb) HE	Annual	1.00E-01	8.00E-05	0.1
	30-min	1.00	7.62E-03	0.8
Chromium - BGU	Annual	1.00E-01	1.49E-04	1.5
	30-min	1.00	1.33E-01	13.3
Cresols	Annual	NA	1.72E-03	—
	30-min	5.00	4.13E-01	8.3
Cresylic Acid	Annual	NA	2.14E-03	—
	30-min	5.00	5.10E-01	10.2
Dibenzofurans - 45.4 kg (100 lb) HE	Annual	NA	2.00E-05	—
	30-min	NA	9.60E-04	—
Dibenzofurans - 363 kg (800 lb) HE	Annual	NA	0.00[a]	—
	30-min	NA	8.00E-05	—
Dimethylformamide	Annual	3.00E+01	6.19E-02	0.2
	30-min	3.00E+02	2.80E+01	9.3

TABLE B.4.2–2.—*Percentage of the TNRCC ESL Consumed by the Estimated Maximum Concentration of Air Pollutants at Pantex Plant Boundary (2,000 Weapons)-Continued*

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM CONCENTRATION AT BOUNDARY $\mu g/m^3$	PERCENT OF ESL
Ester Glycol Ethers	Annual	NA	1.50E-01	—
	30-min	NA	3.59E+01	—
Ethyl Acetate	Annual	1.44E+03	6.93	0.5
	30-min	1.44E+04	1.99E+03	13.8
Ethyl Benzene	Annual	4.34E+02	1.29E-01	0.0[b]
	30-min	2.00E+03	3.11E+01	1.6
Ethylene Dichloride	Annual	4.00	3.99E-02	1.0
	30-min	1.60E+02	9.58	6.0
Formaldehyde - 45.4 kg (100 lb) HE	Annual	1.50	4.03E-03	0.3
	30-min	1.50E+01	3.66E-01	2.4
Formaldehyde - 363 kg (800 lb) HE	Annual	1.50	4.03E-03	0.3
	30-min	1.50E+01	3.66E-01	2.4
Hydrogen chloride - 45.4 kg (100 lb) HE	Annual	1.00E-01	7.59E-02	75.9
	30-min	7.50E+01	5.19	6.9
Hydrogen chloride - 363 kg (800 lb) HE	Annual	1.00E-01	3.06E-02	30.6
	30-min	7.50E+01	3.24	4.3
Hydrogen chloride - BGU	Annual	1.00E-01	6.89E-02	68.9
	30-min	7.50E+01	6.17	8.2
Hydrogen cyanide - BGU	Annual	5.50	1.00E-05	0.0[b]
	30-min	5.50E+01	7.70E-04	0.0[b]
Hydrogen fluoride - 45.4 kg (100 lb) HE	3-hour	4.90	4.21	85.9
	12-hour	3.68	1.05	28.6
	24-hour	2.86	7.46E-01	26.1
Hydrogen fluoride - 363 kg (800 lb) HE	3-hour	4.90	2.94E-01	6.0
	12-hour	3.68	7.36E-02	2.0
	24-hour	2.86	5.73E-02	2.0
Hydrogen fluoride - BGU	3-hour	4.90	3.59	73.2
	12-hour	3.68	1.32	35.8
	24-hour	2.86	7.49E-01	26.2
Mercury	Annual	5.00E-02	0.00[a]	0.0[b]
	24-hour	2.50E-01	0.00[a]	0.0[b]
	30-min	5.00E-01	0.00[a]	0.0[b]
Methanol	Annual	2.62E+02	5.75E-01	0.2
	30-min	2.62E+03	2.45E+02	9.3
Methyl Cyanide - 45.4 kg (100 lb) HE	Annual	NA	0.00[a]	—
	30-min	NA	0.00[a]	—

TABLE B.4.2–2.—*Percentage of the TNRCC ESL Consumed by the Estimated Maximum Concentration of Air Pollutants at Pantex Plant Boundary (2,000 Weapons)-Continued*

POLLUTANT	AVERAGING TIME	ESL μg/m³	MAXIMUM CONCENTRATION AT BOUNDARY μg/m³	PERCENT OF ESL
Methyl Cyanide - 363 kg (800 lb) HE	Annual	NA	0.00[a]	—
	30-min	NA	0.00[a]	—
Methyl Ethyl Ketone	Annual	5.90E+02	5.10	0.9
	30-min	3.90E+03	1.40E+03	36.0
Methyl Isobutyl Ketone	Annual	2.05E+02	1.85E-02	0.0[b]
	30-min	2.05E+03	4.45	0.2
Methylene Chloride	Annual	2.60E+01	7.37E-01	2.8
	30-min	2.60E+02	1.80E+02	69.2
Naphthalene - 45.4 kg (100 lb) HE	Annual	5.00E+01	1.10E-04	0.0[b]
	30-min	4.40E+02	5.48E-03	0.0[b]
Naphthalene - 363 kg (800 lb) HE	Annual	5.00E+01	0.00[a]	0.0[b]
	30-min	4.40E+02	4.30E-04	0.0[b]
Nickel - BGU	Annual	1.50E-02	2.40E-04	1.6
	30-min	1.50E-01	2.16E-02	14.4
Nitrobenzene	Annual	5.00	2.14E-03	0.0[b]
	30-min	2.40E+01	5.13E-01	2.1
Phenol - 45.4 kg (100 lb) HE	Annual	1.90E+01	5.70E-04	0.0[b]
	30-min	1.54E+02	2.92E-02	0.0[b]
Phenol - 363 kg (800 lb) HE	Annual	1.90E+01	2.00E-05	0.0[b]
	30-min	1.54E+02	2.29E-03	0.0[b]
Tetrachloroethylene	Annual	3.40E+01	7.33E-02	0.2
	30-min	3.40E+02	1.76E+01	5.2
Titanium - BGU	Annual	NA	6.50E-04	—
	30-min	5.00E+02	5.82E-02	0.0[b]
Toluene	Annual	1.88E+02	1.73	0.9
	30-min	1.88E+03	5.58E+02	29.6
Trichloroethylene	Annual	1.35E+02	2.12E-01	0.2
	30-min	1.35E+03	5.11E+01	3.8
Triethylamine	Annual	4.00	2.38E-03	0.6
	30-min	4.00E+01	1.08	2.7
Xylene	Annual	4.34E+02	4.74E-01	0.1
	30-min	3.70E+03	1.45E+02	3.9

TABLE B.4.2–2.—*Percentage of the TNRCC ESL Consumed by the Estimated Maximum Concentration of Air Pollutants at Pantex Plant Boundary (2,000 Weapons)-Continued*

POLLUTANT	AVERAGING TIME	ESL µg/m³	MAXIMUM CONCENTRATION AT BOUNDARY µg/m³	PERCENT OF ESL
TNRCC Listed Air Pollutants				
1,1,1-chloroethane	Annual	5.00E+01	5.28E-01	1.1
	30-min	5.00E+02	1.27E+02	25.4
1,3,5-trinitrobenzene - 45.4 kg (100 lb) HE	Annual	NA	0.00[a]	—
	30-min	2.00	3.00E-05	0.0[b]
1,3,5-trinitrobenzene - 363 kg (800 lb) HE	Annual	NA	0.00[a]	—
	30-min	2.00	0.00[a]	0.0[b]
1-butanol	Annual	7.60E+01	1.99E-02	0.0[b]
	30-min	7.60E+02	4.79	0.6
2,4,6-trinitrotoluene - 45.4 kg (100 lb) HE	Annual	NA	0.00[a]	—
	30-min	5.00	3.30E-04	0.0[b]
2,4,6-trinitrotoluene - 363 kg (800 lb) HE	Annual	NA	0.00[a]	—
	30-min	5.00	2.00E-05	0.0[b]
2,4-dinitrotoluene - 45.4 kg (100 lb) HE	Annual	1.50E-01	0.00[a]	—
	30-min	1.50E+01	5.00E-05	0.0[b]
2,4-dinitrotoluene - 363 kg (800 lb) HE	Annual	1.50E-01	0.00[a]	—
	30-min	1.50E+01	3.00E-05	0.0[b]
2,6-dinitrotoluene - 45.4 kg (100lb) HE	Annual	NA	0.00[a]	—
	30-min	1.50E+01	5.00E-04	0.0[b]
2,6-dinitrotoluene - 363 kg (800 lb) HE	Annual	NA	0.00[a]	—
	30-min	1.50E+01	4.00E-05	0.0[b]
2-ethoxyethanol	Annual	NA	3.91E-01	—
	30-min	1.80E+02	9.42	5.2
2-nitronaphthalene - 45.4 kg (100 lb) HE	Annual	NA	1.00E-05	—
	30-min	5.00E+02	4.20E-04	0.0[b]
2-nitronaphthalene - 363 kg (800 lb) HE	Annual	NA	0.00[a]	—
	30-min	5.00E+02	2.00E-05	0.0
Acetone	Annual	5.90E+02	3.39	0.6
	30-min	5.90E+03	5.19E+02	8.8
Acetylene - 45.4 kg (100 lb) HE	Annual	2.66E+03	3.33E-03	0.0[b]
	30-min	2.66E+04	1.11	0.0[b]
Acetylene - 363 kg (800 lb) HE	Annual	2.66E+03	3.33E-03	0.0[b]
	30-min	2.66E+04	1.11	0.0[b]
Aluminum - 45.4 kg (100 lb) HE	Annual	5.00	1.28E-03	0.0[b]
	30-min	5.00E+01	5.22E-02	0.1

TABLE B.4.2–2.—*Percentage of the TNRCC ESL Consumed by the Estimated Maximum Concentration of Air Pollutants at Pantex Plant Boundary (2,000 Weapons)-Continued*

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM CONCENTRATION AT BOUNDARY $\mu g/m^3$	PERCENT OF ESL
Aluminum - 363 kg (800 lb) HE	Annual	5.00	1.17E-03	0.0[b]
	30-min	5.00E+01	4.94E-02	0.1
Ammonia	Annual	1.70E+01	2.89E-02	0.2
	30-min	1.70E+02	1.31E+01	7.7
Barium	Annual	5.00E-01	1.25E-03	0.3
	1-hour	5.00	2.93E-03	0.1
Benzo(a)anthracene - 45.4 kg (100 lb) HE	Annual	NA	1.00E-05	—
	30-min	5.00E-01	5.00E-04	0.1
Benzo(a)anthracene - 363 kg (800 lb) HE	Annual	NA	0.00[a]	—
	30-min	5.00E-01	4.00E-05	0.0[b]
Benzo(a)pyrene - 45.4 kg (100 lb) HE	Annual	3.00E-03	1.00E-05	0.3
	30-min	3.00E-02	4.10E-04	1.4
Benzo(a)pyrene - 363 kg (800 lb) HE	Annual	3.00E-03	0.00[a]	0.0[b]
	30-min	3.00E-02	2.00E-05	0.1
Bismuth	Annual	5.00	3.00E-05	0.0[b]
	30-min	5.00E+02	1.13E-03	0.0[b]
Butane	Annual	1.90E+03	2.98E-02	0.0[b]
	30-min	1.90E+04	1.12E+01	0.1
Butene	Annual	NA	2.81E-01	—
	30-min	1.60E+02	1.18E+01	7.4
Calcium	Annual	5.00	5.00E-05	0.0[b]
	30-min	5.00E+01	1.90E-03	0.0[b]
Chlorinated Fluorocarbon	Annual	NA	2.90E-01	—
	30-min	1.80E+04	6.93E+01	0.4
Copper	Annual	1.00	3.08E-03	0.3
	30-min	1.00E+01	1.25E-01	1.3
Cyanogen - 45.4 kg (100 lb) HE	Annual	2.10E+01	1.00E-05	0.0[b]
	30-min	2.10E+02	2.00E-04	0.0[b]
Cyanogen - 363 kg (800 lb) HE	Annual	2.10E+01	0.00[a]	—
	30-min	2.10E+02	2.00E-05	0.0[b]
Cyclohexane	Annual	3.40E+02	3.68E-01	0.1
	30-min	1.44E+03	9.41E+01	6.5
Cyclohexanone	Annual	1.00E+02	6.09E-02	0.1
	30-min	4.81E+02	1.44	0.3

TABLE B.4.2–2.—*Percentage of the TNRCC ESL Consumed by the Estimated Maximum Concentration of Air Pollutants at Pantex Plant Boundary (2,000 Weapons)-Continued*

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM CONCENTRATION AT BOUNDARY $\mu g/m^3$	PERCENT OF ESL
Dioxane	Annual	9.00E+01	7.88E-01	0.9
	30-min	9.00E+02	3.57E+01	4.0
Ethyl Ether	Annual	NA	3.33E-01	—
	30-min	9.27E+02	7.96E+01	8.6
Ethylene - 45.4 kg (100 lb) HE	Annual	NA	6.04E-01	—
	30-min	1.17E+03	2.53E+02	21.6
Ethylene - 363 kg (800 lb) HE	Annual	NA	6.04E-01	—
	30-min	1.17E+03	2.44E+02	20.9
Formic Acid - 45.4 kg(100lb) HE	Annual	9.40	0.00[a]	0.0[b]
	30-min	9.40E+01	8.00E-05	0.0[b]
Formic Acid - 363 kg (800 lb) HE	Annual	9.40	0.00[a]	0.0[b]
	30-min	9.40E+01	2.00E-05	0.0[b]
Iron - 45.4 kg (100 lb) HE	Annual	NA	4.99E-02	—
	30-min	5.00E+01	1.82	3.6
Iron - 363 kg (800 lb) HE	Annual	NA	2.44E-02	—
	30-min	5.00E+01	1.02	2.0
Isobutane	Annual	1.90E+03	4.01E-02	0.0[b]
	30-min	4.85E+03	1.39E+01	0.3
Isobutanol	Annual	1.52E+02	2.27E-02	0.0[b]
	30-min	1.52E+03	5.46	0.4
Ketene - 45.4 kg (100 lb) HE	Annual	9.00E-01	0.00[a]	0.0[b]
	30-min	9.00	0.00[a]	0.0[b]
Ketene - 363 kg (800 lb) HE	Annual	9.00E-01	0.00[a]	0.0[b]
	30-min	9.00	0.00[a]	0.0[b]
Ketone	Annual	NA	1.39E-01	—
	30-min	1.00E+02	3.34E+01	33.4
Lithium	Annual	NA	4.00E-05	—
	30-min	1.00E+01	1.84E-03	0.0[b]
Magnesium	Annual	NA	1.05E-03	—
	30-min	5.00E+01	4.41E-02	0.1
Methane - 45.4 kg (100 lb) HE	Annual	NA	7.16E-01	—
	30-min	3.00E+04	2.64E+01	0.1
Methane - 363 kg (800 lb) HE	Annual	NA	7.16E-01	—
	30-min	3.00E+04	2.61E+01	0.1
N-butyl Alcohol	Annual	7.60E+01	1.35E-01	0.2
	30-min	7.60E+02	3.25	0.4

TABLE B.4.2-2.—*Percentage of the TNRCC ESL Consumed by the Estimated Maximum Concentration of Air Pollutants at Pantex Plant Boundary (2,000 Weapons)-Continued*

POLLUTANT	AVERAGING TIME	ESL $\mu g/m^3$	MAXIMUM CONCENTRATION AT BOUNDARY $\mu g/m^3$	PERCENT OF ESL
Non-F Listed Solvents[c]	Annual	NA	9.40E-04	—
	30-min	1.00E+01	2.26E-01	2.3
Ortho-dichlorobenzene	Annual	NA	6.36E-01	—
	30-min	1.50E+03	1.53E+02	10.2
Propane	Annual	1.80E+03	4.21E-02	0.0[b]
	30-min	1.80E+04	1.32E+01	0.1
Propene	Annual	NA	3.71E-01	—
	30-min	3.00E+04	1.56E+02	0.5
Pyrene - 45.4 kg (100 lb) HE	Annual	5.00E-02	5.00E-04	1.0
	30-min	5.00E-01	1.57E-03	0.3
Pyrene - 363 kg (800 lb) HE	Annual	5.00E-02	0.00[a]	0.0[b]
	30-min	5.00E-01	9.00E-05	0.0[b]
Pyridine	Annual	1.50E+01	3.78E-01	2.5
	30-min	6.90E+01	9.08	13.2
Silicon	Annual	5.00	0.00[a]	—
	30-min	5.00E+02	2.90E-04	0.0[b]
Silver	Annual	1.00E-02	1.45E-03	14.5
	30-min	1.00E-01	6.22E-02	62.2
Tetrahydrofuran	Annual	5.90E+02	7.55E-01	0.1
	30-min	5.90E+03	3.42E+02	5.8
Trichlorofluoromethane	Annual	5.62E+03	4.21E-01	0.0[b]
	30-min	2.80E+04	1.01E+02	0.4
Trichlorotrifluoroethane	Annual	NA	1.77	—
	30-min	7.60E+04	4.73E+02	0.6
Zinc	Annual	NA	1.32E-03	—
	30-min	5.00E+01	5.58E-02	0.1

[a]The ISCST2 air quality model returns a value of 0.00 for any concentration equal to or less than 1.00 x 10^{-5} $\mu g/m^3$ (i.e., less than one ten millionth of a part per billion or less than ten parts per quadrillion).

[b]Percent of ESL is shown as zero, as it is below 0.05.

[c]Those solvents not listed under 40 CFR 261.33 (Hazardous Waste from Non-specific Sources).

Note: Table shows the modeling results (maximum concentrations at boundary) from models ISCST2 and ISCLT2. The above chemicals were modeled with appropriate time periods for Open Burning, Burning Ground Upgrade, and Engine Emission Area.

Source: TNRCC 1996a

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant ($\mu g/m^3$)*

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1,2-trichloroethane	2000	Annual	5.50E-01	6.89E-02	3.32E-02	1.43E-02	3.69E-03	2.25E-03	2.10E-03	2.19E-03	3.19E-03	4.99E-03	7.55E-03	4.82E-02
	1000	Annual	5.50E+01	3.42E-02	1.65E-02	7.08E-03	1.83E-03	1.12E-03	1.40E-03	1.08E-03	1.58E-03	2.47E-03	3.75E-03	2.39E-02
	500	Annual	5.50E+01	1.71E-02	8.23E-03	3.54E-03	9.15E-04	5.60E-04	7.00E-04	5.40E-04	7.90E-04	1.24E-03	1.88E-03	1.19E-02
1,1,2-trichloroethane	2000	30-min	5.50E+02	1.72E+01	2.26E+00	1.52E+00	1.16E+00	1.09E+00	1.27E+00	9.87E-01	1.07E+00	1.08E+00	1.82E+00	1.03E+01
	1000	30-min	5.50E+02	8.53E+00	1.12E+00	7.52E-01	5.78E-01	5.42E-01	6.31E-01	4.89E-01	5.31E-01	5.36E-01	9.04E-01	5.12E-01
	500	30-min	5.50E+02	4.27E+00	5.60E-01	3.76E-01	2.89E-01	2.71E-01	3.15E-01	2.45E-01	2.65E-01	2.68E-01	4.52E-01	2.56E-01
1,3-butadiene 45.4 kg (100 lb) HE	2000	Annual	1.10E+01	1.89E-03	1.71E-03	7.64E-04	5.40E-03	3.70E-04	3.40E-04	2.50E-04	8.60E-04	9.10E-04	2.38E-03	2.10E-03
	1000	Annual	1.10E+01	1.59E-03	1.53E-03	6.40E-04	4.80E-04	3.40E-04	3.20E-04	2.20E-04	8.10E-04	8.20E-04	2.19E-03	1.86E-03
	500	Annual	1.10E+01	1.45E-03	1.44E-03	5.80E-04	4.50E-04	3.20E-04	3.10E-04	2.10E-04	7.90E-04	7.80E-04	2.09E-03	1.73E-03
1,3-butadiene 45.4 kg (100 lb) HE	2000	30-min	1.10E+02	8.85E-01	9.75E-01	5.51E-01	4.96E-01	5.54E-01	4.57E-01	3.27E-01	1.27E+00	6.54E-01	1.85E+00	6.81E-01
	1000	30-min	1.10E+02	8.83E-01	9.74E-01	5.46E-01	4.94E-01	5.53E-01	4.55E-01	3.26E-01	1.26E-01	6.54E-01	1.85E+00	6.77E-01
	500	30-min	1.10E+02	8.82E-01	9.73E-01	5.44E-01	4.93E-01	5.53E-01	4.55E-01	3.25E-01	1.26E-01	6.53E-01	1.84E+00	6.75E-01
1,3-butadiene 800 kg (363 lb) HE	2000	Annual	1.10E+01	1.89E-03	1.71E-03	7.64E-04	5.40E-03	3.70E-04	3.40E-04	2.50E-04	8.60E-04	9.10E-04	2.38E-03	2.10E-03
	1000	Annual	1.10E+01	1.59E-03	1.53E-03	6.40E-04	4.80E-04	3.40E-04	3.20E-04	2.20E-04	8.10E-04	8.20E-04	2.19E-03	1.86E-03
	500	Annual	1.10E+01	1.45E-03	1.44E-03	5.80E-04	4.50E-04	3.20E-04	3.10E-04	2.10E-04	7.90E-04	7.80E-04	2.09E-03	1.73E-03
1,3-butadiene 45.4 kg (800 lb) HE	2000	30-min	1.10E+02	8.85E-01	9.75E-01	5.51E-01	4.96E-01	5.54E-01	4.57E-01	3.27E-01	1.27E+00	6.54E-01	1.85E+00	6.81E-01
	1000	30-min	1.10E+02	8.83E-01	9.74E-01	5.46E-01	4.94E-01	5.53E-01	4.55E-01	3.26E-01	1.26E-01	6.54E-01	1.85E+00	6.77E-01
	500	30-min	1.10E+02	8.82E-01	9.73E-01	5.44E-01	4.93E-01	5.53E-01	4.55E-01	3.25E-01	1.26E-01	6.53E-01	1.84E+00	6.75E-01
2-nitropropane	2000	Annual	5.00E+00	2.57E-02	2.39E-02	1.04E-02	2.53E-03	1.23E-03	1.20E-03	1.14E-03	2.15E-03	2.21E-03	4.12E-03	1.72E-02
	1000	Annual	5.00E+00	1.28E-02	1.12E-02	5.21E-03	1.27E-03	6.20E-04	6.00E-04	5.70E-04	1.07E-03	1.11E-03	2.06E-03	8.57E-03
	500	Annual	5.00E+00	6.41E-03	5.98E-03	2.60E-03	6.35E-04	3.10E-04	3.00E-04	2.85E-04	5.35E-04	5.55E-04	1.03E-03	4.28E-03
2-nitropropane	2000	30-min	5.00E+01	3.14E+00	2.95E+00	1.04E+00	6.37E-01	4.52E-01	5.60E-01	3.30E-01	2.49E+00	5.37E-01	1.03E+00	4.06E+00
	1000	30-min	5.00E+01	1.57E+00	1.48E+00	5.21E-01	3.18E-01	2.26E-01	2.80E-01	1.65E-01	1.25E+00	2.69E-01	5.13E-01	2.03E+00
	500	30-min	5.00E+01	7.87E-01	7.39E-01	2.61E-01	1.59E-01	1.13E-01	1.40E-01	8.25E-02	6.23E-01	1.19E-01	2.56E-01	1.02E+00
Alcohols[a]	2000	Annual	NA	4.41E-01	3.71E-01	1.86E-01	5.86E-02	3.36E-02	2.71E-02	2.91E-02	5.51E-02	9.87E-02	2.60E-01	3.26E-01
	1000	Annual	NA	2.89E-01	2.29E-01	1.24E-01	4.37E-02	2.63E-02	2.00E-02	2.24E-02	4.24E-02	8.57E-02	2.36E-01	2.25E-01
	500	Annual	NA	2.14E-01	1.59E-01	9.34E-02	3.62E-02	2.27E-02	1.64E-02	1.91E-02	3.60E-02	7.91E-02	2.24E-01	1.74E-01

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air*[1] *and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant* ($\mu g/m^3$)-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
Alcohols[a]	2000	30-min	1.00E+02	3.71E+01	3.48E+01	2.78E+01	1.35E+01	1.27E+01	1.20E+01	2.30E+01	2.94E+01	3.73E+01	1.12E+02	4.79E+01
	1000	30-min	1.00E+02	2.18E+01	2.92E+01	2.62E+01	1.35E+01	1.27E+01	1.20E+01	2.30E+01	1.47E+01	3.61E+01	1.12E+02	3.26E+01
	500	30-min	1.00E+02	2.18E+01	2.67E+01	2.54E+01	1.35E+01	1.27E+01	1.20E+01	2.30E+01	1.37E+01	3.55E+01	1.12E+02	3.26E+01
Benzene	2000	Annual	3.00E+01	3.59E-02	3.19E-02	1.53E-02	4.86E-03	2.76E-03	2.74E-03	2.50E-03	5.99E-03	7.54E-03	1.49E-02	2.65E-02
	1000	Annual	3.00E+01	1.17E-02	8.74E-03	5.82E-03	2.74E-03	1.91E-03	1.74E-03	1.86E-03	4.47E-03	5.40E-03	1.16E-02	1.03E-02
	500	Annual	3.00E+01	1.16E-02	8.64E-03	5.75E-03	2.71E-03	1.89E-03	1.73E-03	1.84E-03	4.44E-03	5.35E-03	1.15E-02	1.02E-02
Benzene	2000	30-min	7.50E+01	3.22E+00	3.04E+00	1.12E+00	7.72E-01	6.38E-01	6.83E-01	6.56E-01	2.55E+00	1.85E+00	2.76E+00	4.16E+00
	1000	30-min	7.50E+01	2.25E+00	1.68E+00	1.09E+00	1.74E-01	6.38E-01	6.26E-01	1.93E-01	1.45E+00	1.78E+00	1.91E+00	1.55E+00
	500	30-min	7.50E+01	2.24E+00	1.68E+00	1.09E+00	1.74E-01	6.36E-01	6.25E-01	1.93E-01	1.44E+00	1.78E+00	1.91E+00	1.54E+00
Carbon Disulfide	2000	Annual	3.00E+00	6.78E-02	6.32E-02	2.76E+00	6.70E-02	3.26E-03	3.17E-03	3.01E-02	5.69E-03	5.85E-03	1.09E-02	4.53E-02
	1000	Annual	3.00E+00	3.39E-02	3.16E-02	1.38E-02	3.35E-03	1.63E-03	1.59E-03	1.51E-03	2.84E-03	2.93E-03	5.45E-03	2.27E-02
	500	Annual	3.00E+00	1.70E-02	1.58E-02	6.90E-03	1.68E-03	8.10E-04	7.90E-04	7.50E-04	1.42E-03	1.46E-03	2.73E-03	1.13E-02
Carbon Disulfide	2000	30-min	3.00E+01	8.33E+00	7.81E+00	2.76E+00	1.68E+00	1.19E+00	1.48E+00	8.73E-01	6.59E+00	1.42E+00	2.71E+00	1.08E+01
	1000	30-min	3.00E+01	4.16E+00	3.91E+00	1.38E+00	8.42E-01	5.97E-01	7.41E-01	4.37E-01	3.30E+00	7.10E-01	1.36E+00	5.37E+00
	500	30-min	3.00E+01	2.08E+00	1.95E+00	6.90E-01	4.21E-01	2.99E-01	3.70E-01	2.18E-01	1.65E+00	3.55E-01	6.78E-01	2.69E+00
Carbon Tetrachloride	2000	Annual	1.30E+01	5.92E-02	5.52E-02	2.41E-02	5.85E-03	2.84E-03	2.77E-03	2.63E-03	4.96E-03	5.10E-03	9.51E-03	3.95E-02
	1000	Annual	1.30E+01	2.94E-02	2.74E-02	1.19E-02	2.90E-03	1.41E-03	1.37E-03	1.30E-03	2.46E-03	2.53E-03	4.72E-03	1.96E-02
	500	Annual	1.30E+01	1.47E-02	1.37E-02	5.97E-03	1.45E-03	7.05E-04	6.85E-04	6.50E-04	1.23E-03	1.27E-03	2.36E-03	9.82E-03
Carbon Tetrachloride	2000	30-min	1.26E+02	7.26E+00	6.81E+00	2.41E+00	1.47E+00	1.04E+00	1.29E+00	7.62E-01	5.75E+00	1.24E+00	2.37E+00	9.37E+00
	1000	30-min	1.26E+02	3.61E+00	3.38E+00	1.19E+00	7.29E-01	5.17E-01	6.42E-01	3.78E-01	2.86E+00	6.15E-01	1.18E+00	4.65E+00
	500	30-min	1.26E+02	1.80E+00	1.69E+00	5.97E-01	3.65E-01	2.59E-01	3.21E-01	1.89E-01	1.43E+00	3.08E-01	5.88E-01	2.33E+00
Chlorobenzene	2000	Annual	4.60E+01	5.87E-02	5.48E-02	2.39E-02	5.81E-03	2.82E-03	2.75E-03	2.61E-03	4.92E-03	5.07E-03	9.44E-03	3.93E-02
	1000	Annual	4.60E+01	2.94E-02	2.74E-02	1.19E-02	2.90E-03	1.41E-03	1.37E-03	1.30E-03	2.46E-03	2.53E-03	4.72E-03	1.96E-02
	500	Annual	4.60E+01	1.47E-02	1.37E-02	5.97E-03	1.45E-03	7.05E-04	6.85E-04	6.50E-04	1.23E-03	1.27E-03	2.36E-03	9.82E-03
Chlorobenzene	2000	30-min	4.60E+02	7.21E+00	6.77E+00	2.39E+00	1.46E+00	1.03E+00	1.28E+00	7.56E-01	5.71E+00	1.23E+00	2.35E+00	9.31E+00
	1000	30-min	4.60E+02	3.61E+00	3.38E+00	1.19E+00	7.29E-01	5.17E-01	6.42E-01	3.78E-01	2.86E+00	6.15E-01	1.18E+00	4.65E+00
	500	30-min	4.60E+02	1.80E+00	1.69E+00	5.97E-01	3.65E-01	2.59E-01	3.21E-01	1.89E-01	1.43E+00	3.08E-01	5.88E-01	2.33E+00

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant* ($\mu g/m^3$)-**Continued**

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
Chromium - 45.4 kg (100 lb) HE	2000	Annual	1.00E-01	9.00E-05	4.30E-04	1.22E-03	1.00E-04	4.00E-05	3.00E-05	3.00E-05	3.00E-05	2.00E-05	4.00E-05	6.00E-05
	1000	Annual	1.00E-01	9.00E-05	4.30E-04	1.22E-03	1.00E-04	4.00E-05	3.00E-05	3.00E-05	3.00E-05	2.00E-05	4.00E-05	6.00E-05
	500	Annual	1.00E-01	9.00E-05	4.30E-04	1.22E-03	1.00E-04	4.00E-05	3.00E-05	3.00E-05	3.00E-05	2.00E-05	4.00E-05	6.00E-05
Chromium - 45.4 kg (100 lb) HE	2000	30-min	1.00E+00	3.08E-02	4.06E-02	7.68E-02	3.78E-02	2.17E-02	1.12E-02	1.17E-02	9.15E-03	1.29E-02	1.60E-02	2.05E-02
	1000	30-min	1.00E+00	3.08E-02	4.06E-02	7.38E-02	3.01E-02	2.17E-02	1.12E-02	1.17E-02	9.15E-03	1.29E-02	1.60E-02	2.05E-02
	500	30 min	1.00E+00	4.38E-03	5.21E-03	5.96E-03	3.58E-03	2.73E-03	1.93E-03	2.84E-03	3.88E-03	4.17E-03	4.31E-03	4.70E-03
Chromium - 363 kg (800 lb) HE	2000	Annual	1.00E-01	3.00E-05	7.00E-05	8.00E-05	2.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05	1.00E-05	1.00E-05	2.00E-05
	1000	Annual	1.00E-01	3.00E-05	7.00E-05	8.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05	1.00E-05	1.00E-05	2.00E-05
	500	Annual	1.00E-01	3.00E-05	7.00E-05	8.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05	1.00E-05	1.00E-05	2.00E-05
Chromium - 363 kg (800 lb) HE	2000	30-min	1.00E+00	2.51E-02	3.79E-02	7.67E-02	3.62E-02	2.16E-02	1.14E-02	1.04E-02	7.53E-03	9.99E-03	9.45E-03	1.63E-02
	1000	30-min	1.00E+00	4.38E-03	5.21E-03	5.96E-03	3.58E-03	2.73E-03	1.93E-03	2.84E-03	3.88E-03	4.17E-03	4.31E-03	4.70E-03
	500	30-min	1.00E+00	4.38E-03	5.21E-03	5.96E-03	3.58E-03	2.73E-03	1.93E-03	2.84E-03	3.88E-03	4.17E-03	4.31E-03	4.70E-03
Chromium - BGU	2000	Annual	1.00E-01	8.00E-05	3.90E-04	9.90E-04	1.00E-04	4.00E-05	3.00E-05	2.00E-05	3.00E-05	2.00E-05	3.00E-05	5.00E-05
	1000	Annual	1.00E-01	8.00E-05	3.90E-04	9.90E-04	1.00E-04	4.00E-05	3.00E-05	2.00E-05	3.00E-05	2.00E-05	3.00E-05	5.00E-05
	500	Annual	1.00E-01	8.00E-05	3.90E-04	9.90E-04	1.00E-04	4.00E-05	3.00E-05	2.00E-05	3.00E-05	2.00E-05	3.00E-05	5.00E-05
Chromium - BGU	2000	30-min	1.00E+00	2.51E-02	3.79E-02	7.67E-02	3.62E-02	2.16E-02	1.14E-02	1.04E-02	7.53E-03	9.99E-03	9.45E-03	1.63E-02
	1000	30-min	1.00E+00	2.51E-02	3.79E-02	7.67E-02	3.62E-02	2.16E-02	1.14E-02	1.04E-02	7.53E-03	9.99E-03	9.45E-03	1.63E-02
	500	30-min	1.00E+00	2.51E-02	3.79E-02	7.67E-02	3.62E-02	2.16E-02	1.14E-02	1.04E-02	7.53E-03	9.99E-03	9.45E-03	1.63E-02
CO - 45.4 kg (100 lb) HE	2000	1-hour	4.00E+04[b]	2.28E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.99E+01	2.81E+01	6.06E+01	7.54E+01	1.18E+02	1.39E+02
	1000	1-hour	4.00E+04[b]	2.27E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.95E+01	2.76E+01	6.01E+01	7.49E+01	1.17E+02	1.39E+02
	500	1-hour	4.00E+04[b]	2.27E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.94E+01	2.75E+01	6.01E+01	7.47E+01	1.17E+02	1.39E+02
CO - 45.4 kg (100 lb) HE	2000	8-hour	1.00E+04[b]	5.22E+01	8.19E+01	2.26E+01	8.40E+00	6.85E+00	9.36E+00	6.19E+00	9.29E+00	1.33E+01	2.51E+01	1.73E+01
	1000	8-hour	1.00E+04[b]	5.22E+01	8.19E+01	2.26E+01	8.29E+00	6.75E+00	9.28E+00	6.11E+00	9.09E+00	1.31E+01	2.49E+01	1.73E+01
	500	8-hour	1.00E+04[b]	5.22E+01	8.18E+01	2.26E+01	8.26E+00	6.73E+00	9.27E+00	6.10E+00	9.08E+00	1.31E+01	2.48E+01	1.73E+01
CO - 363 kg (800 lb) HE	2000	1-hour	4.00E+04[b]	2.28E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.99E+01	2.81E+01	6.06E+01	7.54E+01	1.18E+02	1.39E+02
	1000	1-hour	4.00E+04[b]	2.27E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.95E+01	2.76E+01	6.01E+01	7.49E+01	1.17E+02	1.39E+02
	500	1-hour	4.00E+04[b]	2.27E+02	4.92E+02	1.81E+02	4.03E+01	3.23E+01	2.94E+01	2.75E+01	6.01E+01	7.47E+01	1.17E+02	1.39E+02

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant* ($\mu g/m^3$)-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
CO - 363 kg (800 lb) HE	2000	8-hour	1.00E+04[b]	5.22E+01	8.19E+01	2.26E+01	8.40E+00	6.83E+00	9.36E+00	6.20E+00	9.29E+00	1.33E+01	2.51E+01	1.73E+01
	1000	8-hour	1.00E+04[b]	5.22E+01	8.19E+01	2.26E+01	8.29E+00	6.74E+00	9.28E+00	6.13E+00	9.09E+00	1.32E+01	2.49E+01	1.73E+01
	500	8-hour	1.00E+04[b]	5.22E+01	8.18E+01	2.26E+01	8.25E+00	6.71E+00	9.27E+00	6.11E+00	9.08E+00	1.31E+01	2.48E+01	1.73E+01
CO - BGU	2000	1-hour	4.00E+04[b]	2.83E+03	1.34E+03	1.21E+03	5.70E+02	3.45E+02	1.79E+02	1.63E+02	1.89E+02	3.51E+02	1.37E+03	3.18E+02
	1000	1-hour	4.00E+04[b]	2.83E+03	1.34E+03	1.21E+03	5.70E+02	3.45E+02	1.79E+02	1.63E+02	1.89E+02	3.51E+02	1.37E+03	3.18E+02
	500	1-hour	4.00E+04[b]	2.83E+03	1.34E+03	1.21E+03	5.70E+02	3.45E+02	1.79E+02	1.63E+02	1.89E+02	3.51E+02	1.37E+03	3.18E+02
CO - BGU	2000	8-hour	1.00E+04[b]	3.81E+02	1.94E+02	2.98E+02	9.55E+01	8.16E+01	2.98E+01	2.24E+01	2.92E+01	5.08E+01	1.79E+02	6.11E+01
	1000	8-hour	1.00E+04[b]	3.81E+02	1.94E+02	2.98E+02	9.55E+01	8.16E+01	2.98E+01	2.24E+01	2.92E+01	5.08E+01	1.79E+02	6.11E+01
	500	8-hour	1.00E+04[b]	3.81E+02	1.94E+02	2.98E+02	9.55E+01	8.16E+01	2.98E+01	2.24E+01	2.92E+01	5.08E+01	1.79E+02	6.11E+01
Cresols	2000	Annual	NA	1.24E-03	1.16E-03	5.00E-04	1.20E-04	6.00E-05	6.00E-05	6.00E-05	1.00E-04	1.10E-04	2.00E-04	2.00E-04
	1000	Annual	NA	6.20E-04	5.80E-04	2.50E-04	6.00E-05	3.00E-05	3.00E-05	3.00E-05	5.00E-05	5.00E-05	1.00E-04	1.00E-04
	500	Annual	NA	3.10E-04	2.89E-04	1.26E-04	3.10E-05	1.50E-05	1.50E-05	1.50E-05	2.60E-05	2.60E-05	5.00E-05	5.00E-05
Cresols	2000	30-min	5.0E+00	1.89E-01	1.78E-01	6.28E-02	3.83E-02	2.72E-02	3.37E-02	1.99E-02	1.50E-01	3.25E-02	6.17E-02	2.44E-01
	1000	30-min	5.0E+00	7.62E-02	7.15E-02	2.52E-02	1.54E-02	1.09E-02	1.35E-02	7.99E-03	6.03E-02	1.30E-02	2.48E-02	9.83.E-02
	500	30-min	5.0E+00	3.81E-02	3.57E-02	1.26E-02	7.21E-03	5.46E-03	6.78E-03	4.00E-03	3.01E-02	6.50E-03	1.24E-02	4.92E-02
Cresylic Acid	2000	Annual	NA	1.54E-03	1.44E-03	6.30E-04	1.50E-04	7.00E-05	7.00E-05	7.00E-05	1.30E-04	1.30E-04	2.50E-04	1.03E-03
	1000	Annual	NA	7.70E-04	7.20E-04	3.15E-04	8.00E-05	4.00E-05	4.00E-05	4.00E-05	6.00E-05	7.00E-05	1.20E-04	5.15E-04
	500	Annual	NA	3.85E-04	3.60E-04	1.57E-04	4.00E-05	2.00E-05	2.00E-05	2.00E-05	3.00E-05	3.00E-05	6.00E-05	2.57E-04
Cresylic Acid	2000	30-min	5.0E+00	1.89E-01	1.78E-01	6.28E-02	3.83E-02	2.72E-02	3.37E-02	1.99E-02	1.50E-01	3.23E-02	6.17E-02	2.44E-01
	1000	30-min	5.0E+00	9.45E-02	8.86E-02	3.13E-02	1.91E-02	1.35E-02	1.68E-02	9.95E-03	7.48E-02	1.61E-02	3.08E-02	1.22E-01
	500	30-min	5.0E+00	4.73E-02	4.44E-02	1.57E-02	9.08E-03	6.79E-03	8.42E-03	4.97E-03	3.74E-02	8.08E-03	1.54E-02	6.11E-02
Dibenzofurans - 45.4 kg (100 lb) HE	2000	Annual	NA	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	Annual	NA	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	Annual	NA	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzofurans - 45.4 kg (100 lb) HE	2000	30-min	NA	3.00E-04	4.00E-04	7.30E-04	3.00E-04	2.10E-04	1.10E-04	1.20E-04	9.00E-05	1.30E-04	1.60E-04	2.00E-04
	1000	30-min	NA	3.00E-04	4.00E-04	7.30E-04	3.00E-04	2.10E-04	1.10E-04	1.20E-04	9.00E-05	1.30E-04	1.60E-04	2.00E-04
	500	30-min	NA	3.00E-04	4.00E-04	7.30E-04	3.00E-04	2.10E-04	1.10E-04	1.20E-04	9.00E-05	1.30E-04	1.60E-04	2.00E-04

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant (μg/m³)*-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL μg/m³	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
Dibenzofurans - 363 kg (800 lb) HE	2000	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Dibenzofurans - 363 kg (800 lb) HE	2000	30-min	NA	4.00E-05	5.00E-05	6.00E-05	4.00E-05	3.00E-05	2.00E-05	3.00E-05	4.00E-05	4.00E-05	4.00E-05	4.00E-05
	1000	30-min	NA	4.00E-05	5.00E-05	6.00E-05	4.00E-05	3.00E-05	2.00E-05	3.00E-05	4.00E-05	4.00E-05	4.00E-05	4.00E-05
	500	30-min	NA	4.00E-05	5.00E-05	6.00E-05	4.00E-05	3.00E-05	2.00E-05	3.00E-05	4.00E-05	4.00E-05	4.00E-05	4.00E-05
Dimethylformamide	2000	Annual	3.00E+01	3.44E-02	3.44E-02	2.96E-02	1.64E-02	1.11E-02	5.42E-03	7.13E-03	1.62E-02	1.75E-02	2.67E-02	3.09E-02
	1000	Annual	3.00E+01	3.44E-02	3.44E-02	2.96E-02	1.64E-02	1.11E-02	5.42E-03	7.13E-03	1.62E-02	1.75E-02	2.67E-02	3.09E-02
	500	Annual	3.00E+01	3.44E-02	3.44E-02	2.96E-02	1.64E-02	1.11E-02	5.42E-03	7.13E-03	1.62E-02	1.75E-02	2.67E-02	3.09E-02
Dimethylformamide	2000	30-min	3.00E+02	6.82E+00	8.30E+00	8.52E+00	3.13E+00	5.90E+00	6.70E+00	6.23E+00	6.06E+00	7.08E+00	1.41E+00	7.15E+00
	1000	30-min	3.00E+02	6.82E+00	8.30E+00	8.52E+00	3.13E+00	5.90E+00	6.70E+00	6.23E+00	6.06E+00	7.08E+00	1.41E+00	7.15E+00
	500	30-min	3.00E+02	6.82E+00	8.30E+00	8.52E+00	3.13E+00	5.90E+00	6.70E+00	6.23E+00	6.06E+00	7.08E+00	1.41E+00	7.15E+00
Ester Glycol Ethers	2000	Annual	NA	1.08E-01	1.01E-01	4.39E-02	1.01E-02	5.18E-03	5.05E-03	4.79E-03	9.05E-03	9.32E-03	1.73E-02	7.22E-02
	1000	Annual	NA	5.42E-02	5.04E-02	2.20E-02	5.36E-03	2.60E-03	2.53E-03	2.41E-03	4.54E-03	4.68E-03	8.71E-03	3.62E-02
	500	Annual	NA	2.68E-02	2.51E-02	1.01E-02	2.66E-03	1.29E-03	1.26E-03	1.19E-03	2.50E-03	2.32E-03	4.32E-03	1.79E-02
Ester Glycol Ethers	2000	30-min	NA	1.32E+01	1.24E+01	4.39E+00	2.68E+00	1.91E+00	2.36E+00	1.39E+00	1.05E+01	2.26E+00	4.32E+00	1.71E+01
	1000	30-min	NA	6.65E+00	6.24E+00	2.20E+00	1.34E+00	9.51E-01	1.18E+00	6.98E-01	5.27E+00	1.13E+00	2.17E+00	8.59E+00
	500	30-min	NA	3.30E+00	3.09E+00	1.09E+00	6.69E-01	4.73E-01	5.87E-01	3.46E-01	2.61E+00	5.63E-01	1.07E+00	4.26E+00
Ethyl Acetate	2000	Annual	1.44E+03	2.31E+00	1.68E+00	1.02E+00	4.05E+00	2.56E-01	1.84E-01	2.14E-01	4.06E-01	9.91E-01	2.57E+00	1.91E+00
	1000	Annual	1.44E+03	1.96E+00	1.36E+00	8.76E-01	3.70E-01	2.39E-01	1.67E-01	1.99E-01	3.77E-01	8.79E-01	2.52E+00	1.68E+00
	500	Annual	1.44E+03	1.79E+00	1.20E+00	8.00E-01	3.53E-01	2.31E-01	1.59E-01	1.91E-01	3.62E-01	8.64E-01	2.49E-01	1.56E+00
Ethyl Acetate	2000	30-min	1.44E+04	2.48E+02	2.95E+02	2.89E+02	1.53E+02	1.46E+02	1.37E+02	2.61E+02	1.55E+02	3.94E+02	1.26E+03	3.67E+02
	1000	30-min	1.44E+04	2.48E+02	2.84E+02	2.85E+02	1.53E+02	1.46E+02	1.37E+02	2.61E+02	1.55E+02	3.91E+02	1.26E+03	3.67E+02
	500	30-min	1.44E+04	2.48E+02	2.78E+02	2.83E+02	1.53E+02	1.45E+02	1.37E+02	2.61E+02	1.55E+02	3.90E+02	1.26E+03	3.67E+02
Ethyl Benzene	2000	Annual	4.34E+02	4.68E-02	4.36E-02	1.90E-02	4.62E-03	2.24E-03	2.19E-03	2.08E-03	3.92E-03	4.03E-03	7.51E-03	3.13E-02
	1000	Annual	4.34E+02	2.34E-02	2.18E-02	9.50E-03	2.31E-03	1.12E-03	1.10E-03	1.04E-03	1.96E-03	2.02E-03	3.76E-03	1.56E-02
	500	Annual	4.34E+02	1.17E-02	1.09E-02	4.75E-03	1.15E-03	5.60E-04	5.50E-04	5.20E-04	9.80E-04	1.01E-03	1.88E-03	7.80E-03

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant (μg/m³)*-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL μg/m³	RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
Ethyl Benzene	2000	30-min	2.00E+03	5.74E+00	5.38E+00	1.90E+00	1.16E+00	8.23E-01	1.02E+00	6.02E-01	4.54E+00	9.79E-01	1.87E+00	7.41E+00
	1000	30-min	2.00E+03	2.87E+00	2.69E+00	9.51E-01	5.80E-01	4.12E-01	5.11E-01	3.01E-01	2.27E+00	4.90E-01	9.35E-01	3.70E+00
	500	30-min	2.00E+03	1.43E+00	1.34E+00	4.75E-01	2.90E-01	2.06E-01	2.55E-01	1.50E-01	1.13E+00	2.45E-01	4.67E-01	1.85E+00
Ethylene Dichloride	2000	Annual	4.00E+00	4.07E-02	1.31E-02	5.72E-03	1.39E-03	6.70E-04	6.60E-04	6.20E-04	1.18E-03	1.21E-03	2.26E-03	9.40E-03
	1000	Annual	4.00E+00	2.04E-02	6.56E-03	2.86E-03	6.95E-04	3.35E-04	3.30E-04	3.10E-04	5.90E-04	6.05E-04	1.13E-03	4.70E-03
	500	Annual	4.00E+00	1.02E-02	3.28E-03	1.43E-03	3.47E-04	1.65E-04	1.65E-04	1.55E-04	2.95E-04	3.02E-04	5.65E-04	2.35E-03
Ethylene Dichloride	2000	30-min	1.60E+02	1.73E+00	1.62E+00	5.72E-01	3.49E-01	2.48E-01	3.07E-01	1.81E-01	1.37E+00	2.95E-01	5.63E-01	2.23E+00
	1000	30-min	1.60E+02	8.63E-01	8.10E-01	2.86E-01	1.75E-01	1.24E-01	1.54E-01	9.00E-02	6.84E-01	1.47E-01	2.81E-01	1.11E+00
	500	30-min	1.60E+02	4.30E-01	4.05E-01	1.43E-01	8.75E-02	6.20E-02	7.70E-02	4.51E-02	3.42E-01	7.35E-02	1.40E-01	5.55E-01
Formaldehyde - 45.4 kg (100 lb) HE	2000	Annual	1.50E+00	7.10E-04	7.70E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.90E-04	2.70E-04	5.30E-04	6.20E-04
	1000	Annual	1.50E+00	7.00E-04	7.70E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.90E-04	2.70E-04	5.20E-04	6.10E-04
	500	Annual	1.50E+00	6.90E-04	7.60E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.80E-04	2.70E-04	5.10E-04	6.10E-04
Formaldehyde - 45.4 kg (100 lb) HE	2000	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	4.01E-02	3.56E-02	4.74E-02	3.40E-02	6.32E-02	8.43E-02	7.87E-02
	1000	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	3.96E-02	3.55E-02	4.74E-02	3.39E-02	6.32E-02	8.43E-02	7.87E-02
	500	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	3.94E-02	3.55E-02	4.74E-02	3.39E-02	6.32E-02	8.43E-02	7.87E-02
Formaldehyde - 363 kg (800 lb) HE	2000	Annual	1.50E+00	7.10E-04	7.70E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.90E-04	2.70E-04	5.30E-04	6.70E-04
	1000	Annual	1.50E+00	7.00E-04	7.70E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.90E-04	2.70E-04	5.20E-04	6.10E-04
	500	Annual	1.50E+00	6.90E-04	7.60E-04	4.80E-04	2.10E-04	1.30E-04	7.00E-05	1.00E-04	1.80E-04	2.70E-04	5.10E-04	6.10E-04
Formaldehyde - 363 kg (800 lb) HE	2000	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	4.01E-02	3.56E-02	4.74E-02	3.40E-02	6.32E-02	8.43E-02	7.87E-02
	1000	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	3.96E-02	3.55E-02	4.74E-02	3.39E-02	6.32E-02	8.43E-02	7.87E-02
	500	30-min	1.50E+01	7.71E-02	8.20E-02	4.63E-02	3.04E-02	3.94E-02	3.55E-02	4.74E-02	3.39E-01	6.32E-02	8.43E-02	7.87E-02
Hydrogen Chloride - 45.4 kg (100 lb) HE	2000	Annual	1.00E-01	5.65E-03	2.64E-02	7.52E-02	6.27E-03	2.42E-03	1.66E-03	1.65E-03	1.92E-03	1.51E-03	2.16E-03	3.54E-03
	1000	Annual	1.00E-01	5.65E-03	2.64E-02	7.52E-02	6.27E-03	2.42E-03	1.66E-03	1.65E-03	1.92E-03	1.51E-03	2.16E-03	3.54E-03
	500	Annual	1.00E-01	5.65E-03	2.64E-02	7.52E-02	6.27E-03	2.42E-03	1.66E-03	1.65E-03	1.92E-03	1.51E-03	2.16E-03	3.54E-03
Hydrogen Chloride - 45.4 kg (100 lb) HE	2000	30-min	7.50E+01	1.89E+00	2.49E+00	4.54E+00	1.85E+00	1.34E+00	6.90E-01	7.78E-01	5.64E-01	7.96E-01	9.86E-01	1.26E+00
	1000	30-min	7.50E+01	1.89E+00	2.49E+00	4.54E+00	1.85E+00	1.34E+00	6.90E-01	7.78E-01	5.64E-01	7.96E-01	9.86E-01	1.26E+00
	500	30-min	7.50E+01	1.89E+00	2.49E+00	4.54E+00	1.85E+00	1.34E+00	6.90E-01	7.78E-01	5.64E-01	7.96E-01	9.86E-01	1.26E+00

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant ($\mu g/m^3$)*-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
Hydrogen Chloride - 363 kg (800 lb) HE	2000	Annual	1.00E-01	1.57E-03	3.77E-03	4.10E-03	7.90E-04	5.20E-04	7.30E-04	7.40E-04	1.00E-03	6.00E-04	7.40E-04	1.17E-03
	1000	Annual	1.00E-01	1.57E-03	3.77E-03	4.10E-03	7.90E-04	5.20E-04	7.30E-04	7.40E-04	1.00E-03	6.00E-04	7.40E-04	1.17E-03
	500	Annual	1.00E-01	1.57E-03	3.77E-03	4.10E-03	7.90E-04	5.20E-04	7.30E-04	7.40E-04	1.00E-03	6.00E-04	7.40E-04	1.17E-03
Hydrogen Chloride - 363 kg (800 lb) HE	2000	30-min	7.50E+01	2.33E-01	2.78E-01	3.18E-01	1.91E-01	1.45E-01	1.03E-01	1.51E-01	2.07E-01	2.22E-01	2.30E-01	2.51E-01
	1000	30-min	7.50E+01	2.33E-01	2.78E-01	3.18E-01	1.91E-01	1.45E-01	1.03E-01	1.51E-01	2.07E-01	2.22E-01	2.30E-01	2.51E-01
	500	30-min	7.50E+01	2.33E-01	2.78E-01	3.18E-01	1.91E-01	1.45E-01	1.03E-01	1.51E-01	2.07E-01	2.22E-01	2.30E-01	2.51E-01
Hydrogen Chloride - BGU	2000	Annual	1.00E-01	3.85E-03	1.81E-02	4.60E-02	4.56E-03	1.70E-03	1.17E-03	1.15E-03	1.35E-03	1.04E-03	1.46E-03	2.50E-03
	1000	Annual	1.00E-01	3.85E-03	1.81E-02	4.60E-02	4.56E-03	1.70E-03	1.17E-03	1.15E-03	1.35E-03	1.04E-03	1.46E-03	2.50E-03
	500	Annual	1.00E-01	3.85E-03	1.81E-02	4.60E-02	4.56E-03	1.70E-03	1.17E-03	1.15E-03	1.35E-03	1.04E-03	1.46E-03	2.50E-03
Hydrogen Chloride - BGU	2000	30-min	7.50E+01	1.17E+00	1.76E+00	3.56E+00	1.68E+00	9.99E-01	5.26E-01	4.80E-01	3.49E-01	4.63E-01	4.39E-01	7.54E-01
	1000	30-min	7.50E+01	1.17E+00	1.76E+00	3.56E+00	1.68E+00	9.99E-01	5.26E-01	4.80E-01	3.49E-01	4.63E-01	4.39E-01	7.54E-01
	500	30-min	7.50E+01	1.17E+00	1.76E+00	3.56E+00	1.68E+00	9.99E-01	5.26E-01	4.80E-01	3.49E-01	4.63E-01	4.39E-01	7.54E-01
Hydrogen Fluoride - 45.4 kg (100 lb) HE	2000	3-hour	4.90E+00	3.72E-01	1.13E+00	2.84E+00	1.08E+00	4.59E-01	4.85E-01	2.85E-01	2.34E-01	9.26E-01	1.26E-01	3.71E-01
	1000	3-hour	4.90E+00	3.72E-01	1.13E+00	2.84E+00	1.08E+00	4.59E-01	4.85E-01	2.85E-01	2.34E-01	9.26E-01	1.26E-01	3.71E-01
	500	3-hour	4.90E+00	3.72E-01	1.13E+00	2.84E+00	1.08E+00	4.59E-01	4.85E-01	2.85E-01	2.34E-01	9.26E-01	1.26E-01	3.71E-01
Hydrogen Fluoride - 45.4 kg (100 lb) HE	2000	12-hour	3.68E+00	9.30E-02	2.83E-01	7.11E-01	2.94E-01	1.15E-01	1.21E-01	7.12E-02	5.85E-02	2.31E-02	3.15E-02	9.27E-02
	1000	12-hour	3.68E+00	9.30E-02	2.83E-01	7.11E-01	2.94E-01	1.15E-01	1.21E-01	7.12E-02	5.85E-02	2.31E-02	3.15E-02	9.27E-02
	500	12-hour	3.68E+00	9.30E-02	2.83E-01	7.11E-01	2.94E-01	1.15E-01	1.21E-01	7.12E-02	5.85E-02	2.31E-02	3.15E-02	9.27E-02
Hydrogen Fluoride - 45.4 kg (100 lb) HE	2000	24-hour	2.86E+00	4.65E-02	1.67E-01	4.24E-01	2.09E-01	5.74E-02	7.23E-02	3.71E-02	2.93E-02	1.16E-02	1.57E-02	4.63E-02
	1000	24-hour	2.86E+00	4.65E-02	1.67E-01	4.24E-01	2.09E-01	5.74E-02	7.23E-02	3.71E-02	2.93E-02	1.16E-02	1.57E-02	4.63E-02
	500	24-hour	2.86E+00	4.65E-02	1.67E-01	4.24E-01	2.09E-01	5.74E-02	7.23E-02	3.71E-02	2.93E-02	1.16E-02	1.57E-02	4.63E-02
Hydrogen Fluoride - 363 kg (800 lb) HE	2000	3-hour	4.90E+00	1.40E-01	2.05E-01	2.36E-01	1.55E-01	1.11E-01	6.79E-02	5.72E-02	5.86E-02	7.54E-02	6.98E-02	1.08E-02
	1000	3-hour	4.90E+00	1.40E-01	2.05E-01	2.36E-01	1.55E-01	1.11E-01	6.79E-02	5.72E-02	5.86E-02	7.54E-02	6.98E-02	1.08E-02
	500	3-hour	4.90E+00	1.40E-01	2.05E-01	2.36E-01	1.55E-01	1.11E-01	6.79E-02	5.72E-02	5.86E-02	7.54E-02	6.98E-02	1.08E-02
Hydrogen Fluoride - 363 kg (800 lb) HE	2000	12-hour	3.68E+00	3.50E-02	5.14E-02	5.91E-02	3.87E-02	2.78E-02	1.69E-02	1.45E-02	1.89E-02	1.88E-02	1.74E-02	2.71E-02
	1000	12-hour	3.68E+00	3.50E-02	5.14E-02	5.91E-02	3.87E-02	2.78E-02	1.69E-02	1.45E-02	1.89E-02	1.88E-02	1.74E-02	2.71E-02
	500	12-hour	3.68E+00	3.50E-02	5.14E-02	5.91E-02	3.87E-02	2.78E-02	1.69E-02	1.45E-02	1.89E-02	1.88E-02	1.74E-02	2.71E-02

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant (μg/m³)*-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL μg/m³	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
Hydrogen Fluoride - 363 kg (800 lb) HE	2000	24-hour	2.86E+00	1.75E-02	4.40E-02	3.32E-02	2.58E-02	1.45E-02	1.05E-02	8.55E-03	1.27E-02	9.42E-03	8.87E-03	1.53E-02
	1000	24-hour	2.86E+00	1.75E-02	4.40E-02	3.32E-02	2.58E-02	1.45E-02	1.05E-02	8.55E-03	1.27E-02	9.42E-03	8.87E-03	1.53E-02
	500	24-hour	2.86E+00	1.75E-02	4.40E-02	3.32E-02	2.58E-02	1.45E-02	1.05E-02	8.55E-03	1.27E-02	9.42E-03	8.87E-03	1.53E-02
Hydrogen Fluoride - BGU	2000	3-hour	4.90E+00	2.00E-01	6.23E-01	1.26E+00	5.95E-01	1.84E-01	7.79E-02	8.21E-02	7.20E-02	1.64E-01	1.56E-01	2.67E-01
	1000	3-hour	4.90E+00	2.00E-01	6.23E-01	1.26E+00	5.95E-01	1.84E-01	7.79E-02	8.21E-02	7.20E-02	1.64E-01	1.56E-01	2.67E-01
	500	3-hour	4.90E+00	2.00E-01	6.23E-01	1.26E+00	5.95E-01	1.84E-01	7.79E-02	8.21E-02	7.20E-02	1.64E-01	1.56E-01	2.67E-01
Hydrogen Fluoride - BGU	2000	12-hour	3.68E+00	5.00E-02	1.56E-01	3.79E-01	1.49E-01	4.59E-02	1.95E-02	2.46E-02	1.80E-02	4.10E-02	5.19E-02	6.68E-02
	1000	12-hour	3.68E+00	5.00E-02	1.56E-01	3.79E-01	1.49E-01	4.59E-02	1.95E-02	2.46E-02	1.80E-02	4.10E-02	5.19E-02	6.68E-02
	500	12-hour	3.68E+00	5.00E-02	1.56E-01	3.79E-01	1.49E-01	4.59E-02	1.95E-02	2.46E-02	1.80E-02	4.10E-02	5.19E-02	6.68E-02
Hydrogen Fluoride - BGU	2000	24-hour	2.86E+00	2.50E-02	7.79E-02	2.27E-01	7.44E-02	2.29E-02	9.73E-03	1.33E-02	9.00E-03	2.05E-02	2.46E-02	3.40E-02
	1000	24-hour	2.86E+00	2.50E-02	7.79E-02	2.27E-01	7.44E-02	2.29E-02	9.73E-03	1.33E-02	9.00E-03	2.05E-02	2.46E-02	3.40E-02
	500	24-hour	2.86E+00	2.50E-02	7.79E-02	2.27E-01	7.44E-02	2.29E-02	9.73E-03	1.33E-02	9.00E-03	2.05E-02	2.46E-02	3.40E-02
Lead - BGU	2000	1st Qtr	1.50E+00[b]	4.32E-03	1.36E-02	2.70E-02	3.47E-03	2.56E-03	1.28E-03	1.09E-03	1.94E-03	1.74E-03	2.40E-03	2.98E-03
	1000	1st Qtr	1.50E+00[b]	1.63E-03	7.29E-03	1.34E-02	1.99E-03	8.20E-04	6.40E-04	6.30E-04	8.80E-04	8.60E-04	1.77E-03	1.07E-03
	500	1st Qtr	1.50E+00[b]	1.50E-03	7.13E-03	1.33E-02	1.92E-03	7.70E-04	5.90E-04	5.90E-04	8.30E-04	7.70E-04	1.02E-03	9.40E-04
Lead - BGU	2000	2nd Qtr	1.50E+00[b]	2.75E-03	8.40E-03	2.61E-02	7.18E-03	2.35E-03	8.90E-04	9.00E-04	1.04E-03	9.20E-04	1.08E-03	2.04E-03
	1000	2nd Qtr	1.50E+00[b]	1.43E-03	4.79E-03	1.32E-02	2.64E-03	1.14E-03	3.00E-04	3.70E-04	4.70E-04	3.70E-04	4.80E-04	1.01E-03
	500	2nd Qtr	1.50E+00[b]	1.35E-03	4.63E-03	1.31E-02	2.48E-03	1.05E-03	2.70E-04	3.30E-04	4.40E-04	3.30E-04	4.20E-04	9.30E-04
Lead - BGU	2000	3rd Qtr	1.50E+00[b]	3.08E-03	1.26E-02	5.62E-02	3.84E-03	1.62E-03	9.60E-04	1.13E-03	8.20E-04	5.60E-04	7.70E-04	1.74E-03
	1000	3rd Qtr	1.50E+00[b]	1.39E-03	7.59E-03	3.06E-02	1.89E-03	5.00E-04	5.20E-04	5.00E-04	2.50E-04	2.40E-04	3.80E-04	9.70E-04
	500	3rd Qtr	1.50E+00[b]	1.13E-03	7.25E-03	3.03E-02	1.69E-03	4.20E-04	4.90E-04	4.70E-04	2.20E-04	2.10E-04	3.20E-04	8.20E-04
Lead - BGU	2000	4th Qtr	1.50E+00[b]	6.45E-03	1.80E-02	2.78E-02	3.27E-03	1.60E-03	1.50E-03	1.02E-03	1.37E-03	1.22E-03	2.04E-03	4.71E-03
	1000	4th Qtr	1.50E+00[b]	2.36E-03	8.79E-03	1.26E-02	1.28E-03	5.70E-04	5.50E-04	4.80E-04	7.10E-04	4.60E-04	8.20E-04	1.56E-03
	500	4th Qtr	1.50E+00[b]	2.36E-02	8.79E-03	1.26E-02	1.28E-03	5.70E-04	5.50E-04	4.80E-04	7.10E-04	4.60E-04	8.20E-04	1.56E-03
Methanol	2000	Annual	2.62E+02	3.64E-01	4.42E-01	2.84E-01	1.50E-01	1.00E-01	5.04E-02	6.52E-02	1.47E-01	1.58E-01	2.44E-01	3.12E-01
	1000	Annual	2.62E+02	3.32E-01	4.13E-01	2.71E-01	1.47E-01	9.89E-02	4.89E-02	6.37E-02	1.44E-01	1.55E-01	2.39E-01	2.91E-01
	500	Annual	2.62E+02	3.16E-01	3.98E-01	2.65E-01	1.45E-01	9.81E-02	4.81E-02	6.36E-02	1.43E-01	1.54E-01	2.36E-01	2.80E-01

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant ($\mu g/m^3$)*-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
Methanol	2000	30-min	2.62E+03	6.17E+01	7.29E+01	7.45E+01	2.73E+01	5.16E+01	5.86E+01	5.4E+01	5.40E+01	6.19E+01	1.23E+02	6.25E+01
	1000	30-min	2.62E+03	6.07E+01	7.28E+01	7.45E+01	2.73E+01	5.16E+01	5.86E+01	5.4E+01	5.35E+01	6.19E+01	1.23E+02	6.25E+01
	500	30-min	2.62E+03	6.01E+01	7.27E+01	7.45E+01	2.73E+01	5.16E+01	5.86E+01	5.4E+01	5.35E+01	6.19E+01	1.23E+02	6.25E+01
Mercury	2000	Annual	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2000	24-hour	2.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2000	30-min	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Cyanide - 45.kg (100 lb) HE	2000	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	Annual	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Cyanide - 45.kg (100 lb) HE	2000	30-min	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	30-min	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	30-min	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Ethyl Ketone	2000	Annual	5.90E+02	1.25E+00	8.27E-01	5.78E-01	2.60E-01	1.70E-01	1.17E-01	1.39E-01	2.64E-01	6.37E-01	1.80E+00	1.11E+00
	1000	Annual	5.90E+02	1.25E+00	8.27E-01	5.78E-01	2.60E-01	1.70E-01	1.17E-01	1.39E-01	2.64E-01	6.37E-01	1.80E+00	1.11E+00
	500	Annual	5.90E+02	1.19E+00	7.78E-01	5.48E-01	2.48E-01	1.63E-01	1.12E-01	1.34E-01	2.55E-01	6.18E-01	1.77E+00	1.06E+00
Methyl Ethyl Ketone	2000	30-min	3.90E+03	1.80E+02	1.95E+02	2.01E+02	1.08E+02	1.04E+02	9.76E+01	1.86E+02	1.12E+02	2.75E+02	8.95E+02	2.68E+02
	1000	30-min	3.90E+03	1.80E+02	1.95E+02	2.01E+02	1.08E+02	1.04E+02	9.76E+01	1.86E+02	1.12E+02	2.75E+02	8.95E+02	2.68E+02
	500	30-min	3.90E+03	1.77E+02	1.94E+02	1.99E+02	1.08E+02	1.03E+02	9.71E+01	1.85E+02	1.11E+02	2.74E+02	8.93E+02	2.64E+02
Methyl Isobutyl Ketone	2000	Annual	2.05E+02	1.53E-02	1.43E-02	6.22E-03	1.51E-03	7.30E-04	7.20E-04	6.80E-04	1.28E-03	1.32E-03	2.46E-03	1.10E-02
	1000	Annual	2.05E+02	7.86E-03	7.33E-03	3.20E-03	7.80E-04	3.80E-04	3.70E-04	3.50E-04	6.60E-04	6.80E-04	1.26E-03	5.25E-03
	500	Annual	2.05E+02	3.72E-03	3.47E-03	1.51E-03	3.70E-03	1.80E-04	1.70E-04	1.70E-04	3.10E-04	3.20E-04	6.00E-04	2.49E-03
Methyl Isobutyl Ketone	2000	30-min	2.05E+03	1.88E+00	1.76E+00	6.22E-01	3.80E-01	2.69E-01	3.34E-01	1.97E-01	1.49E+00	3.21E-01	6.12E-01	2.42E+00
	1000	30-min	2.05E+03	9.69E-01	9.05E-01	3.19E-01	1.93E-01	1.38E-01	1.72E-01	1.01E-01	7.64E-01	1.65E-01	3.14E-01	1.24E+00
	500	30-min	2.05E+03	4.57E-01	4.29E-01	1.51E-01	9.20E-02	6.56E-02	8.13E-02	4.79E-02	3.62E-01	7.80E-02	1.49E-02	5.90E-01
Methylene Chloride	2000	Annual	2.60E+01	4.67E-01	3.92E-01	1.97E-01	6.21E-02	3.56E-02	2.87E-02	3.08E-02	5.84E-02	1.05E-01	2.75E-01	3.45E-01
	1000	Annual	2.60E+01	3.06E-01	2.93E-01	1.32E-01	4.63E-02	2.79E-02	2.12E-02	2.37E-02	4.50E-02	9.08E-02	2.49E-01	2.38E-01
	500	Annual	2.60E+01	3.06E-01	2.93E-01	1.32E-01	4.63E-02	2.79E-02	2.12E-02	2.37E-02	4.50E-02	9.08E-02	2.49E 01	2.38E-01
Methylene Chloride	2000	30-min	2.60E+02	3.93E+01	3.69E+01	2.90E+01	1.39E+01	1.32E+01	1.24E+01	2.36E+01	3.11E+01	3.77E+01	1.15E+02	5.07E+01
	1000	30-min	2.60E+02	2.25E+01	3.00E+01	2.75E+01	1.39E+01	1.32E+01	1.24E+01	2.36E+01	1.56E+01	3.64E+01	1.15E+02	3.33E+01
	500	30-min	2.60E+02	2.25E+01	3.00E+01	2.72E+01	1.39E+01	1.32E+01	1.24E+01	2.36E+01	1.56E+01	3.64E+01	1.15E+02	3.33E+01

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant ($\mu g/m^3$)*-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
Naphthalene - 45.4 kg (100 lb) HE	2000	Annual	5.00E+01	1.00E-05	2.00E-05	7.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	Annual	5.00E+01	1.00E-05	2.00E-05	7.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	Annual	5.00E+01	1.00E-05	2.00E-05	7.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene - 45.4 kg (100 lb) HE	2000	30-min	4.40E+02	1.73E-03	2.28E-03	4.16E-03	1.70E-03	1.20E-03	6.30E-04	6.60E-04	5.20E-04	7.30E-04	9.00E-04	1.16E-03
	1000	30-min	4.40E+02	1.73E-03	2.28E-03	4.16E-03	1.70E-03	1.20E-03	6.30E-04	6.60E-04	5.20E-04	7.30E-04	9.00E-04	1.16E-03
	500	30-min	4.40E+02	1.73E-03	2.28E-03	4.16E-03	1.70E-03	1.20E-03	6.30E-04	6.60E-04	5.20E-04	7.30E-04	9.00E-04	1.16E-03
Naphthalene - 363 kg (800 lb) HE	2000	Annual	5.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	Annual	5.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	Annual	5.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene - 363 kg (800 lb) HE	2000	30-min	4.40E+02	2.50E-04	2.90E-04	3.40E-04	2.00E-04	1.30E-04	1.10E-04	1.60E-04	2.20E-04	2.30E-04	2.40E-04	2.60E-04
	1000	30-min	4.40E+02	2.50E-04	2.90E-04	3.40E-04	2.00E-04	1.50E-04	1.10E-04	1.60E-04	2.20E-04	2.30E-04	2.40E-04	2.60E-04
	500	30-min	4.40E+02	2.50E-04	2.90E-04	3.40E-04	2.00E-04	1.50E-04	1.10E-04	1.60E-04	2.20E-04	2.30E-04	2.40E-04	2.60E-04
Nickel - BGU	2000	Annual	1.50E-02	1.00E-05	6.00E-05	1.60E-04	2.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	1.00E-05
	1000	Annual	1.50E-02	1.00E-05	6.00E-05	1.60E-04	2.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	1.00E-05
	500	Annual	1.50E-02	1.00E-05	6.00E-05	1.60E-04	2.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	1.00E-05
Nickel - BGU	2000	30-min	1.50E-01	4.09E-03	6.16E-03	1.25E-02	5.89E-03	3.51E-03	1.85E-03	1.68E-03	1.22E-03	1.62E-03	1.54E-03	2.64E-03
	1000	30-min	1.50E-01	4.09E-03	6.16E-03	1.25E-02	5.89E-03	3.51E-03	1.85E-03	1.68E-03	1.22E-03	1.62E-03	1.54E-03	2.64E-03
	500	30-min	1.50E-01	4.09E-03	6.16E-03	1.25E-02	5.89E-03	3.51E-03	1.85E-03	1.68E-03	1.22E-03	1.62E-03	1.54E-03	2.64E-03
Nitrobenzene	2000	Annual	5.00E+00	1.54E-03	1.44E-03	6.30E-04	1.50E-04	7.00E-05	7.00E-05	7.00E-05	1.30E-04	1.30E-04	2.50E-04	1.03E-03
	1000	Annual	5.00E+00	7.70E-04	7.20E-04	3.10E-04	8.00E-05	4.00E-05	4.00E-05	4.00E-05	6.00E-05	6.50E-05	1.25E-04	5.15E-04
	500	Annual	5.00E+00	3.85E-04	3.60E-04	1.55E-04	4.00E-05	2.00E-05	2.00E-05	2.00E-05	3.00E-05	3.25E-05	6.25E-05	2.57E-04
Nitrobenzene	2000	30-min	2.40E+01	1.89E-01	1.78E-01	6.28E-02	3.83E-02	2.72E-02	3.37E-02	1.99E-02	1.50E-01	3.23E-02	6.17E-02	2.45E-01
	1000	30-min	2.40E+01	9.45E-02	8.86E-02	3.13E-02	1.91E-02	1.36E-02	1.68E-02	9.91E-03	7.48E-02	1.61E-02	3.08E-02	1.22E-01
	500	30-min	2.40E+01	4.72E-02	4.43E-02	1.57E-02	9.56E-03	6.78E-03	8.41E-03	4.96E-03	3.74E-02	8.06E-03	1.54E-02	6.10E-02
NO_2 - 45.4 kg (100 lb) HE	2000	Annual	1.00E+02[b]	3.69E-01	4.78E-01	4.39E-01	1.29E-01	1.08E-01	9.18E-02	9.39E-02	1.69E-01	1.43E-01	2.13E-01	2.99E-01
	1000	Annual	1.00E+02[b]	3.65E-01	4.76E-01	4.38E-01	1.28E-01	1.07E-01	9.16E-02	9.36E-02	1.68E-01	1.42E-01	2.10E-01	2.97E-01
	500	Annual	1.00E+02[b]	3.63E-01	4.75E-01	4.37E-01	1.28E-01	1.07E-01	9.14E-02	9.34E-02	1.68E-01	1.41E-01	2.08E-01	2.96E-01

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air*[1] *and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant* (*µg/m*^{3})-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL µg/m^3	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
NO_2 - 363 kg (800 lb) HE	2000	Annual	1.00E+02[b]	2.83E-01	4.72E-01	9.52E-02	1.14E-01	7.92E-02	4.12E-02	4.13E-02	7.45E-02	9.31E-02	1.56E-01	2.15E-01
	1000	Annual	1.00E+02[b]	2.80E-01	4.70E-01	9.51E-02	1.14E-01	7.90E-02	4.09E-02	4.11E-02	7.40E-02	9.17E-02	1.52E-01	2.12E-01
	500	Annual	1.00E+02[b]	2.78E-01	4.69E-01	9.51E-01	1.13E-01	7.86E-02	4.08E-02	4.09E-02	7.36E-02	9.09E-02	1.51E-01	2.11E-01
NO_2 - BGU	2000	Annual	1.00E+02[b]	1.75E-01	2.11E-01	1.42E-01	5.13E-02	3.02E-02	2.01E-02	2.25E-02	4.05E-02	7.14E-02	1.24E-01	1.43E-01
	1000	Annual	1.00E+02[b]	1.71E-01	2.08E-01	1.41E-01	5.07E-02	2.98E-02	1.99E-02	2.25E-02	3.99E-02	7.00E-02	1.21E-01	1.40E-01
	500	Annual	1.00E+02[b]	1.69E-01	2.07E-01	1.40E-01	5.03E-02	2.96E-02	1.98E-02	2.21E-02	3.97E-02	6.93E-02	1.19E-01	1.39E-01
Phenol - 45.4 kg (100 lb) HE	2000	Annual	1.90E+01	3.00E-05	1.30E-04	3.70E-04	3.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05
	1000	Annual	1.90E+01	3.00E-05	1.30E-04	3.70E-04	3.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05
	500	Annual	1.90E+01	3.00E-05	1.30E-04	3.70E-04	3.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05
Phenol - 45.4 kg (100 lb) HE	2000	30-min	1.54E+02	9.25E-03	1.22E-02	2.22E-02	9.05E-03	6.53E-03	3.37E-03	3.51E-03	2.75E-03	3.89E-03	4.82E-03	6.17E-03
	1000	30-min	1.54E+02	9.25E-03	1.22E-02	2.22E-02	9.05E-03	6.53E-03	3.37E-03	3.51E-03	2.75E-03	3.89E-03	4.82E-03	6.17E-03
	500	30-min	1.54E+02	9.25E-03	1.22E-02	2.22E-02	9.05E-03	6.53E-03	3.37E-03	3.51E-03	2.75E-03	3.89E-03	4.82E-03	6.17E-03
Phenol - 363 kg (800 lb) HE	2000	Annual	1.90E+01	1.00E-05	2.00E-05	2.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	1.00E-05
	1000	Annual	1.90E+01	1.00E-05	2.00E-05	2.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	1.00E-05
	500	Annual	1.90E+01	1.00E-05	2.00E-05	2.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	1.00E-05
Phenol - 363 kg (800 lb) HE	2000	30-min	1.54E+02	1.32E-03	1.57E-03	1.79E-03	1.08E-03	8.20E-04	5.80E-04	8.50E-04	1.17E-03	1.25E-03	1.30E-03	1.41E-03
	1000	30-min	1.54E+02	1.32E-03	1.57E-03	1.79E-03	1.08E-03	8.20E-04	5.80E-04	8.50E-04	1.17E-03	1.25E-03	1.30E-03	1.41E-03
	500	30-min	1.54E+02	1.32E-03	1.57E-03	1.79E-03	1.08E-03	8.20E-04	5.80E-04	8.50E-04	1.17E-03	1.25E-03	1.30E-03	1.41E-03
PM10 - 45.4 kg (100 lb) HE	2000	Annual	5.00E+01[b]	6.87E-01	2.13E+00	5.64E+00	5.19E-01	2.13E-01	1.51E-01	1.52E-01	2.11E-01	2.38E-01	4.39E-01	5.22E-01
	1000	Annual	5.00E+01[b]	5.65E-01	2.05E+00	5.59E+00	4.94E-01	1.99E-01	1.41E-01	1.40E-01	1.90E-01	1.86E-01	3.19E-01	4.01E-01
	500	Annual	5.00E+01[b]	5.28E-01	2.03E+00	5.57E+00	4.86E-01	1.95E-01	1.39E-01	1.37E-01	1.83E-01	1.71E-01	2.83E-01	3.66E-01
PM10 - 45.4 kg (100 lb) HE	2000	24-hour	1.50E+02[b]	8.85E+00	2.17E+01	5.36E+01	1.26E+01	1.03E+01	3.14E+00	3.32E+00	2.41E+00	3.16E+00	6.07E+00	5.00E+00
	1000	24-hour	1.50E+02[b]	8.85E+00	2.17E+01	5.36E+01	1.26E+01	1.01E+01	3.12E+00	3.32E+00	2.32E+00	2.84E+00	5.52E+00	5.00E+00
	500	24-hour	1.50E+02[b]	8.85E+00	2.17E+01	5.36E+01	1.26E+01	1.01E+01	3.12E+00	3.32E+00	2.29E+00	2.74E+00	5.35E+00	5.00E+00
PM10 - 363 kg (800 lb) HE	2000	Annual	5.00E+01[b]	4.05E-01	5.08E-01	4.70E-01	1.27E-01	7.98E-02	9.08E-02	9.28E-02	1.55E-01	1.78E-01	3.43E-01	3.62E-01
	1000	Annual	5.00E+01[b]	2.83E-01	4.33E-01	4.18E-01	1.02E-01	6.61E-02	8.17E-02	8.12E-02	1.33E-01	1.26E-01	2.23E-01	2.41E-01
	500	Annual	5.00E+01[b]	2.46E-01	4.09E-01	4.02E-01	9.04E-02	6.19E-02	7.90E-02	7.78E-02	1.27E-01	1.11E-01	1.87E-01	2.05E-01

TABLE B.4.2-3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant ($\mu g/m^3$)*-Continued

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL $\mu g/m^3$	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
PM10 - 363 kg (800 lb) HE	2000	24-hour	1.50E+02[b]	1.89E+00	3.92E+00	4.68E+00	2.19E+00	1.49E+00	1.48E+00	1.82E+00	1.45E+00	2.47E+00	4.70E+00	3.26E+00
	1000	24-hour	1.50E+02[b]	1.89E+00	3.92E+00	4.68E+00	2.16E+00	1.34E+00	1.48E+00	1.92E+00	1.26E+00	2.20E+00	3.17E+00	1.85E+00
	500	24-hour	1.50E+02[b]	1.89E+00	3.92E+00	4.68E+00	2.16E+00	1.29E+00	1.48E+00	1.92E+00	1.25E+00	2.12E+00	2.80E+00	1.85E+00
Tetrachloroethylene	2000	Annual	3.40E+01	5.29E-02	4.94E-02	2.15E-02	5.23E-03	2.54E-03	2.48E-03	2.35E-03	4.44E-03	4.57E-03	8.51E-03	3.54E-03
	1000	Annual	3.40E+01	2.65E-02	2.47E-02	1.08E-02	2.62E-03	1.27E-03	1.24E-03	1.18E-03	2.22E-03	2.28E-03	4.25E-03	1.77E-03
	500	Annual	3.40E+01	1.32E-02	1.23E-02	5.40E-03	1.31E-03	6.35E-04	6.2E-04	5.90E-04	1.11E-03	1.14E-03	2.12E-03	8.85E-04
Tetrachloroethylene	2000	30-min	3.40E+02	6.50E+00	6.10E+00	2.15E+00	1.31E+00	9.32E-01	1.16E+00	6.80E-01	5.14E+00	1.10E+00	2.11E+00	8.39E-01
	1000	30-min	3.40E+02	3.25E+00	3.05E+00	1.08E+00	6.57E-01	4.67E-01	5.78E-01	3.41E-01	2.57E+00	5.54E-01	1.06E+00	4.19E-01
	500	30-min	3.40E+02	1.62E+00	1.52E+00	5.40E-01	3.28E-01	2.33E-01	2.89E-01	1.70E-01	1.28E+00	2.77E-01	5.30E-01	2.09E-01
Titanium - BGU	2000	Annual	NA	4.00E-05	1.70E-04	4.30E-04	4.00E-05	2.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05
	1000	Annual	NA	4.00E-05	1.70E-04	4.30E-04	4.00E-05	2.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05
	500	Annual	NA	4.00E-05	1.70E-04	4.30E-04	4.00E-05	2.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	2.00E-05
Titanium - BGU	2000	30-min	5.00E+02	1.10E-03	1.66E-02	3.36E-02	1.58E-02	9.44E-03	4.97E-03	4.53E-03	3.30E-03	4.37E-03	4.14E-03	7.12E-03
	1000	30-min	5.00E+02	1.10E-03	1.66E-02	3.36E-02	1.58E-02	9.44E-03	4.97E-03	4.53E-03	3.30E-03	4.37E-03	4.14E-03	7.12E-03
	500	30-min	5.00E+02	1.10E-03	1.66E-02	3.36E-02	1.58E-02	9.44E-03	4.97E-03	4.53E-03	3.30E-03	4.37E-03	4.14E-03	7.12E-03
Toluene	2000	Annual	1.88E+02	1.15E+00	1.18E+00	7.49E-01	3.79E-01	2.50E-01	1.33E-01	1.66E-01	3.61E-01	4.34E-01	6.78E-01	9.50E-01
	1000	Annual	1.88E+02	9.09E-01	5.47E-01	6.60E-01	3.45E-01	2.30E-01	1.18E-01	1.50E-01	3.33E-01	3.83E-01	5.96E-01	7.70E-01
	500	Annual	1.88E+02	4.65E-01	2.98E-01	3.43E-01	1.75E-01	1.16E-01	5.95E-02	7.56E-02	1.67E-01	1.88E-01	2.93E-01	3.87E-01
Toluene	2000	30-min	1.88E+03	1.39E+02	1.62E+02	1.63E+02	7.34E+01	1.16E+02	1.25E+02	1.20E+02	1.17E+02	1.35E+02	1.34E+01	1.45E+02
	1000	30-min	1.88E+03	1.34E+02	1.61E+02	1.61E+02	6.65E+01	1.13E+02	1.24E+02	1.19E+02	1.15E+02	1.33E+02	2.68E+02	1.39E+02
	500	30-min	1.88E+03	6.69E+01	8.22E+01	8.06E+01	3.46E+01	5.60E+01	6.19E+01	5.94E+01	5.77E+01	6.65E+01	1.34E+01	6.96E+01
Trichloroethylene	2000	Annual	1.35E+02	1.53E-01	1.43E-01	6.24E-02	1.52E-02	7.36E-03	7.18E-03	6.82E-03	1.29E-03	1.32E-03	2.47E-03	1.03E-02
	1000	Annual	1.35E+02	7.65E-02	7.14E-02	3.11E-02	7.56E-02	3.67E-03	3.58E-03	3.40E-03	6.40E-04	6.60E-04	1.23E-03	5.12E-03
	500	Annual	1.35E+02	3.81E-02	3.55E-02	1.55E-02	3.26E-03	1.83E-03	1.78E-03	1.69E-03	3.19E-04	3.28E-04	6.12E-04	2.54E-03
Trichloroethylene	2000	30-min	1.35E+03	1.88E+01	1.77E+01	6.24E+00	3.81E+00	2.70E+00	3.35E+00	1.98E+00	1.49E+00	3.21E+00	6.14E+00	2.43E+00
	1000	30-min	1.35E+03	9.39E+02	8.81E+00	3.11E+00	1.90E+00	1.35E+00	1.67E+00	9.85E-01	7.45E-01	1.60E+00	3.06E+00	1.21E+00
	500	30-min	1.35E+03	4.67E+00	4.38E+00	1.55E+00	9.45E-01	6.70E-01	8.31E-01	4.90E-01	3.70E-01	8.02E-01	1.52E+00	6.03E-01

TABLE B.4.2–3.—*Estimated Maximum Concentrations of Hazardous Air[1] and Criteria Pollutants for 2,000, 1,000, and 500 Weapons at Local Residences Surrounding Pantex Plant (μg/m³)*-**Continued**

POLLUTANT	OPS	AVG. TIME	NAAQS OR ESL μg/m³	RESIDENCE										
				1	2	3	4	5	6	7	8	9	10	11
SO_2 - BGU	2000	Annual	8.0E+01[b]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	Annual	8.0E+01[b]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	Annual	8.0E+01[b]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SO_2 - BGU	2000	24-hour	3.65E+02[b]	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	24-hour	3.65E+02[b]	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	24-hour	3.65E+02[b]	0.00E+00	0.00E+00	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SO_2 - BGU	2000	3-hour	1.30E+03[b]	1.00E-05	2.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	1000	3-hour	1.30E+03[b]	1.00E-05	2.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	500	3-hour	1.30E+03[b]	1.00E-05	2.00E-05	1.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SO_2 - BGU	2000	30-min	1.121E-03[b]	3.00E-05	4.00E-05	9.00E-05	3.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
	1000	30-min	1.121E-03[b]	3.00E-05	4.00E-05	9.00E-05	3.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
	500	30-min	1.121E-03[b]	3.00E-05	4.00E-05	9.00E-05	3.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
Triethylamine	2000	Annual	4.00E+00	1.32E-03	1.68E-03	1.14E-03	6.30E-04	4.30E-04	2.10E-04	6.20E-04	1.03E-03	1.19E-02	1.00E-05	2.00E-05
	1000	Annual	4.00E+00	1.32E-03	1.68E-03	1.14E-03	6.30E-04	4.30E-04	2.10E-04	6.20E-04	1.03E-03	1.19E-02	1.00E-05	2.00E-05
	500	Annual	4.00E+00	1.32E-03	1.68E-03	1.14E-03	6.30E-04	4.30E-04	2.10E-04	6.20E-04	1.03E-03	1.19E-02	1.00E-05	2.00E-05
Triethylamine	2000	30-min	4.00E+01	2.61E-01	3.19E-01	3.27E-01	1.20E-01	2.26E-01	2.57E-01	2.39E-01	2.32E-01	2.72E-01	5.40E-01	2.74E-01
	1000	30-min	4.00E+01	2.61E-01	3.19E-01	3.27E-01	1.20E-01	2.26E-01	2.57E-01	2.39E-01	2.32E-01	2.72E-01	5.40E-01	2.74E-01
	500	30-min	4.00E+01	2.61E-01	3.19E-01	3.27E-01	1.20E-01	2.26E-01	2.57E-01	2.39E-01	2.32E-01	2.72E-01	5.40E-01	2.74E-01
Xylene	2000	Annual	4.34E+02	2.24E-01	2.04E-01	1.49E-01	6.12E-02	3.44E-02	2.66E-02	2.39E-02	4.69E-02	9.86E-02	1.53E-01	1.84E-01
	1000	Annual	4.34E+02	1.05E-01	9.58E-02	7.17E-02	2.99E-02	1.69E-02	1.30E-02	1.17E-02	2.29E-02	4.87E-02	7.51E-02	8.74E-02
	500	Annual	4.34E+02	5.24E-02	4.77E-02	3.57E-02	1.49E-02	8.41E-03	6.48E-03	5.81E-03	1.14E-02	2.43E-02	3.75E-02	4.35E-02
Xylene	2000	30-min	3.70E+03	1.57E+01	4.62E+01	1.85E+01	1.73E+01	7.96E+00	1.22E+01	1.12E+01	1.11E+01	2.85E+01	5.51E+01	2.33E+01
	1000	30-min	3.70E+03	7.84E+00	2.23E+01	9.27E+00	8.63E+00	3.98E+00	6.00E+00	5.61E+00	5.53E+00	1.42E+01	2.75E+01	1.16E+01
	500	30-min	3.70E+03	3.91E+00	1.11E+01	4.64E+00	4.31E+00	1.99E+00	3.00E+00	2.79E+00	2.76E+00	7.70E+00	1.37E+01	5.80E+00

[a]Alcohols is the only pollutant which exceeded the ESL at the fence line. Therefore modeling results were also reported for all the residents.
[b]Indicates a NAAQS. Other values are ESLs.
[1]As listed in the *Clean Air Act*, as amended, Nov, 1990 (42 U.S.C. 7401).
NA - An ESL has not been established by TNRCC.
Note: Table shows the results (maximum concentrations at residences for all three operations levels) obtained from models ISCST2 and ISCL2.
Sources: TNRCC 1993a; TNRCC 1996a

REFERENCES

40 CFR 51	EPA, "Implementation Plans, Requirements for Preparation, Adoption, and Submittal", *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, Revised July 1, 1994.
42 USC 7401	*Clean Air Act of 1990*, 42 United States Code 7401.
Auer 1978	Auer, *Journal of Applied Meteorology*, Volume 17, 1978.
Carter 1978	Carter, Roy V., "Emissions from the Open Burning or Detonation of Explosives", prepared for presentation at the 71st Annual Meeting of the Air Pollution Control Association, Houston, TX, June 25–30, 1978.
PC 1994	Ecklund, B., "U.S. Department of Energy, Pantex Plant, Current Emissions Inventory", Letter from Bart Ecklund, Radian Corporation, Austin, TX, to Robert Roulston, Pantex, December 2, 1994.
PC 1996l	Bowman, A., "Identification of Alcohols," Pantex EIS Support Request provided by Alan Bowman, to Raji Sinha, Tetra Tech, Inc., Albuquerque, NM, July 12, 1996.
Radian 1993	Radian Corporation, *Air Quality Impact Analysis Open Burning of Explosives*, prepared under Contract DCN 93-0252-012-01, by Radian Corporation, Austin, TX, managed by Battelle Pantex, Amarillo, TX, for the U.S. Department of Energy, September 1993.
Radian 1994	Radian Corporation, *Air Quality Impact Analysis in Support of Permit Number HW-50284,* RCN:252-012-05-01, prepared by Radian Corporation, Austin, TX, managed by Battelle Pantex, Amarillo, TX, for the U.S. Department of Energy, June 1994.
TNRCC 1993a	Texas Natural Resources Conservation Commission, *Air Quality Modeling Guidelines,* Modeling Division, Austin, TX, December, 1993.
TNRCC 1995b	Texas Natural Resources Conservation Commission, *Modeling Analysis of the Pantex Plant, Amarillo, Texas,* Modeling Division, Austin, TX, June 1995.
TNRCC 1996a	Texas Natural Resources Conservation Commission, *Effective Screening Levels (ESLs),* Modeling Division, Austin, TX, April 15, 1996.
USGS 1973	US Geological Survey, *Sevenmile Basin, Quadrangle Texas, 7.5 Minute Series Topographic Map,* US Department of Interior, Denver, CO, 1953, Photorevised 1967 and 1973.

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APPENDIX C

Water Resources Analysis

APPENDIX C
WATER RESOURCES ANALYSIS

This appendix supplements the information on the characterization of surface water, groundwater, and water quality presented in section 4.6, Water Resources.

C.1 SURFACE WATER

Surface water studies and data were reviewed during a literature search performed for this EIS. Surface water availability and use were not primary issues of concern, because groundwater is the source of all water supplied to Pantex Plant.

C.1.1 Hydrologic Characterization

Playas are the primary surface water feature at Pantex Plant and the surrounding vicinity. The assessment and characterization of playas was important for determining the potential for flooding onsite, the significance of playas as a source of recharge to groundwater, and evaluation of playas as receptors of wastewater disposal. Numerous investigations have attempted to characterize the significance of playas at and in the vicinity of Pantex Plant. The characterization of surface water resources in the EIS took these and other investigations into account.

C.1.2 Surface Water Quality

Evaluation of baseline surface water quality is based on a review of data tabulated in Pantex Plant annual environmental reports for a 5-year period, from 1990 through 1994. Information regarding surface water monitoring stations and sources of flow are summarized in volume I, Table 4.6.1.1–2. Surface water quality samples were collected and analyzed for a full suite of analytical laboratory parameters, including radionuclides, metals, high explosive(s) (HE), polychlorinated biphenyls (PCBs), pesticides, herbicides, volatile organics, semivolatile organics and other miscellaneous constituents and field parameters. Samples were collected from 29 onsite sampling locations from 1990 to 1993; surface water samples were collected from only 17 of these sampling locations in 1994. The surface water quality data collected over the past 5 years do not include every sampling location each year, because some locations only have sufficient water to sample during storm events. One offsite location, Bushland Playa at the U.S. Department of Agriculture's Agricultural Experimental Station 54 kilometers (34 miles) west of Pantex Plant, was used as a control sample to give some insight on background surface water quality. Suspected contaminants of concern (COCs) were determined by comparing tabulated annual average values to the following defined surface water quality decision criteria:

- Texas State Water Quality Criteria, Aquatic Life Protection (§307.2–307.10) for fresh water acute aquatic life protection (TWC 1991).
- Texas State Water Quality Criteria, Human Health Protection (§307.2–307.10) for water and fish (TWC 1991).
- Environmental Protection Agency (EPA) Region 6 National Pollutant Discharge Elimination System (NPDES) Permit (No. TX-0107107) (EPA 1996).
- TNRCC permit to dispose of wastes (Permit No. 02296) (TNRCC 1996).
- DOE Derived Concentration Guides (DOE Order 5400.5) for radionuclide health standards.

The summary of surface water quality decision criteria defined for Pantex Plant is presented in Table C.1.2–1 (all tables are presented at the end of this appendix). The Texas State Water Quality Criteria do not apply directly to the

Pantex Plant playas; these decision criteria were selected for comparative purposes only. The State of Texas applies regulations through the concentration limits specified in permits; therefore, decision criteria for surface water compliance are based on permit limits established in the EPA NPDES Permit and TNRCC Wastewater Discharge Permit for Pantex Plant. Pantex Plant has worked very closely with EPA Region VI and TNRCC to produce wastewater discharge permits (EPA NPDES Permit No. TX-0107107 and TNRCC Wastewater Discharge Permit No. 02296) that dictate stringent wastewater discharge requirements protective of human health and the environment. Permit limits specified in the Pantex Plant NPDES Permit for various outfalls are provided in Table C.1.2–2.

Pantex Plant wastewater discharge permit limits meet or exceed all current regulations that apply to surface water. DOE Derived Concentration Guides (DOE Order 5400.5) are used as decision criteria for radionuclides. The *Atomic Energy Act of 1954* (42 U.S.C. 2011), as amended, authorizes DOE to protect public health and safety and the environment in conducting programs, such as Pantex Plant operations. As a result, DOE is self-regulating with respect to standards and requirements for radiation.

The following assumptions were made for this analysis:

- Some of the Texas State Water Quality Criteria standards (e.g., copper, nickel, zinc, cadmium, and lead) are defined as a function of hardness. The average water hardness at Pantex Plant was assumed to be 128 milligrams per liter. Therefore, the following criteria were determined:
  - — Copper = 0.024 milligrams per liter.
  - — Nickel = 1.75 milligrams per liter.
  - — Zinc = 0.144 milligrams per liter.
  - — Cadmium = 0.045 milligrams per liter.
  - — Lead = 0.112 milligrams per liter.
- Tabulated water quality data are assumed to be representative of the sampling locations. State-approved standard operating procedures have been used in sample collection and analysis, and the results are assumed to be validated using EPA-approved methodology.

The emphasis of the surface water quality analysis results is placed on Playa 1, since it is the only onsite perennial wetland and receives discharge from the Wastewater Treatment Facility. The suspected COCs in samples from Playa 1 are presented in Table C.1.2–3. With the exception of Playa 1, all Pantex Plant surface water sampling locations are usually dry except during storm events. Because of frequent dry periods, soil sampling is likely to be more representative of the extent of contamination, if any, at these sampling locations. Soil sampling is discussed in section 4.5 and appendix I. Surface water quality results for sampling locations other than Playa 1 are presented in Table C.1.2–4.

C.2 GROUNDWATER

Evaluation of Pantex Plant groundwater resources involved three primary components:

- Hydrogeologic site characterization of the perched and Ogallala aquifers.
- Evaluation of groundwater quality data.
- Determination of groundwater availability and use.

C.2.1 Hydrogeologic Properties

Hydrogeologic parameters (e.g., hydraulic conductivity, transmissivity, recharge, groundwater velocity) at Pantex Plant have been estimated during investigations by Battelle Pantex, the University Consortium (including Texas Tech University and Texas A&M University), the U.S. Army Corps of Engineers (COE), Argonne National Laboratories, Engineering-Science, Inc., and Radian Corporation.

Existing available well information for the Pantex Plant Site area has been identified, compiled, and tabulated (Table C.2.1–1). This table was compiled based on data provided by Pantex Plant, Texas A&M University, and COE. Wells reported with an unknown status are those for which data were unavailable. Well locations are shown in volume I, Figure 4.6.1.2–2. Well construction information and hydraulic parameter data were compiled and tabulated to determine which wells would provide enough information to assess the groundwater hydraulic parameters (Table C.2.1–2).

Available Pantex Plant area well logs and specific capacity estimates from wells within an 8-kilometer (5-mile) radius from Pantex Plant Site were obtained from COE except where noted. Vertical saturated hydraulic conductivities were determined for the Texas Department of Criminal Justice Playa, located approximately 11 kilometers (7 miles) northeast of Pantex Plant. The results of this playa investigation are summarized in Table C.2.1–3.

The following assumptions were made in the evaluation of the existing hydrogeologic data:

- The Theis curve method was assumed to be the most representative method to evaluate the drawdown data used to calculate transmissivities from perched monitoring wells OW–WR–19, –20, –38, –44, and –45.
- For wells BEG–PTX2, BEG–PTX3, PTX08–1008, and PTX06–1004, the ambient vertical hydraulic conductivity (K_V) value was reported.
- When actual Quality Assurance/Quality Control forms, data validation forms, or chain of custody information was unavailable it was assumed that the data presented in each report were valid and that approved methodologies for sample collecting and testing were implemented.

C.2.2 Groundwater Quality

Baseline groundwater quality was assessed using data tabulated in Pantex Plant annual environmental reports for a 5-year period, from 1990 through 1994. Additional perched groundwater quality data, collected in conjunction with the *Resource Conservation and Recovery Act* (RCRA) site investigations, were also examined. Groundwater quality monitoring data were collected from wells completed in the perched and Ogallala aquifers. Groundwater quality data used for the analysis were collected from reported onsite sampling locations from January 1990 to December 1994. The drinking water from an Ogallala water supply well at Bushland, located 54 kilometers (34 miles) west of Pantex Plant was also sampled to provide regional background groundwater quality data. The control well at Bushland is completed in the Ogallala aquifer upgradient from Pantex Plant and is, therefore, unaffected by plant operations (Pantex 1996a:82).

Groundwater samples collected from perched and Ogallala wells were analyzed for a full suite of analytical laboratory parameters, including radionuclides, metals, HEs, PCBs, pesticides, herbicides, volatile organics, semivolatile organics and other miscellaneous constituents and field parameters. It should be noted that the groundwater data collected over the 5 years does not include every sampling location or parameter each year. The following decision criteria for groundwater quality were used in the evaluation:

- TNRCC Primary and Secondary Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements (§290.101–290.119).
- EPA, Drinking Water Regulations and Health Advisories, Maximum Contaminant Levels, and Secondary Maximum Contaminant Levels.
- DOE Derived Concentration Guides (DOE Order 5400.5) for radionuclide health standards.

In addition, groundwater quality data were compared to Pantex Plant Risk Reduction Standards (RRSs), or proposed groundwater cleanup levels for anticipated potential contaminants at Pantex Plant. These derived RRS values were established for the RCRA Facility Investigations (RFIs) (DOE 1994). The summary of groundwater quality decision criteria and RRS values is presented in Table C.2.2–1.

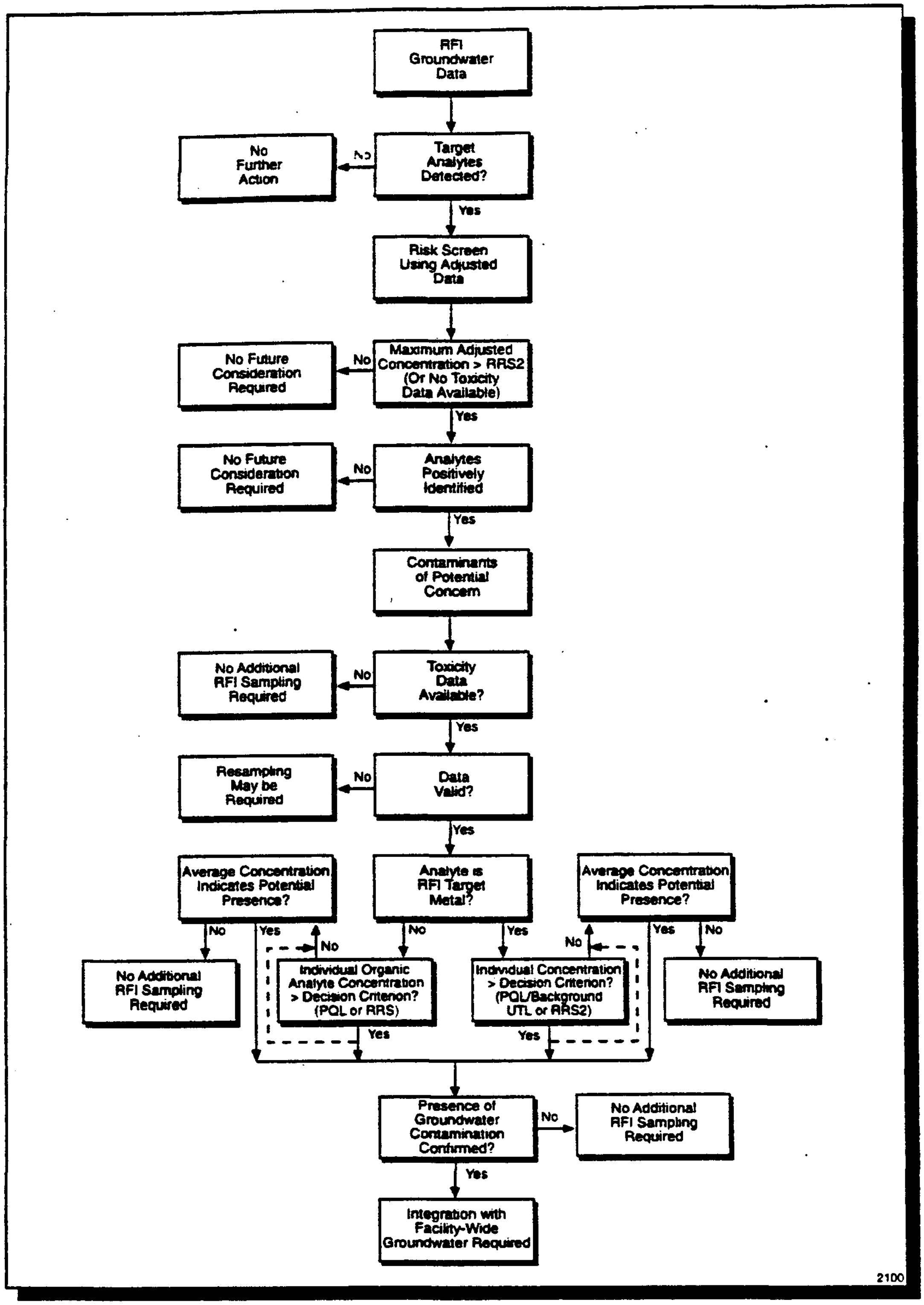
The following assumptions were made in the groundwater quality evaluation for the EIS:

- Gross alpha (dissolved) (GAd) and gross beta (dissolved) (GBd) values reported in the annual environmental reports were the actual measured values.
- Tabulated water quality data are assumed to be representative of the sampling locations. Agency-approved standard operating procedures have been used in sample collection and analysis, and the results are assumed to be validated using EPA-approved methodology.

In addition to the routine sampling documented in the annual environmental reports, available COE quarterly groundwater monitoring reports were reviewed. Quarterly groundwater monitoring was conducted to characterize the groundwater quality and extent of contamination in the perched aquifer, in association with the Ditches and Playas RFI for Flow System 6, groundwater in the perched aquifer. Flow System No. 6 includes groundwater data from perched monitoring wells constructed in Solid Waste Management Unit (SWMU) 5 Areas 10, 11, 12, and SWMU 6. Groundwater samples were collected from perched aquifer monitoring wells to determine the nature and presence or probable absence of contamination. Figure C.2.2–1 outlines the decision tree used to evaluate the groundwater data.

All groundwater samples were analyzed for total metals, cyanide, volatile organics, semivolatile organics, HEs, radionuclides, pesticides, and PCBs. Analytical data collected during the RFI were screened using a risk-based approach. This approach is based on the toxicological properties and the maximum reported concentrations of detected RFI target analytes. Throughout this screening process, the constituents that pose no significant risk to human health and the environment were eliminated from further consideration. After this process was complete, a list of suspected constituents of potential concern was compiled.

In general, analytical data were evaluated against decision criteria, including Texas RRS 1 (background upper tolerance limits and practical quantitation limits) and RRS 2 (risk based action levels), to determine the nature and extent of contamination and to assess the need for additional sampling (USCOE 1994:ES-1, ES-2, 1-1, 1-3). It should be noted that the water quality constituents that were analyzed for the COE investigation are not always the same constituents that were analyzed for the annual environmental reports. The results of both the annual environmental reports and COE investigations are presented in Table C.2.2–2 for the perched aquifer and Table C.2.2–3 for the Ogallala aquifer. Site characterization investigations are ongoing.



SOURCE: USCOE 1994:ES-2

FIGURE C.2.2–1.—*Decision Tree for Evaluating Groundwater Data.*

TABLE C.1.2–1.—*Defined Surface Water Quality Decision Criteria for Pantex Plant Surface Water*

PARAMETERS	UNITS	STD	BACKGROUND (BUSHLAND) (1994)	
			MAX.	AVG.
METALS				
Aluminum	mg/L	0.84/1.77 (3)	22.700	9.500
Antimony	mg/L	*	NA	0.048
Arsenic	mg/L	0.360 (1)	0.030	0.010
Barium	mg/L	1.0 (2)	0.300	0.270
Beryllium	mg/L	*	NA	0.008
Boron	mg/L	NA	0.100	0.075
Bromide	mg/L	NA	1.300	0.610
Cadmium	mg/L	0.045 (1,5)	NA	0.004
Calcium	mg/L	NA	47.800	39.700
Chromium (hexavalent)	mg/L	0.016 (1)	0.020	0.020
Chromium	mg/L	*	0.020	0.009
Cobalt	mg/L	*	0.005	0.012
Copper	mg/L	0.024 (1,5)	0.040	0.016
Cyanide	mg/L	0.046 (1)	0.010	0.006
Fluoride	mg/L	4.0 (2)	0.600	0.500
Iron	mg/L	NA	15.400	6.400
Lead	mg/L	0.112 (1,5)	0.020	0.010
Magnesium	mg/L	NA	9.000	7.200
Manganese	mg/L	*	0.200	0.200
Mercury	mg/L	0.0024 (1)	NA	0.0001
Molybdenum	mg/L	*	NA	0.200
Nickel	mg/L	1.75 (1,5)	0.020	0.011
Nitrate [as Nitrogen (N)]	mg/L	10.0 (2)	0.890	0.500
Nitrite (N)	mg/L	NA	0.490	0.150
Potassium	mg/L	NA	23.400	19.800
Selenium	mg/L	0.02 (1)	NA	0.005
Scandium	mg/L	NA	NM	NM
Silica	mg/L	NA	53.000	26.100
Silver	mg/L	0.05 (2,6)	NA	0.005
Sodium	mg/L	NA	25.000	5.700
Strontium	mg/L	NA	0.170	0.200
Thallium	mg/L	*	NA	0.200

TABLE C.1.2–1.—*Defined Surface Water Quality Decision Criteria for Pantex Plant Surface Water*-Continued

PARAMETERS	UNITS	STD	BACKGROUND (BUSHLAND) (1994)	
			MAX.	AVG.
Tin	mg/L	NA	NA	0.040
Titanium	mg/L	*	0.300	0.130
Vanadium	mg/L	NA	0.040	0.030
Zinc	mg/L	0.144 (1,5)	0.200	0.070
RADIOACTIVE MATERIALS				
Gross Alpha (dissolved)	μCi E-9/ml	NA	2 +/-1	1.5 +/-1.0
Gross Alpha (suspended)	μCi E-9/ml	NA	12 +/-5	8.5 +/-4.0
Gross Beta (dissolved)	μCi E-9/ml	NA	62 +/-6	29.5 +/-3.0
Gross Beta (suspended)	μCi E-9/ml	NA	100 +/-20	58.5 +/-11.5
Plutonium-239/240	μCi E-9/ml	30.0 (4)	0.03 +/-0.04	0.015 +/-0.033
Radium-226	μCi E-9/ml	100.0 (4)	0.9 +/-0.4	0.65 +/-0.33
Radium-228	μCi E-9/ml	100.0 (4)	1.4 +/-0.5	1.15 +/-0.6
Tritium	μCi E-6/ml	2000.0 (4)	0.12 +/-0.21	0.078 +/-0.205
Uranium-234	μCi E-9/ml	500.0 (4)	0.6 +/-0.2	0.3 +/-0.15
Uranium-238	μCi E-9/ml	600.0 (4)	0.3 +/-0.2	0.23 +/-0.15
ORGANICS				
2,4-dinitrotoluene	mg/L	0.1 (2)	NM	NM
3,3'-dichlorobenzidine	mg/L	*	NM	NM
4-methyl-2-pentanone	mg/L	NA	NM	NM
4-methylphenol	mg/L	NA	NM	NM
Acetone	mg/L	NA	NM	NM
Benzoic Acid	mg/L	NA	NM	NM
Chloroform	mg/L	*	NM	NM
Dieldrin	mg/L	0.0025 (1)	NM	NM
Endrin	mg/L	0.00018 (1)	NM	NM
Ethylbenzene	mg/L	*	NM	NM
Heptachlor	mg/L	0.00052 (1)	NM	NM
Lindane	mg/L	0.002 (1)	NM	NM
Methylene chloride	mg/L	*	NM	NM
Phenol	mg/L	*	0.030	0.020
Tetrahydrofuran	mg/L	NA	NM	NM
Toluene	mg/L	*	NM	NM
Total Xylenes	mg/L	NA	NM	NM

TABLE C.1.2–1.—*Defined Surface Water Quality Decision Criteria for Pantex Plant Surface Water*-Continued

PARAMETERS	UNITS	STD	BACKGROUND (BUSHLAND) (1994)	
			MAX.	AVG.
HIGH EXPLOSIVES				
HMX	mg/L	*	NM	NM
PETN	mg/L	*	NM	NM
RDX	mg/L	*	NM	NM
TNT	mg/L	*	NM	NM
MISCELLANEOUS				
Ammonia (as N)	mg/L	*	0.200	0.180
Biochemical Oxygen Demand	mg/L	*	21.000	11.800
Chemical Oxygen Demand	mg/L	*	120.000	67.000
Chloride	mg/L	NA	7.000	4.500
Oil & Grease	mg/L	*	6.000	2.320
Sulfate	mg/L	NA	13.000	6.460
Specific Conductance	µmho/cm	NA	NM	NM
Total Dissolved Solids	mg/L	*	420.000	331.670
Total Organic Carbon	mg/L	NA	31.000	15.670
Total Organic Halogen	mg/L	NA	14.000	9.340
Total Suspended Solids	mg/L	*	557.000	280.330
pH		*	8.800	7.940

[1]TWC 1991:Table 1
[2]TWC 1991:Table 3
[3]TNRCC Permit No. 02296 (daily average/daily maximum) (TNRCC 1996).
[4]DOE Derived Concentration Guidelines (DCGs) (DOE Order 5400.5).
[5]Specific numerical criteria exists, however it is a function of water hardness which was not measured (assume a hardness of 128 mg/L as $CaCO_3$ to estimate each).
[6]Used Human Health Protection because Aquatic Life Protection had silver as free ion (0.00092 mg/L), which was not measured.
* NPDES Permit No. TX-0107107. Permit limits vary per sampling location. See Table C.1.2–2.
HMX - High melt explosive
NA - Not Applicable; NM - Not Measured; STD - Standard
PTEN - Pentaerythritoltetranitrate
RDX - Research development explosive
TNT - Trinitrotoluene

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
Flow	001	WWTF	0.65	0.82	NA	NA	Continuous
	002	Z-12-EN	Report	Report	NA	NA	Daily
	003	Z-12-W	Report	Report	NA	NA	Daily
	004	16-1	Report	Report	NA	NA	Daily
	005	NDITCH	Report	Report	NA	NA	Daily
	006	Z-12-S	Report	Report	NA	NA	Daily
	101	12-21	Report	Report	NA	NA	Daily
	102	12-17-N	Report	Report	NA	NA	Daily
	103	11-20	Report	Report	NA	NA	Daily
	104	11-50	Report	Report	NA	NA	Daily
	201	12-84-B1	Report	Report	NA	NA	Daily
	202	12-17-S	Report	Report	NA	NA	Daily
	203	11-38	Report	Report	NA	NA	Daily
	301	12-84-B10	Report	Report	NA	NA	Daily
	302	12-19-S	Report	Report	NA	NA	Daily
	401	12-116R110	Report	Report	NA	NA	Daily
	402	12-19-N	Report	Report	NA	NA	Daily
	501	12-104a-B19	Report	Report	NA	NA	Daily
	502	12-19-CT	Report	Report	NA	NA	Daily
	601	12-104a-B23	Report	Report	NA	NA	Daily
	602	12-43	Report	Report	NA	NA	Daily
	702	12-39	Report	Report	NA	NA	Daily
Ammonia (as N)	001	WWTF	NA	NA	5	10	1/week
Biochemical Oxygen Demand	001	WWTF	NA	NA	30	70	1/week
Chemical Oxygen Demand	002	Z-12-EN	NA	NA	NA	120	1/week
	003	Z-12-W	NA	NA	NA	120	1/week
	004	16-1	NA	NA	NA	120	1/week
	005	NDITCH	NA	NA	NA	200	1/week
	006	Z-12-S	NA	NA	NA	120	1/week
	102	12-17-N	NA	NA	25	50	1/6 months
	103	11-20	NA	NA	25	50	1/month
	104	11-50	NA	NA	25	75	1/month

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
Chemical Oxygen Demand (cont'd)	202	12-17-S	NA	NA	25	50	1/6 months
	302	12-19-S	NA	NA	25	50	1/6 months
	402	12-19-N	NA	NA	25	50	1/6 months
	502	12-19-CT	NA	NA	25	50	1/6 months
	602	12-43	NA	NA	25	50	1/month
	702	12-39	NA	NA	10	20	1/6 months
Oil & Grease	001	WWTF	NA	NA	NA	15	1/week
	002	Z-12-EN	NA	NA	NA	15	1/week
	003	Z-12-W	NA	NA	NA	15	1/week
	004	16-1	NA	NA	NA	15	1/week
	005	NDITCH	NA	NA	NA	15	1/week
	006	Z-12-S	NA	NA	NA	15	1/week
	102	12-17-N	NA	NA	Report	15	1/6 months
	103	11-20	NA	NA	Report	15	1/month
	104	11-50	NA	NA	Report	15	1/month
	202	12-17-S	NA	NA	Report	15	1/6 months
	302	12-19-S	NA	NA	Report	15	1/6 months
	402	12-19-N	NA	NA	Report	15	1/6 months
	502	12-19-CT	NA	NA	Report	15	1/6 months
	602	12-43	NA	NA	Report	15	1/month
	702	12-39	NA	NA	Report	15	1/6 months
pH	001	WWTF	NA	NA	NA	6.0-10.0	1/week
	002	Z-12-EN	NA	NA	NA	6.0-10.0	1/week
	003	Z-12-W	NA	NA	NA	6.0-10.0	1/week
	004	16-1	NA	NA	NA	6.0-10.0	1/week
	005	NDITCH	NA	NA	NA	6.0-9.0	1/week
	006	Z-12-S	NA	NA	NA	6.0-10.0	1/week
	101	12-21	NA	NA	NA	6.0-9.0	1/6 months
	102	12-17-N	NA	NA	NA	6.0-9.0	1/6 months
	103	11-20	NA	NA	NA	6.0-9.0	1/month
	104	11-50	NA	NA	NA	6.0-9.0	1/month
	201	12-84-B1	NA	NA	NA	6.0-9.0	1/6 months
	202	12-17-S	NA	NA	NA	6.0-9.0	1/6 months
	203	11-38	NA	NA	NA	6.0-9.0	1/6 months

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
pH (cont'd)	301	12-84-B10	NA	NA	NA	6.0-9.0	1/6 months
	302	12-19-S	NA	NA	NA	6.0-9.0	1/6 months
	401	12-116R110	NA	NA	NA	6.0-9.0	1/6 months
	402	12-19-N	NA	NA	NA	6.0-9.0	1/6 months
	501	12-104a-B19	NA	NA	NA	6.0-9.0	1/6 months
	502	12-19-CT	NA	NA	NA	6.0-9.0	1/6 months
	601	12-104a-B23	NA	NA	NA	6.0-9.0	1/6 months
	602	12-43	NA	NA	NA	6.0-9.0	1/month
	702	12-39	NA	NA	NA	6.0-9.0	1/6 months
Total Suspended Solids	001	WWTF	NA	NA	30	60	1/week
	102	12-17-N	NA	NA	20	70	1/6 months
	103	11-20	NA	NA	10	15	1/month
	104	11-50	NA	NA	25	75	1/month
	202	12-17-S	NA	NA	10	15	1/6 months
	302	12-19-S	NA	NA	25	50	1/6 months
	402	12-19-N	NA	NA	25	100	1/6 months
	502	12-19-CT	NA	NA	10	15	1/6 months
	602	12-43	NA	NA	20	30	1/month
	702	12-39	NA	NA	10	15	1/6 months
Total Dissolved Solids	103	11-20	NA	NA	Report	Report	1/month
	104	11-50	NA	NA	Report	Report	1/month
	602	12-43	NA	NA	Report	Report	1/month
Antimony (T)	001	WWTF	NA	NA	Report	Report	1/6 months
	002	Z-12-EN	NA	NA	Report	Report	1/month
	003	Z-12-W	NA	NA	Report	Report	1/month
	004	16-1	NA	NA	Report	Report	1/month
	006	Z-12-S	NA	NA	Report	Report	1/month
	103	11-20	NA	NA	Report	Report	1/month
	104	11-50	NA	NA	Report	Report	1/month
	602	12-43	NA	NA	Report	Report	1/month
Arsenic (T)	001	WWTF	NA	NA	0.019	0.030	1/6 months
	002	Z-12-EN	NA	NA	0.019	0.030	1/month
	003	Z-12-W	NA	NA	0.019	0.030	1/month
	004	16-1	NA	NA	0.019	0.030	1/month

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
Arsenic (T)	006	Z-12-S	NA	NA	0.019	0.030	1/month
(cont'd)	103	11-20	NA	NA	0.172	0.311	1/month
	104	11-50	NA	NA	0.172	0.311	1/month
	602	12-43	NA	NA	0.172	0.311	1/month
Beryllium (T)	001	WWTF	NA	NA	Report	Report	1/6 months
	002	Z-12-EN	NA	NA	Report	Report	1/month
	003	Z-12-W	NA	NA	Report	Report	1/month
	004	16-1	NA	NA	Report	Report	1/month
	006	Z-12-S	NA	NA	Report	Report	1/month
	103	11-20	NA	NA	Report	Report	1/month
	104	11-50	NA	NA	Report	Report	1/month
	602	12-43	NA	NA	Report	Report	1/month
Cadmium (T)	001	WWTF	NA	NA	Report	Report	1/6 months
	002	Z-12-EN	NA	NA	Report	Report	1/month
	003	Z-12-W	NA	NA	Report	Report	1/month
	004	16-1	NA	NA	Report	Report	1/month
	006	Z-12-S	NA	NA	Report	Report	1/month
	103	11-20	NA	NA	Report	Report	1/month
	104	11-50	NA	NA	Report	Report	1/month
	602	12-43	NA	NA	Report	Report	1/month
Chromium (T)	001	WWTF	NA	NA	0.043	0.055	1/6 months
	002	Z-12-EN	NA	NA	0.043	0.055	1/month
	003	Z-12-W	NA	NA	0.043	0.055	1/month
	004	16-1	NA	NA	0.043	0.055	1/month
	006	Z-12-S	NA	NA	0.043	0.055	1/month
	103	11-20	NA	NA	0.009	0.012	1/month
	104	11-50	NA	NA	0.009	0.012	1/month
	602	12-43	NA	NA	0.009	0.012	1/month
Cobalt (T)	001	WWTF	NA	NA	Report	Report	1/6 months
	002	Z-12-EN	NA	NA	Report	Report	1/month
	003	Z-12-W	NA	NA	Report	Report	1/month
	004	16-1	NA	NA	Report	Report	1/month
	006	Z-12-S	NA	NA	Report	Report	1/month
	103	11-20	NA	NA	Report	Report	1/month

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
Cobalt (T) (cont'd)	104	11-50	NA	NA	Report	Report	1/month
	602	12-43	NA	NA	Report	Report	1/month
Copper (T)	001	WWTF	NA	NA	0.033	0.046	1/6 months
	002	Z-12-EN	NA	NA	0.033	0.046	1/month
	003	Z-12-W	NA	NA	0.033	0.046	1/month
	004	16-1	NA	NA	0.033	0.046	1/month
	006	Z-12-S	NA	NA	0.033	0.046	1/month
	103	11-20	NA	NA	0.067	Report	1/month
	104	11-50	NA	NA	0.067	Report	1/month
	602	12-43	NA	NA	0.067	Report	1/month
Cyanide (T)	101	12-21	NA	NA	NA	<0.02	1/6 months
	201	12-84-B1	NA	NA	NA	<0.02	1/6 months
	301	12-84-B10	NA	NA	NA	<0.02	1/6 months
	401	12-116-R110	NA	NA	NA	<0.02	1/6 months
	501	12-104a-B19	NA	NA	NA	<0.02	1/6 months
	601	12-104a-B23	NA	NA	NA	<0.02	1/6 months
Cyanide (amenable)	101	12-21	NA	NA	NA	<0.02	1/6 months
	201	12-84-B1	NA	NA	NA	<0.02	1/6 months
	301	12-84-B10	NA	NA	NA	<0.02	1/6 months
	401	12-116-R110	NA	NA	NA	<0.02	1/6 months
	501	12-104a-B19	NA	NA	NA	<0.02	1/6 months
	601	12-104a-B23	NA	NA	NA	<0.02	1/6 months
Lead (T)	001	WWTF	NA	NA	0.172	0.229	1/6 months
	002	Z-12-EN	NA	NA	0.172	0.229	1/month
	003	Z-12-W	NA	NA	0.172	0.229	1/month
	004	16-1	NA	NA	0.172	0.229	1/month
	006	Z-12-S	NA	NA	0.172	0.229	1/month
	103	11-20	NA	NA	0.230	Report	1/month
	104	11-50	NA	NA	0.230	Report	1/month
	602	12-43	NA	NA	0.230	Report	1/month
Manganese (T)	001	WWTF	NA	NA	0.439	0.557	1/6 months
	002	Z-12-EN	NA	NA	0.439	0.557	1/month
	003	Z-12-W	NA	NA	0.439	0.557	1/month
	004	16-1	NA	NA	0.439	0.557	1/month

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
Manganese (T)	006	Z-12-S	NA	NA	0.439	0.557	1/month
(cont'd)	103	11-20	NA	NA	0.239	0.290	1/month
	104	11-50	NA	NA	0.239	0.290	1/month
	602	12-43	NA	NA	0.239	0.290	1/month
Mercury (T)	001	WWTF	NA	NA	0.0003	0.0007	1/6 months
	002	Z-12-EN	NA	NA	0.0003	0.0007	1/month
	003	Z-12-W	NA	NA	0.0003	0.0007	1/month
	004	16-1	NA	NA	0.0003	0.0007	1/month
	006	Z-12-S	NA	NA	0.0003	0.0007	1/month
	103	11-20	NA	NA	0.0004	0.0005	1/month
	104	11-50	NA	NA	0.0004	0.0005	1/month
	602	12-43	NA	NA	0.0004	0.0005	1/month
Molybdenum (T)	001	WWTF	NA	NA	Report	Report	1/month
	002	Z-12-EN	NA	NA	Report	Report	1/month
	003	Z-12-W	NA	NA	Report	Report	1/month
	004	16-1	NA	NA	Report	Report	1/month
	006	Z-12-S	NA	NA	Report	Report	1/month
	103	11-20	NA	NA	Report	Report	1/month
	104	11-50	NA	NA	Report	Report	1/month
	602	12-43	NA	NA	Report	Report	1/month
Nickel (T)	001	WWTF	NA	NA	0.042	0.055	1/6 months
	002	Z-12-EN	NA	NA	0.042	0.055	1/month
	003	Z-12-W	NA	NA	0.042	0.055	1/month
	004	16-1	NA	NA	0.042	0.055	1/month
	006	Z-12-S	NA	NA	0.042	0.055	1/month
	103	11-20	NA	NA	0.030	0.030	1/month
	104	11-50	NA	NA	0.030	0.030	1/month
	602	12-43	NA	NA	0.030	0.030	1/month
Selenium (T)	001	WWTF	NA	NA	Report	Report	1/6 months
	002	Z-12-EN	NA	NA	Report	Report	1/month
	003	Z-12-W	NA	NA	Report	Report	1/month
	004	16-1	NA	NA	Report	Report	1/month
	006	Z-12-S	NA	NA	Report	Report	1/month
	103	11-20	NA	NA	Report	Report	1/month

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
Selenium (T)	104	11-50	NA	NA	Report	Report	1/month
(cont'd)	602	12-43	NA	NA	Report	Report	1/month
Silver (T)	001	WWTF	NA	NA	Report	Report	1/6 months
	002	Z-12-EN	NA	NA	Report	Report	1/month
	003	Z-12-W	NA	NA	Report	Report	1/month
	004	16-1	NA	NA	Report	Report	1/month
	006	Z-12-S	NA	NA	Report	Report	1/month
	101	12-21	NA	NA	0.01	Report	1/6 months
	103	11-20	NA	NA	Report	Report	1/month
	104	11-50	NA	NA	Report	Report	1/month
	201	12-84-B1	NA	NA	0.01	Report	1/6 months
	301	12-84-B10	NA	NA	0.01	Report	1/6 months
	401	12-116-R110	NA	NA	0.01	Report	1/6 months
	501	12-104a-B19	NA	NA	0.01	Report	1/6 months
	601	12-104a-B23	NA	NA	0.01	Report	1/6 months
	602	12-43	NA	NA	Report	Report	1/month
Thallium (T)	001	WWTF	NA	NA	0.372	0.588	1/6 months
	002	Z-12-EN	NA	NA	0.372	0.588	1/month
	003	Z-12-W	NA	NA	0.372	0.588	1/month
	004	16-1	NA	NA	0.372	0.588	1/month
	006	Z-12-S	NA	NA	0.372	0.588	1/month
	103	11-20	NA	NA	0.300	Report	1/month
	104	11-50	NA	NA	0.300	Report	1/month
	602	12-43	NA	NA	0.300	Report	1/month
Titanium (T)	001	WWTF	NA	NA	0.372	0.727	1/6 months
	002	Z-12-EN	NA	NA	0.372	0.727	1/month
	003	Z-12-W	NA	NA	0.372	0.727	1/month
	004	16-1	NA	NA	0.372	0.727	1/month
	006	Z-12-S	NA	NA	0.372	0.727	1/month
	103	11-20	NA	NA	0.250	0.334	1/month
	104	11-50	NA	NA	0.250	0.334	1/month
	602	12-43	NA	NA	0.250	0.334	1/month
Zinc (T)	001	WWTF	NA	NA	0.115	0.142	1/6 months
	002	Z-12-EN	NA	NA	0.115	0.142	1/month

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
Zinc (T) (cont'd)	003	Z-12-W	NA	NA	0.115	0.142	1/month
	004	16-1	NA	NA	0.115	0.142	1/month
	006	Z-12-S	NA	NA	0.115	0.142	1/month
	103	11-20	NA	NA	0.149	0.190	1/month
	104	11-50	NA	NA	0.149	0.190	1/month
	602	12-43	NA	NA	0.149	0.190	1/month
HMX	001	WWTF	NA	NA	0.1	Report	1/6 months
	002	Z-12-EN	NA	NA	0.1	Report	1/month
	003	Z-12-W	NA	NA	0.1	Report	1/month
	004	16-1	NA	NA	0.1	Report	1/month
	006	Z-12-S	NA	NA	0.1	Report	1/month
	103	11-20	NA	NA	0.2	Report	1/month
	104	11-50	NA	NA	0.2	Report	1/month
	602	12-43	NA	NA	0.2	Report	1/month
RDX	001	WWTF	NA	NA	0.2	Report	1/6 months
	002	Z-12-EN	NA	NA	0.2	Report	1/month
	003	Z-12-W	NA	NA	0.2	Report	1/month
	004	16-1	NA	NA	0.2	Report	1/month
	006	Z-12-S	NA	NA	0.2	Report	1/month
	103	11-20	NA	NA	0.5	Report	1/month
	104	11-50	NA	NA	0.5	Report	1/month
	602	12-43	NA	NA	0.5	Report	1/month
PETN	001	WWTF	NA	NA	0.4	Report	1/6 months
	002	Z-12-EN	NA	NA	0.4	Report	1/month
	003	Z-12-W	NA	NA	0.4	Report	1/month
	004	16-1	NA	NA	0.4	Report	1/month
	006	Z-12-S	NA	NA	0.4	Report	1/month
	103	11-20	NA	NA	0.8	Report	1/month
	104	11-50	NA	NA	0.8	Report	1/month
	602	12-43	NA	NA	0.8	Report	1/month
TNT	001	WWTF	NA	NA	0.02	Report	1/6 months
	002	Z-12-EN	NA	NA	0.02	Report	1/month
	003	Z-12-W	NA	NA	0.02	Report	1/month
	004	16-1	NA	NA	0.02	Report	1/month

TABLE C.1.2–2.—*Pantex Plant NPDES Permit No. TX0107107 Requirements*-Continued

PARAMETER	OUTFALL	SAMPLE ID	DISCHARGE LIMITATIONS				FREQUENCY
			QUANTITY (MGD)		QUALITY (mg/L)		
			DAILY AVG	DAILY MAX	DAILY AVG	DAILY MAX	
TNT (cont'd)	006	Z-12-S	NA	NA	0.02	Report	1/month
	103	11-20	NA	NA	0.04	Report	1/month
	104	11-50	NA	NA	0.04	Report	1/month
	602	12-43	NA	NA	0.04	Report	1/month

NA - Not Applicable
(T) - Total
WWTF - Wastewater Treatment Facility
Source: EPA 1996

TABLE C.1.2–3.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water at Playa 1 (OW–WR–08) for 1990 to 1994*

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR
Aluminum	mg/L	NA	16.7	3.5	16	1994
Aluminum	mg/L	NA	20.0	5.8	10	1993
Bromide	mg/L	NA	2.1	0.9	15	1994
Bromide	mg/L	NA	3.2	1.1	13	1993
Chromium	mg/L	NA	0.079	0.019	11	1990
Endrin	mg/L	NA	NA	0.00035	13	1994
Gross Alpha (dissolved)	µCi E-9/ml	NA	7	2.93	14	1994
Gross Alpha (dissolved)	µCi E-9/ml	NA	15	6.09	11	1991
Gross Alpha (dissolved)	µCi E-9/ml	NA	13	7.1	8	1993
Gross Alpha (dissolved)	µCi E-9/ml	NA	82	18.85	13	1990
Gross Alpha (suspended)	µCi E-9/ml	NA	5	1.93	14	1994
Gross Alpha (suspended)	µCi E-9/ml	NA	10	3	11	1991
Gross Alpha (suspended)	µCi E-9/ml	NA	6	3.3	8	1993
Gross Alpha (suspended)	µCi E-9/ml	NA	260	43.46	13	1990
Gross Beta (dissolved)	µCi E-9/ml	NA	22	17.21	14	1994
Gross Beta (dissolved)	µCi E-9/ml	NA	26	17.8	8	1993
Gross Beta (dissolved)	µCi E-9/ml	NA	34	20.7	11	1991
Gross Beta (dissolved)	µCi E-9/ml	NA	86	31.69	13	1990
Gross Beta (suspended)	µCi E-9/ml	NA	9	4	14	1994
Gross Beta (suspended)	µCi E-9/ml	NA	17	5.64	11	1991
Gross Beta (suspended)	µCi E-9/ml	NA	15	7.4	8	1993
Gross Beta (suspended)	µCi E-9/ml	NA	240	48	13	1990
Heptachlor	mg/L	NA	NA	0.0006	13	1994
Iron	mg/L	NA	11	2.5	16	1994
Iron	mg/L	NA	12	3.618	10	1993
Iron	mg/L	NA	15	5.5	22	1991
Iron	mg/L	NA	53	9.5	10	1990
Manganese	mg/L	NA	0.53	0.35	8	1991
Manganese	mg/L	NA	0.556	0.31	10	1993
Specific Conductance	µmho/cm	NA	833	827.5	2	1994
Specific Conductance	µmho/cm	NA	1053	953	13	1993
Total Dissolved Solids	mg/L	NA	860	470.4	15	1994
Total Dissolved Solids	mg/L	NA	736	517.7	13	1993
Total Dissolved Solids	mg/L	NA	3000	990	9	1990
Titanium	mg/L	NA	0.27	0.08	10	1993
Titanium	mg/L	NA	0.3	0.08	13	1994

TABLE C.1.2-3.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water at Playa 1 (OW-WR-08) for 1990 to 1994*-Continued

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR
Total Organic Halogen	mg/L	NA	70	21.64	14	1994
Total Organic Halogen	mg/L	NA	68	33.4	13	1993
Total Suspended Solids	mg/L	NA	240	125.93	15	1994
Total Suspended Solids	mg/L	NA	1200	250	8	1990

NA - Not Applicable
Sources: MH 1991; Battelle 1992; Battelle 1993; DOE 1994a; DOE 1995

TABLE C.1.2–4.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water Sampling Locations at Permitted Outfalls and Pantex Playas for 1990 to 1994*

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR	LOCATION
3,3'-dichlorobenzidine	mg/L	0.00015	0.04	0.034	4	1993	OW–WR–01
Aluminum	mg/L	0.84	13	2.2	10	1991	11–20
Aluminum	mg/L	0.84	6.1	2.4	8	1991	12–17–N
Aluminum	mg/L	0.84	8.9	2.4	22	1992	16–1
Aluminum	mg/L	0.84	5.8	3.7	9	1993	16–1
Aluminum	mg/L	0.84	27	4.5	12	1994	16–1
Aluminum	mg/L	0.84	12	5.3	9	1991	16–1
Aluminum	mg/L	0.84	2.4	2.4	1	1994	NDITCH
Aluminum	mg/L	0.84	12	7.4	5	1993	OW–WR–01
Aluminum	mg/L	0.84	32	19.6	3	1994	OW–WR–01
Aluminum	mg/L	0.84	2.1	2.1	1	1994	OW–WR–24
Aluminum	mg/L	0.84	15	9.7	5	1994	OW–WR–27
Aluminum	mg/L	0.84	2.2	1.9	2	1993	OW–WR–34
Aluminum	mg/L	0.84	22.7	9.5	6	1994	OW–WR–34
Aluminum	mg/L	0.84	130	70	3	1993	OW–WR–36
Aluminum	mg/L	0.84	7	3.1	8	1992	Z–12–EN
Aluminum	mg/L	0.84	16	5.5	5	1991	Z–12–EN
Aluminum	mg/L	0.84	44	8	9	1994	Z–12–EN
Aluminum	mg/L	0.84	27	10.2	5	1993	Z–12–EN
Aluminum	mg/L	0.84	21	4.4	37	1993	Z–12–S
Aluminum	mg/L	0.84	18	5.3	21	1994	Z–12–S
Aluminum	mg/L	0.84	9.3	5.7	4	1990	Z–12–S
Aluminum	mg/L	0.84	30	7.7	13	1991	Z–12–S
Aluminum	mg/L	0.84	6.4	1.1	12	1991	Z–12–W
Aluminum	mg/L	0.84	6.3	1.5	15	1994	Z–12–W
Aluminum	mg/L	0.84	9	2.7	9	1993	Z–12–W
Aluminum	mg/L	0.84	19	4.2	22	1992	Z–12–W
Ammonia (as N)	mg/L	5/10	12	5.8	14	1993	INCOMING
Ammonia (as N)	mg/L	5/10	12.5	7.9	15	1994	INCOMING
Antimony	mg/L	Report	0.06	0.03	91	1994	DACAUTO
Barium	mg/L	1	10.0	1.7	6	1993	11–20
Barium	mg/L	1	3.4	1.2	3	1990	12–17–N
Beryllium	mg/L	Report	0.005	0.003	91	1994	DACAUTO

TABLE C.1.2–4.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water Sampling Locations at Permitted Outfalls and Pantex Playas for 1990 to 1994*-Continued

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR	LOCATION
Beryllium	mg/L	Report	0.005	0.005	64	1991	DACAUTO
Beryllium	mg/L	Report	0.004	0.005	14	1993	INCOMING
BOD	mg/L	30/70	152	45	80	1994	INCOMING
Chromium	mg/L	0.043	28	3.5	8	1990	Z–12–S
Chromium	mg/L	0.009	0.1	NA	1	1990	11–20
Chromium	mg/L	0.009	0.012	<0.006	10	1991	11–20
Chromium	mg/L	0.043	0.057	0.038	2	1991	OW–WR–24
Chromium	mg/L	0.043	0.08	0.04	3	1993	OW–WR–36
Chromium	mg/L	0.043	0.3	0.03	16	1994	Incoming
Chromium (hexavalent)	mg/L	0.016	0.12	0.12	1	1990	12–17–N
Chromium (hexavalent)	mg/L	0.016	0.02	0.02	3	1994	OW–WR–34
Chromium (hexavalent)	mg/L	0.016	0.8	0.2	7	1990	Z–12–S
Copper	mg/L	0.024	0.15	0.044	8	1991	12–17–N
Copper	mg/L	0.024	0.051	0.033	11	1993	12–17–S
Copper	mg/L	0.024	0.093	0.025	10	1993	12–19–N
Copper	mg/L	0.024	0.26	0.061	10	1993	12–19–S
Copper	mg/L	0.024	0.54	0.068	14	1993	INCOMING
Copper	mg/L	0.024	13	0.8	16	1994	INCOMING
Copper	mg/L	0.024	0.046	0.038	2	1991	OW–WR–24
Copper	mg/L	0.024	0.07	0.04	3	1993	OW–WR–36
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	NA	1	1990	11–20
Gross Alpha (dissolved)	µCi E-9/ml	NA	3	3	1	1993	11–50
Gross Alpha (dissolved)	µCi E-9/ml	NA	9	NA	2	1990	12–43
Gross Alpha (dissolved)	µCi E-9/ml	NA	6	6	2	1993	12–43
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	0.7	6	1993	16–1
Gross Alpha (dissolved)	µCi E-9/ml	NA	6	0.88	8	1991	16–1
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	0.92	7	1994	16–1
Gross Alpha (dissolved)	µCi E-9/ml	NA	7	NA	2	1990	DAC
Gross Alpha (dissolved)	µCi E-9/ml	NA	12	7.2	15	1994	DAC
Gross Alpha (dissolved)	µCi E-9/ml	NA	14	7.9	14	1993	DAC
Gross Alpha (dissolved)	µCi E-9/ml	NA	1	NA	1	1990	DACAUTO
Gross Alpha (dissolved)	µCi E-9/ml	NA	11	4.25	12	1991	DACAUTO
Gross Alpha (dissolved)	µCi E-9/ml	NA	11	3.92	12	1991	INCOMING
Gross Alpha (dissolved)	µCi E-9/ml	NA	8	4.75	4	1990	INCOMING
Gross Alpha (dissolved)	µCi E-9/ml	NA	8	5	14	1994	INCOMING

TABLE C.1.2–4.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water Sampling Locations at Permitted Outfalls and Pantex Playas for 1990 to 1994*-Continued

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR	LOCATION
Gross Alpha (dissolved)	µCi E-9/ml	NA	12	6.2	13	1993	INCOMING
Gross Alpha (dissolved)	µCi E-9/ml	NA	9	6.2	13	1993	Lagoon
Gross Alpha (dissolved)	µCi E-9/ml	NA	13	6.93	14	1994	Lagoon
Gross Alpha (dissolved)	µCi E-9/ml	NA	3	2	3	1994	OW–WR–01
Gross Alpha (dissolved)	µCi E-9/ml	NA	11	2.43	7	1991	OW–WR–01
Gross Alpha (dissolved)	µCi E-9/ml	NA	12	5	5	1993	OW–WR–01
Gross Alpha (dissolved)	µCi E-9/ml	NA	1	1	1	1994	OW–WR–24
Gross Alpha (dissolved)	µCi E-9/ml	NA	3	1.5	2	1991	OW–WR–24
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	NA	5	1991	OW–WR–27
Gross Alpha (dissolved)	µCi E-9/ml	NA	3	1.4	5	1994	OW–WR–27
Gross Alpha (dissolved)	µCi E-9/ml	NA	1	0.8	4	1993	OW–WR–34
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	1.5	4	1994	OW–WR–34
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	1	3	1993	OW–WR–36
Gross Alpha (dissolved)	µCi E-9/ml	NA	1	NA	5	1991	Z–12–EN
Gross Alpha (dissolved)	µCi E-9/ml	NA	1	0.33	3	1994	Z–12–EN
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	1.5	2	1993	Z–12–EN
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	0.8	7	1994	Z–12–S
Gross Alpha (dissolved)	µCi E-9/ml	NA	7	1.92	12	1991	Z–12–S
Gross Alpha (dissolved)	µCi E-9/ml	NA	8	4.1	8	1993	Z–12–S
Gross Alpha (dissolved)	µCi E-9/ml	NA	4	NA	1	1990	Z–12–W
Gross Alpha (dissolved)	µCi E-9/ml	NA	2	1.03	9	1994	Z–12–W
Gross Alpha (dissolved)	µCi E-9/ml	NA	6	1.92	12	1991	Z–12–W
Gross Alpha (dissolved)	µCi E-9/ml	NA	6	2.7	6	1993	Z–12–W
Gross Alpha (suspended)	µCi E-9/ml	NA	0	NA	1	1990	11–20
Gross Alpha (suspended)	µCi E-9/ml	NA	1	1	1	1993	11–50
Gross Alpha (suspended)	µCi E-9/ml	NA	1	0.5	2	1993	12–43
Gross Alpha (suspended)	µCi E-9/ml	NA	2	1.22	7	1994	16–1
Gross Alpha (suspended)	µCi E-9/ml	NA	2	1.5	6	1993	16–1
Gross Alpha (suspended)	µCi E-9/ml	NA	7	2.5	8	1991	16–1
Gross Alpha (suspended)	µCi E-9/ml	NA	3	NA	2	1990	DAC
Gross Alpha (suspended)	µCi E-9/ml	NA	1	0.1	14	1993	DAC
Gross Alpha (suspended)	µCi E-9/ml	NA	1	0.2	15	1994	DAC
Gross Alpha (suspended)	µCi E-9/ml	NA	12	NA	1	1990	DACAUTO
Gross Alpha (suspended)	µCi E-9/ml	NA	1	0.08	12	1991	DACAUTO
Gross Alpha (suspended)	µCi E-9/ml	NA	3	0.8	13	1993	INCOMING

TABLE C.1.2–4.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water Sampling Locations at Permitted Outfalls and Pantex Playas for 1990 to 1994*-Continued

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR	LOCATION
Gross Alpha (suspended)	µCi E-9/ml	NA	3	1.25	4	1990	INCOMING
Gross Alpha (suspended)	µCi E-9/ml	NA	5	1.43	14	1994	INCOMING
Gross Alpha (suspended)	µCi E-9/ml	NA	6	1.58	12	1991	INCOMING
Gross Alpha (suspended)	µCi E-9/ml	NA	2	0.2	13	1993	Lagoon
Gross Alpha (suspended)	µCi E-9/ml	NA	1	0.29	14	1994	Lagoon
Gross Alpha (suspended)	µCi E-9/ml	NA	4	2	5	1993	OW–WR–01
Gross Alpha (suspended)	µCi E-9/ml	NA	7	2.86	7	1991	OW–WR–01
Gross Alpha (suspended)	µCi E-9/ml	NA	17	9.67	3	1994	OW–WR–01
Gross Alpha (suspended)	µCi E-9/ml	NA	8	6	2	1991	OW–WR–24
Gross Alpha (suspended)	µCi E-9/ml	NA	2	0.2	5	1991	OW–WR–27
Gross Alpha (suspended)	µCi E-9/ml	NA	5	3.4	5	1994	OW–WR–27
Gross Alpha (suspended)	µCi E-9/ml	NA	1	1	4	1993	OW–WR–34
Gross Alpha (suspended)	µCi E-9/ml	NA	12	8.5	4	1994	OW–WR–34
Gross Alpha (suspended)	µCi E-9/ml	NA	8	5	2	1991	OW–WR–36
Gross Alpha (suspended)	µCi E-9/ml	NA	39	18.7	3	1993	OW–WR–36
Gross Alpha (suspended)	µCi E-9/ml	NA	1	0.33	3	1994	Z–12–EN
Gross Alpha (suspended)	µCi E-9/ml	NA	3	1.6	5	1991	Z–12–EN
Gross Alpha (suspended)	µCi E-9/ml	NA	7	5	2	1993	Z–12–EN
Gross Alpha (suspended)	µCi E-9/ml	NA	3	0.9	8	1993	Z–12–S
Gross Alpha (suspended)	µCi E-9/ml	NA	5	2.32	7	1994	Z–12–S
Gross Alpha (suspended)	µCi E-9/ml	NA	17	4.08	12	1991	Z–12–S
Gross Alpha (suspended)	µCi E-9/ml	NA	7	0.5	12	1991	Z–12–W
Gross Alpha (suspended)	µCi E-9/ml	NA	2	0.74	9	1994	Z–12–W
Gross Alpha (suspended)	µCi E-9/ml	NA	2	1	6	1993	Z–12–W
Gross Beta (dissolved)	µCi E-9/ml	NA	2	NA	1	1990	11–20
Gross Beta (dissolved)	µCi E-9/ml	NA	9	9	1	1993	11–50
Gross Beta (dissolved)	µCi E-9/ml	NA	7	NA	2	1990	12–43
Gross Beta (dissolved)	µCi E-9/ml	NA	9	7.5	2	1993	12–43
Gross Beta (dissolved)	µCi E-9/ml	NA	16	7.8	6	1993	16–1
Gross Beta (dissolved)	µCi E-9/ml	NA	13	8.75	8	1991	16–1
Gross Beta (dissolved)	µCi E-9/ml	NA	37	12.14	7	1994	16–1
Gross Beta (dissolved)	µCi E-9/ml	NA	13	NA	2	1990	DAC
Gross Beta (dissolved)	µCi E-9/ml	NA	17	11.5	14	1993	DAC
Gross Beta (dissolved)	µCi E-9/ml	NA	46	13.2	15	1994	DAC
Gross Beta (dissolved)	µCi E-9/ml	NA	16	9.92	12	1991	DACAUTO

TABLE C.1.2–4.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water Sampling Locations at Permitted Outfalls and Pantex Playas for 1990 to 1994*-Continued

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR	LOCATION
Orthophosphate	mg/L	NA	0.2	0.2	1	1990	11–20
PETN	mg/L	0.8	0.79	0.426	11	1993	11–50
RDX	mg/L	NA	0.019	0.017	5	1993	OW–WR–01
RDX	mg/L	NA	0.014	0.018	3	1994	OW–WR–01
Selenium	mg/L	0.02	0.034	0.034	1	1990	12–19–N
Selenium	mg/L	0.02	0.056	0.04	4	1990	NDITCH
Tetrahydrofuran	mg/L	NA	0.62	0.093	7	1993	12–43
Tetrahydrofuran	mg/L	NA	330	124	10	1990	12–43
Tetrahydrofuran	mg/L	NA	0.084	0.0138	9	1994	INCOMING
Total Suspended Solids	mg/L	NA	260	158.7	7	1993	OW–WR–01
Total Suspended Solids	mg/L	NA	330	195	3	1991	OW–WR–01
Total Suspended Solids	mg/L	NA	600	465	2	1994	OW–WR–01
Total Suspended Solids	mg/L	NA	255	191.67	3	1994	OW–WR–27
Total Suspended Solids	mg/L	NA	557	280.33	6	1994	OW–WR–34
Total Suspended Solids	mg/L	NA	2900	1316	5	1993	OW–WR–36
Zinc	mg/L	0.144	0.7	0.165	8	1991	12–17–N
Zinc	mg/L	0.144	0.47	0.47	1	1990	12–43
Zinc	mg/L	0.144	0.44	0.24	3	1993	OW–WR–36

Note: The Wastewater Treatment Facility (Outfall 001) includes the following specific effluent sampling locations: Influent into the Wastewater Treatment facility (INCOMING), treatment lagoon, composite sampler at chlorinator (DACAUTO), and effluent. It should be noted that wastewater influent collected at the inlet weir (INCOMING) to the Wastewater Treatment Facility and the treatment lagoon have not undergone wastewater treatment and, therefore, would not be expected to meet the effluent discharge limitations.

Constituent abbreviations:

- BOD - Biological oxygen demand
- PETN- pentaerythritohetranitrate
- RDX - Research development explosive

NA - Not Applicable

Sources: MH 1991; Battelle 1992; Battelle 1993; DOE 1994a; DOE 1995

TABLE C.2.1–1.—*Pantex Plant Well Information*[1]

WELL ID NUMBER	ALSO KNOWN AS	AQUIFER	TYPE OF WELL	STATUS
1114–MW1	MW–1 Zone 11 PM–101	Perched	Monitoring	Active
1114–MW2	MW–2 Zone 11 PM–102	Perched	Monitoring	Active
1114–MW3	MW–3 Zone 11 PM–103	Perched	Monitoring	Active
1114–MW4	MW–4 Zone 11 PM–104	Perched	Monitoring	Active
15–16	OW–WR–18 PM–18 CA–630 PR–18 DA–06–44–211 Well 16	Ogallala	Production	Active
15–17	1–69 Well 17 PR–02 DA–06–44–210 OW–WR–02	Ogallala	Production	Active
15–20	Well 20 3–70 PR–16 OW–WR–16	Ogallala	Production	Active
15–26	Well 26 PR–41 OW–WR–41	Ogallala	Production	Active
15–32	PR–120	Ogallala	Production	Inactive
15–6	PR–06 DA–06–44–213 Well 11 OW–WR–06	Ogallala	Production	Active
BEG–PTX2	OM–105 OW–WR–105	Ogallala	Observation	Active
BEG–PTX3	PM–106 OW–WR–106	Perched	Observation	Active
MW–01A	FPOP–MW–01A	Perched	Monitoring	Unknown
MW–02	CR–102–MW FPOP–MW–02	Perched	Monitoring	Unknown
MW–03	CR–103–MW FPOP–MW–03	Perched	Monitoring	Unknown
MW–04B	FPOP–MW–04B	Perched	Monitoring	Unknown
MW–05	FPOP–MW–05	Perched	Monitoring	Unknown
MW–06	FPOP–MW–06	Perched	Monitoring	Unknown
OW–WR–19	PM–19	Perched	Monitoring	Active

TABLE C.1.2–4.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water Sampling Locations at Permitted Outfalls and Pantex Playas for 1990 to 1994*-Continued

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR	LOCATION
Gross Beta (dissolved)	µCi E-9/ml	NA	14	10.25	12	1991	INCOMING
Gross Beta (dissolved)	µCi E-9/ml	NA	21	11.2	13	1993	INCOMING
Gross Beta (dissolved)	µCi E-9/ml	NA	13	11.5	4	1990	INCOMING
Gross Beta (dissolved)	µCi E-9/ml	NA	22	11.5	14	1994	INCOMING
Gross Beta (dissolved)	µCi E-9/ml	NA	18	11.2	13	1993	Lagoon
Gross Beta (dissolved)	µCi E-9/ml	NA	18	11.43	14	1994	Lagoon
Gross Beta (dissolved)	µCi E-9/ml	NA	12	9.43	7	1991	OW–WR–01
Gross Beta (dissolved)	µCi E-9/ml	NA	15	11.33	3	1994	OW–WR–01
Gross Beta (dissolved)	µCi E-9/ml	NA	16	11.8	5	1993	OW–WR–01
Gross Beta (dissolved)	µCi E-9/ml	NA	8	8	1	1994	OW–WR–24
Gross Beta (dissolved)	µCi E-9/ml	NA	19	17	2	1991	OW–WR–24
Gross Beta (dissolved)	µCi E-9/ml	NA	15	12.2	5	1991	OW–WR–27
Gross Beta (dissolved)	µCi E-9/ml	NA	24	17	5	1994	OW–WR–27
Gross Beta (dissolved)	µCi E-9/ml	NA	62	29.5	4	1994	OW–WR–34
Gross Beta (dissolved)	µCi E-9/ml	NA	40	38.3	4	1993	OW–WR–34
Gross Beta (dissolved)	µCi E-9/ml	NA	25	13.5	2	1991	OW–WR–36
Gross Beta (dissolved)	µCi E-9/ml	NA	18	13.7	3	1993	OW–WR–36
Gross Beta (dissolved)	µCi E-9/ml	NA	8	7	5	1991	Z–12–EN
Gross Beta (dissolved)	µCi E-9/ml	NA	9	7.67	3	1994	Z–12–EN
Gross Beta (dissolved)	µCi E-9/ml	NA	12	10.5	2	1993	Z–12–EN
Gross Beta (dissolved)	µCi E-9/ml	NA	11	5.44	7	1994	Z–12–S
Gross Beta (dissolved)	µCi E-9/ml	NA	13	6.42	12	1991	Z–12–S
Gross Beta (dissolved)	µCi E-9/ml	NA	11	7	8	1993	Z–12–S
Gross Beta (dissolved)	µCi E-9/ml	NA	8	NA	1	1990	Z–12–W
Gross Beta (dissolved)	µCi E-9/ml	NA	14	NA	12	1991	Z–12–W
Gross Beta (dissolved)	µCi E-9/ml	NA	11	7.7	6	1993	Z–12–W
Gross Beta (dissolved)	µCi E-9/ml	NA	20	8.26	9	1994	Z–12–W
Gross Beta (suspended)	µCi E-9/ml	NA	2	2	1	1993	11–50
Gross Beta (suspended)	µCi E-9/ml	NA	2	1	2	1993	12–43
Gross Beta (suspended)	µCi E-9/ml	NA	4	2.42	7	1994	16–1
Gross Beta (suspended)	µCi E-9/ml	NA	7	3.8	6	1993	16–1
Gross Beta (suspended)	µCi E-9/ml	NA	16	4.63	8	1991	16–1
Gross Beta (suspended)	µCi E-9/ml	NA	2	NA	2	1990	DAC
Gross Beta (suspended)	µCi E-9/ml	NA	3	1.2	14	1993	DAC
Gross Beta (suspended)	µCi E-9/ml	NA	3	1.27	15	1994	DAC

TABLE C.1.2–4.—*Contaminants with Values Greater than or without Defined Water Quality Criteria for Surface Water Sampling Locations at Permitted Outfalls and Pantex Playas for 1990 to 1994*-Continued

PARAMETER	UNITS	STD	MAX	AVG	# OF SAMP	YEAR	LOCATION
Gross Beta (suspended)	µCi E-9/ml	NA	3.5	NA	1	1990	DACAUTO
Gross Beta (suspended)	µCi E-9/ml	NA	4	0.92	12	1991	DACAUTO
Gross Beta (suspended)	µCi E-9/ml	NA	5	0.92	12	1991	INCOMING
Gross Beta (suspended)	µCi E-9/ml	NA	2	1.07	14	1994	INCOMING
Gross Beta (suspended)	µCi E-9/ml	NA	3	1.1	13	1993	INCOMING
Gross Beta (suspended)	µCi E-9/ml	NA	3	1.75	4	1990	INCOMING
Gross Beta (suspended)	µCi E-9/ml	NA	4	1.64	14	1994	Lagoon
Gross Beta (suspended)	µCi E-9/ml	NA	4	1.7	13	1993	Lagoon
Gross Beta (suspended)	µCi E-9/ml	NA	8	4.8	5	1993	OW–WR–01
Gross Beta (suspended)	µCi E-9/ml	NA	14	5.14	7	1991	OW–WR–01
Gross Beta (suspended)	µCi E-9/ml	NA	24	14	3	1994	OW–WR–01
Gross Beta (suspended)	µCi E-9/ml	NA	13	8	2	1991	OW–WR–24
Gross Beta (suspended)	µCi E-9/ml	NA	2	0.6	5	1991	OW–WR–27
Gross Beta (suspended)	µCi E-9/ml	NA	14	10.4	5	1994	OW–WR–27
Gross Beta (suspended)	µCi E-9/ml	NA	4	3.5	4	1993	OW–WR–34
Gross Beta (suspended)	µCi E-9/ml	NA	16	13.3	4	1994	OW–WR–34
Gross Beta (suspended)	µCi E-9/ml	NA	12	10.5	2	1991	OW–WR–36
Gross Beta (suspended)	µCi E-9/ml	NA	93	48	3	1993	OW–WR–36
Gross Beta (suspended)	µCi E-9/ml	NA	5	2.67	3	1994	Z–12–EN
Gross Beta (suspended)	µCi E-9/ml	NA	9	3.4	5	1991	Z–12–EN
Gross Beta (suspended)	µCi E-9/ml	NA	14	8.5	2	1993	Z–12–EN
Gross Beta (suspended)	µCi E-9/ml	NA	11	4.1	8	1993	Z–12–S
Gross Beta (suspended)	µCi E-9/ml	NA	12	4.33	12	1991	Z–12–S
Gross Beta (suspended)	µCi E-9/ml	NA	8	4.48	7	1994	Z–12–S
Gross Beta (suspended)	µCi E-9/ml	NA	1	NA	1	1990	Z–12–W
Gross Beta (suspended)	µCi E-9/ml	NA	5	0.67	12	1991	Z–12–W
Gross Beta (suspended)	µCi E-9/ml	NA	3	1.45	9	1994	Z–12–W
Gross Beta (suspended)	µCi E-9/ml	NA	5	3	6	1993	Z–12–W
Mercury	mg/L	0.0024	0.0033	0.0033	1	1990	NDITCH
Methylene Chloride	mg/L	NA	0.031	0.0075	15	1994	INCOMING
Methylene Chloride	mg/L	NA	0.006	0.0058	6	1994	Z–12–S
Nickel	mg/L	0.03	2.2	2.2	1	1990	11–20
Oil & Grease	mg/L	15	160	24.38	13	1994	INCOMING
Oil & Grease	mg/L	15	30	16	2	1990	Z–12–S
Oil & Grease	mg/L	15	16	16	1	1990	Z–12–W

TABLE C.2.1–1.—*Pantex Plant Well Information*[1]-Continued

WELL ID NUMBER	ALSO KNOWN AS	AQUIFER	TYPE OF WELL	STATUS
OW–WR–20	PM–20	Perched	Monitoring	Active
OW–WR–21	PM–21 TH–3 06–44–7B	Perched	Observation	Dry
OW–WR–38	PTX08–001 PM–38	Perched	Monitoring	Active
OW–WR–39	OM–39 MW–1 06–44–5B	Ogallala	Monitoring	Active
OW–WR–40	OM–40 MW–2 06–44–5A	Ogallala	Monitoring	Active
OW–WR–44	PTX10–0002 PM–44 16–1	Perched	Monitoring	Active
OW–WR–45	PM–45 PTX09–0004 SE–12–2 06–45–5	Perched	Monitoring	Active
OW–WR–46	PTX–03–0010 OM–46 06–44–01	Ogallala	Monitoring	Active
OW–WR–47	PTX03–0011 06–44–1 OM–47	Ogallala	Monitoring	Active
OW–WR–48	PTX03–0012 OM–48	Ogallala	Monitoring	Active
OW–WR–52	3–66	Unknown	Observation	Unused
OW–WR–54		Unknown	Observation	Unused
OW–WR–55		Not Applicable[2]	Neutron Probe Hole	Unknown
OW–WR–56		Not Applicable[2]	Neutron Probe Hole	Unknown
OW–WR–57		Not Applicable[2]	Neutron Probe Hole	Unknown
OW–WR–58		Not Applicable[2]	Neutron Probe Hole	Unknown
PTX01–1001		Perched	Monitoring	Active
PTX01–1002		Perched	Monitoring	Active
PTX01–1003		Ogallala	Monitoring	Active
PTX06–1001		Perched	Monitoring	Plugged
PTX06–1001A		Perched	Monitoring	Active
PTX06–1002		Perched	Monitoring	Plugged

TABLE C.2.1–1.—*Pantex Plant Well Information*[1]-Continued

WELL ID NUMBER	ALSO KNOWN AS	AQUIFER	TYPE OF WELL	STATUS
PTX06–1002A		Perched	Monitoring	Active
PTX06–1003		Perched	Monitoring	Active
PTX06–1004		Perched	Monitoring	Active
PTX06–1005		Perched	Monitoring	Active
PTX06–1006		Perched	Monitoring	Active
PTX06–1007		Perched	Monitoring	Active
PTX06–1008		Perched	Monitoring	Active
PTX06–1009		Dry	Monitoring	Active
PTX06–1010		Perched	Monitoring	Active
PTX06–1011		Perched	Monitoring	Active
PTX06–1012		Perched	Monitoring	Active
PTX06–1013		Perched	Monitoring	Active
PTX06–1014		Perched	Monitoring	Active
PTX06–1015		Perched	Observation	Active
PTX06–1017		Ogallala	Hydropunch	Plugged
PTX06–1018		Perched	Hydropunch	Plugged
PTX06–1019		Perched	Hydropunch	Plugged
PTX06–1020		Dry	Hydropunch	Plugged
PTX06–1021		Perched	Hydropunch	Active
PTX06–1022		Dry	Hydropunch	Active
PTX06–1023		Perched	Hydropunch	Active
PTX06–1024		Perched	Hydropunch	Plugged
PTX06–1025		Perched	Hydropunch	Plugged
PTX06–1026		Dry	Hydropunch	Plugged
PTX06–1027		Dry	Hydropunch	Plugged
PTX06–1028		Dry	Hydropunch	Plugged
PTX07–1O01	PTX07–1013	Perched	Monitoring	Active
PTX07–1O02	PTX07–1011	Perched	Monitoring	Active
PTX07–1O03	PTX07–1012	Perched	Monitoring	Active
PTX07–1P01	PTX07–1P16	Perched	Monitoring	Active
PTX07–1P02	PTX07–1P15	Perched	Monitoring	Active
PTX07–1P03	PTX07–1P17	Perched	Monitoring	Active
PTX07–1Q01	PTX07–1Q29	Perched	Monitoring	Active
PTX07–1Q02	PTX07–1Q28	Perched	Monitoring	Active
PTX07–1Q03	PTX07–1Q27	Perched	Monitoring	Active
PTX08–1001		Perched	Monitoring	Active
PTX08–1002		Perched	Monitoring	Active

TABLE C.2.1–1.—*Pantex Plant Well Information*[1]-Continued

WELL ID NUMBER	ALSO KNOWN AS	AQUIFER	TYPE OF WELL	STATUS
PTX08–1003		Perched	Monitoring	Active
PTX08–1004		Perched	Monitoring	Plugged
PTX08–1005		Perched	Monitoring	Active
PTX08–1006		Perched	Monitoring	Active
PTX08–1007		Perched	Monitoring	Active
PTX08–1008		Perched	Monitoring	Active
PTX08–1009		Perched	Monitoring	Active
PTX08–1010		Perched	Monitoring	Active
PTX08–1011		Ogallala	Background Well	Plugged
PTX08–1011A		Ogallala	Monitoring	Unknown
PTX10–1007	PTX10–0007 PM–107	Perched	Monitoring	Active
PTX10–1008	PTX10–0008 PM–108	Perched	Monitoring	Active
PTX10–1013	PTX10–0013 PM–109 PTX09–0013	Perched	Monitoring	Active
PTX10–1014	PTX10–0014 PM–110 PTX09–0014	Perched	Monitoring	Active
W15–11	Well ll E–6B DA–06–44–214	Ogallala	Production	Plugged
W15–2	Well 2 DA–06–44–212	Ogallala	Production	Plugged
W15–5	Well 5	Ogallala	Production	Plugged
W15–7	Well 7 DA–06–44–215	Ogallala	Production	Plugged
Walco #1	Well 18 70–1	Ogallala	Production	Active
Walco #2	Well 19 70–2	Ogallala	Production	Active
Walco #4	Well 21 70–4	Unknown	Unknown	Abandoned
Walco #5	Well 22 70–5	Unknown	Unknown	Abandoned

[1]Well Locations are displayed on Figure 4.6.1.2 –2.
[2]Neutron probe holes in the unsaturated zone with total depths ranging from 8.5 to 11 meters (28 to 37 feet) below land surface.
Note: Some data inconsistencies may exist from one source to another.
Sources: MH 1992; PC 1994; TBEG 1995; DOE 1991; USCOE 1991; USCOE 1994; TBEG nd; Argonne 1995

TABLE C.2.1-2.—*Hydraulic Parameter Summary of Onsite Wells*

WELL ID NUMBERS	TESTED ZONE	GROUND SURFACE ELEVA-TION (ft)	TOTAL DEPTH OF WELL (ft)	TOP OF SCREEN (ft)	BOTTOM OF SCREEN (ft)	TYPE OF WELL	TRANS. (ft^2/d)	HOR. COND. (ft/d)	VERT. COND (ft/d)
15–26	Ogall.	3539.89[1]	763	530 676	656 750	Prod.	1403.7	4.46	NR
15–16	Ogall.	3526.36[1]	727	507	717	Prod.	3008.02	14.32	NR
BEGPTX–02[2]	FGZ	3540[1]	420	375.75	417	Monitor	NR	NR	1.96E-05 to 2.14E-03
BEGPTX–03[2]	Perch. or FGZ	3535[1]	282	230.5	282	Monitor	NR	NR	1.54E-03 to 5.95E-03
OW–WR–19	Perch.	3539.46	350	308	350	Monitor	42.89	NR	NR
OW–WR–20	Perch.	3537.93[1]	350	308	350	Monitor	19.39	NR	NR
OW–WR–38	Perch.	3518.10[1]	230	210	230	Monitor	120.86	NR	NR
OW–WR–44	Perch.	3542.16[1]	298	77.75	297.75	Monitor	85.43	NR	NR
OW–WR–45	Perch.	3544.11[1]	275	249.7	269.7	Monitor	122.72	NR	NR
PTX08–1008[2]	FGZ	3534.22[1]	292	259	289	Monitor	NR	NR	6.14E-03
PTX06–1004[2]	Perch.	3535.9[1]	286	253	283	Monitor	NR	NR	87.87
1114–MW1[3,4]	Perch.	3545.73[1]	290	268	288	Monitor	89–712	6.1–48.3	NR
1114–MW2[3,4]	Perch.	3544.99[1]	294	267	287	Monitor	133–606	9.4–42.6	NR
1114–MW3[3,4]	Perch.	3546.03[1]	287	267	287	Monitor	147–1,146	11.1–80.7	NR
1114–MW4[3,4]	Perch.	3546.34[1]	288	268	288	Monitor	180–722	9.2–47.5	NR
PTX06–1014[5,6]	Perch.	3529.00	290	260	280	Monitor	1149.2–1195.4	57.46–59.77	NR
PTX06–1017[5,6]	Perch.	3529.30	284	NR	NR	Observa-tion	789.4–1774.1	51.26–115.2	NR

Trans. - Transmissivity
Sat. - Saturated thickness
Hor. Cond. - Horizontal hydraulic conductivity
Vert. Cond. - Vertical hydraulic conductivity
FGZ - Fine-Grained Zone
NR - Information not reported
[1]DOE 1991
[2]TBEG 1994
[3]MH 1992
[4]TBEG 1995a
[5]Pantex 1995
[6]PC 1996
For all other information: USCOE 1992

TABLE C.2.1–3.—*Vertical Saturated Hydraulic Conductivity*[1]

LOCATION	CYLINDER ID	SATURATED HYDRAULIC CONDUCTIVITY (ft/d)					
TDCJ1	13	1.56	2.18	2.30	2.10	2.38	3.40
	23	0.29	0.22	0.39	1.42	0.99	1.11
	28 [2]	4.39	NM	NM	NM	NM	NM
	33	2.27	1.96	NM	NM	NM	NM
	34	1.08	4.54	0.60	1.59	1.50	NM
	36	2.53	2.53	4.68	NM	NM	NM
	38 [2]	0.31	0.65	NM	NM	NM	NM
	45	2.64	1.13	0.91	0.79	1.30	NM
	47	0.82	0.94	1.02	1.50	NM	NM
	48	0.77	0.82	0.62	0.91	NM	NM
	49 [2]	1.76	0.94	0.82	NM	NM	NM
TDCJ2	12	0.26	0.07	0.04	NM	NM	NM
	17	0.19	0.24	NM	NM	NM	NM
	18	0.01	NM	NM	NM	NM	NM
	19	0.43	0.74	NM	NM	NM	NM
	20	0.33	0.07	0.33	NM	NM	NM
	21	0.12	0.13	0.12	NM	NM	NM
	22 [3]	0.03	NM	NM	NM	NM	NM
	24	1.01	NM	NM	NM	NM	NM
	26	4.68	NM	NM	NM	NM	NM
	31	3.77	NM	NM	NM	NM	NM
	40 [3]	0.02	0.06	0.03	NM	NM	NM
	43	0.15	0.16	0.14	NM	NM	NM
TDCJ4	B	3.12	1.33	1.87	1.39	NM	NM
	C	0.05	0.04	0.04	0.09	0.11	0.04
	F	0.29	0.24	0.84	NM	NM	NM
TDCJ5	B	0.34	0.48	0.31	0.31	0.62	NM
	C	0.27	0.40	0.99	0.82	0.57	NM
	D	0.45	0.28	0.18	0.11	0.05	NM
	F	0.14	0.10	0.32	NM	NM	NM
	J	1.13	0.65	1.28	NM	NM	NM
	K	0.65	0.37	0.26	NM	NM	NM

[1]Based on constant head tests of surface and shallow subsurface soils at the TDCJ playa. Individual test runs on the same sample consisted of using different constant heads, which resulted in different flow rates. Each value represents a separate test. For additional information, refer to TBEG 1992.
[2]Subsurface sample from 0.12 to 0.2 m (0.4 to 0.6 ft).
[3]Subsurface sample from 0.15 to 0.21 m (0.5 to 0.7 ft).
Texas Department of Criminal Justice (TDCJ1) Interplaya
TDCJ2 Next to current water level (Fringe) east
TDCJ4 Next to current water level (Fringe) west
TDCJ5 Fringe, halfway between TDCJ1 and TDCJ3
NM - Not measured
Source: TBEG 1992

TABLE C.2.2–1.—*Decision Criteria Standards and Risk Reduction Standards Used for the Groundwater Quality Analysis*

PARAMETER	UNITS	DECISION CRITERIA	RRS[5]
1,1-dichloroethane	µg/L	NA	10,200
1,1,1-trichloroethane	µg/L	200 (1)	200
1,2-dichloroethane	µg/L	5 (1)	5
1,3,5-trinitrobenzene	µg/L	NA	5.11
2-amino-4,6-dinitrotoluene	µg/L	NA	NA
2,4-dinitrotoluene	µg/L	NA	204
2,4,6-trinitrotoluene	µg/L	NA	51
2,6-dinitrotoluene	µg/L	NA	10,220
Alkalinity	mg/L	NA	414
Aluminum	µg/L	200 (2)	NA
Ammonia (as N)	µg/L	NA	NA
Arsenic	µg/L	50 (1)	50
Barium	µg/L	2000 (1)	2000
Benzene	µg/L	5 (1)	5
Bicarbonate	mg/L	NA	473
Boron	µg/L	NA	NA
Bromodichloromethane	µg/L	100 (3)	100
Calcium	µg/L	NA	566,000
Carbon tetrachloride	µg/L	5 (1)	5
Chloride	mg/L	300 (2)	1637
Chloroform	µg/L	100 (3)	100
Chromium (total)	µg/L	100 (1)	100
Chromium (hexavalent)	µg/L	NA	100
Cis-1,2-dichloroethane	µg/L	70 (1)	70
Copper	µg/L	1000 (2)	40
Cyanide	µg/L	200 (1)	200
Fluoride	mg/L	4 (1)	5.1
Gross Alpha (dissolved)	µCi E-9/ml	15 (1)	NA
Gross Alpha (suspended)	µCi E-9/ml	NA	NA
Gross Beta (dissolved)	µCi E-9/ml	50 (1)	NA
Gross Beta (suspended)	µCi E-9/ml	NA	NA

TABLE C.2.2–1.—*Decision Criteria Standards and Risk Reduction Standards Used for the Groundwater Quality Analysis*-Continued

PARAMETER	UNITS	DECISION CRITERIA	RRS[5]
Hardness	mg/L	NA	2238
HMX	µg/L	NA	5110
Iron	µg/L	300 (2)	1900
Lead	µg/L	15 (3)	100
Magnesium	µg/L	NA	219,000
Manganese	µg/L	50 (2)	40
Mercury	µg/L	2 (1)	2
Methylene Chloride	µg/L	NA	5
Molybdenum	µg/L	NA	NA
Nickel	µg/L	100 (1)	100
Nitrate (as N)	mg/L	10 (1)	16.2
Nitrite (as N)	mg/L	1,000 (1)	1,000
Nitrobenzene	µg/L	NA	51
Oil and Grease	µg/L	NA	NA
Orthophosphate	µg/L	NA	NA
Phenol	µg/L	NA	61,300
pH		6.5-8.5 (3)	NA
Phosphorous	mg/L	NA	1.0
Potassium	µg/L	NA	13,300
Plutonium - 239/240	µCi E-9/ml	1.2 (4)	NA
Radium - 226	µCi E-9/ml	5	5
Radium - 228	µCi E-9/ml	5	5
RDX	µg/L	NA	26
Selenium	µg/L	50 (1)	50
Silica	µg/L	NA	NA
Silver	ug/L	100 (2)	512
Sodium	µg/L	NA	1,863,000
Specific Conductance	µmho/cm	NA	15,400
Strontium	µg/L	NA	61,300
Sulfate	mg/L	300 (2)	3,750
Sulfite	mg/L	NA	NA
Total Dissolved Solids	mg/L	1000 (2)	8,057

TABLE C.2.2–1.—*Decision Criteria Standards and Risk Reduction Standards Used for the Groundwater Quality Analysis*-Continued

PARAMETER	UNITS	DECISION CRITERIA	RRS[5]
Tetrachloroethylene	µg/L	NA	5
Tetrahydrofuran	µg/L	NA	NA
Tetryl	µg/L	NA	4
Toluene	µg/L	1000 (1)	1000
Total Xylenes	µg/L	10,000 (1)	10,000
Total organic compounds	mg/L	NA	NA
Total organic halogen	mg/L	NA	NA
Trichloroethylene	µg/L	NA	5
Trichlorofluoromethane	µg/L	NA	30,700
Tritium	µCiE-6/ml	20,000 (1)	NA
Total suspended solids	µg/L	NA	NA
Uranium - 234	µCi E-9/ml	20 (4)	NA
Uranium - 238	µCi E-9/ml	24 (4)	NA
Vanadium	µg/L	NA	307
Zinc	µg/L	5,000 (2)	30,700

1) TNRCC Primary Maximum Contaminant (MCL) Level for Drinking Water (TNRCC 1994)
2) TNRCC Secondary Maximum Contaminant (SMCL) Level for Drinking Water (TNRCC 1994)
3) EPA Drinking Water Regulations and Health Advisories (EPA 1994)
4) DOE DCG's (DOE Order 5400.5)
5) RRS, Risk Reduction Standards (DOE, 1994)

Constituent abbreviations:

HMX - High melt explosive
RDX - Research development explosive

NA - Not Available

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
PTX06-1005	Spring-94	1,2-dichloroethane	µg/L	5.5	5 (1)	5	NR
PTX08-1006	Spring-94	1,2-dichloroethane	µg/L	5.7	5 (1)	5	NR
1114-MW2	Fall-94	1,2-dichloroethane	µg/L	6	5 (1)	5	NR
PTX06-1005	Fall-93	1,2-dichloroethane	µg/L	6	5 (1)	5	NR
PTX06-1010	Spring-94	1,2-dichloroethane	µg/L	6.8	5 (1)	5	NR
PTX06-1008	Fall-93	1,2-dichloroethane	µg/L	8	5 (1)	5	NR
PTX08-1006	Winter-94	1,2-dichloroethane	µg/L	10	5 (1)	5	NR
PTX06-1010	Fall-94	1,2-dichloroethane	µg/L	11.9	5 (1)	5	NR
PTX08-1006	Fall-93	1,2-dichloroethane	µg/L	13	5 (1)	5	NR
1114-MW2	Spring-94	1,2-dichloroethane	µg/L	14	5 (1)	5	NR
1114-MW2	Fall-93	1,2-dichloroethane	µg/L	15	5 (1)	5	NR
PTX06-1010	Fall-93	1,2-dichloroethane	µg/L	20	5 (1)	5	NR
OW-WR-20	1990	1,2-dichloroethane	µg/L	10	5 (1)	0.005	11
OW-WR-20	1991	1,2-dichloroethane	µg/L	6	5 (1)	0.005	10
1114-MW2	1994	1,2-dichloroethane	µg/L	140	5 (1)	0.005	5
PTX08-1002	Fall-94	1,3,5-trinitrobenzene	µg/L	14	NA	5.11	NR
PTX08-1002	Fall-93	1,3,5-trinitrobenzene	µg/L	15	NA	5.11	NR
PTX06-1003	Spring-94	1,3,5-trinitrobenzene	µg/L	17.8	NA	5.11	NR
PTX08-1002	Spring-94	1,3,5-trinitrobenzene	µg/L	18	NA	5.11	NR
PTX06-1010	Spring-94	1,3,5-trinitrobenzene	µg/L	30.1	NA	5.11	NR
PTX06-1003	Winter-94	1,3,5-trinitrobenzene	µg/L	30.3	NA	5.11	NR
PTX06-1003	Fall-94	1,3,5-trinitrobenzene	µg/L	42.5	NA	5.11	NR
PTX06-1004	Fall-94	1,3,5-trinitrobenzene	µg/L	368	NA	5.11	NR
PTX06-1004	Fall-93	1,3,5-trinitrobenzene	µg/L	395	NA	5.11	NR
PTX06-1004	Winter-94	1,3,5-trinitrobenzene	µg/L	456	NA	5.11	NR
PTX06-1005	Fall-94	1,3,5-trinitrobenzene	µg/L	738	NA	5.11	NR
PTX06-1005	Spring-94	1,3,5-trinitrobenzene	µg/L	805	NA	5.11	NR
PTX06-1005	Fall-93	1,3,5-trinitrobenzene	µg/L	810	NA	5.11	NR
PTX06-1004	Spring-94	1,3,5-trinitrobenzene	µg/L	1,980	NA	5.11	NR
PTX06-1005	Winter-94	1,3,5-trinitrobenzene	µg/L	2,230	NA	5.11	NR
PTX06-1005	Fall-93	2,4,6-trinitrotoluene	µg/L	63	NA	51	NR
PTX06-1004	Fall-93	2,4,6-trinitrotoluene	µg/L	102	NA	51	NR

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
PTX06-1004	Winter-94	2,4,6-trinitrotoluene	µg/L	122	NA	51	NR
PTX06-1005	Winter-94	2,4,6-trinitrotoluene	µg/L	248	NA	51	NR
PTX06-1002A	Winter-94	2-amino-4,6-dinitrotoluene	µg/L	1.32	NA	NR	NR
PTX06-1011	Winter-94	2-amino-4,6-dinitrotoluene	µg/L	2.46	NA	NR	NR
PTX08-1006	Winter-94	2-amino-4,6-dinitrotoluene	µg/L	5.04	NA	NR	NR
OW-WR-38	1992	Ammonia (as N)	mg/L	0.2	NA	NA	12
OW-WR-45	1993	Ammonia (as N)	mg/L	21	NA	NA	16
PTX10-1013	Fall-94	Benzene	µg/L	42.7	5 (1)	5	NR
PTX10-1013	Spring-94	Benzene	µg/L	43.7	5 (1)	5	NR
PTX10-1013	Winter-94	Benzene	µg/L	52.4	5 (1)	5	NR
PTX10-1013	Fall-93	Benzene	µg/L	64	5 (1)	5	NR
PTX08-1001	Winter-94	Chromium	µg/L	109	100 (1)	100	NR
OW-WR-38	Fall-94	Chromium	µg/L	112	100 (1)	100	NR
PTX10-1014	Fall-93	Chromium	µg/L	115	100 (1)	100	NR
PTX06-1007	Fall-93	Chromium	µg/L	119	100 (1)	100	NR
PTX07-1P01	Fall-94	Chromium	µg/L	123	100 (1)	100	NR
PTX06-1003	Spring-94	Chromium	µg/L	130	100 (1)	100	NR
PTX10-1014	Winter-94	Chromium	µg/L	190	100 (1)	100	NR
PTX06-1003	Fall-93	Chromium	µg/L	232	100 (1)	100	NR
PTX06-1011	Fall-94	Chromium	µg/L	260	100 (1)	100	NR
PTX06-1001A	Fall-94	Chromium	µg/L	277	100 (1)	100	NR
PTX06-1011	Winter-94	Chromium	µg/L	283	100 (1)	100	NR
PTX06-1011	Spring-94	Chromium	µg/L	330	100 (1)	100	NR
PTX06-1011	Fall-93	Chromium	µg/L	342	100 (1)	100	NR
OW-WR-20	Fall-93	Chromium	µg/L	560	100 (1)	100	NR
PTX06-1003	Winter-94	Chromium	µg/L	588	100 (1)	100	NR
PTX08-1008	Fall-93	Chromium	µg/L	603	100 (1)	100	NR
PTX08-1008	Winter-94	Chromium	µg/L	621	100 (1)	100	NR
OW-WR-20	Winter-94	Chromium	µg/L	680	100 (1)	100	NR
OW-WR-20	Spring-94	Chromium	µg/L	696	100 (1)	100	NR
PTX10-1014	Fall-94	Chromium	µg/L	710	100 (1)	100	NR

Table C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
PTX08-1008	Spring-94	Chromium	µg/L	850	100 (1)	100	NR
PTX08-1009	Winter-94	Chromium	µg/L	1,750	100 (1)	100	NR
OW-WR-20	Fall-94	Chromium	µg/L	1,830	100 (1)	100	NR
PTX08-1008	Fall-94	Chromium	µg/L	2,090	100 (1)	100	NR
PTX08-1009	Fall-93	Chromium	µg/L	2,110	100 (1)	100	NR
PTX06-1010	Fall-93	Chromium	µg/L	2,730	100 (1)	100	NR
PTX08-1009	Fall-94	Chromium	µg/L	2,760	100 (1)	100	NR
PTX08-1009	Spring-94	Chromium	µg/L	2,930	100 (1)	100	NR
PTX06-1010	Spring-94	Chromium	µg/L	4,300	100 (1)	100	NR
PTX06-1010	Fall-94	Chromium	µg/L	6,040	100 (1)	100	NR
PTX06-1010	Winter-94	Chromium	µg/L	9,040	100 (1)	100	NR
OW-WR-20	1990	Chromium	µg/L	120	100 (1)	100	11
OW-WR-38	1991	Chromium	µg/L	120	100 (1)	100	10
OW-WR-38	1994	Chromium	µg/L	150	100 (1)	100	12
OW-WR-20	1992	Chromium	µg/L	230	100 (1)	100	12
OW-WR-20	1993	Chromium	µg/L	594	100 (1)	100	11
OW-WR-20	1994	Chromium	µg/L	1,950	100 (1)	100	12
OW-WR-44	1991	Chromium	µg/L	3,100	100 (1)	100	10
PTX08-1009	Spring-94	Chromium (hexavalent)	µg/L	211	NA	100	NR
PTX06-1011	Winter-94	Chromium (hexavalent)	µg/L	224	NA	100	NR
PTX06-1011	Fall-94	Chromium (hexavalent)	µg/L	230	NA	100	NR
PTX06-1011	Fall-93	Chromium (hexavalent)	µg/L	230	NA	100	NR
PTX06-1011	Spring-94	Chromium (hexavalent)	µg/L	346	NA	100	NR
PTX08-1008	Fall-93	Chromium (hexavalent)	µg/L	530	NA	100	NR
PTX08-1008	Winter-94	Chromium (hexavalent)	µg/L	563	NA	100	NR
PTX08-1008	Spring-94	Chromium (hexavalent)	µg/L	850	NA	100	NR
PTX08-1009	Winter-94	Chromium (hexavalent)	µg/L	1,770	NA	100	NR
PTX08-1008	Fall-94	Chromium (hexavalent)	µg/L	1,800	NA	100	NR
PTX08-1009	Fall-93	Chromium (hexavalent)	µg/L	2,200	NA	100	NR
PTX06-1010	Winter-94	Chromium (hexavalent)	µg/L	2,220	NA	100	NR
PTX08-1009	Fall-94	Chromium (hexavalent)	µg/L	2,500	NA	100	NR
PTX06-1010	Fall-93	Chromium (hexavalent)	µg/L	3,000	NA	100	NR
OW-WR-20	1991	Chromium (hexavalent)	µg/L	100	NA	100	5

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
OW-WR-20	1992	Chromium (hexavalent)	µg/L	280	NA	100	3
OW-WR-20	1993	Chromium (hexavalent)	µg/L	440	NA	100	1
PTX06-1010	Winter-94	Copper	µg/L	236	1000 (2)	40	NR
OW-WR-44	1990	Gross Alpha (dissolved)	µCi E-9/ml	20	15	NA	11
OW-WR-20	1990	Gross Alpha (dissolved)	µCi E-9/ml	28	15	NA	11
OW-WR-20	1994	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-45	1994	Gross Alpha (suspended)	µCiE-9/ml	1	NA	NA	9
OW-WR-PTX3	1994	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-19	1990	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-20	1991	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-20	1992	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-20	1993	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-38	1991	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-44	1992	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-45	1990	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-45	1991	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	9
OW-WR-45	1992	Gross Alpha (suspended)	µCi E-9/ml	1	NA	NA	9
OW-WR-19	1993	Gross Alpha (suspended)	µCi E-9/ml	2	NA	NA	12
OW-WR-38	1990	Gross Alpha (suspended)	µCi E-9/ml	2	NA	NA	11
OW-WR-38	1992	Gross Alpha (suspended)	µCi E-9/ml	2	NA	NA	11
OW-WR-38	1993	Gross Alpha (suspended)	µCi E-9/ml	2	NA	NA	9
OW-WR-44	1991	Gross Alpha (suspended)	µCi E-9/ml	2	NA	NA	10
OW-WR-20	1990	Gross Alpha (suspended)	µCi E-9/ml	5	NA	NA	11
OW-WR-19	1991	Gross Alpha (suspended)	µCi E-9/ml	7	NA	NA	10
OW-WR-19	1992	Gross Alpha (suspended)	µCi E-9/ml	7	NA	NA	10
OW-WR-19	Fall-93	Gross Beta (suspended)	µCi E-9/ml	1	NA	NR	NR
OW-WR-20	Fall-93	Gross Beta (suspended)	µCi E-9/ml	1	NA	NR	NR
OW-WR-20	Fall-94	Gross Beta (suspended)	µCi E-9/ml	1	NA	NR	NR
OW-WR-38	Fall-94	Gross Beta (suspended)	µCi E-9/ml	1	NA	NR	NR
OW-WR-19	Winter-94	Gross Beta (suspended)	µCi E-9/ml	1	NA	NR	NR
OW-WR-20	Winter-94	Gross Beta (suspended)	µCi E-9/ml	1	NA	NR	NR
OW-WR-45	Winter-94	Gross Beta (suspended)	µCi E-9/ml	1	NA	NR	NR
OW-WR-19	1994	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-20	1994	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	12
OW-WR-38	1994	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	12
BEG-PTX3	1994	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	10

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
OW-WR-19	1991	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-19	1992	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-20	1990	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-38	1992	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-44	1990	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	11
OW-WR-44	1992	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	10
OW-WR-45	1993	Gross Beta (suspended)	µCi E-9/ml	1	NA	NA	14
OW-WR-45	1994	Gross Beta (suspended)	µCi E-9/ml	2	NA	NA	9
OW-WR-19	1990	Gross Beta (suspended)	µCi E-9/ml	2	NA	NA	11
OW-WR-20	1991	Gross Beta (suspended)	µCi E-9/ml	2	NA	NA	10
OW-WR-20	1992	Gross Beta (suspended)	µCi E-9/ml	2	NA	NA	11
OW-WR-20	1993	Gross Beta (suspended)	µCi E-9/ml	2	NA	NA	10
OW-WR-44	1993	Gross Beta (suspended)	µCi E-9/ml	2	NA	NA	12
OW-WR-44	1994	Gross Beta (suspended)	µCi E-9/ml	3	NA	NA	10
OW-WR-19	1993	Gross Beta (suspended)	µCi E-9/ml	3	NA	NA	12
OW-WR-38	1993	Gross Beta (suspended)	µCi E-9/ml	3	NA	NA	9
OW-WR-45	1991	Gross Beta (suspended)	µCi E-9/ml	3	NA	NA	9
OW-WR-44	1991	Gross Beta (suspended)	µCi E-9/ml	4	NA	NA	10
OW-WR-45	1992	Gross Beta (suspended)	µCi E-9/ml	4	NA	NA	9
OW-WR-45	1990	Gross Beta (suspended)	µCi E-9/ml	5	NA	NA	11
OW-WR-38	1990	Gross Beta (suspended)	µCi E-9/ml	6	NA	NA	11
OW-WR-38	1991	Gross Beta (suspended)	µCi E-9/ml	6	NA	NA	10
PTX06-1004	Spring-94	HMX	µg/L	11,000	NA	5,110	NR
PTX06-1007	Fall-94	Iron	µg/L	300	300 (2)	1,900	NR
PTX07-1O02	Fall-94	Iron	µg/L	300	300 (2)	1,900	NR
PTX07-1P01	Fall-94	Iron	µg/L	300	300 (2)	1,900	NR
PTX06-1001A	Spring-94	Iron	µg/L	300	300 (2)	1,900	NR
PTX06-1007	Spring-94	Iron	µg/L	300	300 (2)	1,900	NR
OW-WR-20	Spring-94	Iron	µg/L	330	300 (2)	1,900	NR
OW-WR-20	Fall-93	Iron	µg/L	340	300 (2)	1,900	NR
PTX06-1002A	Winter-94	Iron	µg/L	354	300 (2)	1,900	NR
PTX06-1001A	Winter-94	Iron	µg/L	370	300 (2)	1,900	NR
PTX06-1011	Winter-94	Iron	µg/L	381	300 (2)	1,900	NR
PTX07-1P02	Fall-94	Iron	µg/L	400	300 (2)	1,900	NR

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
PTX06-1007	Winter-94	Iron	µg/L	414	300 (2)	1,900	NR
PTX08-1001	Fall-93	Iron	µg/L	436	300 (2)	1,900	NR
PTX06-1007	Fall-93	Iron	µg/L	448	300 (2)	1,900	NR
OW-WR-38	Fall-94	Iron	µg/L	520	300 (2)	1,900	NR
PTX07-1O01	Fall-94	Iron	µg/L	600	300 (2)	1,900	NR
PTX10-1014	Fall-93	Iron	µg/L	790	300 (2)	1,900	NR
PTX06-1011	Fall-93	Iron	µg/L	817	300 (2)	1,900	NR
PTX06-1003	Fall-93	Iron	µg/L	888	300 (2)	1,900	NR
PTX07-1Q01	Fall-94	Iron	µg/L	900	300 (2)	1,900	NR
PTX06-1010	Fall-93	Iron	µg/L	1,010	300 (2)	1,900	NR
OW-WR-19	Fall-93	Iron	µg/L	1,020	300 (2)	1,900	NR
PTX07-1P03	Fall-94	Iron	µg/L	1,100	300 (2)	1,900	NR
PTX06-1010	Fall-94	Iron	µg/L	1,300	300 (2)	1,900	NR
PTX06-1003	Spring-94	Iron	µg/L	1,400	300 (2)	1,900	NR
PTX08-1001	Winter-94	Iron	µg/L	1,680	300 (2)	1,900	NR
PTX10-1014	Spring-94	Iron	µg/L	1,700	300 (2)	1,900	NR
PTX10-1014	Fall-94	Iron	µg/L	1,900	300 (2)	1,900	NR
OW-WR-19	Winter-94	Iron	µg/L	2,100	300 (2)	1,900	NR
OW-WR-19	Fall-94	Iron	µg/L	2,160	300 (2)	1,900	NR
OW-WR-19	Spring-94	Iron	µg/L	2.160	300 (2)	1,900	NR
PTX10-1014	Winter-94	Iron	µg/L	2,290	300 (2)	1,900	NR
PTX06-1006	Spring-94	Iron	µg/L	2,600	300 (2)	1,900	NR
PTX06-1010	Spring-94	Iron	µg/L	2,600	300 (2)	1,900	NR
PTX06-1003	Winter-94	Iron	µg/L	2,770	300 (2)	1,900	NR
OW-WR-20	Winter-94	Iron	µg/L	3,550	300 (2)	1,900	NR
PTX06-1001A	Fall-94	Iron	µg/L	4,000	300 (2)	1,900	NR
PTX06-1010	Winter-94	Iron	µg/L	16,200	300 (2)	1,900	NR
OW-WR-38	1992	Iron	µg/L	350	300 (2)	1,900	11
BEG-PTX3	1994	Iron	µg/L	400	300 (2)	1,900	10
OW-WR-45	1993	Iron	µg/L	600	300 (2)	1,900	16

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
OW-WR-38	1994	Iron	µg/L	950	300 (2)	1,900	12
OW-WR-20	1992	Iron	µg/L	1,200	300 (2)	1,900	12
OW-WR-19	1994	Iron	µg/L	2,160	300 (2)	1,900	13
OW-WR-20	1993	Iron	µg/L	2,300	300 (2)	1,900	11
OW-WR-19	1991	Iron	µg/L	2,500	300 (2)	1,900	10
OW-WR-19	1992	Iron	µg/L	2,500	300 (2)	1,900	10
OW-WR-38	1991	Iron	µg/L	2,500	300 (2)	1,900	10
OW-WR-44	1991	Iron	µg/L	2,500	300 (2)	1,900	10
OW-WR-19	1993	Iron	µg/L	2,600	300 (2)	1,900	12
OW-WR-20	1994	Iron	µg/L	3,550	300 (2)	1,900	12
OW-WR-20	1991	Iron	µg/L	3,700	300 (2)	1,900	10
OW-WR-20	1990	Iron	µg/L	5,000	300 (2)	1,900	11
OW-WR-19	1990	Iron	µg/L	5,500	300 (2)	1,900	11
PTX06-1008	Spring-94	Lead	µg/L	31	15 (3)	100	NR
PTX10-1014	Winter-94	Manganese	µg/L	44	50 (2)	40	NR
PTX10-1013	Spring-94	Manganese	µg/L	50	50 (2)	40	NR
PTX10-1013	Fall-94	Manganese	µg/L	54	50 (2)	40	NR
PTX10-1013	Winter-94	Manganese	µg/L	56	50 (2)	40	NR
PTX07-1Q01	Fall-94	Manganese	µg/L	57	50 (2)	40	NR
PTX06-1010	Fall-93	Manganese	µg/L	64	50 (2)	40	NR
PTX07-1P03	Fall-94	Manganese	µg/L	111	50 (2)	40	NR
PTX07-1P01	Fall-94	Manganese	µg/L	271	50 (2)	40	NR
PTX08-1005	Fall-94	Methylene Chloride	µg/L	5.5	NA	5	NR
PTX08-1005	Spring-94	Methylene Chloride	µg/L	6.1	NA	5	NR
PTX08-1005	Winter-94	Methylene Chloride	µg/L	11.8	NA	5	NR
OW-WR-45	Fall-93	Nickel	µg/L	110	100 (1)	100	NR
OW-WR-45	Spring-94	Nickel	µg/L	110	100 (1)	100	NR
PTX07-1P02	Fall-94	Nickel	µg/L	113	100 (1)	100	NR
OW-WR-45	Spring-94	Nickel	µg/L	120	100 (1)	100	NR
PTX06-1003	Fall-94	Nickel	µg/L	122	100 (1)	100	NR

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
OW-WR-45	Winter-94	Nickel	μg/L	140	100 (1)	100	
OW-WR-45	Fall-94	Nickel	μg/L	159	100 (1)	100	NR
OW-WR-38	Fall-93	Nickel	μg/L	160	100 (1)	100	NR
PTX06-1003	Spring-94	Nickel	μg/L	180	100 (1)	100	NR
PTX06-1007	Spring-94	Nickel	μg/L	180	100 (1)	100	NR
PTX06-1010	Spring-94	Nickel	μg/L	180	100 (1)	100	NR
PTX06-1010	Fall-93	Nickel	μg/L	192	100 (1)	100	NR
PTX07-1P01	Fall-94	Nickel	μg/L	199	100 (1)	100	NR
PTX10-1014	Fall-93	Nickel	μg/L	207	100 (1)	100	NR
PTX06-1003	Winter-94	Nickel	μg/L	214	100 (1)	100	NR
PTX06-1007	Winter-94	Nickel	μg/L	219	100 (1)	100	NR
PTX06-1007	Fall-93	Nickel	μg/L	223	100 (1)	100	NR
PTX06-1003	Fall-93	Nickel	μg/L	229	100 (1)	100	NR
PTX06-1001A	Spring-94	Nickel	μg/L	230	100 (1)	100	NR
OW-WR-38	Winter-94	Nickel	μg/L	230	100 (1)	100	NR
PTX06-1001A	Fall-94	Nickel	μg/L	243	100 (1)	100	NR
PTX10-1014	Spring-94	Nickel	μg/L	250	100 (1)	100	NR
PTX06-1001A	Fall-93	Nickel	μg/L	253	100 (1)	100	NR
OW-WR-38	Spring-94	Nickel	μg/L	270	100 (1)	100	NR
OW-WR-38	Fall-94	Nickel	μg/L	280	100 (1)	100	NR
PTX06-1001A	Winter-94	Nickel	μg/L	286	100 (1)	100	NR
PTX06-1010	Winter-94	Nickel	μg/L	338	100 (1)	100	NR
PTX10-1014	Winter-94	Nickel	μg/L	344	100 (1)	100	NR
PTX10-1014	Fall-94	Nickel	μg/L	356	100 (1)	100	NR
BEG-PTX3	1994	Nickel	μg/L	100	100 (1)	100	10
OW-WR-45	1994	Nickel	μg/L	170	100 (1)	100	10
OW-WR-38	1994	Nickel	μg/L	390	100 (1)	100	12
PTX06-1011	Spring-94	Nitrate (as N)	mg/L	230	10 (1)	16.2	NR
OW-WR-38	1991	Orthophosphate (as P)	mg/L	0.02	NA	NA	5
OW-WR-38	1992	Orthophosphate (as P)	mg/L	0.06	NA	NA	1

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
OW-WR-20	1992	Orthophosphate (as P)	mg/L	0.7	NA	NA	1
PTX07-1P01	Fall-94	pH	NR	6.49	6.5-8.5 (3)	NA	NR
1114-MW1	1994	pH	NR	8.8	6.5-8.5 (3)	NA	5
1114-MW2	1994	pH	NR	8.8	6.5-8.5 (3)	NA	5
BEG-PTX3	1994	pH	NR	9	6.5-8.5 (3)	NA	10
PTX08-1003	Winter-94	Potassium	µg/L	59.950	NA	13.300	NR
PTX06-1011	Winter-94	RDX	µg/L	27.1	NA	26	NR
PTX08-1005	Fall-94	RDX	µg/L	29	NA	26	NR
PTX06-1011	Fall-94	RDX	µg/L	30.7	NA	26	
PTX06-1002A	Fall-93	RDX	µg/L	34	NA	26	NR
PTX06-1002A	Winter-94	RDX	µg/L	35.1	NA	26	NR
PTX07-1P02	Fall-94	RDX	µg/L	40	NA	26	NR
PTX06-1010	Fall-93	RDX	µg/L	40	NA	26	NR
PTX06-1002A	Fall-94	RDX	µg/L	50.5	NA	26	NR
PTX06-1010	Winter-94	RDX	µg/L	66.8	NA	26	NR
PTX07-1003	Fall-94	RDX	µg/L	71.5	NA	26	NR
PTX07-1001	Fall-94	RDX	µg/L	84.5	NA	26	NR
PTX08-1002	Fall-93	RDX	µg/L	101	NA	26	NR
PTX08-1002	Winter-94	RDX	µg/L	154	NA	26	NR
PTX08-1002	Spring-94	RDX	µg/L	212	NA	26	NR
PTX06-1010	Fall-94	RDX	µg/L	235	NA	26	NR
PTX08-1002	Fall-94	RDX	µg/L	287	NA	26	NR
PTX06-1010	Spring-94	RDX	µg/L	465	NA	26	NR
OW-WR-20	Fall-93	RDX	µg/L	1.000	NA	26	NR
PTX06-1005	Fall-94	RDX	µg/L	1.120	NA	26	NR
PTX06-1005	Spring-94	RDX	µg/L	1.490	NA	26	NR
PTX06-1004	Fall-94	RDX	µg/L	1.970	NA	26	NR
PTX06-1005	Fall-93	RDX	µg/L	2.020	NA	26	NR
PTX06-1004	Winter-94	RDX	µg/L	2,200	NA	26	NR
PTX06-1005	Winter-94	RDX	µg/L	2.420	NA	26	NR
PTX06-1004	Fall-93	RDX	µg/L	3.070	NA	26	NR
PTX06-1004	Spring-94	RDX	µg/L	4.920	NA	26	NR
OW-WR-44	1992	RDX	µg/L	33	NA	26	10
OW-WR-38	1993	RDX	µg/L	34	NA	26	11
OW-WR-38	1990	RDX	µg/L	38	NA	26	11
OW-WR-20	1992	RDX	µg/L	920	NA	26	12
OW-WR-20	1991	RDX	µg/L	950	NA	26	10

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
OW-WR-20	1993	RDX	µg/L	1,000	NA	26	9
OW-WR-20	1994	RDX	µg/L	1,100	NA	26	9
OW-WR-20	1990	RDX	µg/L	2,400	NA	26	11
PTX06-1005	Fall-93	Total Dissolved Solids	µg/L	9,286	1,000 (2)	8,057	NR
PTX06-1011	Winter-94	Tetrachloroethene	µg/L	6	NA	5	NR
PTX06-1011	Spring-94	Tetrachloroethene	µg/L	6.1	NA	5	NR
PTX06-1011	Fall-94	Tetrachloroethene	µg/L	11.8	NA	5	NR
OW-WR-44	Fall-93	Tetrahydrofuran	µg/L	12	NR	NR	NR
BEG-PTX3	Fall-93	Tetrahydrofuran	µg/L	13	NR	NR	NR
OW-WR-19	Fall-93	Tetrahydrofuran	µg/L	13	NR	NR	NR
OW-WR-45	Fall-93	Tetrahydrofuran	µg/L	14	NR	NR	NR
OW-WR-PTX2	Fall-93	Tetrahydrofuran	µg/L	15	NR	NR	NR
OW-WR-20	Fall-93	Tetrahydrofuran	µg/L	15	NR	NR	NR
PTX06-1010	Winter-94	Trichloroethene	µg/L	5	NA	5	NR
PTX06-1008	Spring-94	Trichloroethylene	µg/L	5.5	NA	5	NR
1114-MW1	Fall-93	Trichloroethylene	µg/L	5.7	NA	5	NR
OW-WR-45	Winter-94	Trichloroethylene	µg/L	5.9	NA	5	NR
OW-WR-45	Fall-93	Trichloroethylene	µg/L	6	NA	5	NR
PTX06-1011	Fall-93	Trichloroethylene	µg/L	6	NA	5	NR
PTX06-1011	Winter-94	Trichloroethylene	µg/L	6	NA	5	NR
OW-WR-45	Spring-94	Trichloroethylene	µg/L	6.8	NA	5	NR
PTX06-1010	Spring-94	Trichloroethylene	µg/L	6.8	NA	5	NR
OW-WR-45	Fall-94	Trichloroethylene	µg/L	6.9	NA	5	NR
PTX06-1008	Winter-94	Trichloroethylene	µg/L	7	NA	5	NR
PTX06-1008	Fall-94	Trichloroethylene	µg/L	7.1	NA	5	NR
PTX08-1006	Fall-94	Trichloroethylene	µg/L	7.3	NA	5	NR
PTX08-1006	Spring-94	Trichloroethylene	µg/L	7.3	NA	5	NR
PTX06-1011	Fall-94	Trichloroethylene	µg/L	7.7	NA	5	NR
PTX06-1008	Fall-93	Trichloroethylene	µg/L	8	NA	5	NR
PTX06-1010	Fall-93	Trichloroethylene	µg/L	8	NA	5	NR
OW-WR-45	Spring-94	Trichloroethylene	µg/L	9.6	NA	5	NR
PTX06-1010	Fall-94	Trichloroethylene	µg/L	10.5	NA	5	NR
PTX08-1006	Winter-94	Trichloroethylene	µg/L	10.8	NA	5	NR
PTX08-1007	Fall-94	Trichloroethylene	µg/L	12.2	NA	5	NR
1114-MW2	Fall-94	Trichloroethylene	µg/L	13	NA	5	NR
PTX08-1006	Fall-93	Trichloroethylene	µg/L	13	NA	5	NR
PTX08-1007	Spring-94	Trichloroethylene	µg/L	13.5	NA	5	NR

TABLE C.2.2–2.—*Suspected COCs in Pantex Plant Perched Aquifer Wells, Groundwater Analysis for 1990 to 1994*-Continued

LOCATION	DATE	PARAMETER	UNITS	CONCENTRATION OR ACTIVITY	DECISION CRITERIA	RISK REDUCTION STANDARDS	# OF SAMPLES
1114-MW2	Fall-93	Trichloroethylene	µg/L	16	NA	5	NR
PTX08-1007	Winter-94	Trichloroethylene	µg/L	16.4	NA	5	NR
PTX08-1003	Fall-93	Trichloroethylene	µg/L	28	NA	5	NR
PTX10-1014	Spring-94	Trichloroethylene	µg/L	35.3	NA	5	NR
PTX10-1014	Fall-94	Trichloroethylene	µg/L	45.6	NA	5	NR
PTX10-1014	Winter-94	Trichloroethylene	µg/L	47.4	NA	5	NR
PTX10-1014	Fall-93	Trichloroethylene	µg/L	51	NA	5	NR
PTX10-1013	Spring-94	Trichloroethylene	µg/L	55.6	NA	5	NR
PTX10-1013	Fall-94	Trichloroethylene	µg/L	59.3	NA	5	NR
PTX10-1013	Winter-94	Trichloroethylene	µg/L	68.1	NA	5	NR
OW-WR-20	Fall-93	Trichloroethylene	µg/L	76	NA	5	NR
PTX10-1013	Fall-93	Trichloroethylene	µg/L	95	NA	5	NR
OW-WR-20	Spring-94	Trichloroethylene	µg/L	95	NA	5	NR
OW-WR-20	Winter-94	Trichloroethylene	µg/L	100	NA	5	NR
OW-WR-20	Fall-94	Trichloroethylene	µg/L	110	NA	5	NR
PTX08-1005	Fall-94	Trichloroethylene	µg/L	260	NA	5	NR
PTX08-1005	Spring-94	Trichloroethylene	µg/L	353	NA	5	NR
PTX08-1005	Winter-94	Trichloroethylene	µg/L	416	NA	5	NR
PTX08-1005	Fall-93	Trichloroethylene	µg/L	617	NA	5	NR
OW-WR-20	1990	Trichloroethylene	µg/L	5	NA	5	11
OW-WR-20	1991	Trichloroethylene	µg/L	5	NA	5	10
OW-WR-45	1990	Trichloroethylene	µg/L	8	NA	5	11
OW-WR-45	1992	Trichloroethylene	µg/L	8	NA	5	2
OW-WR-45	1993	Trichloroethylene	µg/L	8	NA	5	16
1114-MW1	1994	Trichloroethylene	µg/L	9	NA	5	5
OW-WR-45	1991	Trichloroethylene	µg/L	9	NA	5	9
OW-WR-45	1994	Trichloroethylene	µg/L	10	NA	5	8
1114-MW2	1994	Trichloroethylene	µg/L	15	NA	5	5
OW-WR-20	1992	Trichloroethylene	µg/L	22	NA	5	4
OW-WR-44	1992	Trichloroethylene	µg/L	22	NA	5	2
OW-WR-20	1993	Trichloroethylene	µg/L	93	NA	5	10
OW-WR-20	1994	Trichloroethylene	µg/L	150	NA	5	12

Constituent abbreviations:
 HMX - High melt explosive
 RDX - Research development explosive
NA - Not available
NR - Information not reported
Sources: MH 1991; Battelle 1992; Battelle 1993; DOE 1994a; DOE 1995; USCOE 1994a; USCOE 1995; USCOE 1995a

TABLE C.2.2-3.—*Suspected COCs in Pantex Plant Ogallala Aquifer Wells, Groundwater Analysis for 1990 to 1994*

LOCATION	DATE	PARAMETER	UNITS	# OF SAMPLES	VALUE	DECISION CRITERIA	RISK REDUCTION STANDARDS
15-20	1994	Copper	mg/L	2	0.046	1	0.04
15-20	1993	Copper	mg/L	6	0.076	1	0.04
15-20	1990	Copper	mg/L	7	0.28	1	0.04
15-20	1991	Copper	mg/L	2	0.3	1	0.04
15-16	1991	Iron	mg/L	6	0.33	0.3	1.9
OW-WR-40	1993	Iron	mg/L	13	0.53	0.3	1.9
OW-WR-39	1993	Iron	mg/L	13	0.72	0.3	1.9
OW-WR-39	1991	Iron	mg/L	10	0.92	0.3	1.9
OW-WR-40	1991	Iron	mg/L	10	0.97	0.3	1.9
15-26	1991	Iron	mg/L	6	1.1	0.3	1.9
15-26	1992	Iron	mg/L	6	1.1	0.3	1.9
OW-WR-39	1992	Iron	mg/L	10	1.4	0.3	1.9
OW-WR-39	1994	Iron	mg/L	14	1.49	0.3	1.9
OW-WR-40	1990	Iron	mg/L	11	2.1	0.3	1.9
OW-WR-39	1990	Iron	mg/L	11	2.7	0.3	1.9
15-20	1991	Lead	mg/L	2	0.019	0.015	0.1
OW-WR-39	1992	Lead	mg/L	10	0.023	0.015	0.1
OW-WR-39	1993	Lead	mg/L	13	0.029	0.015	0.1
15-20	1992	Lead	mg/L	6	0.031	0.015	0.1
OW-WR-39	1990	Lead	mg/L	11	0.066	0.015	0.1
15-26	1990	Lead	mg/L	5	0.088	0.015	0.1
OW-WR-40	1991	pH		10	8.5	6.5-8.5	NA
OW-WR-39	1990	Zinc	mg/L	11	10	5	30.7

Sources: MH 1991; Battelle 1992; Battelle 1993; DOE 1994a; DOE 1995; USCOE 1994a; USCOE 1995; USCOE 1995a

REFERENCES

42 U.S.C. 6901	RCRA/Hazardous and Solid Waste Amendments of 1984, 42 United States Code 6901.
Argonne 1995	Argonne National Laboratory and Battelle Memorial Institute, *Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant*, November 1995.
Battelle 1992	Battelle Pantex and Mason & Hanger-Silas Mason Company, Inc., *Pantex Plant Site Environmental Report for Calendar Year 1991*, prepared by Environmental Monitoring Section Environmental Protection Department, Environment, Safety and Health Division, Amarillo, TX, December 1992.
Battelle 1993	Battelle Pantex and Mason & Hanger-Silas Mason Company, Inc., *Pantex Plant Site Environmental Report for Calendar Year 1992*, prepared by Environmental Monitoring Section Environmental Protection Department, Environment, Safety and Health Division, Amarillo, TX, December 1993.
DOE 1991	DOE, *Work Plan RCRA Facilities Investigation,* Volume 1, prepared by the U.S. Army Corps of Engineers, Tulsa District, for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, May 1991.
DOE 1994	DOE, *Risk Reduction Rule Guidance for Pantex Plant RCRA Facility Investigations,* Draft Final, Revision 01, prepared by U.S. Army Corps of Engineers, Tulsa District, and Mason & Hanger-Silas Mason Company, Inc./ Battelle Pantex, for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, April 1994.
DOE 1994a	Mason & Hanger-Silas Mason Company Inc., *1993 Environmental Report for Pantex Plant,* DOE/AL/65030-9413 UC-702, prepared under contract DE-AC09-91AL65030 by Environmental Protection Department, Environment, Safety and Health Division, Amarillo, TX, for U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, June 1994.
DOE 1995	Battelle Pantex and Mason & Hanger-Silas Mason Company, Inc., *1994 Environmental Report for the Pantex Plant* DOE/AL/65030-9506, prepared under contract DE-AC04-91AL65030, by Environmental Protection Department, Environment, Safety and Health Division, for U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, June 1995.
DOE Order 5400.5	DOE, Radiation Protection of the Public and the Environment, Office of Environment, Safety, and Health, Washington, DC, 1993.
EPA 1994	EPA, *Drinking Water Regulations and Health Advisories,* prepared by the Office of Water, U.S. Environmental Protection Agency, Washington, DC, May 1994.

EPA 1996	EPA Region 6, NPDES Permit No. TX0107107, *Authorization to Discharge Under the National Pollutant Discharge Elimination System*, Effective June 1, 1996.
MH 1991	Mason & Hanger-Silas Mason Company, Inc., *Pantex Plant Site Environment Report for Calendar Year 1990*, MHSMP-91-06, prepared under contract DE-AC04-76DP-00487, by Environmental Monitoring Section, Environmental Protection Department, Environment, Safety and Health Division, Amarillo, TX, July 1991.
MH 1992	Mason & Hanger-Silas Mason Company, Inc. and Battelle Pantex, *Report of Partial Closure Pantex Plant 11-14 Wastewater Pond*, prepared by Engineering-Science, Inc., Austin, TX, October 1992.
Pantex 1995	Pantex Environmental Restoration Program, *Draft Aquifer Pumping Test Report for Groundwater Pump and Treat/Soil Vapor Extraction System Pantex Zone 12 Treatability Study*, Amarillo, TX, November 9, 1995.
Pantex 1996a	Pantex Plant, *1995 Environmental Report for Pantex Plant*, DOE/AL/65030-9602, Prepared by the Environmental Protection Department, Environment, Safety and Health Division, Amarillo, TX, May 1996.
PC 1994	Brady, R. "Well Log Header Information," Memo from R. Brady, Pantex Plant, Amarillo, TX, to M. Lincoln, Battele Pantex, June 30, 1994.
PC 1996	Jagucki, P., Battelle Pantex Environmental Restoration, Task 4, Regarding Subcontract No. CFF000001, BCO Proposal/Project No. CP0282981G456128, Correspondence From Philip Jagucki To Rodger K. Soderberg, June 14, 1996.
TBEG nd	Texas Bureau of Economic Geology, *Groundwater Input Data from TBEG (Texas Bureau of Economic Geology)*, Austin TX, nd.
TBEG 1992	Gustavson, T.C., *Moisture Retention and Hydraulic Conductivity of Unsaturated Soils—Preliminary Results*, prepared by the Bureau of Economic Geology, University of Texas, Austin, TX, May 1, 1992.
TBEG 1994	Mullican, W.F., III, A.E. Fryar and N.D. Johns, *Vertical Transport of Contaminants through Perched Aquifers to the Ogallala Aquifer, Pantex Plant Area, Southern Plains, Texas*, prepared by the Bureau of Economic Geology, University of Texas, Austin, TX, 1994.
TBEG 1995	Texas Bureau of Economic Geology, *Milestone Report on Potentiometric Surfaces and Vertical Hydraulic Conductivity Measurements for Perched Aquifers at the Pantex Plant, Carson County, Texas*, (Activity No. 4 of Appendix C, Supplement to Scope of Work, 1993–1994) Austin, TX, January 1995.

TBEG 1995a Texas Bureau of Economic Geology, *Hydrogeologic and Hydrochemical Results from Pumping Tests Conducted at the 11-14 Pond, Pantex Plant, Texas*, Austin, TX, May 1995.

TNRCC 1994 Texas Natural Resource Conservation Commission, *Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements, 30 TAC 290.101-290.119*, Effective April 15, 1994.

TNRCC 1996 Texas Natural Resource Conservation Commission, *Permit to Dispose of Wastes Under Provisions of Chapter 26 of the Texas Water Code*, Permit No. 02296, Corresponds to NPDES Permit No. TX0107107, Effective June 14, 1996.

TWC 1991 Texas Water Commission, *Permanent Rule Changes, Chapter 307, Texas Surface Water Quality Standards, 307.2-307.10*, Effective July 1991.

USCOE 1991 U.S. Army Corps of Engineers, *Work Plan RCRA Facility Investigations at ADS 1198, ADS 1200, ADS 1203, ADS 1205, ADS 1207, ADS 1212, ADS 1216, ADS 1219, ADS 1220, ADS 1222, ADS 1223, ADS 1227, ADS 1230, ADS 1232*, Volume 1, prepared for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, May 1991.

USCOE 1992 U.S. Army Corps of Engineers, *Hydrogeologic Assessment for the Pantex Plant*, Appendix A: Amarillo Well Field Well Registrations and Drillers Logs, prepared by the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, 1992.

USCOE 1994 Radian Corporation, *Preliminary Recommendations Memorandum for Flow System No. 6, Pantex RCRA Facility Investigation, Ditches and Playas*, ADS 1216, prepared under contract RCN 236-045-19-01, for the U.S. Army Corps of Engineers, Tulsa District, Tulsa, OK, April 1994.

USCOE 1994a U.S. Army Corps of Engineers, *Groundwater Monitoring Quarterly Report November 1993 Sampling Round*, prepared for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, April 1994 (Revised June 1994).

USCOE 1995 U.S. Army Corps of Engineers, *Groundwater Assessment, Monitoring Quarterly Report, November 1994 Sampling Round, Preliminary Data Package*, prepared for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, May 1995.

USCOE 1995a U.S. Army Corps of Engineers, *Groundwater Sampling Report, February/May 1994 Sampling Round, Preliminary Data Package*, prepared for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, May 1995.

APPENDIX D

Human Health Analysis

APPENDIX D HUMAN HEALTH ANALYSIS

D.1 INTRODUCTION

The basic approach used in assessing human health impacts was to first identify the affected environments and establish a baseline representing the risk from current operations. This baseline was primarily established from empirical data (e.g., annual environmental reports, occupational incident rates, and worker exposure records). Next, changes in this baseline risk resulting from the Proposed Action, No Action, and Pit Storage Relocation Alternatives were examined to ascertain the human health impacts of the alternatives.

Radiological impacts on human health are an important consideration in establishing the baseline risk and estimating changes to it. The impact of radiation on human health is the topic of section D.2.

Assessing the human health impacts of the alternatives involved a four-step process. The first step was to identify a broad spectrum of potential accident scenarios. These scenarios were obtained from available, site-specific safety and environmental documents.

The second step in the process used screening techniques to identify the specific scenarios that dominate risk (i.e., scenarios that contribute an appreciable fraction of the total risk). This is described in section D.3.

Due to the large number of potential accident scenarios that could impact human health, it is impractical to evaluate all of them in detail. This is a common problem encountered in risk assessments. The standard approach is to apply scoping calculations during the screening step. Rigorous evaluations (the third step in the process) were only performed for the risk-dominant scenarios identified in step two. Section D.4 addresses the methodology used to evaluate the risk dominant scenarios.

The fourth and final step in assessing the human health impact of the alternatives was to evaluate the risk from normal operations (i.e., the risk if no accidents occur). This is the topic of section D.5. Consequence uncertainties in the assessment are the topic of section D.6.

D.2 RADIOLOGICAL IMPACTS ON HUMAN HEALTH

This section addresses the human health impacts resulting from exposure to radiation. The nature of radiation, its effects on human health, and the sources of radiation pertinent to this EIS are examined.

D.2.1 Nature of Radiation and Its Effects on Humans

For a uniform irradiation of the body, the incidence of cancer varies among organs and tissues; the thyroid and skin demonstrate a greater sensitivity than other organs. However, such cancers also produce relatively low mortality rates because they are relatively amenable to medical treatment. Because of the readily available data for cancer mortality rates and the relative scarcity of prospective epidemiologic studies, somatic effects leading to cancer incidence are presented in this EIS. The number of cancer fatalities can be used to compare the risks among the various alternatives.

The National Research Council's Committee on the Biological Effects of Ionizing Radiations has prepared a series of reports to advise the U.S. Government on the health consequences of radiation exposures. The latest of these reports, *Health Effects of Exposure to Low Levels of Ionizing Radiation BEIR V*, published in 1990, provides the most current estimates for excess mortality from leukemia and cancers other than leukemia expected to result from exposure to ionizing radiation (NAP 1990). The BEIR V report updates the models and risk estimates provided in the earlier report of the BEIR III Committee published in 1980. BEIR V models were developed for application to the U.S. population.

D.2.1.1 *Risk Estimates for Doses Received During Normal Operation*

For low doses and dose rates, a linear-quadratic model was found to provide a significantly better fit to the data for leukemia than a linear one, and leukemia risks were based on a linear-quadratic function. This reduces the effects by a factor of two over estimates that are obtained from the linear model. For other cancers, linear models were found to provide an adequate fit to the data, and were used for extrapolation to low doses. However, the BEIR V Committee recommended reducing these linear estimates by a factor between 2 and 10 for doses received at low dose rates. For this EIS, a risk reduction factor of two was adopted for conservatism.

Based on the above discussion, the resulting risk estimator would be equal to half the value observed for accident situations or approximately 500 excess fatal cancers per million person-rem (0.0005 excess fatal cancers per person-rem). This is the risk value used in this EIS to calculate fatal cancers to the general public during normal operations. For workers, a value of 400 excess fatal cancers per million person-rem (0.0004 excess fatal cancers per person-rem) is used. This lower value reflects the absence of children in the workforce.

The risk estimates may be applied to calculate the effects of exposing a population to radiation. For example, in a population of 100,000 people exposed only to natural background radiation (0.3 rem per year), 15 latent cancer fatalities per year would be inferred to be caused by the radiation (100,000 persons x 0.3 rem per year x 0.0005 latent cancer fatalities per person-rem = 15 latent cancer fatalities per year).

How should one interpret a nonintegral number of latent cancer fatalities, such as 0.05? The answer is to interpret the result as a statistical estimate. That is, 0.05 is the average number of deaths that would result if a total dose of 0.001 rem were applied to many different groups of 100,000 people. In most groups, no person (0 people) would incur a latent cancer fatality from the 0.001 rem dose each member would have received. In a small fraction of the groups, one latent fatal cancer would result; in exceptionally few groups, two or more latent fatal cancers would occur. The average number of deaths over all the groups would be 0.05 latent fatal cancers (just as the average of 0, 0, 0, and 1 is 1/4, or 0.25). The most likely outcome is zero latent cancer fatalities.

These same concepts apply to estimating the effects of radiation exposure on a single individual. Consider the effects, for example, of exposure to background radiation over a lifetime. The "number of latent cancer fatalities" corresponding to a single individual's exposure over a (presumed) 72-year lifetime to 0.3 rem per year is the following:

1 person x 0.3 rem/year x 72 years x

0.0005 latent cancer fatalities/person-rem

= 0.011 latent cancer fatalities.

Again, this should be interpreted in a statistical sense; that is, the estimated effect of background radiation exposure on the exposed individual would produce a 1.1 percent chance that the individual might incur a fatal cancer caused by the exposure. Presented another way, this method estimates that approximately 1.1

percent of the population might die of cancers induced by background radiation.

Although health risk factors are statistical factors, and therefore not strictly applicable to individuals, they have been used in the past to estimate the incremental risk to an individual from exposure to radiation. Therefore, the factor of 0.0005 and 0.0004 per rem of individual committed effective dose equivalent for a member of the public and for a worker, respectively, have also been used in this EIS to calculate the individual's incremental fatal cancer risk from exposure to radiation.

For the public, the health effects expressed in this EIS are the number of fatal cancers to the population within 80 kilometers (50 miles) from exposure to radioactivity released from the site. For workers, the health effects expressed are the risk to the average worker at a site and the number of fatal cancers to all workers at that site.

D.2.2 Sources of Radiation

The sources of radiation pertinent to this EIS can be classified as background (i.e., the radiation to which workers and the public are exposed exclusive of all radiation sources at Pantex Plant and the alternative sites) or site-specific in origin. With respect to background radiation, on the average, Americans receive a total of about 350 millirem per year from all sources of radiation, both natural and man-made. The sources of radiation can be divided into six different categories: cosmic radiation, external terrestrial radiation, internal radiation, consumer products, medical diagnosis and therapy, and other sources. Each category is discussed below.

Cosmic radiation is ionizing radiation resulting from energetic charged particles from space continuously hitting the earth's atmosphere. These particles and the secondary particles and photons they create are cosmic radiation. Because the atmosphere provides some shielding against cosmic radiation, the intensity of this radiation increases with altitude above sea level.

External terrestrial radiation is the radiation emitted from the radioactive materials in the earth's rocks and soils. The average annual dose from cosmic and external terrestrial radiation is about 55 millirem. The cosmic and external terrestrial radiation for the sites in this EIS ranges from about 70 to 120 millirem per year.

Internal radiation arises from the human body metabolizing natural radioactive material which has entered the body by inhalation or ingestion. Natural radionuclides in the body include isotopes of uranium, thorium, radium, radon, polonium, bismuth, potassium, rubidium, and carbon. The major contributor to the annual dose equivalent for internal radioactivity are the short-lived decay products of radon which contribute about 200 millirem per year. The average dose from other internal radionuclides is about 39 millirem per year.

Consumer products also contain sources of ionizing radiation. In some products, like smoke detectors and airport x-ray machines, the radiation source is essential to the products' operation. In other products, such as television and tobacco, the radiation occurs incidentally to the product function. The average annual dose from all consumer products is about 10 millirem.

Radiation is an important diagnostic medical tool and cancer treatment. Diagnostic x-rays result in an average annual exposure of 39 millirem. Nuclear medical procedures result in an average annual exposure of 14 millirem.

There are a few additional sources of radiation that contribute minor doses to individuals in the U.S. The dose from nuclear fuel cycle facilities such as uranium mines, mills and fuel processing plants, nuclear power plants and transportation routes has been estimated to be less than 1 millirem per year. Radioactive fallout from atmospheric atomic bomb tests, emissions of radioactive material from DOE facilities, emissions from certain mineral extraction facilities, and transportation of radioactive materials contribute less than 1 millirem per year to the average dose to an individual. Air travel contributes approximately 1 millirem per year to the average dose.

The collective (or population) dose to an exposed population is calculated by summing the estimated doses received by each member of the exposed population. This total dose received by the exposed population is measured in person-rem. For example, if 1,000 people each received a dose of 1 millirem (0.001 rem), the collective dose is 1,000 persons x 0.001 rem = 1.0 person-rem. Alternatively, the same collective dose (1.0 person-rem) results from 500 people each of whom received a dose of 2 millirem (500 persons x 2 millirem = 1 person-rem).

Site-specific sources of radiation are industrial sources and sources associated with nuclear weapons. The industrial sources are used to generate x-rays and gamma rays for non-destructive examinations of weapon components. Exposure to these sources of radiation only poses a potential risk to workers. However, since nondestructive examination using x-rays and gamma rays is a well established industrial practice, this contribution to worker risk is negligible.

The sources of radiation associated with nuclear weapons include tritium, uranium, and plutonium. Tritium is a radioactive form of hydrogen. By itself, its effects on human health are relatively modest. However, tritium can combine with hydrogen and oxygen to form a radioactive molecule that chemically mimics ordinary water. In this form tritium is readily assimilated by living tissue, which is subsequently irradiated as the tritium decays. This represents the most toxic form of tritium, and is especially a concern if the release involves a fire (which converts most of the tritium into the radioactive form of water).

Uranium is present at Pantex Plant both in the enriched and depleted forms. Enriched uranium contains a high percentage (up to 93 percent) of the 235 isotope, while depleted uranium is mostly the 238 isotope. Although uranium is toxic, its toxicity is so low relative to plutonium that its relative risk to workers and the public is negligibly small.

Plutonium is present in pits and radioisotopic thermoelectric generators (RTGs). The predominant plutonium isotope in pits is 239, while the 238 isotope is used as the RTG power source. Due to their highly robust design and construction, RTGs pose only a negligible risk to workers and the public.

Plutonium poses two principal human health risks: direct exposure to workers involved in disassembly and transportation activities; and a potential inhalation hazard to workers and the public if it is accidentally released and disperses as respirable particles. To be respirable, plutonium particles must be smaller than 10 microns. Particles larger than 10 microns are too large to disperse deeply into the lungs. As a result, they have a relatively short residence time and essentially cause no adverse health effects.

Inhaled plutonium particles smaller than 10 microns are not cleared from the lungs by normal bodily processes. This results in a potentially significant alpha dose to the lungs. Moreover, the plutonium will eventually cross the capillaries into the bloodstream. Once in the bloodstream, the plutonium eventually accumulates at the interface between hard bone and the marrow. Hence, the two most vulnerable organs to plutonium inhalation are the lungs and bone marrow. Both workers and the public are vulnerable to plutonium inhalation if an accident occurs that disperses it as respirable particles (e.g., a fire or explosion).

Plutonium inhalation is not a concern during normal operations because the plutonium is always contained.

D.3 SCENARIO SCREENING

Ideally, a complete risk assessment would express the total human health risk as the sum of all potential accident scenarios. Since it is impractical to rigorously quantify all of the terms in the ideal summation, the purpose of a screening methodology is to identify a subset of the terms such that the summation over this subset constitutes a large fraction (e.g., >95 percent) of the total risk.

The basic facility risk screening methodology used for the Pantex EIS is explained in section D.3.1. This basic methodology identifies the risk dominant potential accident scenarios that require a rigorous analysis in the EIS. A description of the methodology application is presented in section D.3.2.

D.3.1 Screening Methodology

Ideally, a complete risk assessment would express the total facility risk for a particular endpoint, R_T, as the summation:

$$R_T = \sum_{n=1}^{N} R_n \qquad \text{(Eq. D–1)}$$

where there are a total of N scenarios contributing to the risk. Rather than rigorously quantify all N terms in Equation D–1, the purpose of the screening methodology was to identify a subset of the N terms such that the summation over this subset, N', satisfies the relation:

$$\sum_{n \in N'} R_n \geq F \sum_{n=1}^{N} R_n \qquad \text{(Eq. D–2)}$$

where F is some large fraction (e.g., >0.95).

Three endpoints for which the screening methods were applied are:

- Potential direct exposure of workers or the public to radiation and hazardous chemicals as a result of continued operations or change in mission.
- Risk from an accidental release of radionuclides or hazardous chemicals as a result of continued operations or change in mission.
- Potential latent cancer fatalities as a result of continued operations or change in mission.

The first endpoint required addressing the quantities of radiation and hazardous chemicals to which workers or the public are exposed, regardless of the health effects associated with the exposure. The risk from accidental releases stated in the second endpoint definition is interpreted as the risk of fatalities. Quantifying the second and third endpoints necessitated examining both the amount of exposure and the health effects (in terms of the likelihood of a resultant fatality) associated with the exposure.

Risks associated with potential accident scenarios were quantified using probabilistic risk assessment (PRA) techniques. These techniques expressed risk as the product of two parameters:

λ_n	the frequency (per year) that scenario "n" is expected to occur.
C_n	the consequence (e.g., fatal cancers) associated with the occurrence of scenario "n".

The screening methodology used to identify risk dominant potential accident scenarios was predicated upon DOE 1994, DOD 1977, Jones 1988, and DH 1993. Essentially, it involved developing a risk matrix that divided the frequency and consequence ranges into a finite number of categories. The selected frequency categories were from criteria tabulated in DOE 1994:

- Anticipated ($\lambda_n \geq 10^{-2}$ per year).
- Unlikely (10^{-2} per year $> \lambda_n \geq 10^{-4}$ per year).
- Extremely unlikely (10^{-4} per year $> \lambda_n \geq 10^{-6}$ per year).
- Not reasonably foreseeable (10^{-6} per year $> \lambda_n$).

DOE 1994 does not address consequence categories. However, the consequence categories cited in DOD 1977, Jones 1988, and DH 1993 are:

- Catastrophic (consequences cause deaths).
- Critical (consequences cause severe injuries or occupational illnesses).
- Marginal (consequences cause minor injuries or occupational illnesses).
- Negligible (consequences corresponding to no injuries nor occupational illnesses).

The definitions in DOD 1977, Jones 1988, and DH 1993 include environmental consequences and facility damage. Although these additional consequences exceed the endpoint definitions, any potential accident scenario that can appreciably impact the environment or damage a facility is capable of contributing to the risk of a human receptor and was included in the screening process.

Figure D.3.1–1 depicts the risk matrix developed from these frequency and consequence categories. Since:

$$R_n = \lambda_n \times C_n \qquad \text{(Eq. D–3)}$$

it is evident from Figure D.3.1–1 that for a given frequency category, the dominant risk scenarios are those assigned to the highest consequence category. This resulted in the following risk screening process:

- Identification of anticipated scenarios. Those facility-specific, hazard-specific scenarios assigned to the highest consequence category were selected as risk dominant. This consequence was designated category C' (e.g., the marginal category).
- Examination of the unlikely scenarios. If none of these scenarios belonged to a consequence category higher than C', there are no risk dominant scenarios with unlikely frequencies. If some unlikely scenarios belonged to a consequence category higher than C', these facility-specific, hazard-specific scenarios were also risk dominant. If some unlikely scenarios belonged to a consequence category higher than C', then C' designated this higher consequence category (e.g., the critical category).
- Examination of the extremely unlikely scenarios. If none of these scenarios belonged to a consequence category higher than C', there were no risk dominant scenarios with extremely unlikely frequencies. If some extremely unlikely scenarios belonged to a consequence category higher than C', these facility-specific, hazard-specific scenarios were also risk dominant. If some extremely unlikely scenarios belonged to a consequence category higher than C', than C' designated this higher consequence category.
- Examination of the not reasonably foreseeable scenarios. If none of these scenarios belonged to a consequence category higher than C', there were no

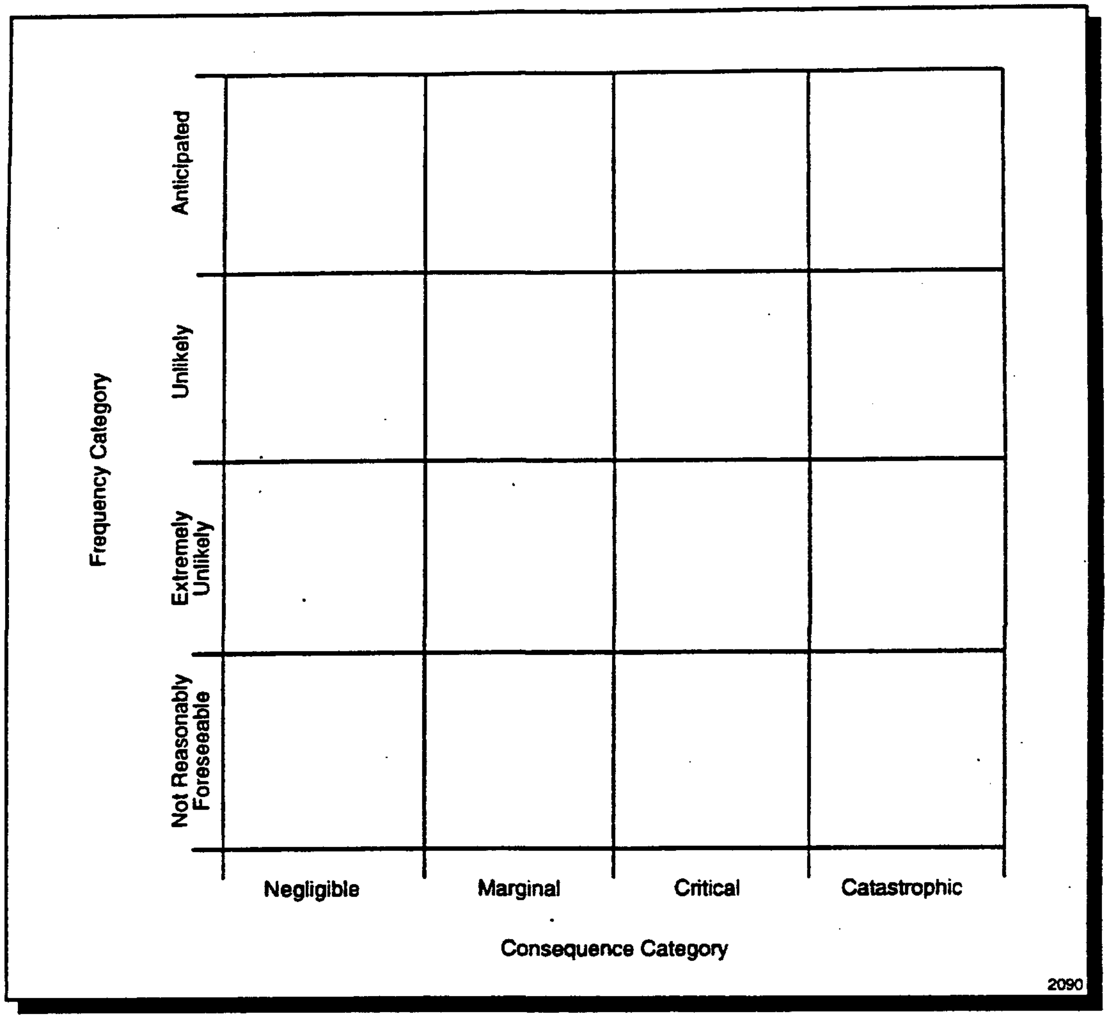


FIGURE D.3.1-1.—***Risk Matrix for Potential Accident Scenario.***

risk dominant scenarios with not reasonably foreseeable frequencies. If some not reasonably foreseeable scenarios belonged to a consequence category higher than C', these facility-specific, hazard-specific scenarios were also risk dominant.

These four steps constitute the process developed for screening risks associated with potential accident scenarios. To the extent practical, frequency categories and consequence categories were assigned using results from applicable risk studies. When applicable PRA results were unavailable, scoping calculations were used to assign scenarios to appropriate frequency and consequence categories.

Figures D.3.1-2 and D.3.1-3 further illustrate the risk screening process. A large X in Figure D.3.1-2 symbolizes that some scenarios have been assigned to a particular risk matrix category. Specifically, Figure D.3.1-2 indicates that:

- All anticipated scenarios have negligible consequences.
- Unlikely scenarios have negligible, marginal, or critical consequences.
- The extremely unlikely scenarios have marginal, critical, or catastrophic consequences.
- All not reasonably foreseeable scenarios belong to either the critical or catastrophic consequence categories.

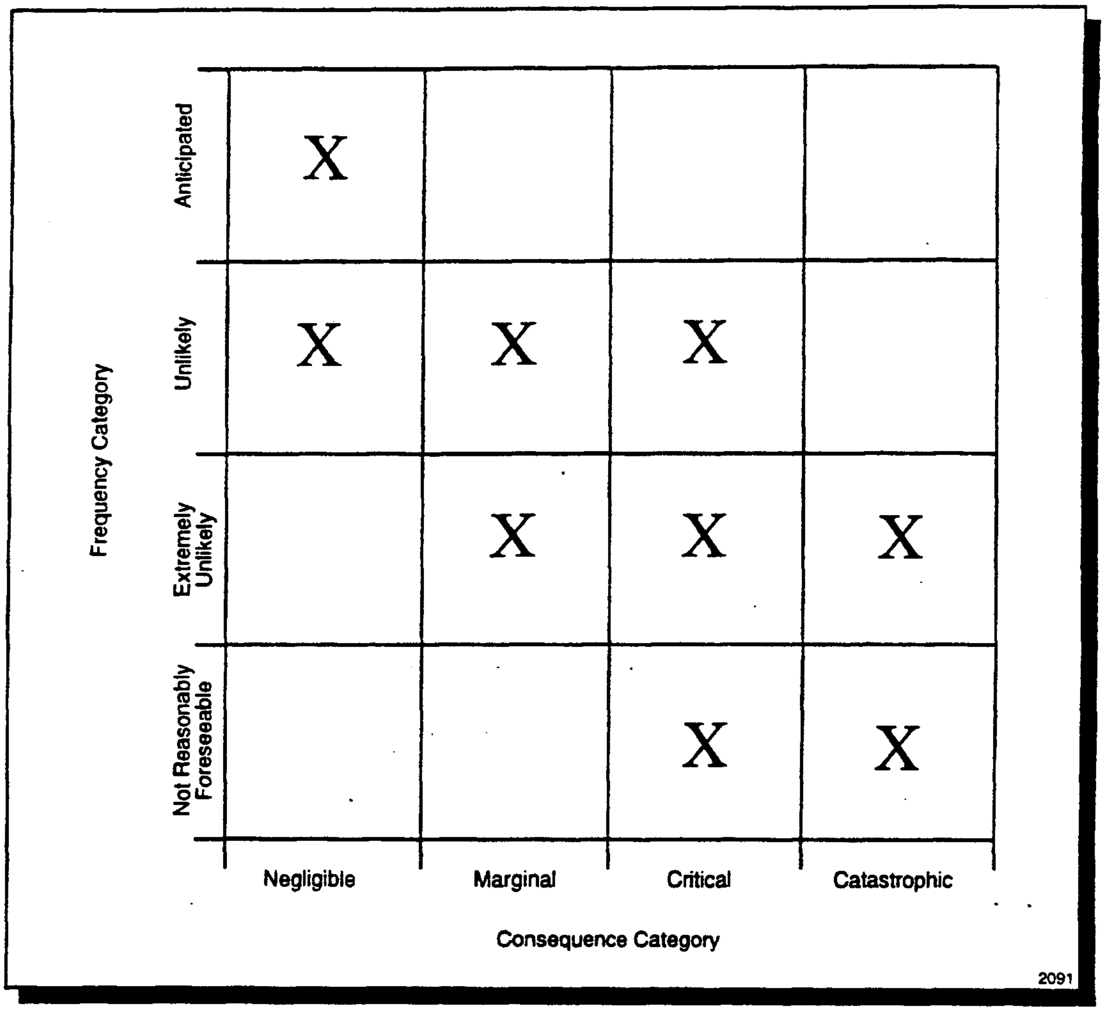


FIGURE D.3.1–2.—*Risk Matrix with Scenarios Assigned to Frequency and Consequence Categories.*

Beginning with the anticipated scenarios, all of them are selected as risk dominant (since they all belong to the same consequence category) using the risk screening process. This selection is depicted by the large circle surrounding the X representing this set of scenarios in Figure D.3.1–3.

Examining the unlikely scenarios disclosed that those assigned to the marginal and critical consequence categories are risk dominant because, even though they are far less likely than the anticipated scenarios, their consequences are greater. However, the unlikely scenarios with negligible consequences are not significant risk contributors. Since each frequency category spans at least two orders of magnitude, the frequency of an unlikely scenario will typically be an order of magnitude or more less than an anticipated scenario. Thus, given an anticipated scenario and an unlikely scenario assigned to the same consequence category, the anticipated scenario risk is typically an order of magnitude or more greater than the risk from the unlikely scenario.

Applying this same reasoning to the extremely unlikely scenarios showed that only those with catastrophic consequences are risk dominant. None of the scenarios assigned to the not reasonably foreseeable frequency category are risk dominant in Figure D.3.1–3.

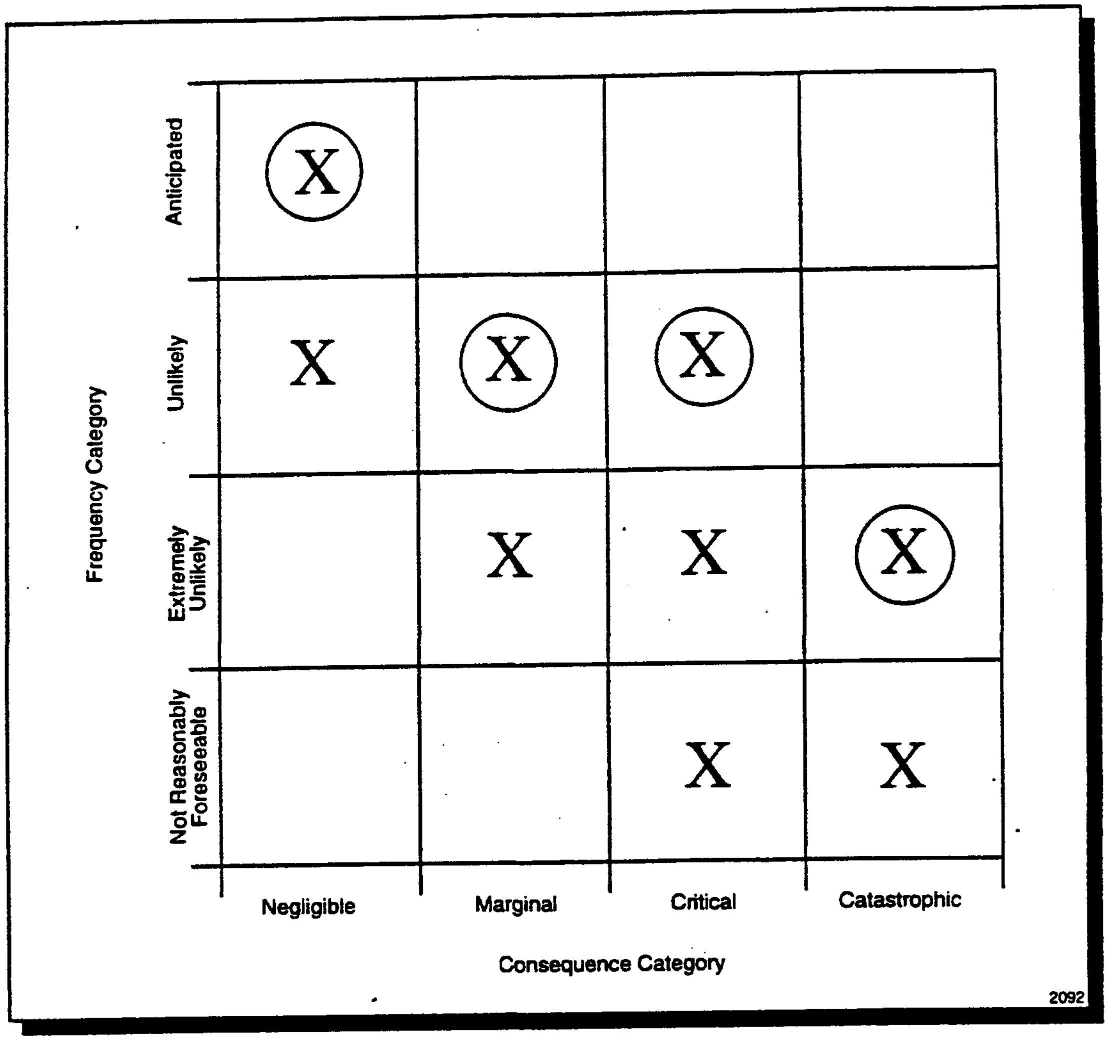


FIGURE D.3.1–3.—*Risk Matrix with Scenarios Identified for Detailed Evaluation.*

The result of this risk screening process is a set of risk dominant scenarios that required detailed analysis. In the context of Equations D–1, D–2, and D–3, the screening process exhibited in Figures D.3.1–1 through D.3.1–3 is an inferential approach for satisfying Equation D–2.

The basic screening methodology embodied in Equation D–2 is a relative risk approach. That is, it identified potential accident scenarios that contribute significantly to the overall facility risk without regard to scenario likelihood or consequence. Thus, it spans the spectrum from high probability-low consequence scenarios to those with extremely low occurrence probabilities, but large consequences. This approach differs from some conventional methods that screened low frequency scenarios without regard to their potential consequences (e.g., DOE 1992a). The typical justification for screening low frequency scenarios without regard to their potential consequences was that such scenarios are not reasonably foreseeable.

An important consideration in applying Equation D–3 is the contribution of the uncertainties inherent in frequency assessments involving numerous conditional probabilities. This consideration is important to provide confidence in the risk estimates (i.e., the product of the scenario frequency and consequence) and to ensure that no potentially risk dominant scenarios are excluded from consideration due to large uncertainties in their assessed frequency. A practical solution to this concern is to use a statistic for the frequency assessment that is relatively easy to calculate, but that also provides confidence that the frequency is not underestimated. The mean frequency is such a statistic. Although the actual impact of inherent uncertainties requires application-specific analyses, the importance of this concern can be illustrated by considering a single scenario with frequency, λ_n. In general:

$$\lambda_n = \lambda_{i,n} \prod_{k=1}^{K} P_k \qquad \text{(Eq. D–4)}$$

Here:

- $\lambda_{i,n}$ is the initiating event frequency for scenario "n".
- P_k is the conditional probability of the kth event that must occur in scenario "n".
- There are a total of K conditional probabilities needed to quantify the scenario frequency.

Uncertainty distributions for the parameters usually encountered in PRAs are lognormal with uncertainty factors (defined as the ratio of the 95th percentile to the median) in the range 2 to 10. Figures D.3.1–4 through D.3.1–6 depict the degree of confidence one can have on the value of λ_n, depending on the number of conditional probabilities in Equation D–4, the statistical values used for each parameter, and the uncertainty factors. A nominal frequency of 10^{-7} per year is used in Figures D.3.1–4 through D.3.1–6, since this represents a not reasonably foreseeable scenario (i.e., a scenario which will typically have large uncertainty). In Figures D.3.1–4 and D.3.1–5 the nominal value corresponds to the mean frequency.

Figure D.3.1–4 shows the mean and 95th percentile (i.e., values where there is 95 percent confidence that they exceed the actual frequency) as a function of the number of conditional probabilities in Equation D–4. If there are no conditional probabilities in the scenario:

$$\lambda_n = \lambda_{i,n} \qquad \text{(Eq. D–5)}$$

and there is 95 percent confidence that the actual frequency is less than 2.4×10^{-7} per year. Although the 95th percentile first increases, then decreases with K, Figure D.3.1–4 demonstrates that if all of the variables in Equation D–4 have uncertainty factors of 3, there is at least 95 percent confidence that the actual frequency exceeds the mean by no more than a factor of 4.

Uncertainty factors of 10 are used in Figure D.3.1–5. Here, the 95th percentile is actually less than the mean when K exceeds 4. This represents a fundamental property of the lognormal distribution—as the overall uncertainty increases the chances of exceeding the mean diminish. Also, Figure D.3.1–5 discloses that there is at least 95-percent confidence that the actual frequency exceeds the mean by no more than a factor of 4.

Figure D.3.1–6 compares the median (instead of the mean) to the 95th percentile. As in Figure D.3.1–4, an uncertainty factor of 3 is assigned to the variables in Equation D–4. Notice that as the number of conditional probabilities increases, the ratio of the 95th percentile to the median continually increases to over one and one half orders of magnitude.

The crucial difference between Figures D.3.1–4 and D.3.1–6 is that different statistical representations of the nominal frequency are used—the mean in Figure D.3.1–4 and the median in Figure D.3.1–6. This suggests that while there is reasonable confidence that the actual scenario frequency will not exceed the mean value, there can be an appreciable chance that the actual scenario frequency exceeds the median value.

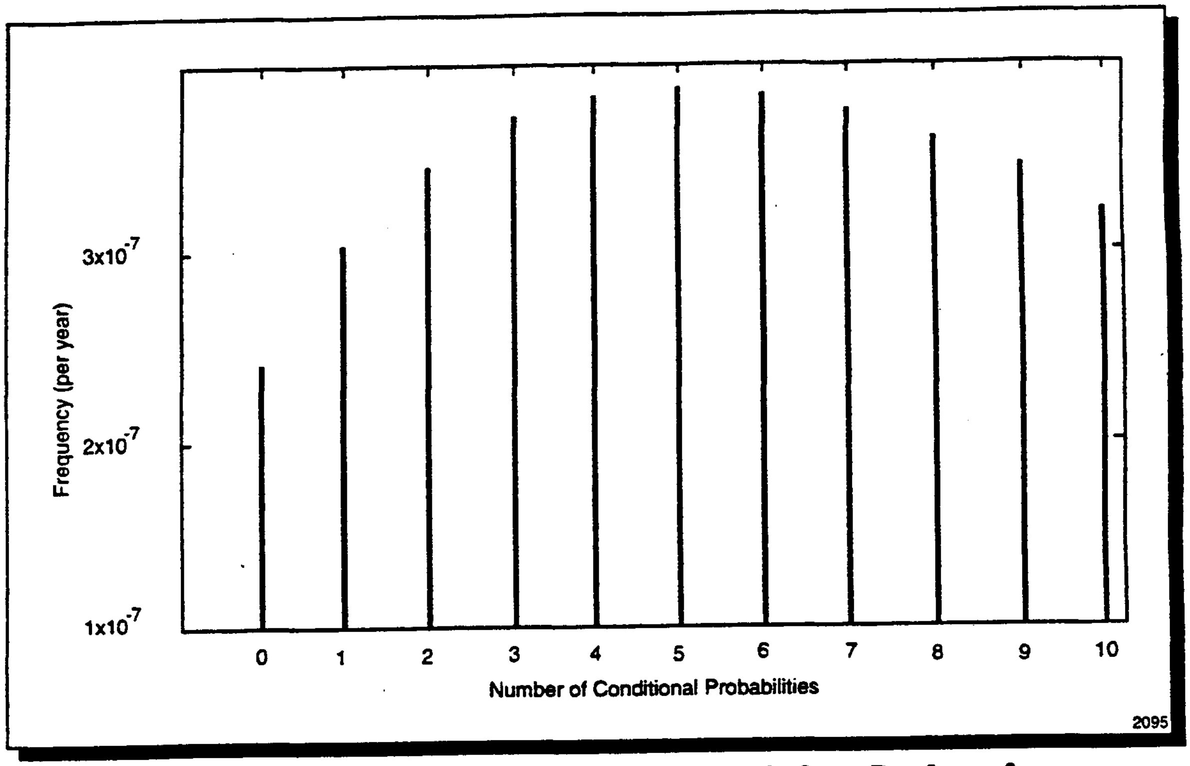


FIGURE D.3.1-4.—***Mean and 95th Percentile for a Product of Probabilities with Uncertainty Factors of 3.***

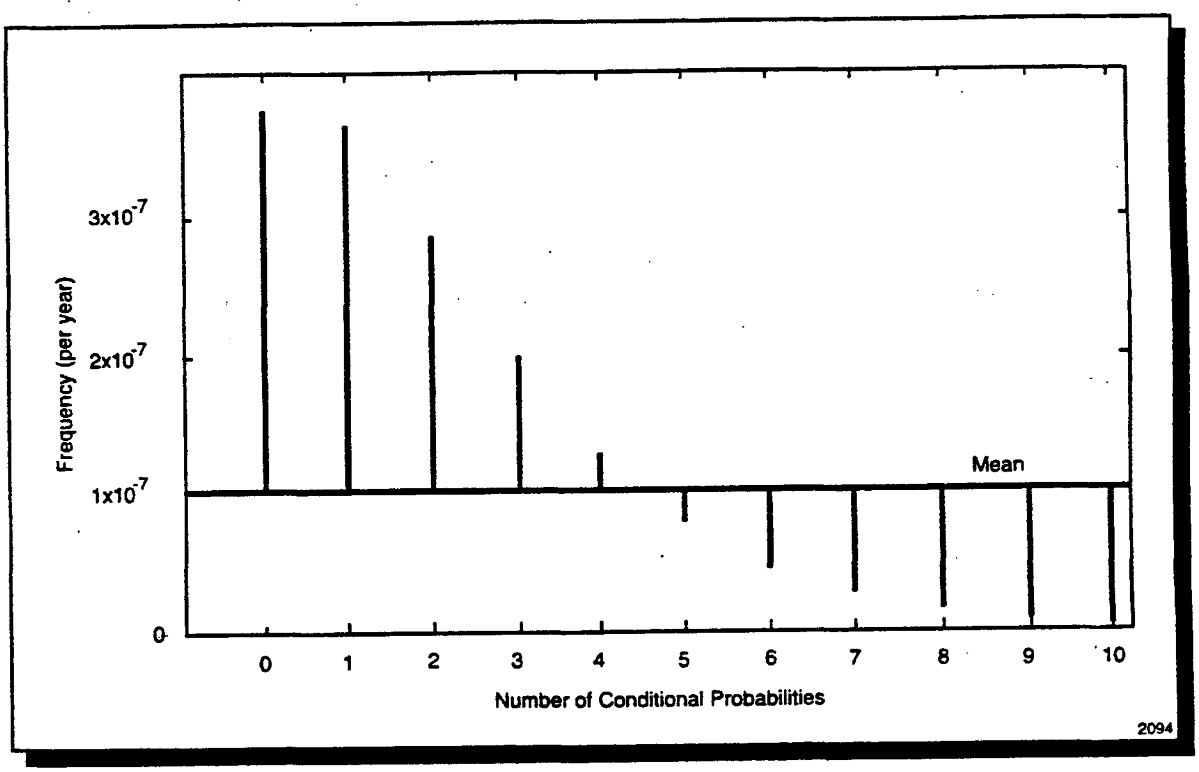


FIGURE D.3.1-5.—***Mean and 95th Percentile for a Product of Probabilities with Uncertainty Factors of 10.***

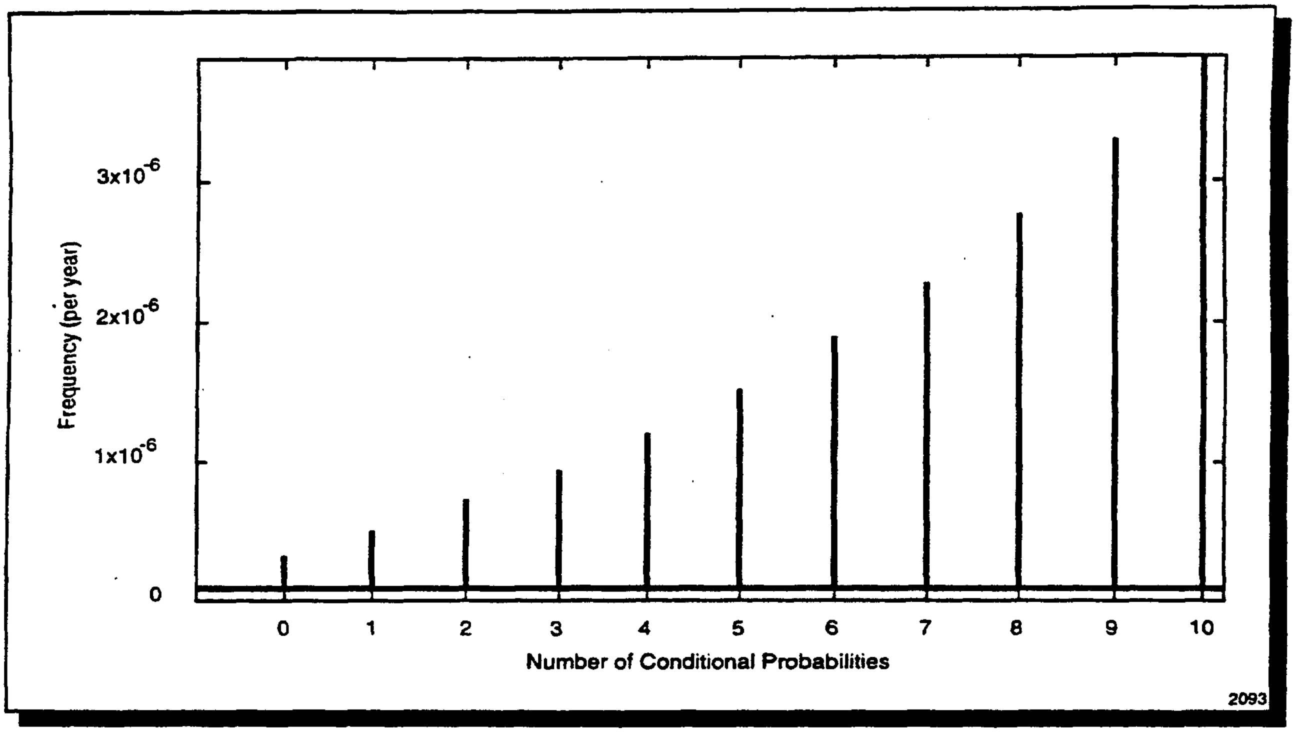


FIGURE D.3.1–6.—*Median and 95th Percentile for a Product of Probabilities with Uncertainty Factors of 3.*

Conclusions obtained from Figures D.3.1–4 through D.3.1–6 are only strictly applicable to situations involving the products of lognormally distributed parameters. Fortunately, such situations are commonly encountered in PRAs. However, caution must be exercised when estimating confidence levels for calculations differing from Equation D–4.

D.3.2 Screening Methodology Application

Table D.3.2–1 contains the risk dominant scenarios for Pantex Plant. These are the scenarios that remained after the section D.3.1 methodology was applied to the candidate scenarios in Table D.3.2–2. Using frequency and consequence estimates from available plant safety and environmental documents, the Table D.3.2–2 scenarios were grouped into the appropriate risk matrix categories. Since it is somewhat difficult to directly compare the consequences of all scenarios together, candidate scenarios involving radionuclide hazards, chemical hazards, and high explosive (HE) hazards were considered separately. The risk dominant scenarios for each of these three hazards appear in Table D.3.2–1 for Pantex Plant.

This same process was applied to the alternative sites. Since only relocation of pit storage is being considered at these alternative sites, many of the candidate scenarios in Table D.3.2–1 are inapplicable. For example, candidate scenario C40 in Table D.3.2–2 is applicable to pit storage at an alternative site (although the facility designations in Table D.3.2–2 would have to be modified to the appropriate facility at the alternative site—e.g., P-Reactor at the Savannah River Site). However, candidate scenario C2 in Table D.3.2–2 is inapplicable to the alternative sites since there will be no relocation of tritium. Similarly, candidate scenarios involving HE fires and explosions or

TABLE D.3.2–1.—*Risk-Dominant Scenarios for Pantex Plant*

SCENARIO	DESCRIPTION
1	HE explosion initiated during normal operation releases tritium and plutonium due to reservoir and pit failure.
2	HE explosion initiated during normal operation without accompanying radionuclide releases.
3	HE explosion initiated by seismic event or aircraft accident releases tritium and plutonium due to reservoir and pit failure.
4	HE explosion initiated by seismic event or aircraft accident without accompanying radionuclide releases.
5	Tritium release resulting from reservoir failure initiated during normal operation.
6	Pit breach with plutonium release initiated during normal operation.
7	Tritium release resulting from reservoir failures caused by a Building 12-42 South Vault fire initiated by a seismic event or aircraft accident.
8	Pit breach with plutonium release caused by seismic event or aircraft accident.
9	Tritium or plutonium release caused by seismic event or aircraft accident.
10	Chlorine release due to failure of system piping and valves, or cylinder caused by seismic event.
11	Chlorine release due to failure of system piping and valves, or cylinder initiated during normal operation.

TABLE D.3.2–2.—*Candidate Accident Scenarios for Pantex Plant*

CANDIDATE SCENARIO	DESCRIPTION[(1)]
C1	Pit breach with Plutonium release due to operational accidents in 12-64, 12-84, 12-99, and 12-104.
C2	Tritium release due to operational accidents in 12-64, 12-84, 12-99, and 12-104.
C3	Criticality accidents due to operational accidents in 12-64, 12-84, 12-99, and 12-104.
C4	HE explosions due to operational accidents in 12-64, 12-84, 12-99, and 12-104.
C5	HE fires due to operational accidents in 12-64, 12-84, 12-99, and 12-104.
C6	Aircraft initiated accidents involving 12-64, 12-84, 12-99, and 12-104.
C7	Earthquake initiated accidents involving 12-64, 12-84, 12-99, and 12-104.
C8	Tornado and high wind initiated accidents involving 12-64, 12-84, 12-99, and 12-104.
C9	Internal flood initiated accidents involving 12-64, 12-84, 12-99, and 12-104.
C10	Lightning initiated accidents involving 12-64, 12-84, 12-99, and 12-104.
C11	Pit breach with plutonium release due to operational accidents in 12-44, 12-85, 12-96, and 12-98.
C12	Tritium release due to operational accidents in 12-44, 12-85, 12-96, and 12-98.
C13	Criticality accidents due to operational accidents in 12-44, 12-85, 12-96, and 12-98.
C14	HE explosions due to operational accidents in 12-44, 12-85, 12-96, and 12-98.
C15	HE fires due to operational accidents in 12-44, 12-85, 12-96, and 12-98.
C16	Aircraft initiated accidents involving 12-44, 12-85, 12-96, and 12-98.
C17	Earthquake initiated accidents involving 12-44, 12-85, 12-96, and 12-98.

TABLE D.3.2–2.—*Candidate Accident Scenarios for Pantex Plant*-Continued

CANDIDATE SCENARIO	DESCRIPTION[1]
C18	Tornado and high wind initiated accidents involving 12-44, 12-85, 12-96, and 12-98.
C19	Internal flood initiated accidents involving 12-44, 12-85, 12-96, and 12-98.
C20	Lightning initiated accidents involving 12-44, 12-85, 12-96, and 12-98.
C21	Pit breach with Pu release due to operational accidents in 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C22	Tritium release due to operational accidents in 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C23	Criticality accidents due to operational accidents in 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C24	HE explosions due to operational accidents in 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C25	HE fires due to operational accidents in 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C26	Aircraft initiated accidents involving 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C27	Earthquake initiated accidents involving 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C28	Tornado and high wind initiated accidents involving 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C29	Internal flood initiated accidents involving 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C30	Lightning initiated accidents involving 12-26, 12-41, 12-50, 12-60, 12-94, 12-104A; and Bays 27 and 28.
C31	Pit breach with Pu release due to operational accidents in 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C32	Tritium release due to operational accidents in 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C33	Criticality accidents due to operational accidents in 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C34	HE fires due to operational accidents in 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C35	Aircraft initiated accidents involving 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C36	Earthquake initiated accidents involving 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C37	Tornado and high wind initiated accidents involving 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C38	Internal flood initiated accidents involving 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).
C39	Lightning initiated accidents involving 12-26PV, 12-42SV, 12-42NV, 12-44-8, 12-58 Bays 4 and 5, and 12-116 (Zone 12 Staging).

TABLE D.3.2-2.—*Candidate Accident Scenarios for Pantex Plant*-Continued

CANDIDATE SCENARIO	DESCRIPTION(1)
C40(2)	Pit breach with plutonium release due to operational accidents in Steel Arch Construction (SAC) and Modified Richmond (MR) magazines (Zone 4 Staging).
C41	Tritium release due to operational accidents in SAC and MR magazines (Zone 4 Staging).
C42(2)	Criticality accidents due to operational accidents in SAC and MR magazines (Zone 4 Staging).
C43	HE explosions due to operational accidents in SAC and MR magazines (Zone 4 Staging).
C44	HE fires due to operational accidents in SAC and MR magazines (Zone 4 Staging).
C45(2)	Aircraft initiated accidents involving SAC and MR magazines (Zone 4 Staging).
C46(2)	Earthquake initiated accidents involving SAC and MR magazines (Zone 4 Staging).
C47(2)	Tornado and high wind initiated accidents involving SAC and MR magazines (Zone 4 Staging).
C48(2)	Internal flood initiated accidents involving SAC and MR magazines (Zone 4 Staging).
C49(2)	Lightning initiated accidents involving SAC and MR magazines (Zone 4 Staging).
C50	HE explosions due to operational accidents in 11-17, 11-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C51	HE fires due to operational accidents in 11-17, 11-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C52	Aircraft initiated accidents involving 11-17, 1-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C53	Earthquake initiated accidents involving 11-17, 11-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C54	Tornado and high wind initiated accidents involving 11-17, 11-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C55	Internal flood initiated accidents involving 11-17, 11-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C56	Lightning initiated accidents involving 11-17, 11-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C57	Chemical hazardous material release due to operational accidents in 11-17, 11-22, 11-38, 11-51, 11-55, 11-56, 12-8, 12-19, 12-59, 12-62.
C58	HE explosions due to operational accidents in 11-20, 11-36, 11-50, 12-17 A and B, 12-63, 12-121.
C59	HE fires due to operational accidents in 11-20, 11-36, 11-50, 12-17 A and B, 12-63, 12-121.
C60	Aircraft initiated accidents involving 11-20, 11-36, 11-50, 12-17 A and B, 12-63, 12-121.
C61	Earthquake initiated accidents involving 11-20, 11-36, 11-50, 12-17 A and B, 12-63, 12-121.
C62	Tornado and high wind initiated accidents involving 11-20, 11-36, 11-50, 12-17 A and B, 12-63, 12-121.
C63	Internal flood initiated accidents involving 11-20, 11-36, 11-50, 12-17 A and B, 12-63, 12-121.
C64	Lightning initiated accidents involving 11-20, 11-36, 11-50, 12-17 A and B, 12-63, 12-121.
C65	HE explosions due to operational accidents in 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-71, 12-92, 12-95.
C66	HE fires due to operational accidents in 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-71, 12-92, 12-95.

TABLE D.3.2–2.—*Candidate Accident Scenarios for Pantex Plant*-Continued

CANDIDATE SCENARIO	DESCRIPTION[1]
C67	Aircraft initiated accidents involving 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-71, 12-92, 12-95.
C68	Earthquake initiated accidents involving 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-71, 12-92, 12-95.
C69	Tornado and high wind initiated accidents involving 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-71, 12-92, 12-95.
C70	Internal flood initiated accidents involving 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-71, 12-92, 12-95.
C71	Lightning initiated accidents involving 11-23, 11-25, 11-37, 11-42, 11-45, 11-46, 12-71, 12-92, 12-95.
C72	Criticality accidents due to operational accidents in 4-45 through 4-75, 12-58, 12-65, 12-83.
C73	HE explosions due to operational accidents in 4-45 through 4-75, 12-58, 12-65, 12-83.
C74	HE fires due to operational accidents in 4-45 through 4-75, 12-58, 12-65, 12-83.
C75	Aircraft initiated accidents involving 4-45 through 4-75, 12-58, 12-65, 12-83.
C76	Earthquake initiated accidents involving 4-45 through 4-75, 12-58, 12-65, 12-83.
C77	Tornado and high wind initiated accidents involving 4-45 through 4-75, 12-58, 12-65, 12-83.
C78	Internal flood initiated accidents involving 4-45 through 4-75, 12-58, 12-65, 12-83.
C79	Lightning initiated accidents involving 4-45 through 4-75, 12-58, 12-65, 12-83.
C80	Pit breach with Pu release due to operational accidents in 12-55.
C81	Cobalt-60 exposure due to operational accidents in 12-55.
C82	Criticality accidents due to operational accidents in 12-55.
C83	HE explosions due to operational accidents in 12-55.
C84	HE fires due to operational accidents in 12-55.
C85	Aircraft initiated accidents involving 12-55.
C86	Earthquake initiated accidents involving 12-55.
C87	Tornado and high wind initiated accidents involving 12-55.
C88	Internal flood initiated accidents involving 12-55.
C89	Lightning initiated accidents involving 12-55.
C90	HE explosions due to operational accidents in 11-5, 11-16, 11-18, Firing sites, 12-21A, 12-32, 12-33, 12-56.
C91	HE fires due to operational accidents in 11-5, 11-16, 11-18, Firing sites, 12-21A, 12-32, 12-33, 12-56.
C92	Aircraft initiated accidents involving 11-5, 11-16, 11-18, Firing sites, 12-21A, 12-32, 12-33, 12-56.
C93	Earthquake initiated accidents involving 11-5, 11-16, 11-18, Firing sites, 12-21A, 12-32, 12-33, 12-56.
C94	Tornado and high wind initiated accidents involving 11-5, 11-16, 11-18, Firing sites, 12-21A, 12-32, 12-33, 12-56.
C95	Internal flood initiated accidents involving 11-5, 11-16, 11-18, Firing sites, 12-21A, 12-32, 12-33, 12-56.
C96	Lightning initiated accidents involving 11-5, 11-16, 11-18, Firing sites, 12-21A, 12-32, 12-33, 12-56.

TABLE D.3.2-2.—*Candidate Accident Scenarios for Pantex Plant*-Continued

CANDIDATE SCENARIO	DESCRIPTION(1)
C97	Criticality accidents due to operational accidents in 12-31.
C98	HE explosions due to operational accidents in 12-31.
C99	HE fires due to operational accidents in 12-31.
C100	Aircraft initiated accidents involving 12-31.
C101	Earthquake initiated accidents involving 12-31.
C102	Tornado and high wind initiated accidents involving 12-31.
C103	Internal flood initiated accidents involving 12-31.
C104	Lightning initiated accidents involving 12-31.
C105	Criticality accidents due to operational accidents in 12-21.
C106	HE explosions due to operational accidents in 12-21.
C107	HE fires due to operational accidents in 12-21.
C108	Aircraft initiated accidents involving 12-21.
C109	Earthquake initiated accidents involving 12-21.
C110	Tornado and high wind initiated accidents involving 12-21.
C111	Internal flood initiated accidents involving 12-21.
C112	Lightning initiated accidents involving 12-21.
C113	Chemical hazardous material release due to operational accidents in 12-21.
C114	HE explosions due to operational accidents in BG-3, BG-4, 12-73 (Disposal).
C115	Aircraft initiated accidents involving BG-3, BG-4, 12-73 (Disposal).
C116	Earthquake initiated accidents involving BG-3, BG-4, 12-73 (Disposal).
C117	Tornado and high wind initiated accidents involving BG-3, BG-4, 12-73 (Disposal).
C118	Internal flood initiated accidents involving BG-3, BG-4, 12-73 (Disposal).
C119	Lightning initiated accidents involving BG-3, BG-4, 12-73 (Disposal).
C120	Criticality accidents due to operational accidents in 12-86.
C121	HE explosions due to operational accidents in 12-86.
C122	HE fires due to operational accidents in 12-86.
C123	Aircraft initiated accidents involving 12-86.
C124	Earthquake initiated accidents involving 12-86.
C125	Tornado and high wind initiated accidents involving12-86.
C126	Internal flood initiated accidents involving 12-86.
C127	Lightning initiated accidents involving 12-86.
C128	Tritium, Plutonium, Uranium releases due to vehicle accidents.
C129	Tritium, Plutonium, Uranium releases due to aircraft initiating accidents involving vehicles.
C130	Tritium, Plutonium, Uranium releases due to severe weather initiating accidents involving vehicles.
C131	HE fires/explosions due to vehicle accidents from differing initiators.
C132	Plutonium dispersion within bay due to weld rod burning through pit during repackaging.

BG - Burning Ground.
[1]Numbers in this column refer to specific buildings.
[2]These scenarios are particularly applicable to the storage pits at the alternative sites.

hazardous chemicals are inapplicable to the alternative sites. Candidate scenarios particularly applicable to pit storage at the alternative sites are footnoted in Table D.3.2-2.

Relative to the hazards considered for Pantex Plant, the only hazardous material applicable to alternative sites is pits. Moreover, the only significant risk to these pits during normal operations is the risk from a forklift accident during transfer operations when the pits are being placed into storage.

All of the external events and natural phenomena considered for Pantex Plant are included in the candidate scenarios for alternative sites. In addition, some site-specific natural phenomena were added. When the relative risks from a forklift accident and candidate scenarios initiated by external events or natural phenomena are compared, the forklift accident is risk dominant at all alternative sites (with the possible exception of earthquakes at Manzano Weapons Storage Area [WSA]).

There are two reasons why forklift accidents are risk dominant at the alternative sites. First, fewer facilities are at risk at the alternative sites than at Pantex. For example, the Zone 4 storage magazines, as well as the Zone 12 bays, cells, and support facilities, are included in the aircraft accident analysis at Pantex Plant. Except for Manzano WSA, the number of facilities at risk, plus the intensity of aircraft traffic (especially aircraft capable of causing facility damage) is significantly higher at Pantex Plant than at the alternative sites.

At Manzano WSA, the rock overburden reduces the likelihood that an aircraft impact could cause a release from the candidate storage facilities to a negligible level (see section E.3.2.2). Therefore, the frequency of a radionuclide release caused by an aircraft impact is significantly lower at the alternative sites. Although the consequences resulting from a radionuclide release initiated by an aircraft impact are potentially greater than the consequences resulting from a forklift accident, the risk (expressed as the product of frequency and consequence) from aircraft impacts at the alternative sites is a small fraction of a percent relative to the risk associated with a forklift accident (with the possible exception of earthquakes at Manzano WSA).

The risk from natural phenomena at Pantex Plant is dominated by earthquakes. This is not a result of potential earthquake damage to storage magazines, but rather is due to the possibility of seismic damage to certain support facilities that were erected in the late 1940's and 1950's (and which could be replaced by proposed facility construction and upgrades at Pantex Plant as described in appendix H). In terms of relative risk, the contribution to the risk at Pantex Plant from external events that threaten the Zone 4 storage magazines is negligible. With respect to pit storage, this low relative risk is due to the robust construction of the magazines and the integrity of the AT-400A shipping containers. A similar situation exists at the alternative storage sites, and is the second reason why forklift accidents are risk dominant at the alternative sites (with the possible exception of earthquakes at Manzano WSA). Figure D.3.2-7 illustrates this concept.

Occurrence of an external event or natural phenomenon is the initiating event in Figure D.3.2-7. Given that the initiating event occurs, a release from the stored pits is only possible if facility damage results from the initiating event. None of the facilities being considered at the alternative sites are vulnerable to external events or natural phenomenon that are within their design basis. Moreover, even for external events or natural phenomenon that exceed the design basis (a low probability event), the onset of facility damage is typically insufficient to breach the AT-400A shipping containers. Of the natural phenomena capable of causing significant facility damage (if the design basis is sufficiently exceeded), earthquakes are the most likely to cause a significant release (relative to other natural phenomena). For this reason, earthquakes are the risk dominant natural phenomena at the alternative sites.

Preliminary test results demonstrate that an AT–400A shipping container can survive the impact of a half ton mass dropped from a height of 110 feet without any loss of containment capability (PC 1995). Thus, even if the external event or natural phenomenon induced facility damage is severe, there is a high probability that the containers will remain intact. In the context of Figure D.3.2–7, the frequency of a plutonium release is well into the not reasonably foreseeable range defined in section D.3.1. Although the consequences of a plutonium release initiated by an external event or natural phenomenon are potentially high, the relative risk from such scenarios is negligible because of the low frequency that the release can occur.

D.4 Evaluation of Risk-Dominant Scenarios

Both high frequency, low consequence scenarios (such as those occurring during normal operations), and low frequency scenarios having potentially high consequences (i.e., scenarios initiated by natural phenomena or external hazards), are included in Table D.3.2–1. These scenarios were left when the methodology discussed in section D.3 was applied to the Pantex Plant scenarios of Table D.3.2–2. For all scenarios, the frequency and consequence assessments were performed on a site-wide, rather than a facility-specific, basis. This means, for example, that the frequency of a hazardous material release involving a specific handling operation was estimated by first quantifying the probability, per handling operation, that the accident occurs and then multiplying that probability by the total number of handling operations performed annually on site. If the particular handling operation (e.g., involving weapon disassembly) is performed in several separate facilities, then the release frequency incorporates the contribution from all of the individual handling facilities. However, since handling operations typically involve only a single hazardous material unit at a time (e.g., just one pit or one tritium reservoir), the consequences were generally quantified using the release from a single, standard unit in an intact facility (unless the scenario involved an HE explosion).

Aircraft accidents (the risk dominant external hazard for all sites) were modeled somewhat differently. Due to the proximity of Zones 4 and Zone12 to established flight paths and their high inventory of radionuclides, the site-wide risk from aircraft accidents at Pantex Plant is

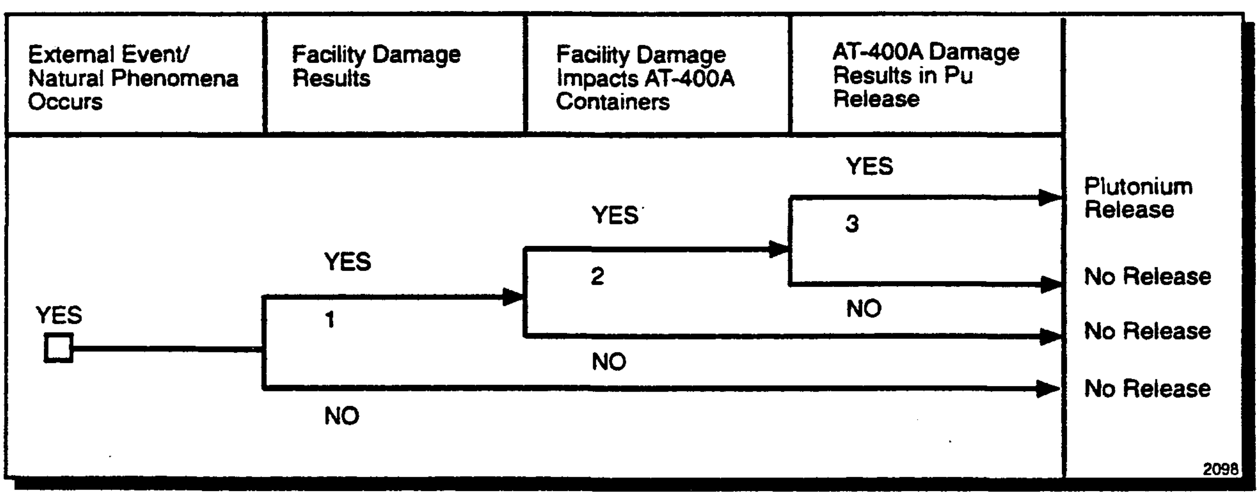


FIGURE D.3.2–7.—*External Event/Natural Phenomena Event Tree for Pits Stored in AT–400A Shipping Containers.*

governed by these zones. The material at risk from an aircraft accident is the inventory of the facility damaged by the impact. This differs from the consequences of most handling accidents (without an HE detonation) in that, in an aircraft accident, multiple units are involved and the facility can be extensively damaged. For alternative storage sites, the material at risk from an aircraft accident includes the inventory of the alternative pit storage facility.

Earthquakes are the risk dominant natural phenomena for all sites. All of the facilities that contain potentially risk significant quantities of hazardous materials were examined in the Pantex Plant seismic assessment. A unique aspect of this seismic assessment is that all site facilities would be simultaneously subjected to seismic stresses, given that an earthquake occurs. Hence, unlike handling and aircraft accidents, seismic events are truly site-wide and can result in releases from multiple facilities. For alternative storage sites, the material at risk from an earthquake is the inventory of the alternative pit storage facility.

D.4.1 Frequency Assessment

Quantifying the frequencies of risk-dominant scenarios required three distinct types of assessments addressing:

- Internal initiators.
- Aircraft accidents.
- Earthquakes.

The frequency assessment of internal initiators relied almost exclusively on published site-specific, accident-specific safety analyses (see references cited in volume I, section 4.14.2.1 and individual scenario descriptions). The basic methodology equated the scenario frequency to the frequency that an operation is performed (e.g., 2,000 disassemblies per year), multiplied by the probability that an operational error would result in a hazardous material release (e.g., the probability, per disassembly, that an operational error would cause a tritium or plutonium release).

For example, the explosive-driven plutonium dispersal from an internal event (Scenario 1) could result from operations conducted in bays, cells, and special purpose facilities. The probability (per operation) that an operational error would cause an explosive-driven plutonium release was estimated for each facility using data from available safety analyses. The frequency (per year) was quantified by multiplying the probability (per operation) by the annual number of operations in each facility, and then summing the results.

Appendix E describes the methodology used for assessing the frequency of aircraft accidents.

The frequency of hazardous material releases initiated by earthquakes is predicated upon a methodology developed in the DOE Standard for *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities* (DOE 1994:C-8, C-9, C-25). Conceptually, the earthquake assessment methodology considers two parameters:

- Frequency, per year, that earthquakes of different intensities occur.
- Probability of facility failure (e.g., building collapse) given an earthquake with a particular intensity.

For a given earthquake intensity, the product of the earthquake frequency and facility failure probability is the frequency, per year, that earthquakes with the specified intensity would cause the facility to fail. By summing these products over the entire range of earthquake intensities, an overall frequency for earthquake induced facility failure is obtained. This basic methodology was directly applicable to earthquakes at the alternative storage sites.

Multiple facilities are at risk from earthquakes at Pantex Plant. For the Pantex Plant assessment, it was necessary to multiply the earthquake frequency by the probability that just one, two, or a specified number of facilities fail in order to determine the frequency, per year, that earthquakes with the specified intensity would cause various combinations of facilities to fail. For a given combination of facility failures, summing these products over the entire range of earthquake intensities gave the overall frequency for earthquake induced facility failures. Considering the overall frequency of multiple facility failures was necessary to quantify the total risk from earthquakes, which threaten all of the facilities onsite.

Facility failure would not necessarily result in a hazardous material release (e.g., it is extremely difficult for a facility failure to breach a shipping container). Using a methodology similar to the one applied for internal initiators, the scenario frequency was determined by multiplying the facility failure frequency (due to an earthquake) by the probability the failure would result in a hazardous material release. For Scenario 7 in Table D.3.2–1, the scenario frequency was determined by multiplying the facility failure frequency (due to an earthquake) by the probability that the failure would result in a fire that would damage the 12–42 South Vault tritium reservoirs.

D.4.2 Radiological Consequence Assessment

Two computer codes were used to assess the consequences of a radionuclide release:

- Melcor Accident Consequence Code System (MACCS) (NRC 1990a, NRC 1990b, NRC 1990).
- Explosive Release Atmospheric Dispersion (ERAD) (DOE 1992).

ERAD was used to quantify the consequences from scenarios in which the radionuclides are dispersed into the atmosphere explosively (i.e., by an HE detonation). All other scenarios involving a radionuclide release were quantified with MACCS. Descriptions of both codes follow.

D.4.2.1 *Application of the Melcor Accident Consequence Code System*

The MACCS computer code models the offsite consequences of an accident that releases a plume of radioactive materials to the atmosphere (NRC 1990a; NRC 1990b; NRC 1990). Should such an accidental release occur, the radioactive gases and aerosols in the plume would be transported by the prevailing wind while dispersing in the atmosphere. The environment would be contaminated by radioactive materials deposited from the plume and the population would be exposed to radiation. The MACCS calculation estimates the range and probability of the health effects induced by radiation exposures (that are not avoided by protective actions). There are two fundamental aspects of the organization of MACCS which are basic to its understanding: the time scale after the accident is divided into various "phases" and the region surrounding the site is divided into a polar-coordinate grid.

The time scale after the accident is divided into three phases: emergency phase, intermediate phase, and long-term phase. The emergency phase begins immediately after the accident and could last up to 7 days following the accident. In this period, the exposure of population to both radioactive clouds and contaminated ground is modeled. Various protective measures can be specified for this phase, including evacuation, sheltering, and dose-dependent relocation.

The intermediate phase is used to represent a period in which evaluations are performed and decisions are made regarding the type of protective actions that need to be taken. In this period, the radioactive clouds are assumed to be gone and the only exposure pathways are those from the contaminated ground. The protective measure which can be taken during this period is temporary relocation.

The long-term phase represents all time subsequent to the intermediate phase. The only exposure pathways considered here are those resulting from the contaminated ground. A variety of protective measures can be taken in the long-term phase in order to reduce doses to acceptable levels: decontamination, interdiction, and condemnation of property.

The spatial grid used to represent the region is centered on the facility itself. The user specifies the number of radial divisions as well as their endpoint distances. Up to 35 of these divisions may be defined, extending out to a maximum distance of 9,999 kilometers (6,200 miles). The angular divisions used to define the spatial grid correspond to the 16 directions of the compass.

The emergency phase calculations use dose-response models for early fatality and early injury and are performed on a finer grid than the calculations of the intermediate and long-term phases. For this phase, the 16 compass sectors are divided into 3, 5, or 7 user-specified subdivisions in the calculations.

For the analysis of high consequence accidents at the different facilities, the MACCS calculations used the source term data and modeled the dispersion and deposition of radionuclides released from facilities to the atmosphere with a straight-line Gaussian plume. Plume rise and dry and wet deposition were taken into consideration. One year of hourly onsite meteorological data and a weather bin sampling technique were used to represent the dispersion process according to each site's characteristic weather. Downwind concentrations of radionuclides up to a distance of 80 kilometers (50 miles) were calculated for each of 16 directional sectors around the facility.

Radiation doses to an offsite population were calculated in the dosimetry models using the concentrations of radionuclides obtained from the dispersion models. Exposure pathways considered in MACCS for calculating doses received during the period following an accident were direct radiation from the passing plume and from radioactive material deposited on the ground, inhalation from the plume, deposition on skin, and inhalation of resuspended ground contamination. Long-term exposure pathways and liquid exposure pathways were not considered. No credit was taken for short-term actions such as evacuation, sheltering, and relocation.

Resuspension of particulate matter that has settled out of the plume is explicitly modeled in MACCS. The inhalation dose of the emergency phase from the resuspended radionuclides after passage of a plume segment is calculated for each of the fine spatial elements using the following equation:

$$DR_k = \left[\sum_i GC_i \cdot DFI_{ik}\right] \cdot BR \cdot J \cdot RF \cdot SFI \quad \text{(Eq. D–6)}$$

where:

DR_k = Resuspension inhalation dose (Sv) to organ "k" after passage of a plume segment over a fine spatial element.

GCi = ground concentration (Bq/m^2) of radionuclide "i" under the plume center line at the time that plume leaves the fine spatial element, calculated by the ATMOS module.

DFI_{ik} = inhalation dose conversion factor (Sv/Bq inhaled) to organ "k" for radionuclide "i", MACCS Dose Conversion Factors File.

BR = breathing rate (m^3/s), user-specified.

J = off-center line correction factor (dimensionless), of the fine spatial element.

RF = time-integrated resuspension factor (s/m) defined below.

SFI = inhalation shielding factor (dimensionless), specified by user.

The resuspension factor, RF, is calculated using the following equation:

$$RF = RC \cdot \int_{t_1}^{t_2} e^{-\lambda t} dt = RC \cdot \left(e^{-\lambda t_1} \cdot e^{-\lambda t_2}\right) / \lambda$$

(Eq. D–7)

where:

RC = the resuspension coefficient that relates ground concentration to air concentration (m^{-1}); user-specified.

λ = the natural log of 2 divided by the resuspension half-life (s^{-1}); user-specified.

t_1 = the time from plume departure to the entrance of the individual into the spatial element (s).

t_2 = the time from plume departure to the departure of the individual from the spatial element (s).

In addition, the chronic exposure model calculates doses from inhalation of resuspended radionuclides. These doses are calculated for all inhabitants living in areas that are not permanently interdicted.

The resuspension inhalation dose of the intermediate or long-term phase for a given time period is calculated for each of the coarse spatial elements using the following equation:

$$DR_k = \sum_i GC_i \cdot DFR_{ik} \cdot SFI \qquad \text{(Eq. D–8)}$$

where:

DR_k = resuspension inhalation dose (Sv) to organ "k" in a spatial element for a given time period.

GC_i = Initial ground concentration (Bq/m^2) of radionuclide "i" in a spatial element.

DFR_{ik} = resuspension inhalation dose factor ($Sv\text{-}m^2/Eq$) to organ "k" for radionuclide "i" for a given time period, defined below.

SFI = inhalation shielding factor (dimensionless).

For the intermediate and long-term phases, the inhalation shielding factor for normal activity (user-specified) is used in the resuspension inhalation dose calculation.

The computation of the resuspension dose factor, DFR_{ik}, for a specific time period t_1 to t_2 requires the evaluation of the following function:

$$DFR_{ik} = BR \cdot DFI_{ik} \cdot \int_{t_1}^{t_2} (e^{-\lambda t} \cdot Rw(t)\, dt)$$

(Eq. D–9)

where:

DFI_{ik} = inhalation dose conversion factor (Sv/Bq inhaled) of either acute or lifetime dose to organ "k" for radionuclide "i", MACCS Dose Conversion Factors File.

BR = breathing rate (m^3/s).

λ_i = decay constant (s^{-1}) of radionuclide i.

Rw(t) = resuspension weathering function, defined below.

If a radionuclide decays to a radioactive daughter, the resuspension inhalation dose resulting from the daughter is added to the resuspension inhalation dose of the parent radionuclide.

The resuspension weathering equation is a multi-term exponential decay function:

$$Rw(t) = \sum_{m=1}^{3} \left(RC_m \cdot e^{-\lambda_m t} \right) \quad \text{(Eq. D–10)}$$

where:

RC_m = resuspension weathering coefficient (m^{-1}) for the m-th term

λ_m = resuspension weathering decay constant (s^{-1}) for the m-th term

D.4.2.2 *Application of the Explosive Release Atmospheric Dispersion Computer Code*

The ERAD code was developed by Sandia National Laboratories (DOE 1992). ERAD provides a three-dimensional numerical simulation for the dispersal of gaseous and particulate airborne source materials in which initial cloud dynamics, turbulent diffusion, and buoyancy effects coupled with elevation-dependent physical and thermodynamic properties of the plume are considered. ERAD's meteorological component implements state-of-the-art scaling derived from Monin-Obukhov similarity theory to model turbulent velocity profiles in the planetary boundary layer. Particle dispersion and depletion are modeled as stochastic processes and simulated using a discrete-time Lagrangian Monte Carlo algorithm. Several thousand individual particle trajectories are traced to determine respirable dosage and deposition contours over the affected area. Particulate resuspension is not modeled in ERAD.

ERAD was developed to give real-time predictions, using field-portable computers, of the radiological hazards resulting from accidents arising in the storage and transportation of nuclear materials and possible acts of terrorism. Actual meteorological data are input to ERAD to model surface friction, thermal turbulence, and mixing height of the planetary boundary layer. These parameters include:

- Effective surface roughness length.
- Relative humidity and atmospheric pressure.
- Vertical profiles of atmospheric temperature, wind direction, and speed.

The menu-driven code has an extensive health physics library that allows the user to select specific radionuclides. Downwind consequences of different types of atmospheric releases of radioactive materials may be analyzed by three programs:

- Non-buoyant—continuous or puff releases.
- Detonation—releases resulting from the detonation of chemical high explosive.
- Fire Plume—continuous releases resulting from fuel fires.

The fire plume model for the ERAD code is currently undergoing verification and was not used for calculations in this EIS.

The complete ERAD code with UNIX-based graphical user interface was developed for Sun workstations. Depending on the speed of the machine, a 10,000-particle Monte Carlo simulation may take as long as 5 to 10 minutes to execute (5,000-particle simulations are usually adequate in most cases).

Health effects consequences for an accident under these circumstances are obtained by multiplying the predicted dosages or time-integrated concentrations by the proper scaling factors. Health risk to the exposed population may be determined by summing the individual health effects over the number of people residing in the affected area.

Perhaps the most notable feature of the ERAD result is the asymmetrical distribution of the dosage contours about the mean surface wind direction. The effect is caused by the variation of wind direction with altitude, relative to surface winds. ERAD also accounts for terrain effects through a term for effective roughness length. Mechanical turbulence increases with the roughness length due to increased surface friction. This decreases the area enclosed by a given dosage isopleth because of enhanced mixing of airborne materials with entrained air.

Two consequence assessments, representative and upper bound, are performed for each scenario that releases radionuclides. The representative consequence represents what is most likely to occur if the release is initiated, while the upper bound indicates sensitivity to uncertainties in the release source term, facility response, and meteorology. For MACCS calculations, the representative consequences cited in Tables D.4.2.2–1 and D.4.2.2–2 are estimated by Monte Carlo simulation. This is achieved because MACCS calculates the consequences for numerous meteorological

TABLE D.4.2.2–1.—Representative and Upper Bound Radiological Consequences to the Public from Risk-Dominant Scenarios

SCENARIO	EXPOSURE (PERSON-REM)		FATAL CANCERS	
	REPRESENTATIVE	UPPER BOUND	REPRESENTATIVE	UPPER BOUND
Pantex 1	1×10^3 (7×10^2)[(1)]	9×10^3 (7×10^3)[(1)]	6×10^{-1} (3×10^{-1})[(1)]	4 (3)[(1)]
Pantex 3	2×10^4 (4×10^3)[(1)]	3×10^5 (9×10^4)[(1)]	8 (2)[(1)]	100 (40)[(1)]
Pantex 5	8×10^{-2}	3×10^{-1}	4×10^{-5}	2×10^{-4}
Pantex 6	4×10^{-4}	1×10^{-3}	2×10^{-7}	7×10^{-7}
Pantex 7	1×10^2	4×10^2	5×10^{-2}	2×10^{-1}
Pantex 8	1×10^3	4×10^3	6×10^{-1}	2
Pantex 9	4×10^{-1}	2	2×10^{-4}	8×10^{-4}
Nevada Test Site (Handling Accident)	3×10^{-5}	2×10^{-4}	2×10^{-8}	8×10^{-8}
Savannah River Site (Handling Accident)	5×10^{-3}	2×10^{-2}	2×10^{-6}	8×10^{-6}
Manzano WSA (Handling Accident)	4×10^{-2}	2×10^{-1}	2×10^{-5}	1×10^{-4}
Hanford Site (Handling Accident)	3×10^{-5}	2×10^{-4}	1×10^{-8}	8×10^{-8}

[(1)] Values in parentheses are for Configuration 2, as described in section 4.14.2.1 of Volume I.

TABLE D.4.2.2–2.—*Representative and Upper Bound Radiological Consequences to the Non-Involved Worker from Risk-Dominant Scenarios*[1]

SCENARIO	EXPOSURE (PERSON-REM)		FATAL CANCERS	
	REPRESENT-ATIVE	UPPER BOUND	REPRESENT-ATIVE	UPPER BOUND
Pantex 1	2×10^3 (6×10^2)[2]	5×10^3 (1×10^3)[2]	9×10^{-1} (2×10^{-1})[2]	1 (6×10^{-1})[2]
Pantex 3	40 (30)[2]	50 (50)[2]	2×10^{-2} (1×10^{-2})[2]	2×10^{-2} (2×10^{-2})[2]
Pantex 5	3×10^{-1}	5×10^{-1}	1×10^{-4}	2×10^{-4}
Pantex 6	4×10^{-3}	9×10^{-3}	1×10^{-6}	4×10^{-6}
Pantex 7	50	4×10^2	2×10^{-2}	2×10^{-1}
Pantex 8	3×10^3	6×10^3	1	1
Pantex 9	4	9	1×10^{-3}	4×10^{-3}
Nevada Test Site (Handling Accident)	6×10^{-2}	2×10^{-1}	3×10^{-5}	8×10^{-5}
Savannah River Site (Handling Accident)	5×10^{-2}	1×10^{-1}	2×10^{-5}	6×10^{-5}
Manzano WSA (Handling Accident)	5×10^{-2}	1×10^{-1}	2×10^{-5}	6×10^{-5}
Hanford Site (Handling Accident)	6×10^{-5}	2×10^{-4}	3×10^{-8}	6×10^{-8}

[1]The risk to close-in workers from Scenarios 1 and 3 is dominated by HE blast effects. The risk to more distant workers (i.e., beyond the range where human health effects are dominated by the blast) contain large uncertainties associated with evacuation and/or sheltering. The consequences cited in Table D.4.2.2–2 are conservative in that they ignore both evacuation and sheltering.
[2]Values in parentheses are for Configuration 2, as described in section 4.14.2.1 of Volume I.

conditions and then identifies the mean and upper bound consequences.

ERAD lacks the Monte Carlo capabilities of MACCS. For ERAD calculations, the typical consequences cited in Tables D.4.2.2–1 and D.4.2.2–2 use mean meteorological parameters obtained from upper air soundings recorded at the Amarillo International Airport. Upper bound consequences obtained from ERAD are for upper bound meteorological conditions being used in developing Pantex Plant safety documents.

For example, the consequence of Scenario 1 is the arithmetic mean for the consequences associated with explosive driven plutonium releases from internal events in bays, cells, and special purpose facilities. This involved three sets of calculations. First, consequences were calculated for the case in which Scenario 1 occurs in a bay. Next, consequences were calculated for the case in which Scenario 1 occurs in a cell. Finally, consequences (both the exposure and excess fatal cancers) were calculated for the case in which Scenario 1 occurs in a special purpose facility.

The arithmetic mean of these consequences is the probability that Scenario 1 occurs in a bay, multiplied by the consequences of the case in which Scenario 1 occurs in a bay; plus the probability that Scenario 1 occurs in a cell, multiplied by the consequences for the case in which Scenario 1 occurs in a cell; plus the probability that Scenario 1 occurs in a special purpose facility, multiplied by the consequences for the case in which Scenario 1 occurs in a special purpose facility. The probability used for each facility was the ratio of the frequency (i.e., the probability per operation that an error causes a release from the facility, multiplied by the annual number of operations in the facility) that Scenario 1 occurs in the facility, divided by the frequency of Scenario 1 (i.e., 1.1 x 10^{-5} per year.)

Tables D.4.2.2–1 and D.4.2.2–2 give the representative and upper bound consequences for each risk dominant scenario that involves a radionuclide release. Table D.4.2.2–3 gives the source terms (i.e., curies of respirable plutonium and tritium released to the atmosphere as a result of a potential accident) used to quantify the representative public and non-involved worker consequences in Tables D.4.2.2–1 and D.4.2.2–2. The source term used for a handling accident at an alternative site is 9.2 x 10^{-5} curies of plutouium.

Table D.4.2.2–4 gives the representative upper bound consequences to the maximally exposed offsite individual for each risk dominant scenario that involves a radionuclide release. This hypothetical individual is located at the site boundary closest to the radiological release. The wind is assumed to blow the radiological release directly towards this individual. For scenarios such as Scenario 1 in which more than one facility has been modeled, results for the facility giving the highest consequence at the site boundary are presented in Table D.4.2.2–4.

The fatal cancer consequences presented in Table D.4.2.2–1 are the excess fatal cancers expected to occur over a 50-year period following the accident in the population in the Region of Influence (ROI). For Pantex Plant, the population in the ROI is 267,107 people. As stated previously, 20 percent of this population is expected to succumb to fatal cancer from all other causes (0.2 x 267,107 = 5.3 x 10^4 fatal cancers). For the fatal cancer consequences presented in Table D.4.2.2–2, the non-involved worker is defined as a receptor 100 meters (328 feet) downwind from the release point, along the plume center line.

Table D.3.2–1 identifies Scenarios 1 and 3 as involving radionuclide releases associated with HE explosions. In Scenario 1, the HE explosion is initiated during normal operations. A seismic event or aircraft accident initiates the HE explosion considered in Scenario 3.

Sensitivity studies using ERAD disclose that the consequences of scenarios involving HE explosions vary with the ratio of plutonium to HE. In assessing the consequences presented in Tables D.4.2.2–1 and D.4.2.2–2, the ratio of plutonium to HE was varied to determine the maximum consequences to the public.

TABLE D.4.2.2–3.—*Representative Source Terms*

SCENARIO	Pu RELEASE (Ci)	TRITIUM RELEASE (Ci)
Pantex 1	300 (270)[1]	3.0 x 10^5 (3.0 x 10^5)[1]
Pantex 3	9.4 x 10^3 (4.0 x 10^3)[1]	2.5 x 10^5 (2.5 x 10^5)[1]
Pantex 5	0	1.8 x 10^5
Pantex 6	1.8 x 10^{-5}	0
Pantex 7	0	4.0 x 10^7
Pantex 8	50	0
Pantex 9	1.2 x 10^{-2}	3.0 x 10^5

[1] Values in parentheses are for Configuration 2, as described in section 4.14.2.1 of Volume I.

Ci - Curie

TABLE D.4.2.2–4.—*Representative and Upper Bound Radiological Consequences to the Maximally Exposed Offsite Individual from Risk-Dominant Scenarios*

SCENARIO	EXPOSURE (REM)		FATAL CANCERS	
	REPRESENTATIVE	UPPER BOUND	REPRESENTATIVE	UPPER BOUND
Pantex 1	50 (30)[1]	100 (80)[1]	2×10^{-2} (2×10^{-2})[1]	7×10^{-2} (4×10^{-2})[1]
Pantex 3	60 (30)[1]	1×10^{2} (80)[1]	3×10^{-2} (2×10^{-2})[1]	6×10^{-2} (4×10^{-2})[1]
Pantex 5	1×10^{-2}	4×10^{-2}	5×10^{-6}	2×10^{-5}
Pantex 6	1×10^{-4}	3×10^{-4}	5×10^{-8}	1×10^{-7}
Pantex 7	7×10^{-1}	5	4×10^{-4}	3×10^{-3}
Pantex 8	30	60	2×10^{-2}	3×10^{-2}
Pantex 9	2	3	1×10^{-3}	2×10^{-3}
Nevada Test Site (Handling Accident)	4×10^{-5}	1×10^{-4}	2×10^{-8}	5×10^{-8}
Savannah River Site (Handling Accident)	1×10^{-5}	3×10^{-5}	5×10^{-9}	1×10^{-8}
Manzano WSA (Handling Accident)	2×10^{-3}	5×10^{-3}	8×10^{-7}	3×10^{-6}
Hanford Site (Handling Accident)	5×10^{-8}	1×10^{-7}	3×10^{-11}	6×10^{-11}

[1]Values in parentheses are for Configuration 2, as described in section 4.14.2.1 of Volume I.

The impacts of accidents presented are meant to bound the consequences that would occur in the unlikely event of a serious accident at Pantex Plant. For example, the upper bound dose to the maximally exposed offsite individual (MEOI) from the bay explosion event within Scenario 1 varies significantly based on the high explosive charge to plutonium mass ratio of specific weapon systems that could be present in bays. When the upper bound MEOI dose is calculated for differing charge to mass ratios, the MEOI dose varies from 6 rem to approximately 100 rem (DOE 1996i). The upper bound dose numbers for the MEOI presented in Table D.4.2.2–4 are based on the worst case weapon system for MEOI exposures and as such bound the consequence from an accident involving the majority of weapons systems that could be present within the bays.

The representative consequences cited in Tables D.4.2.2–1 and D.4.2.2–2 were used for scenario screening and estimating risk. These typical values are utilized because they correspond to a greater level of human health risk than the upper bound values (which are included to indicate uncertainty levels). Except for Scenario 3, the representative and upper bound consequence assessments in Tables D.4.2.2–1 and D.4.2.2–2 rely on the MACCS software described in section D.2.1.2. Based on the Monte Carlo sampling used in MACCS, the probability of a potential accident scenario actually producing consequences equal to or exceeding the upper bound value is less than 0.05 (i.e., one chance in twenty). Thus, the frequency of an accident corresponding to the upper bound consequences is about a factor of 20 below the expected accident frequency.

Consider the first Pantex Plant scenario in Table D.4.2.2–1. If λ_1 denotes its expected frequency and $R_{T,1}$ represents its representative risk, then:

$$R_{T,1} = 1 \times 10^3 \lambda_1 \left(\frac{\text{person-rem}}{\text{year}}\right)$$

(Eq. D–11)

However, the risk associated with the upper bound value, $R_{U,1}$, is:

$$R_{U,1} = \frac{9 \times 10^3 \lambda_1}{20} \left(\frac{\text{person-rem}}{\text{year}}\right) = 0.45 R_{T,1}$$

(Eq. D–12)

This same conclusion applies to the other scenarios whose consequence assessments rely on MACCS.

The consequence assessment for Scenario 3 at Pantex uses ERAD calculations exclusively. A conservative estimate is that there is less than a 5 percent chance that Scenario 3 would produce consequences that exceed the upper bound values. If λ_3 denotes the expected frequency of Scenario 3 and $R_{T,3}$ represents its typical risk, then:

$$R_{T,3} = 2 \times 10^4 \lambda_3 \left(\frac{\text{person-rem}}{\text{year}}\right)$$

(Eq. D–13)

However, the risk associated with the upper bound value, $R_{U,3}$, is

$$R_{U3} < 3 \times 10^5 \times 0.05 \times \lambda_3 \left(\frac{\text{person-rem}}{\text{year}}\right) < R_{T,3}$$

(Eq. D–14)

Here again, the upper bound risk is less than the representative risk impact on human health. The single exception in Table D.4.2.2-1 is for Scenario 3 Configuration 2 at Pantex. Using the actual exposure estimates (4.4 x 10^3person-rem [representative] and 8.9 x 10^4 person-rem [upper bound]), the upper bound risk may exceed the typical risk by approximately 1 percent.

Direct comparisons between the scenarios assessed for the alternative sites and Pantex Plant can be misleading. Although Scenario 6 at Pantex Plant includes a pit breach initiated by a forklift accident, the risk from this scenario is dominated by handling accidents in bays and special purpose facilities. Thus, a number of different events contribute to the risk and consequences from Scenario 6 at Pantex Plant, as opposed to the single event (i.e., forklift accident) that dominates the risk at the alternative sites.

D.5 EVALUATION OF THE RISK FROM NORMAL OPERATIONS

Human health impacts from hazardous chemicals are only a concern at Pantex Plant, since relocating pit storage does not alter the human health impacts from hazardous chemicals at the receiving sites. Air quality analyses using the Industrial Source Complex Short-Term (ISCST2) Model quantified the air concentrations of chemical releases during normal operations (EPA 1987a; EPA 1987). These concentrations were evaluated for all chemicals considered to be carcinogenic and having associated risk factors. Using the chemical concentration results and the risk factors, an estimate of the cancer risk to workers and a qualitative evaluation of public risk was determined.

Toxic, noncarcinogenic chemicals were evaluated for offsite effects using a hazard index, as shown in volume I, chapter 4, Table 4.14.1.2–2. Chemical concentrations onsite were compared to published threshold limit values for chemical substances to determine the extent of potential human health impacts. None of the threshold limit values are exceeded onsite.

Radiation exposure during normal operations is dominated by external exposure to radiation workers. To quantify changes in worker exposure for different disassembly and assembly rates, As Low As Reasonably Achievable goals were used to estimate an average exposure per operation (PC 1994). This average exposure was then multiplied by the number of operations per year.

Radiation exposure to the public is predominantly from air emissions. The majority of these radiological air emissions are the result of off gassing from Cell 1 and not from normal operations. However, environmental monitoring data establish that these radiological air emissions contribute approximately a factor of one in a billion to the annual radiation dose to an average individual in the vicinity of Pantex Plant.

D.6 UNCERTAINTIES

The sequence of analyses performed to generate the radiological impact estimates from normal operation and facility accidents include: (1) selection of normal operational modes and accident sequences, (2) estimation of source terms, (3) estimation of environmental transport and uptake of radionuclides, (4) calculation of radiation doses to exposed individuals, and (5) estimation of health effects. There are uncertainties associated with each of these steps. Uncertainties exist in the way the physical systems being analyzed are represented by computational models and in the data required to exercise the models (due to measurement errors, sampling errors, or natural variability).

In principle, one can estimate the uncertainty associated with each source and predict the remaining uncertainty in the results of each set of calculations. Thus, one can propagate the uncertainties from one set of calculations to the next and estimate the uncertainties in the final results. However, conducting such a full-scale quantitative uncertainty analysis is neither practical nor a standard practice for a study of this type. Instead, the analysis is designed to ensure—through judicious selection of release scenarios, models, and parameters—that the results represent the potential risks.

This is accomplished by making assumptions in the calculations at each step. The models, parameters, and release scenarios used in calculations are selected in such a way that most intermediate results and consequently, the final estimates of impacts are greater than what would be expected. As a result, even though the range of uncertainty in a quantity might be large, the value calculated for the quantity is close to one of the extremes in the range of possible values, so that the chance of the actual quantity being greater than the calculated value is low (or the chance of the quantity being less than the calculated value if the criteria are such that the quantity has to be maximized). This has been the goal of the radiological assessment for normal operation and facility accidents in this study (i.e., to produce results that are conservative).

The degree of conservatism in the calculated results is closely related to the range of possible values the quantity can have. This range is determined by what can be expected to realistically occur. Thus, the only processes, events, and accidents considered are those credible for the conditions under which the physical system being modeled operates. This consideration has also been employed for both normal operation and facility accident analyses.

REFERENCES

DH 1993 — San Diego County Department of Health Services, *Hazardous Materials Management Division Risk Management and Prevention Program Requirements and Guidelines*, August 1993.

DOD 1977 — DOD, *System Safety Program Requirements*, MIL-STD-882B, prepared by the U.S. Department of Defense, June 1977.

DOE 1992 — DOE, *Description and Validation of ERAD: An Atmospheric Dispersion Model for High Explosive Detonations,* SAND92-2069, prepared by Sandia National Laboratories, for the U.S. Department of Energy, Albuquerque, NM, October 1992.

DOE 1992a — DOE, *Final Safety Analysis Report Pantex Plant Zone 4 Staging and Interim Storage for Nuclear Weapons and Components*, Pantex Plant, Amarillo, TX, December 1992.

DOE 1994 — DOE, *DOE Standard, Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities*, prepared under Contract Number DOE-STD-1020-94 by the U.S. Department of Energy, April 1994.

EPA 1987 — EPA, *Industrial Source Complex (ISC) Dispersion Model User's Guide,* Volume 2, Second Edition, Revised, EPA-450/4-88.002b, prepared by the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, December 1987.

EPA 1987a — EPA, *Industrial Source Complex (ISC) Dispersion Model User's Guide,* Volume 1, Second Edition, Revised, EPA-450/4-88.002a, prepared by the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, December 1987.

Jones 1988 — Jones, J.V., *Engineering Design Reliability, Maintainability, and Testability,* TAB Books, Inc., Blue Ridge Summit, PA, 1988.

NAP 1990 — *Health Effects of Exposures to Low Levels of Ionizing Radiation BEIR V,* National Academy Press, Washington, D.C. 1990.

NRC 1990 — U.S. Nuclear Regulatory Commission, *Quality Assurance and Verification of the MACCS Code, Version 1.5,* NUREG/CR-5376, prepared by Idaho National Engineering Laboratory, Idaho Falls, ID, February 1990.

NRC 1990a U.S. Nuclear Regulatory Commission, *MELCOR Accident Consequence Code System (MACCS) User's Guide*, Volume 1, NUREG/CR-4691, prepared by Sandia National Laboratories, Albuquerque, NM, February 1990.

NRC 1990b U.S. Nuclear Regulatory Commission, *MELCOR Accident Consequence Code System (MACCS) User's Guide*, Volume 2, NUREG/CR-4691, prepared by Sandia National Laboratories, Albuquerque, NM, February 1990.

PC 1994 Cole, D.J., "1995 ALARA Goals", Memo from D.J. Cole to W.A. Weinreich, Mason & Hanger-Silas Mason Company, Inc., December 21, 1994.

PC 1995 Baca, W., "AT–400A Testing", Telecon from Wendy Baca, DOE Albuquerque Operations Office, Nuclear Explosive Safety Division, to Bret Simpkins, Tetra Tech, Inc., Albuquerque, NM, March 20, 1996.

APPENDIX E

Aircraft Accident Analysis

APPENDIX E
AIRCRAFT ACCIDENT ANALYSIS

E.1 INTRODUCTION

This appendix presents an analysis of the likelihood of an aircraft crash into structures located within Zones 4 and 12 at Pantex Plant and storage facilities located at the alternative sites covered in this EIS. Sandia National Laboratories performed an assessment of the probability of aircraft impact into Pantex Plant structures in the mid-1970s (SNL 1976). That study used the K. Solomon Model and included a characterization of air traffic in the area, including the classes of aircraft (e.g., commercial, military), the nature of the operations, the number of operations per year, and other information that could affect the probability of an aircraft crash at Pantex Plant Site (ANPP 1975).

DOE has recently issued a *Draft Standard for Accident Analysis for Aircraft Crash Into Hazardous Facilities* that presents a standardized approach and the steps used to apply the approach (DOE 1996g). The DOE Standard methodology was applied in this EIS to estimate the probability of an aircraft crash into the structures of interest. An initial screening of the release frequency, as described in the Draft DOE Standard and based on past experience, indicated that the impact frequency would require detailed analysis. Current data describing air traffic are used in the analyses for both Pantex Plant and the alternative sites. Because the Draft DOE Standard uses English units for crash rates and probability density functions, all figures and tables in this appendix are in English units to avoid confusion when comparing the results with the Draft DOE Standard.

E.2 METHODOLOGY

The determination of the probability for causing sufficient damage to a facility consists of a series of calculations as shown in Figure E.2–1. The first step in the process is to determine the representative type of aircraft for each category. Representative wingspans, engine weights, and engine diameters are calculated by either using a known set of data, i.e., the number of each type of aircraft for operations near a site (e.g., Radar Airspace Monitoring System [RAMS] data identifying the number of 737s, DC10s, MD80s, etc. for commercial air carrier landing and take-off operations near Pantex Plant), or the maximum parameters for the category if the number of each type of aircraft is unknown.

The representative or maximum wingspans are used to calculate the true, shadow, and skid area of a facility taking into account shielding by nearby facilities, as described in section E.2.2. Using the calculated area of a facility, the number of operations near a facility, crash rates, and the probability density function, the probability of hitting the facility for each aircraft category is calculated as described in section E.2.1. The total probability for hitting a facility is the sum of all the aircraft category probabilities. If the probability of hitting a facility is greater than 10^{-7}, further analysis is required.

A structural calculation is performed to determine if an aircraft that hits a facility will cause sufficient damage to warrant further analysis. Aircraft missiles (i.e., flying objects from the crash) for the structural calculations are selected by using representative engine weights and diameters. The velocity of the aircraft is the impact velocity for each aircraft category. The structural analysis is performed by calculating the scabbing and perforation

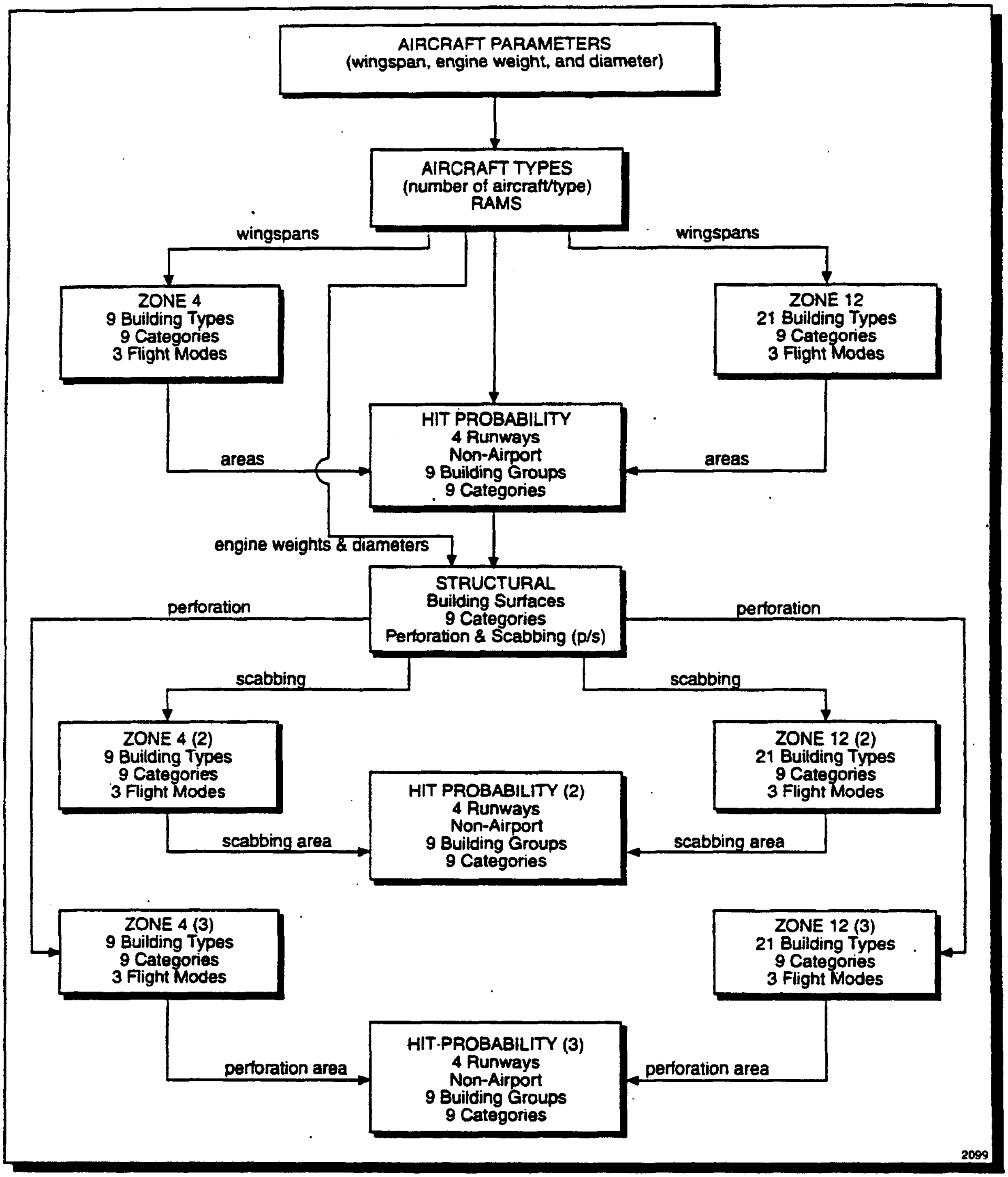


FIGURE E.2–1.—*Calculations Used to Determine Probability for Causing Sufficient Damage to a Facility at Pantex Plant.*

thickness for each aircraft category into the facility using an empirical model.

If an earth overburden exists, the velocity reduction through the earth overburden is calculated prior to the aircraft penetrating the facility. The roofs, walls, and doors of each facility were modeled independently when overburden or structure thickness varied. If scabbing or perforation is not possible, even though the facility can be hit, the material inside cannot be damaged and no further analysis is needed. If scabbing or perforation is possible, additional analysis is needed.

The area calculation is then performed again, eliminating the structural members whose aircraft categories cannot cause scabbing or perforation in a facility. After the area of a facility vulnerable to scabbing or perforation is determined, the probability of hitting a facility and causing either scabbing or perforation is calculated with the reduced area by using the same equation as described in section E.2.1. (This represents a conservative upper bound for causing an explosion in a facility since either a scabbed piece of concrete or a missile that has perforated a facility can cause an explosion.)

The area calculation is redone a third time, eliminating the structural members whose aircraft categories can only cause perforation, but not scabbing in a facility. After the area of a facility vulnerable only to perforation is determined, the probability of hitting a facility and causing perforation is calculated for the reduced area by using the same equation as described in section E.2.1. This represents a conservative upper bound for causing a fire in a facility since only a perforation can allow for sufficient amount of combustible materials to enter a facility. If the probability of hitting a facility and causing either scabbing or perforation is greater than 10^{-7}, a consequence analysis is performed.

E.2.1 Calculation of Aircraft Crash Probability

The Near Airport Model is used to estimate the probability of an aircraft crash for aircraft in the take-off and landing modes; in-flight aircraft crash probabilities are determined using the Non-Airport Model (DOE 1996g:41). The Near-Airport Model uses an aircraft mode and category-specific probability density distribution to estimate the possibility of an aircraft crashing into a particular location surrounding the airport. The Non-Airport Model uses DOE site-specific information to estimate the possibility of an aircraft crashing into a particular location surrounding the airport. In both models, the calculated probability includes all types of postulated impacts, whether slight or severe in consequence (i.e., to be conservative a touch is considered a hit).

A set of indices is used in the analysis to differentiate flight modes, aircraft categories, and flight sources. These indices are designated (i), (j), and (k), respectively. The index (i) differentiates the mode of operations (e.g., landing, in-flight, take-off) and can be equal to the following values:

$i = 1$ Landing

$i = 2$ In-Flight

$i = 3$ Take-off

The index (j) divides the aircraft types into categories. These categories included the following values (DOE 1996g:39):

$j = 1$ Commercial: Air Carrier

$j = 2$ Commercial: Air Taxi

$j = 3$ Military: Large (Bomber, Cargo, and Tanker aircraft)

$j = 4$ Military: Small (Attack, Fighter, and Trainer aircraft)

j = 5	Military: Rotary-wing (Helicopter)
j = 6	General: Fixed-wing, reciprocating, single-engine
j = 7	General: Fixed-wing, reciprocating, multi-engine
j = 8	General: Fixed-wing, turboprop
j = 9	General: Fixed-wing, turbojet
j = 10	Rotary-wing, reciprocating engine (Helicopter)
j = 11	Rotary-wing, turbine engine (Helicopter)

The index (k) describes the flight source and can take on the following characteristics:

k = 1...n	Runways
k = n+1	Non-Airport operations (high-altitude overflights, and local helicopter flights)

An approximation of the total probability per year (F) that any aircraft in any flight path, category, or mode of operation will impact structures is given by the four-factor formula:

$$F = \sum_{i,j,k} N_{ijk} \cdot P_{ijk} \cdot f_{ijk}(x,y) \cdot A_{ij}$$

where:

F	is the estimated total annual aircraft crash impact frequency for the facility of interest (number per year)
N_{ijk}	is the number of annual operations in flight mode (i), aircraft category (j), and flight source (k) (number per year, site dependent)
A_{ij}	is the effective Plant area for an aircraft of mode (i) and flight category (j) (site and aircraft dependent)
$f_{ijk}(x,y)$	is the generic aircraft crash location probability function evaluated at the facility location for each applicable summation parameter (per square mile for Near-Airport and Non-Airport operations)
P_{ijk}	is the generic aircraft crash probability (per take-off or landing for Near-Airport and Non-Airport operations) for each applicable aircraft category, flight mode, and flight source.

Table E.2.1–1 (tables are presented following the text) presents a listing of the values for aircraft crash rates, P_{ijk}.

The four-factor formula is implemented in two different ways depending of the flight phase:

- For Near-Airport operations, take-offs (i = 1) and landings (i = 3), the four-factor equation is implemented through the use of site-specific information and data contained in the Draft DOE Standard (DOE 1996g).
- For Non-Airport operations, (i = 2), DOE site-specific values for the expected number of crashes per square mile per year in the vicinity of selected DOE sites have been established. The value of the product NPf(x,y) is provided in the Draft DOE Standard for each aircraft category. The four-factor formula is implemented by multiplying this value by the facility effective area to assess hit probability.

The analysis of the impact frequency of Non-Airport operations for all categories of aircraft uses the same four-factor equation as for Near-Airport operations. The frequency, F_j, for the jth class of aircraft is

$$F_j = N_j \cdot P_j \cdot f_j(x,y) \cdot A_j$$

where the product of NP equals the expected number of in-flight crashes per year; f(x,y) is the probability, given the crash, that the crash occurs in a 1-square mile area surrounding the given facility; and A is the effective area of the facility. Combined, the product of NPf(x,y) is equivalent to the expected number of crashes per square mile per year in the vicinity of the given site. Table E.2.1–2 gives NPf(x,y) values for selected DOE sites. Also included in this table are minimum, average, and maximum values for facilities at other locations within the continental U.S. (CONUS). The values presented in this table are based on an analysis of the locations of crashes that have occurred in the past in the CONUS. Over 1,000 general aviation crashes were recorded, but available data for air carrier and large military aircraft is limited (DOE 1996g:42).

The calculation of impact frequency is slightly different for helicopters. The four-factor equation becomes

$$F_H = N_H \cdot P_H \cdot (2 \div L_H) \cdot A_H$$

where L is the average length, in miles, of the flights corresponding to the site-specific overflights.

E.2.2 Calculation of the Impact Area

The total effective area (A_{eff}) required for the probability model is the sum of the true area, the shadow area, and the skid area (DOE 1996g:B-27). It is believed that if an aircraft impact occurs within this total effective area, the structure will be hit either before ground impact or as a result of aircraft skid after impact. In estimating each area, allowance is made for aircraft dimension (i.e., wingspan).

The true area (A_t) is the base area of the building adjusted for aircraft dimension and is defined as:

$$A_t = (2 \cdot L \cdot W \cdot WS) \div R + (L \cdot W)$$
$$R = (L^2 + W^2)^{0.5}$$

where L is the facility length, W is the facility width, R is the facility hypotenuse, and WS is the aircraft wingspan. In this aircraft accident analysis, DOE Standard wingspans were used for unknown aircraft. Representative wingspans for Near-Airport operations were determined by examining RAMS data and selecting aircraft for each category that represented at least 50 percent of the aircraft category. Both DOE Standard and representative weighted wingspans are presented in Table E.2.2–1.

The shadow area (A_{sh}) is determined from the structure height, the hypotenuse, and the angle of the postulated aircraft impact and is defined as:

$$A_{sh} = (WS + R) \cdot H \cot\phi$$

where H is the facility height, WS is the aircraft wingspan, and ϕ is the angle the aircraft path makes with the horizon at impact (Figure E.2.2–1). Values for cot ϕ for the various aircraft categories are presented in Table E.2.2–2.

There is a possibility that an aircraft could impact the ground at some distance from a facility and still strike the structure as a result of skidding into it. The skid area (A_{skid}) is defined as:

$$A_{skid} = (WS + R) \cdot S$$

where WS and R are as defined above and S is the skid length. Values for the mean skid distance for each aircraft category are provided in the Draft DOE Standard (DOE 1996g:B-29). The skid distance can be reduced by calculating the critical velocities required to cause damage

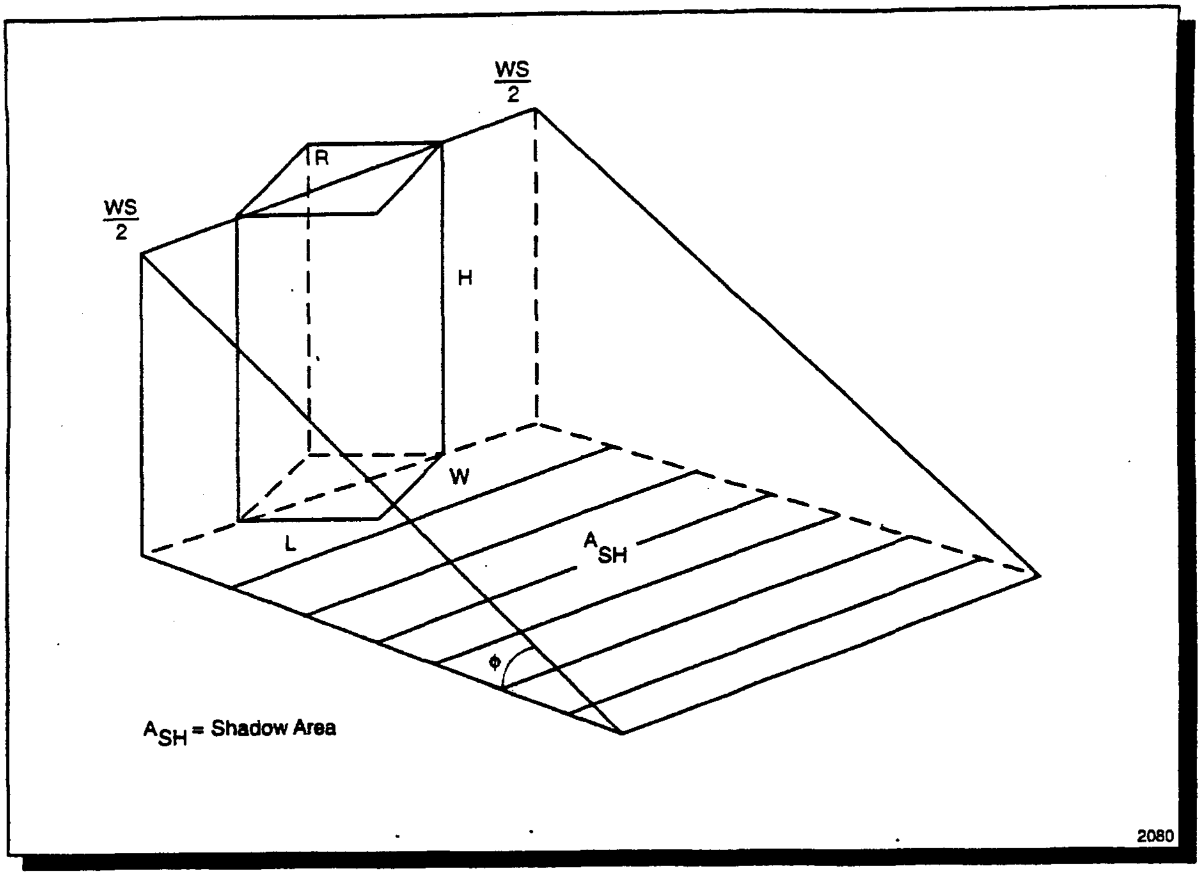


FIGURE E.2.2–1.—*Shadow Area.*

to a facility. Using the model contained in the Drake Report (Drake 1994), aircraft skid distances can be calculated and subsequently reduced from the mean distances given in the DOE Standard. However, this was not done in this analysis because of two cases encountered:

- Walls covered by enough overburden to stop an incoming missile did not require velocity reduction.
- Walls which are very thin, leading to imminent perforation, were still perforated even after velocity reduction.

E.2.3 Calculation of the Structural Response

The Draft DOE Standard (DOE 1996g) contains a methodology for analyzing a facility's local and global structural response to aircraft crash impact forces. The evaluation of structural response in this EIS is based solely on the local impact forces generated by non-rigid missiles on reinforced concrete and steel constructed facilities. These calculations were used to eliminate certain aircraft from their potential contributions to the overall release frequencies.

Although the global response analysis was not performed, it is not expected to result in significant increases in the estimated frequencies. Release frequencies will always be bounded by impact frequencies. In all cases, consequence calculations assume bounding amounts of material at risk, and as such, consequence calculations remain unaffected by the results of structural response calculations.

Formulas are provided for the impact analysis of both rigid and non-rigid missiles for both reinforced concrete and steel constructed facilities.

E.2.3.1 *Reinforced Concrete Targets*

Local impacts to facilities include penetration, perforation, and scabbing. Penetration occurs when the missile striking a facility intrudes into the outer surface of the structure. Perforation occurs when the missile punctures a hole all the way through the concrete or steel surface. Scabbing occurs when the missile does not perforate, but does cause concrete to be ejected from the inside face of the target into the facility.

The local response equations used for this calculation are referred to as the Chang equations for rigid missile penetration of reinforced concrete targets (DOE 1996g:60).

Scabbing

$$t_s = [1.84 \cdot (U \div V)^{0.13}] \cdot \{(MV^2)^{0.4} \div [D^{0.2} \cdot (f'_c)^{0.4}]\}$$

where:

$U =$	reference velocity = 200 ft/sec
$V =$	missile impact velocity (ft/sec)
$M =$	mass of missile = W/g where W = missile weight (lb) and $g = 32.2$ ft/sec^2
$D =$	effective missile diameter (ft)
$f'_c =$	ultimate compressive strength of concrete (lb/ft^2)
$t_s =$	scabbing thickness (ft)

To prevent scabbing, the minimum thickness of the concrete should be $\geq 1.1t_s$ (DOE 1996g:62). Because the missiles considered in this analysis are aircraft engines, they are considered non-rigid. As a result, and in accordance with the Draft DOE Standard, the value obtained for rigid missiles can be reduced to 60 percent (DOE 1996g:64).

Perforation

$$t_p = (U \div V)^{0.25} \cdot (MV^2 \div Df'_c)^{0.5}$$

To prevent perforation, the minimum thickness of the concrete should be $\geq 1.2t_p$ (DOE 1996g:62). Similarly, because the missiles in this analysis are aircraft engines which are considered non-rigid, the value obtained for rigid missiles can be reduced to 70 percent (DOE 1996g:64).

E.2.3.2 *Steel Targets*

The equation used for this calculation is the Ballistic Research Laboratory (BRL) formula for rigid missile penetration of steel targets (DOE 1996g:65).

Perforation

$$T^{1.5} = 0.5MV^2 \div 17{,}400K_sD^{1.5}$$

where:

$T =$	perforation depth (in)
$M =$	W/g missile mass (lbs-sec^2/ft)
$V =$	missile impact velocity (ft/sec)
$K_s =$	constant depending on the grade of steel (usually ≈ 1)
$D =$	missile diameter (in)

To prevent perforation of steel targets, the minimum thickness t_d should be > 1.25T (DOE 1996g:65).

E.2.3.3 *Overburden*

In addition to the above equations, an equation exists to allow calculation of a reduced missile velocity as the result of contact with earth overburden. This reduced velocity was calculated as follows (PC 1995d):

$$V_i = V_o \times \exp\{(-\rho A C_s t) \div W\}$$

where:

V_i = reduced missile velocity as a result of earth overburden (ft/s)

V_o = velocity of missile before contact with earth overburden (ft/s)

A = effective area of missile (ft^2)

W = maximum weight of missile (engine shaft) for the category of aircraft (lbs)

C_s = speed of sound in soil (ft/s)

$= \{(E_s \cdot g) \div \rho\}^{0.5}$

t = time (s) $= 4 \cdot (d \div V_o^{1.25})$

d = depth of soil overburden (ft)

ρ = density of soil = 130 lbs/ft^3

E_s = soil modulus of elasticity = 470,000 lb/ft^2

g = acceleration due to gravity = 32.2 ft/sec^2

For reinforced concrete, a determination is made as to whether the missile perforates or scabs the facility. The steel target equations allow determination of perforation only.

E.3 SITE ANALYSIS

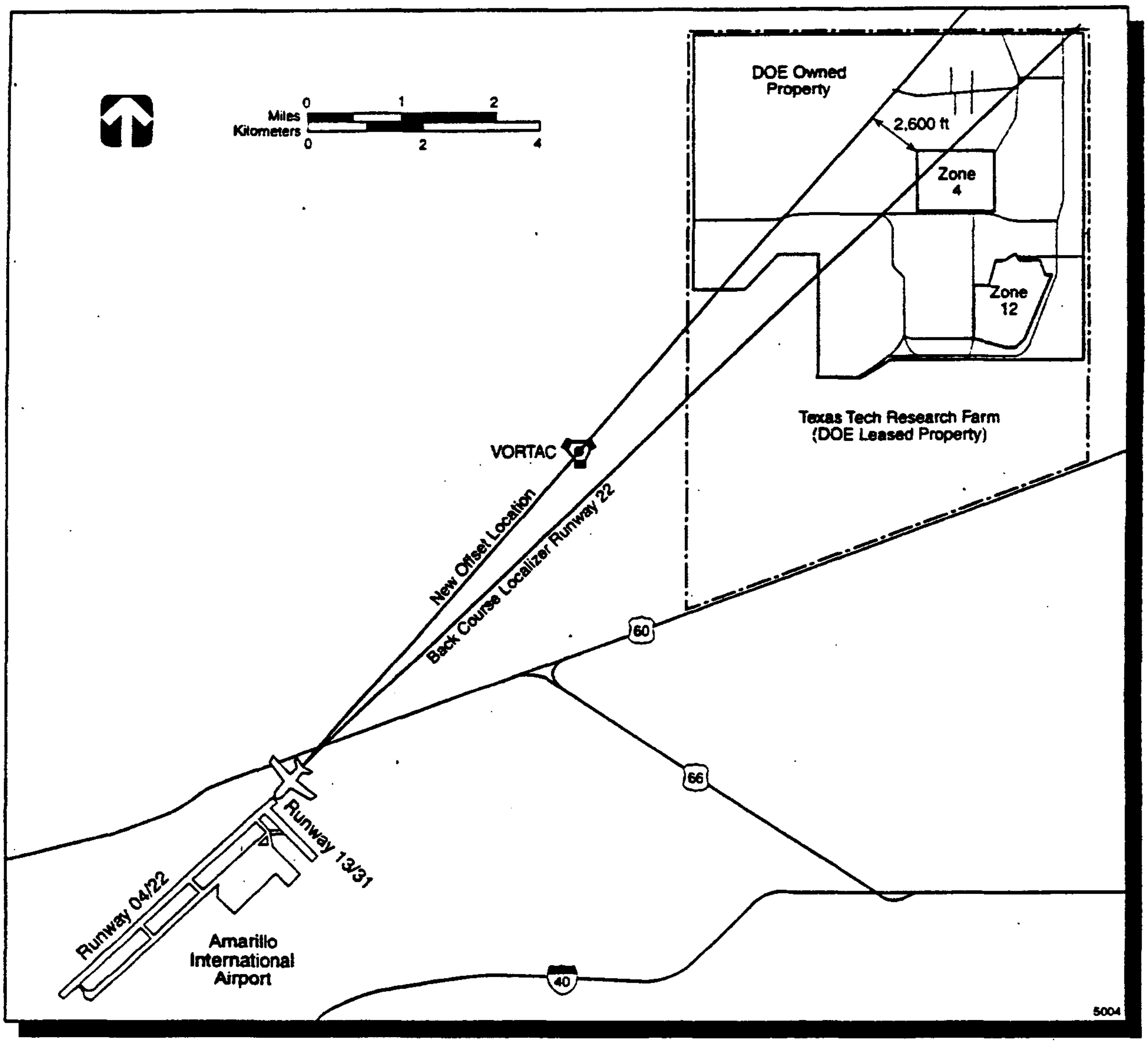
Sites to be analyzed include those that have been selected as possible alternative sites for plutonium pit storage: Pantex Plant, the Manzano Weapons Storage Area (WSA) at Kirtland Air Force Base (KAFB), the Nevada Test Site (NTS), the Savannah River Site (SRS), and the Hanford Site.

E.3.1 Pantex Plant

Pantex Plant is located about 27 kilometers (17 miles) northeast of Amarillo, Texas, approximately 13.6 kilometers (8.5 miles) from the northeast-southwest runway at the Amarillo International Airport. There is a prohibited airspace extending to 1,460 meters (4,800 feet) above mean sea level (MSL) directly above Pantex Plant, which corresponds to 366 meters (1,200 feet) above ground level (AGL).

The principal instrument approaches to the Amarillo International Airport are provided by two methods: an Instrument Landing System (ILS) and a Very High Frequency Omni Directional Radio Range with Tactical Air Navigation (VORTAC), a regional air navigational aid. The main approach uses the azimuth portion of the runway's ILS signals, called the Back Course Localizer (BCL) (Figure E.3.1–1). Any aircraft using full instrument approach to the main runway (Runway 4/22) follows a path that takes it over the Plant's boundaries at an altitude of approximately 1,460 meters (4,800 feet).

The VORTAC is 8 kilometers (5 miles) west of Pantex Plant. An approaching aircraft using the VORTAC also follows a path that also takes it over the Plant's boundaries (Figure E.3.1–2). Thus, air traffic in each of the nine low-altitude and eight high-altitude air corridors serviced by the VORTAC contributes to air traffic in the vicinity of Pantex Plant (Figures E.3.1–3 and E.3.1–4). There is an additional VORTAC



SOURCE: DOE 1995a:15

FIGURE E.3.1–1.—*Back Course Localizer Approach to the Amarillo International Airport.*

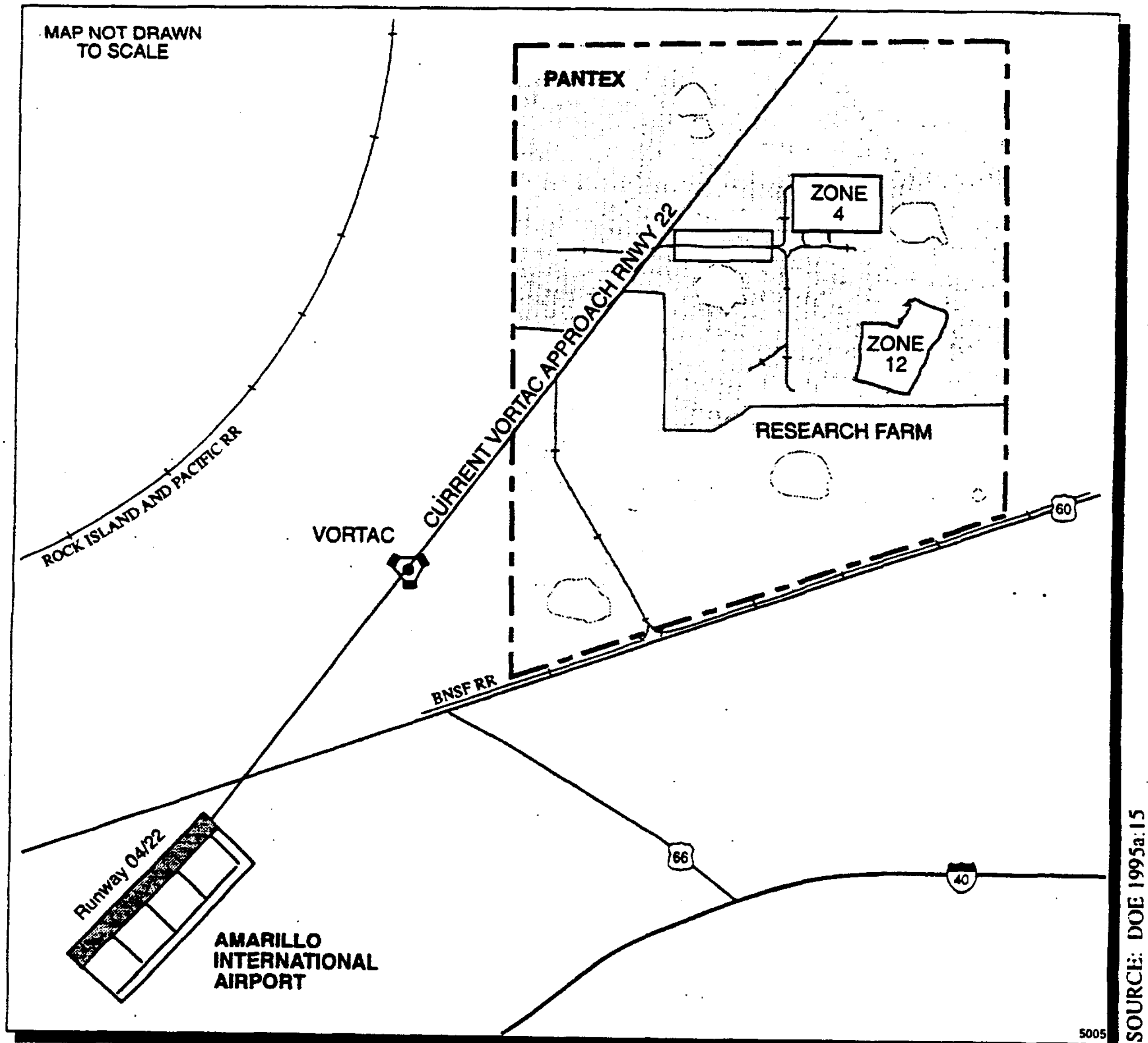
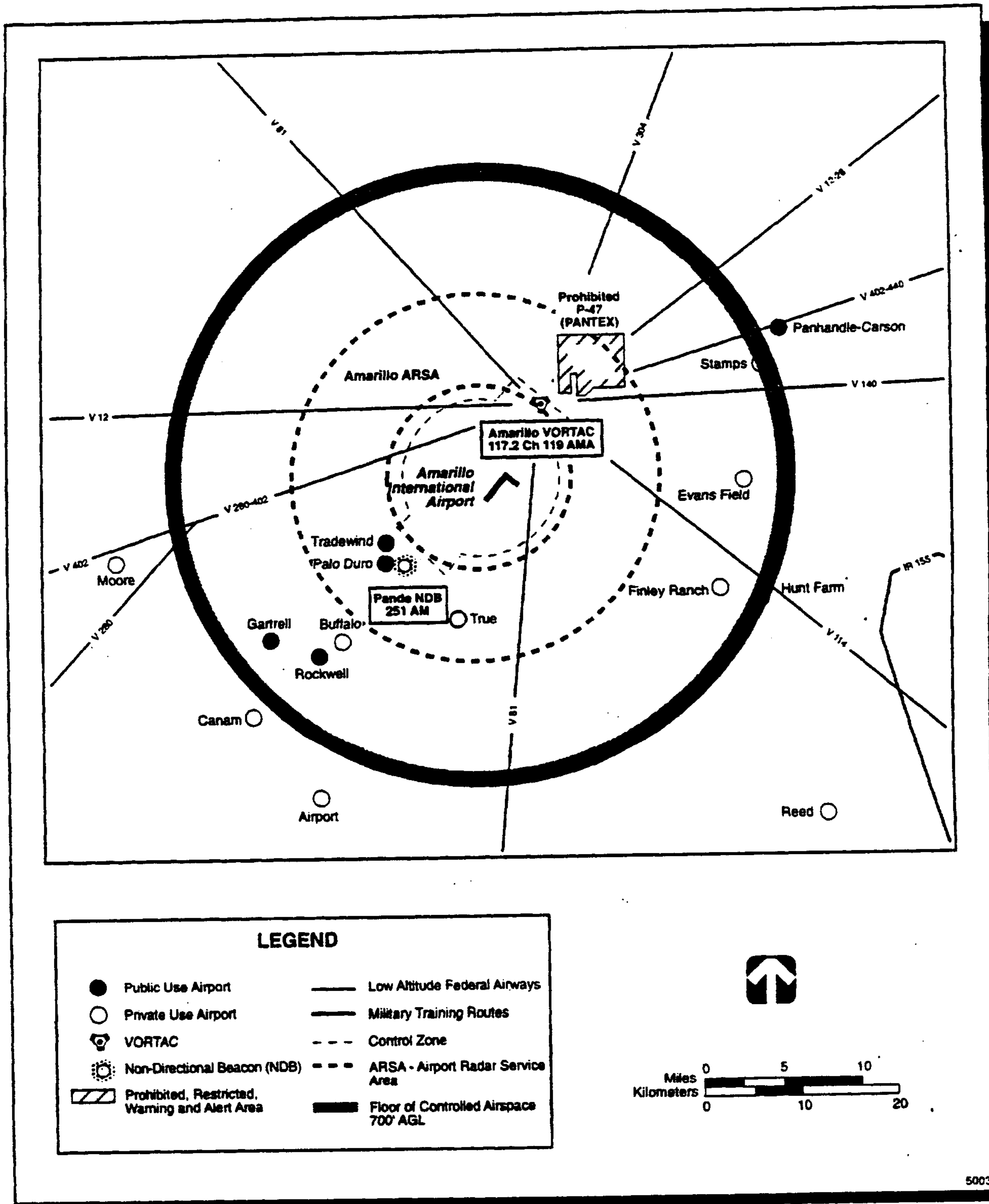
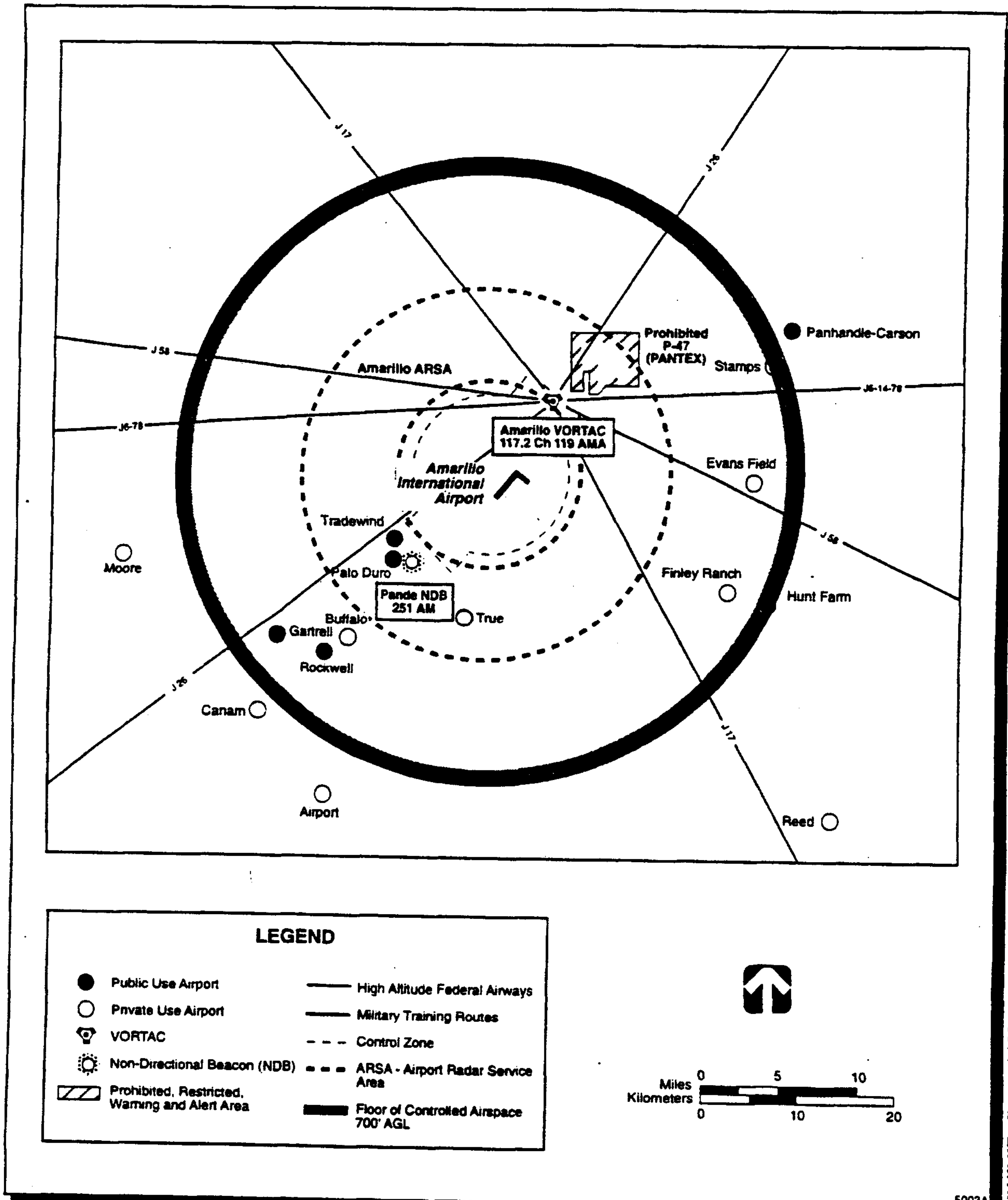


FIGURE E.3.1–2.—*VORTAC Approach to the Amarillo International Airport.*



SOURCE: Barnard 1990:7

FIGURE E.3.1-3.—*VORTAC and Low-Altitude Federal Airways.*



SOURCE: Barnard 1990:7

FIGURE E.3.1-4.—*VORTAC and High-Altitude Federal Airways.*

north of the Plant near Borger. Aircraft flying in this high-altitude air corridor were included in data collected for Pantex Plant.

DOE and the Federal Aviation Administration (FAA) have signed a Memorandum of Understanding (MOU) to take several actions to reduce the number of flights directly over Pantex Plant. Some of these steps include establishing a Global Positioning System (GPS) route around Pantex Plant, moving the holding pattern for commercial aircraft away from the Plant, and moving the high-altitude VORTAC closer to the airport. The estimated reduction in risk for these changes is discussed in section E.3.1.7.

An estimate of an aircraft crash into any of the Zone 4 magazines and Zone 12 buildings at Pantex Plant was generated using the probability equations defined in section E.2.1, the effective areas defined in section E.2.2, and the structural response in section E.2.3.

E.3.1.1 *Radar Airspace Monitoring System Project*

The RAMS project is based at the Amarillo International Airport and consists of a computer system that records radar data from various aircraft overflights in the area. This radar data is then translated into data points that represent aircraft positions in relation to the airport and Pantex Plant. RAMS data include individual aircraft types that were divided into the aircraft categories defined in section E.2.1 to ratio the number of aircraft operations at the airport. The RAMS data was used to categorize the aircraft in more detail than the four categories i.e., Air Carrier, Air Taxi, Military, and General Aviation) supplied by FAA.

E.3.1.2 *Operations Near Pantex Plant*

An adjustment to the Near-Airport Model consisted of manipulation of the aircraft modes (i), aircraft categories (j), and flight sources (k) to model Pantex Plant conditions. The aircraft mode, i, was summed over three phases:

i = 1	Take-off
i = 2	In-Flight
i = 3	Landing

The aircraft categories are very similar to those presented in section E.2.1.

j = 1	Commercial: Air Carrier
j = 2	Commercial: Air Taxi
j = 3	Military: Large (Bomber, Cargo, and Tanker aircraft)
j = 4	Military: Small (Attack, Fighter, and Trainer aircraft)
j = 5	General: Fixed-wing, reciprocating, single-engine
j = 6	General: Fixed-wing, reciprocating, multi-engine
j = 7	General: Fixed-wing, turboprop
j = 8	General: Fixed-wing, turbojet
j = 9	Helicopters

The flight source, k, was set equal to five flight sources.

k = 1	Runway 22
k = 2	Runway 04
k = 3	Runway 31

k = 4 Runway 13

k = 5 Non-Airport Aircraft

It was determined that the following commercial aircraft are used at the Amarillo International Airport:

- American Airlines
  - — F100 (Fokker 100; 90+ passenger capacity)
  - — SF340 (Saab; approximately 35-passenger capacity)
  - — AT72 (ATR72; approximately 66-passenger capacity)
- Delta Air Lines
  - — AT72 (ATR72; approximately 66-passenger capacity)
  - — E120 (Brasilia; approximately 30-passenger capacity)
- United Airlines
  - — E120 (Brasilia; approximately 30-passenger capacity)
- Southwest Airlines
  - — 737 (Boeing; 100+ passenger capacity)

In this analysis, 1995 data obtained from the FAA indicate that there are approximately 74,911 operations per year at the Amarillo International Airport. The FAA supplied data for air carrier, air taxi, military, and general aviation aircraft, with 11,122; 7,134; 30,386; and 26,269 operations, respectively (PC 1995). Based on RAMS data, there were 233 helicopter operations in 1995.

Since the number of annual aircraft operations has been as high as 88,489 in 1992, the maximum number of operations from 1990 to 1996 were used in the analysis for each FAA aircraft category. Maximum values for air carrier, air taxi, military, general aviation, and helicopter operations are 13,174 (1990); 9,938 (1993); 40,638 (1993); 29,134 (1992); and 233 (1995), respectively.

FAA commercial and general aviation operations numbers do not include the number of times a commercial or general aviation may circle during a holding pattern, but holding patterns have been included in the crash rates for commercial and general aviation. The FAA number for military operations includes touch-and-go operations (PC 1995c). RAMS data were used to divide military and general aviation FAA data into aircraft categories (i.e., large or small military, and single-engine, multi-engine, turboprop, or turbojet general aviation).

Approximately 12 months of RAMS data were used to identify and categorize aircraft by type (DOT 1994; DOT 1985; LLNL 1995). The percentage of operations, using the RAMS data, was derived from the four sets of FAA data (i.e., air carrier, air taxi, military, and general aviation). The total number of operations was obtained by multiplying the percentage of RAMS operations for each aircraft category by the FAA data for each category.

The total number of operations that could occur on Runway 31 is the same as the total number of operations for each category except for air carrier and large military, which include aircraft that are too heavy to use Runway 31. The percentage of operations that occur on Runway 31 (6.8 percent) was obtained by evaluating a statistical sample of RAMS data and counting the number of operations on each runway (PC 1995a). The percentage of operations that land on Runway 22 (64.1 percent) versus take-off on Runway 04 (35.9 percent) was determined based on prevailing winds (Figure 4.7.1.1–1 in volume I). Table E.3.1.2–1 presents the number of operations for each aircraft category for Runways 04, 22, and 31.

In addition to FAA operations data, in the Near-Airport Model, in-flight aircraft at high altitudes were considered as Non-Airport operations in the Draft DOE Standard (DOE 1996g) methodology. The evolution of high-altitude aircraft is based on the DOE Standard NPf(x,y) values for Pantex Plant. All high-altitude overflights are assumed to be in-flight. The calculation of this impact frequency is performed using the equation discussed in section E.2.1.

E.3.1.3 *Crash Density Function Near Pantex Plant*

Because Zones 4 and 12 are within the aircraft category dependent exclusion distance from the Amarillo International Airport, the air operations of interest for this analysis are take-off, landing, and in-flight modes (i.e., i = 1, 2, 3). Therefore, the probability equation becomes:

$$F = \sum_{i=1,3}\sum_{j=1,9}\sum_{k=1,5} N_{ijk} \cdot A_{ij} \cdot f_{ijk}(x,y) \cdot P_{ijk}$$

The length of Runway 04/22 at the Amarillo International Airport is 4.12 kilometers (2.56 miles). It was assumed from the direction of the prevailing winds that Runway 22 is used 64.1 percent of the time (Figure 4.7.1.1–1 in volume I). Due to the aircraft category dependent exclusion distance, all aircraft considered as an airport operation on Runway 04/22 were either in the take-off or landing mode. For all runways, the pattern side for military operations was conservatively assumed to be the value for the side with the larger probability density function (pdf), since there is no dominant pattern at the Amarillo International Airport. For all runways, 50 percent of operations are take-off and 50 percent are landing.

The length of Runway 13/31 is 2.41 kilometers (1.50 miles). Approximately 6.8 percent of daily operations occur on Runway 13/31. Because Runway 13 has only about one operation per day, all operations on the runway were assumed to occur on Runway 31. Due to weight restrictions, air carrier and large military aircraft cannot use Runway 31. For this runway, all aircraft considered as an airport operation were either in the take-off or landing mode.

The center-line and perpendicular distances from the geometric center of the runway to specific points of concern in Zones 4 and 12 were determined as shown in Figure E.3.1.3–1 (USGS 1953; USGS 1953a; USGS 1973; USGS 1956). Because Pantex Plant resides within the aircraft category dependent exclusion distances, a Near-Airport Analysis was required and probability density function values were used in this analysis.

Figure E.3.1.3–1 (not to scale) represents the location of Pantex Plant facilities in relation to Runways 22/04 and 31/13 at the Amarillo International Airport. There are two key areas on this figure that are considered in assessing the aircraft impact probability:

- A 1-mile by 1-mile grid area encompassing most of Zone 4 West located southeast of the runway center-line.
- A 1-mile by 1-mile grid area adjacent to the first and encompassing all of Zone 12.

The aircraft impact probability assessment focuses on accidents in the vicinity of these areas; in particular the nearest facility for each of these zone areas. The assessment was performed by separating the displacement vector from the geometric center of the runway to specific points in the zone grids into two orthogonal components:

- Vector coincident with a direct projection of the center-line of the runway.
- Vector perpendicular to the first that extends from the first vector to the nearest impact point in the area. For Pantex Plant, this point represents the plutonium centroid of Zones 4 and 12 (refer to Figure E.3.1.3–1).

The lengths of these two vector components were used to implement the Near-Airport Model methodology. It was assumed for simplicity that all of the Zone 4 West magazines reside in the grid under consideration.

The NPf(x,y) values provided in the Draft DOE Standard (DOE 1996g) for the various aircraft categories reflect the crashes per square mile, per year, centered at a given site for non-airport operations. In this analysis, the following NPf(x,y) values for Pantex Plant were used (DOE 1996g:B-24, B-25):

NPf(x,y) General Aviation =	7×10^{-5}
NPf(x,y) Air Carrier =	6×10^{-8}
NPf(x,y) Air Taxi =	4×10^{-7}
NPf(x,y) Large Military =	1×10^{-7}
NPf(x,y) Small Military =	5×10^{-6}

The NPf(x,y) value for general aviation was split between the four general aviation categories for Pantex Plant based on the RAMS data. The value was divided up based on the following percentages:

Single-engine piston =	$43.8\% \Rightarrow 3.1 \times 10^{-5}$
Multi-engine piston =	$19.8\% \Rightarrow 1.4 \times 10^{-5}$
Turboprop =	$17.0\% \Rightarrow 1.2 \times 10^{-5}$
Turbojet =	$19.4\% \Rightarrow 1.4 \times 10^{-5}$

According to the Draft DOE Standard, it has been shown, based on helicopter crash data, that the contribution to impact frequency from non-local helicopter overflights is insignificant and need not be considered in the impact frequency calculations (DOE 1996g:45). However, it is necessary to consider local helicopter flights that consist of planned overflights dealing with facility operations, or flights dealing with area operations (e.g., Southwestern Public Service

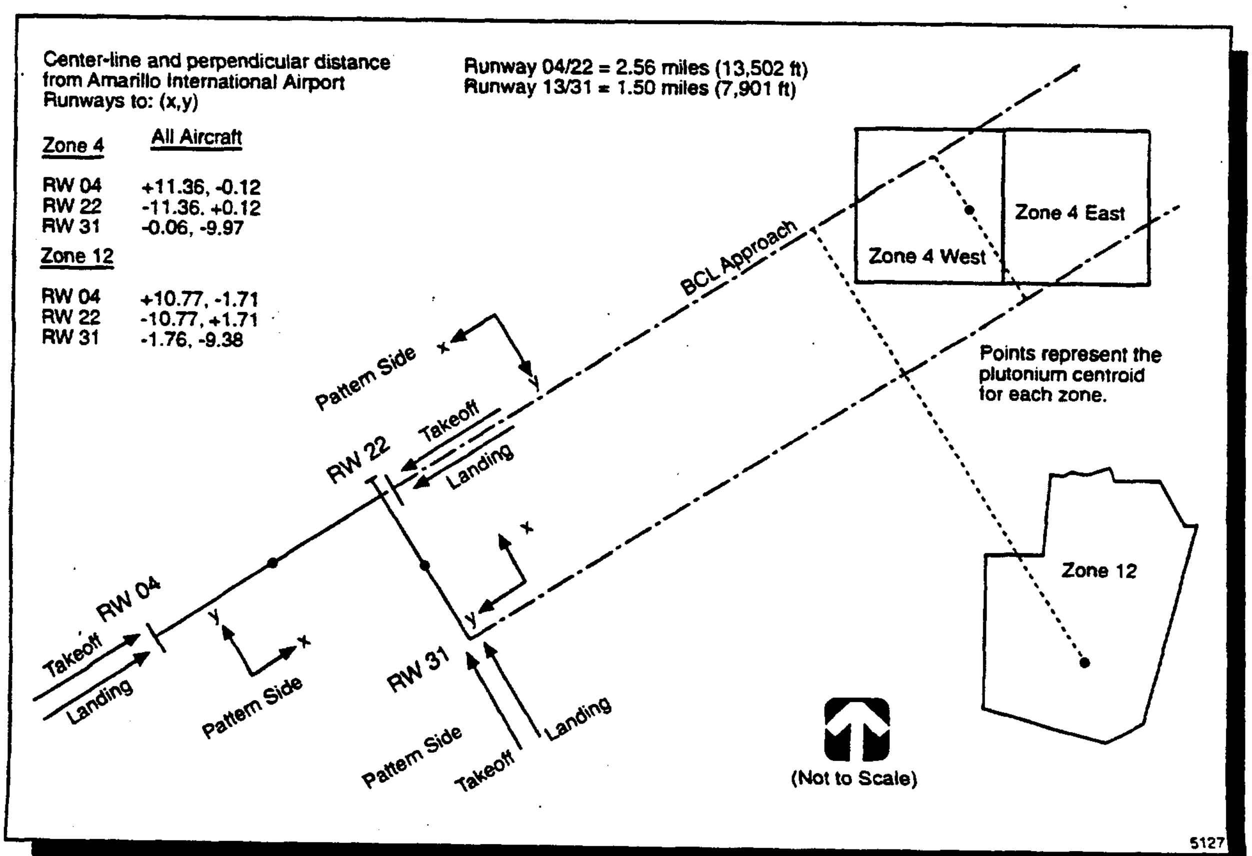


FIGURE E.3.1.3–1.—*Pantex Plant and the Amarillo International Airport.*

powerline maintenance flights), using the equation discussed in section E.2.1.

E.3.1.4 *Zone 4*

In this analysis, only facilities that contain plutonium and large amounts of tritium were considered, as determined in previous hazard assessments, since these materials have possible offsite consequences (Jacobs 1993; Jacobs 1993a; Jacobs 1992).

Area Calculation

To estimate the overall probability of aircraft impact into any magazine in Zone 4, the probability of striking an individual magazine or group of magazines is summed appropriately over the individual magazines or groups of magazines analyzed (i.e., 18 Modified Richmond (MR) magazines, 9 groups of 3 Steel Arch Construction (SAC) magazines, and 3 groups of 5 SAC magazines). The total effective area is the sum of the true areas (the magazine base area adjusted for aircraft dimension), the shadow areas (defined by the magazine height and the angle of postulated impact), and the skid areas (the area covered by a skidding aircraft after impact with the ground) posed by all 60 magazines in Zone 4.

The MR magazines were considered as single structures (18 total), while the SAC magazines were analyzed as 9 groups of 3 (27 total) and 3 groups of 5 (15 total). The distance between the SAC magazines in the groups was included in the value used for the length of the group because this length gave a better representation of the possible area of impact.

The following section illustrates the calculation of the individual areas and the effective area for the groups of three SAC magazines. In this calculation, the magazines were assumed to be in a position (e.g., east row on Figure 4.15.1.1–1 in volume I) that allows the longest skid distance prior to impact with a magazine.

An aircraft that impacts the ground prior to reaching a line of magazines, (i.e., in a skid mode) can impact one line of magazines, but is precluded from reaching the second. The effective areas for one line of magazines (and the five isolated MR magazines) were estimated using the mean skid distances presented in the Draft DOE Standard (DOE 1996g:B-29). However, the skid distances for magazines in the second line were reduced to no more than the distance between the two rows of magazines (125 meters [410 feet]) (Figure 4.15.1.1–1 in volume I). This reduced distance affects commercial and military aircraft only. In addition, the shadow area of the first row was eliminated since it is part of the skid area of the second row. The angle of impact was chosen based on the values presented in the Draft DOE Standard (DOE 1996g:B-29).

A total effective area for the Zone 4 magazines was then computed by combining the effective areas in the following manner. The effective area for magazines in the east row is the sum of the effective areas for three groups of three SAC magazines, three groups of five SAC magazines, and six MR magazines. The effective area for magazines in the west row is the sum of the effective areas for six groups of three SAC magazines and seven MR magazines. All of these effective areas were computed using the 125-meter (410-foot) inter-row separation as the skid distance for air carrier and military aircraft. The total effective area for Zone 4 is the sum of the effective areas for the east and west rows plus the effective areas of the five MR magazines on the west side of Zone 4. Table E.3.1.4–1 presents the Zone 4 building dimensions.

Table E.3.1.4–2 presents the aircraft operational data used for the Zone 4 analysis. In this table, both the Draft DOE Standard and representative wingspans for aircraft in the vicinity of Pantex Plant are given. Representative wingspans were determined by examining RAMS data and selecting aircraft for each category that represented the average of the aircraft (for the commercial and military aircraft categories, over 96 percent of the aircraft were included). Weighted average wingspans were then used in the calculations (Jane's 1961-1996). The skid length used corresponds to the skid distances presented in the Draft DOE Standard (DOE 1996g:B-29).

Hit Probability Calculation

Using the coordinate convention, the center-line (x distance) and perpendicular distances (y distance) to the plutonium centroid for Zone 4 are:

Zone 4	All Aircraft
Runway 04	11.36 mi, -0.12 mi
Runway 22	-11.36 mi, 0.12 mi
Runway 31	-0.06 mi, -9.97 mi

Based on these distances, all aircraft using the Amarillo International Airport were analyzed using the Near-Airport Model. The crash location probabilities for Runway 22 are presented in Table E.3.1.4–3 (DOE 1996g:B-12–B-23). The air carrier and air taxi crash location probabilities are identical because their crash density location probabilities are grouped into a commercial category. The crash location probabilities are zero for Runway 22 take-offs because in this analysis all take-offs are in a direction away from Pantex Plant, and thus are not a threat to the plant facilities.

The crash location probabilities for Runway 04 are provided in Table E.3.1.4–4 (DOE 1996g:B-12–B-23). Both the air carrier and air taxi crash location probabilities are identical because their crash location probabilities are grouped into a single commercial category.

The crash location probabilities for Runway 31 are presented in Table E.3.1.4–5 (DOE 1996g:B-12–B-23). Likewise, the air carrier and air taxi crash location probabilities are also identical because their crash location probabilities are grouped into a single commercial category.

The impact probability was obtained for the entire Zone 4 storage area by multiplying the number of flights, the impact area, the crash rate, and the crash density function for each category. With substitution of the above data into the probability equation for the specific aircraft type, the impact probabilities for Zone 4 were calculated. Table E.3.1.4–6 contains the crash probabilities for Runway 22 landings, Runway 04 take-offs, and the non-airport aircraft. Runway 31 crash probabilities are omitted because they are all zero.

Structural Calculation

For this analysis, 70th percentile velocities of aircraft were used (LLNL 1995:2-24, 3-81, 4-25, 4-26). The velocities chosen were in either take-off or landing operations, whichever was the largest. For facilities with earth overburden, these velocities were reduced according to the earth overburden velocity reduction equation previously defined.

The local response equations for rigid missiles impacting reinforced concrete structures were applied to the MR magazines, and the local response steel equations for rigid missiles were applied to the SAC magazines. A reduction in penetration depth was taken because the missiles were non-rigid. In this analysis, the aircraft engine was investigated as the missile of concern. These engines were treated in the equations as non-rigid missiles. Table E.3.1.4–7 presents representative engine weights and diameters for aircraft landing and taking off at the Amarillo International Airport. Representative engine weights and diameters were determined by examining RAMS data and selecting aircraft for each category that represented the average of the aircraft. Weighted average engine weights and diameters were then used in the structural calculations.

Local response structural calculations were performed for five different sets of overburdens and building thicknesses. These include the MR magazine roof and walls, the SAC magazine roof and walls, and the front doors of both magazine types. Since only the magazine entry barrier was modeled, doors for the SAC and MR magazines are the same. The roof and walls for both types of facilities were modeled separately since there is substantially greater overburden on the walls compared to the roof. The front face was modeled assuming the large security barrier was in place. Table E.3.1.4–8 presents the results for either perforation or scabbing for each of the five different sets. Similarly, Table E.3.1.4–9 presents the results for perforation.

Perforation and Scabbing Probability Calculations

For facilities with high explosives (HE) (weapons), the bounding accident is a perforation or scab leading to an explosion. For facilities without HE, the bounding accident is a perforation leading to a fire. Scabbing leading to an explosion is not possible in Zone 4 since material with HE is stored in SACs which cannot scab. The areas for the facilities were reduced using the structural analysis results. The reduced areas were then used to recalculate perforation and scabbing probabilities. These areas are shown in Table E.3.1.4–10, and used to calculate the perforation leading to a fire probabilities shown in Table E.3.1.4–11 and the perforation leading to an explosion probabilities shown in Table E.3.1.4–12.

The combined perforation and scabbing probabilities were used to calculate an explosion probability, since either perforation or scabbing could cause an explosion. For the case where no HE is present, the model was used to calculate the probability of a perforation leading to a fire. The true, shadow, and skid areas for the Zone 4 facilities were reduced for perforation or scabbing based on the following (see Tables E.3.1.4–8 and E.3.1.4–9):

- If the MR magazine roof is "ND" (no damage), then the true and shadow areas are reduced to 0.0.
- If the MR magazine walls are "ND", then the shadow and skid areas are reduced to the width of the building times the skid distance (damage can only occur through the front wall).
- Similarly, if the SAC magazine roof is "ND", then the true and shadow areas are reduced to 0.0.
- Similarly, if the SAC magazine walls are "ND", then the shadow and skid areas are reduced to the width of the building times the skid distance (damage can only occur through the front wall).
- If the MR or SAC magazine front door is "ND", then the skid area is 0.0.

E.3.1.5 *Zone 12*

The analysis performed for Zone 12 of Pantex Plant was virtually identical to that for Zone 4. The number of airport operations on Runways 22, 04, and 31 discussed in section E.3.1.4 and aircraft wingspans and crash rates used in the Zone 4 analysis were used in the Zone 12 analysis. Zone 12 facilities of concern to aircraft crash are those containing plutonium and large amounts of tritium as determined in previous hazard assessments, since these materials have possible offsite consequences (Jacobs 1993; Jacobs 1993a; Jacobs 1992).

Area Calculation

The following section illustrates the calculation of the individual areas and the effective area for the Zone 12 buildings. In this calculation, the buildings were assumed to be in a position that allows the longest skid distance prior to impact with a building (see Figure 4.15.1.1–2 in volume I). As an exception to using the skid distances provided in the Draft DOE Standard (DOE 1996g), for Zone 12, the skid distance was reduced to the maximum distance to nearby buildings when nearby buildings shield the particular facility. The skid distances are presented in Table E.3.1.5–1, as well as the reduced skid distances to account for shielding.

A total effective area for the Zone 12 buildings was then computed by combining the effective areas. The angle of impact was assumed to be that given in the Draft DOE Standard for the various aircraft types. Table E.3.1.5–2 presents the Zone 12 building dimensions.

Table E.3.1.5–3 presents the aircraft operational data used for the Zone 12 analysis. In this table, both the Draft DOE Standard and representative wingspans for aircraft in the vicinity of Pantex Plant are provided. Representative wingspans were determined by examining RAMS data and selecting aircraft for each category that represented the average of the aircraft (for the commercial and military aircraft categories, over 96 percent of the aircraft were represented). Weighted average wingspans were then used in the calculations. The skid length used corresponds to the mean skid distances presented in the Draft DOE Standard (DOE 1996g:B-29).

Hit Probability Calculation

Using the coordinate convention, the center-line (x distance) and perpendicular (y distance) distances to the plutonium centroid for Zone 12 are:

Zone 12	All Aircraft
Runway 04	10.77 mi, -1.71 mi
Runway 22	-10.77 mi, 1.71 mi
Runway 31	-1.65 mi, -9.38 mi

Based on the above distances, all aircraft using the Amarillo International Airport were analyzed with the Near-Airport Model. The crash location probabilities for Runway 22 are presented in Table E.3.1.5–4 (DOE 1996g:B-12–B-23). Air carrier and air taxi crash location probabilities are identical because their crash density location probabilities are grouped into a commercial category. The crash location probabilities are zero for Runway 22 take-offs because in this analysis all take-offs are in a direction away from Pantex Plant, and thus are not a threat to Plant facilities.

The crash location probabilities for Runway 04 are presented in Table E.3.1.5–5 (DOE 1996g:B-12–B-23). The air carrier and air taxi crash density location probabilities are identical because their crash location probabilities are grouped into a commercial category.

The crash location probabilities for Runway 31 are presented in Table E.3.1.5–6 (DOE 1996g:B-12–B-23). Similarly, both the air carrier and air taxi crash density location probabilities are identical because their crash location probabilities are also grouped into a single commercial category.

The impact probability was obtained for the entire Zone 12 operations area by multiplying the number of flights, the impact area, the crash rate, and the crash density function for each category. With substitution of the above data into the probability equation for the specific aircraft type, the impact probabilities for Zone 12 were calculated. Table E.3.1.5–7 contains the crash probabilities for Runway 22 landings, Runway 04 take-offs, Runway 04 landings and the non-airport aircraft. Runway 31 crash probabilities are omitted because they are all zero.

Structural Calculation

The same local response equations for concrete and steel structures used in the Zone 4 analysis were used in this analysis. Building 12–60 is a steel arch construction building and was treated as such. Building 12–41 is constructed with clay tile walls and perforation was assumed to occur for all aircraft types.

Local response structural calculations were performed for 15 different sets (roofs and walls modeled separately) of overburdens and building thicknesses. These include 12-64, 12-84 West (grouped with 12-99 and 12-104), 12-84 East, 12-44 (grouped with 12-85, 12-96, and 12-98), 12-41, 12-50, 12-60, 12-94, 12-104A, 12-26 Pit Vault, 12-42 North Vault, 12-42 South Vault, 12-44 Cell 8, 12-58, and 12-116. Table E.3.1.5–8 presents the results for either perforation or scabbing and Table E.3.1.5–9 provides the results for perforation.

Perforation and Scabbing Probability Calculations

For facilities with HE (weapons), the bounding accident is a perforation or scab leading to an explosion. For facilities without HE, the bounding accident is a perforation leading to a fire. The areas for the facilities were reduced using the structural analysis results. The reduced areas were then used to recalculate perforation and scabbing probabilities. These areas are shown in Table E.3.1.5–10, and used to calculate the scabbing leading to an explosion probabilities shown in Table E.3.1.5–11, the perforation leading to an explosion probabilities shown in Table E.3.1.5–12, and the perforation leading to a fire probabilities shown in Table E.3.1.5–13.

The combined perforation and scabbing probabilities are used to calculate an explosion probability, since either perforation or scabbing could cause an explosion. For the case where no HE is present, the model was used to calculate the probability of a perforation leading to a fire. The true, shadow, and skid areas for the Zone 12 facilities were reduced for perforation or scabbing based on the following ("ND" denotes no damage. See Tables E.3.1.5–8 and E.3.1.5–9):

- If the 12–64, 12–84 W, 12–99, 12–104 roofs are "ND", then the true and shadow areas are reduced to 0.0.
- If the 12–64 walls are "ND", then the skid area is reduced to the width of the building times the skid distance (damage can only occur through the front).
- If the 12–84 E roof and walls are "ND", then the true and shadow areas are reduced to 0.0 and the skid area is reduced to the width of the building times the skid distance (damage can only occur through the front).
- If the 12–44, 12–85, 12–96, 12–98 roofs and walls are "ND", then the true, shadow and skid areas are reduced to 0.0.
- If the 12–50 roof is "ND", then the true and shadow areas are reduced to 0.0.
- If the 12–50 walls is "ND", then the skid area is reduced to 0.0 (there are no doors exposed to the skid direction).
- If the 12–60 roof is "ND", then the true and shadow areas are reduced to 0.0.
- If the 12–60 walls is "ND", then the skid area is reduced to 0.0 (there are no doors exposed to the skid direction).
- If the 12–41 roof and walls are "ND", then the true, shadow and skid areas are reduced to 0.0 (since this was a clay tile structure the facility was modeled as having no depth to assure that perforation occurs).
- If the 12–94 roof and walls are "ND", then the true, shadow and skid areas are reduced to 0.0.
- If the Cell 8 roof and walls are "ND", then the true, shadow and skid areas are reduced to 0.0.
- If the 12–26 Pit Vault, 12–42 North Vault, and 12–42 South Vault roofs and walls are "ND", then the true, shadow and skid areas are reduced to 0.0.
- If the 12-116 roofs and walls are "ND", then the true, shadow and skid areas are reduced to 0.0.
- If the 12-58 roofs and walls are "ND", then the true, shadow and skid areas are reduced to 0.0.

- If the 12-104A roofs and walls are "ND", then the true, shadow and skid areas are reduced to 0.0.

E.3.1.6 *Consequence Analysis*

The probability of an aircraft hitting a facility in Zone 4 and Zone 12 is 1.3×10^{-5} and 1.8×10^{-5}, respectively, for a total of 3.1×10^{-5}. The probability of damaging a facility by scabbing leading to an explosion in Zone 4 is 0.0 because scabbing is only possible in MR magazines. These magazines are preferentially occupied by pits (no HE present), whereas the SAC magazines are incapable of scabbing because there is no concrete in the roof and walls. In Zone 12, the probability of scabbing is 1.5×10^{-7}, however, a study conducted by Jeff Glover of Mason & Hanger indicates that scabbed material from the missiles of concern do not possess the energy to cause a detonation within Zone 12 (PC 1996).

The probability of damaging a facility by perforation leading to an explosion in Zone 4 and Zone 12 is 6.8×10^{-7} and 2.3×10^{-6}, respectively, for a total of 3.0×10^{-6}. The probability of damaging a facility by perforation leading to fire for Zone 4 and Zone 12 is 5.2×10^{-7} and 4.7×10^{-7}, respectively, for a total of 9.9×10^{-7}. This represents a conservative upper bound for the probability of causing a fire or explosion resulting in plutonium dispersal. This conservative upper bound includes the probability that plutonium or tritium is in the facility, that all of the containers fail, that a fire occurs, and that the contents are exposed to the fire. All four of these probabilities are known to be less than 1 but have been conservatively assumed to be 1 for this calculation.

Consistent with the Draft DOE Standard (DOE 1996g), a consequence analysis has been performed for this accident. The consequence analysis is similar to the consequence analysis for other accidents and is provided for Scenarios 3 and 8 in Table 4.14.2.1–3, volume I.

E.3.1.7 *Risk Reduction Due to Overflight Working Group Initiatives*

Recommendations of the Overflight Working Group are presented in volume I, section 4.15.1.3. DOE has committed to implement the risk reduction measures proposed by this group. Based on the discussion in volume I, section 4.15.7, it is not possible to fully characterize the risk reduction that would result with implementation of the Overflight Working Group initiatives using the current methodology. However, it is estimated that implementation of the MOU, the offset localizer, relocation of the VORTAC, and 65 percent use of GPS non-precision approach tracks would result in an 82 percent cumulative risk reduction (DOE 1995:22). This 82 percent reduction was estimated using the Solomon model. Fortification of areas and structures in which nuclear materials are handled and stored could further reduce the impact of aircraft accidents.

E.3.2 Manzano Weapons Storage Area

The Manzano WSA is located near the Albuquerque International Airport, a major airport whose routine flight operations include many heavy aircraft. The methodology used to assess the aircraft impact probability is very similar to the analysis performed for the Pantex Plant, but in much less detail because there is only one building type to be analyzed.

The Manzano WSA is located in the foothills of the Manzano Mountains, approximately 6.5 kilometers (4 miles) southeast of the main (east-west) runway of the Albuquerque International Airport, one of three airports in the vicinity the Manzano WSA. The Albuquerque International

Airport is the major commercial airfield in the State of New Mexico; it is the only airport with regular commercial jet service. In addition to its role as a commercial airfield, the Albuquerque International Airport is used by military aircraft at KAFB. In 1994, the Albuquerque International Airport had 220,914 aircraft operations (take-offs and landings) (PC 1996a).

In addition to the Albuquerque International Airport, there are two other airports in the Albuquerque area. Coronado Airport, approximately 19 kilometers (12 miles) to the north-northwest, has two runways used only by general aviation aircraft. Similarly, Alameda Airport, approximately 24 kilometers (15 miles) to the northwest, has two runways used only by general aviation aircraft.

A description of the x and y coordinate system, the category of aircraft operations that occur, and a screening of the probability density function values for the three airports is presented in Table E.3.2–1. An initial screening of the probability density function values for the type of aircraft operations eliminated the Coronado and Alameda Airports. Both of these airports are outside the probability density function boundary for general aviation aircraft and, therefore, were not included in the aircraft crash analysis. Only the Albuquerque International Airport and non-airport (in-flight) aircraft were included in the analysis as required by the Draft DOE Standard (DOE 1996g).

In the history of the Manzano WSA facility, there have been three aircraft crashes. One of the crashes involved an F-100C. The crash occurred east of the Manzano WSA administration area. Another crash involved a B-29 in the northern portion of the site. The aircraft departed from KAFB and crashed after approximately three minutes in flight, killing the crew. The third crash also occurred in the northern portion of the site and involved an EC-135 (KAFB 1993:69,73,74).

A major advantage offered by the Manzano WSA storage facilities is the amount of rock overburden that would shield the stored pits from damage due to aircraft accidents. This overburden is needed because the candidate storage facilities lack an automatic fire suppression system and cannot rely on prompt response from local fire fighters (due to remote facility location and lack of automatic fire detection capability).

If DOE chooses to relocate pits to the Manzano WSA, the pits would be stored in Type D magazines. Type D magazines (as shown in Figure 5.5.1.12–1 in volume I) have access tunnels that vary in length from 20 meters to over 30 meters (65 feet to over 100 feet). The main chambers are approximately 19 meters (61 feet) long and have the capacity to store up to 800 pit containers each in a Stage Right configuration. The main chamber is protected by two vault-like steel doors at both ends of the access tunnel.

Type D facilities are tunneled into the mountainside and thus, provide significant earth overburden protection from penetrating aircraft. As many as 35 magazines have overburden greater than 9 meters (30 feet) and are potentially available for pit storage.

For the 20,000 pit storage option, approximately 25 Type D magazines would be utilized. For the 8,000 pit storage option, approximately 10 Type D magazines would be utilized. The frequency of an aircraft impact at the Manzano WSA is relatively high compared with other potential storage sites. However, the earth overburden of Type D magazine provides significant protection against potential damage from aircraft impacts.

E.3.2.1 *Aircraft Crash Affected Environment*

An adjustment to the Near-Airport and Non-Airport Models consisted of manipulation of the flight modes (i), aircraft categories (j), and aircraft sources (k) to fit the Manzano WSA site. The flight mode, i, was set equal to three flight modes.

i = 1	Take-off
i = 2	In-flight
i = 3	Landing

The aircraft categories are very similar to Pantex Plant, except helicopters have been omitted because they are not shown to be penetrating missiles.

j = 1	Commercial: Air Carrier
j = 2	Commercial: Air Taxi
j = 3	Military: Large (Bomber, Cargo, and Tanker aircraft)
j = 4	Military: Small (Attack, Fighter, and Trainer aircraft)
j = 5	General: Fixed-wing, reciprocating, single-engine
j = 6	General: Fixed-wing, reciprocating, multi-engine
j = 7	General: Fixed-wing, turboprop
j = 8	General: Fixed-wing, turbojet

Here the aircraft sources, k, was summed over three phases

k = 1	Albuquerque International Airport Runway 1
k = 2	Albuquerque International Airport Runway 2
k = 3	Non-Airport Aircraft

Figure E.3.2.1–1 (not to scale, adapted from JDRC nd) represents the location of the Manzano WSA storage facilities in relation to east-west runway at the Albuquerque International Airport. There are three key points on Figure E.3.2.1–1 that were considered in assessing the aircraft impact probability:

1. Point 1, located at the geometric center of the east-west runway;
2. Point 2, located at the northern-most end of the candidate storage area;
3. Point 3, located at the south western end of the candidate storage area.

The aircraft impact probability assessment focuses on accidents in between points 2 and 3. The assessment was performed by separating the displacement vector from point 1 to both points 2 and 3 into two orthogonal components, a:

1. Vector coincident with a direct projection of the center-line of the runway; and
2. Vector, perpendicular to the first that extends from the first vector to the impact point (i.e., point 2 or point 3).

The lengths of these two vector components were used to determine the crash probability density. The length of the east-west runway at the Albuquerque International Airport is 4.2 kilometers (2.6 miles) (Smith 1995:9). Using this information, it was determined that the center-line and perpendicular distances from point 1 (the midpoint of the runway) to (JDRC nd):

	Runway 1 (east-west)	Runway 2 (north-south)
Point 2	5.88 miles, -0.22 miles	-0.22 miles, -5.88 miles
Point 3	4.71 miles, -2.78 miles	-2.78 miles, -4.71 miles

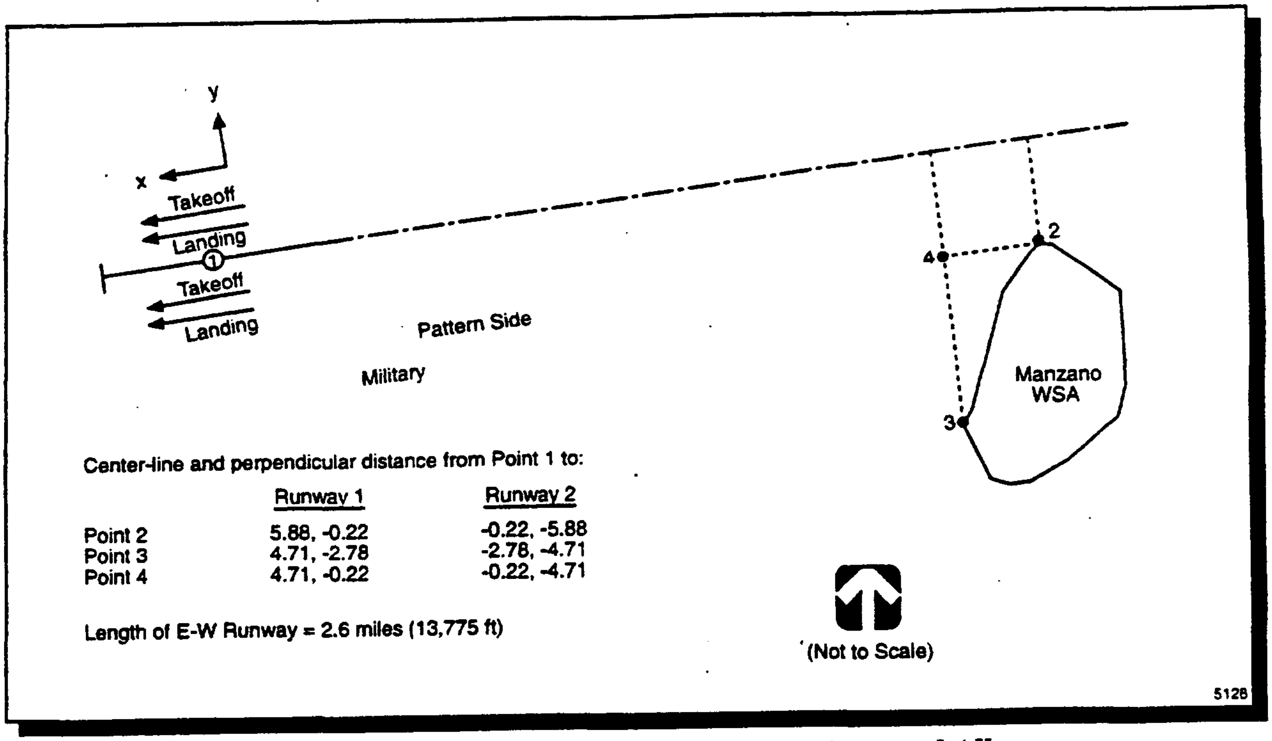


FIGURE E.3.2.1–1.—*Manzano Weapons Storage Area and Albuquerque International Airport.*

Because none of the Manzano WSA storage facilities have a center-line distance closer than 4.71 miles, nor a perpendicular distance less than 0.22 miles, Point 4 was conservatively adopted for the aircraft frequency assessment.

An estimate of an aircraft crash into the Manzano WSA storage facilities was generated using the probability equation defined in Section E.2.1. The south, east, and west are the preferred directions for take-offs and landings at the Albuquerque International Airport (Smith 1995:3). Table E.3.2.1–1 summarizes the 1994 Albuquerque International Airport traffic activity (PC 1996a).

Approximately one-third of the flights at the airport pass in proximity to the Manzano WSA. It was conservatively assumed for this analysis that all of the flights passed in proximity to the Manzano WSA. Since the number of operations included only air carrier, air taxi, military, and general aviation aircraft, the number of military and general aviation operations was divided by the same ratio that was determined for Pantex Plant. While this assumption may not necessarily be accurate, it does not affect the final results for this analysis.

The crash rates values described in section E.2.1 were used in this analysis. The distance to the runway and number of annual flight operations were modeled conservatively in this aircraft impact probability assessment.

Using this information, the probability equation becomes:

$$F = \sum_{i=1,3}\sum_{j=1,8}\sum_{k=1,3} N_{ijk} \cdot A_{ij} \cdot f_{ijk}(x,y) \cdot P_{ijk}$$

Data in Table E.3.2.1–1 does not differentiate between take-offs and landings. Hence, it was assumed that half of the tabulated operations are take-offs and half are landings. Crash rates are provided in Table E.3.2.1–2.

The aircraft crash location probability for each aircraft category and flight mode is presented in Table E.3.2.1–3 (DOE 1996g:B-12 to B-23). Using the coordinate convention in the Near

Airport Model, the center-line and perpendicular distances to Point 4, the hypothetical storage facility, are:

	Runway 1 (east-west)	Runway 2 (north-south)
Point 4	4.71 miles, -0.22 miles	-0.22 miles, -4.71 miles

The crash location probabilities in Table E.3.2.1–3 are identical for the air carrier and air taxi categories, and the four general aviation categories, because their crash location probabilities are grouped into a single category each.

The crash location probabilities for general aviation are asymmetrical in the Draft DOE Standard (DOE 1996g). Therefore, in preparing Table E.3.2.1–3, more conservative crash probabilities were used. This conservative convention was also applied to military crash location probabilities.

The model for aircraft in-flight was changed from a Solomon Model basis in the July 1995 version of the Draft DOE Standard (DOE 1995z) to the curve-fitted empirical Non-Airport Model in the Draft DOE Standard (DOE 1996g) based on crashes that have occurred throughout the country. The July 1996 Draft DOE Standard includes NPf(x,y) values for each DOE site. Only the area of the facility is calculated. For this analysis, the crash rate probabilities per square mile for Sandia National Laboratories, located north of the east-west runway, were used (Table E.3.2.1–4).

E.3.2.2 *Area Calculation*

The last parameter in the above probability equation requiring quantification is A_{ij}. The length, width, and height of a Manzano WSA Type D storage facility are: 18.5 meters (60.7 feet), 8.1 meters (26.5 feet), and 3.8 meters (12.5 feet) (Figure 5.5.1.12–1 in volume I). Using the methodology developed above for Pantex Plant for a rectangular facility (which is conservative since the Type D facilities have a stronger, concrete arch design):

$$A_t = (2 \cdot L \cdot W \cdot WS) \div R + (L \cdot W)$$

$$A_{sh} = (WS+R) \cdot H\cot\phi$$

$$R = (L^2 + W^2)^{0.5}$$

An impact angle, ϕ, dependent on the aircraft category and the flight mode, was used here as was done in the Pantex Plant analysis. The representative maximum wingspan dimensions, WS, for each aircraft category used are also the same.

The total area for the structures does not include the contribution from the skid area because it was assumed that any aircraft skidding along the mountain will skid across the top of storage facilities without damaging them (i.e., no significant forces normal to the rock face will be exerted). Hence, only an impact directly into the storage facility could cause a radionuclide release. The total area for the Manzano WSA storage facilities was obtained by multiplying the individual areas for each aircraft type by 25, the total number of facilities. Table E.3.2.2–1 presents aircraft operational data for take-off, in-flight, and landings used for this analysis.

E.3.2.3 *Impact Probability Calculation*

With substitution of the above data into the probability equation, the impact probabilities listed in Table E.3.2.3–1 were obtained. The impact probability was obtained for the entire Manzano WSA by multiplying the individual facility probability by the total number of facilities present. Since the frequency of hitting one of 25 Type D magazines, 8.8×10^{-5}, was greater than 10^{-7}, in accordance with the Draft DOE Standard (DOE 1996g), further analysis was required.

E.3.2.4 *Structural Calculation*

Given that an aircraft impacts into a Manzano WSA storage facility, there is only a risk to human health if the storage facility is penetrated and the storage containers are damaged sufficiently to release plutonium into the environment. Since the pits will be stored in AT-400A, a certified Type B shipping container, minor damage to the storage facility is not anticipated to cause container failure. However, significant damage to the storage facility is likely to damage containers sufficiently enough to cause a plutonium release.

A survey of Manzano WSA contour maps reveals that the minimum overburden for a facility is approximately 9 meters (30 feet). Therefore, the approach proposed for estimating the penetration probability is to determine if the velocity of the aircraft in take-off and landing modes is sufficient to penetrate 9 meters (30 feet) of rock, and then quantify the probability that the impact is sufficient to cause penetration.

A local response structural analysis was performed according to the Draft DOE Standard (DOE 1996g) for a facility with a 9 meter (30 feet) overburden. The analysis was performed for the maximum penetrator missile for each of the eight aircraft categories. The aircraft penetrators modeled, and if they penetrate the facility, are shown in Table E.3.2.4–1. None of the eight aircraft missiles were capable of penetrating the facility; therefore, the frequency of releasing material from one of the 25 Type D magazines was 0. Since the frequency of releasing material is less than 10^{-7}, in accordance with the Draft DOE Standard, no further analysis was required.

E.3.2.5 *Consequence Calculation*

The probability of an aircraft hitting a facility at Manzano WSA is 8.8×10^{-5}. The probability of damaging a facility by perforation is 0. Consistent with the Draft DOE Standard (DOE 1996g), a consequence analysis was not necessary.

E.3.3 Nevada Test Site

The airspace above NTS, designated as R4808, is a Special-Use Airspace identified by FAA regulations. This designation applies to all aircraft and is unlimited in height. Clearance to penetrate the restricted airspace above NTS must be obtained from DOE. Aircraft desiring to fly over NTS airspace are required to contact the DOE Operations Coordination Center at NTS. Requesters must provide information regarding the type of aircraft and nature of flight into the restricted airspace. DOE has approval authority for flights into the restricted airspace.

Based on penetration calculations performed for Manzano WSA and 9 meters (30 meters) of soil and rock, the proposed pit storage location inside of P-Tunnel at NTS is immune from aircraft accidents, since its location is approximately 240 meters (800 feet) below the mesa. Therefore, pits stored in P-Tunnel could not be affected by an aircraft crash (PC 1995b).

There are four airports and five landing strips in the vicinity of the Device Assembly Facility (DAF) and P-Tunnel. Las Vegas McCarran International Airport is the major commercial airfield in the State of Nevada. The airport, located approximately 122 kilometers (76 miles) southeast of NTS, is used by commercial, military, and general aviation aircraft. In 1994, McCarran International Airport had 488,347 aircraft operations (take-offs and landings).

Another airport located just north of McCarran International is the North Las Vegas Airport. This airport is used by commercial air taxi, military, and general aviation aircraft. In 1994, North Las Vegas Airport had 188,707 air taxi, military, and general aviation aircraft operations (PC 1996a). Nellis Air Force Base, located approximately 107 kilometers (67 miles) southeast of NTS, is also north of McCarran International Airport and is used by only military aircraft. The closest airfield to NTS is Indian Springs Auxiliary Field. This airfield, approximately 48 kilometers (30 miles) southeast of the DAF, has two runways used only by military aircraft. Beatty Airfield, approximately 67 kilometers (42 miles) west of the DAF, has one runway and is used by general aviation aircraft.

There are five landing strips located on or near NTS. The most frequently used is the Desert Rock Airstrip, located in Area 22 southwest of Mercury. Desert Rock Airstrip has a single runway and is 30 kilometers (19 miles) south of the DAF. Two unnamed, single runway airstrips are located on NTS; one 6 kilometers (4 miles) north at Yucca Lake in Area 6, and the other 27 kilometers (17 miles) south in Area 22. Similarly, two unnamed, single-runway airstrips are located west of NTS; one 62 kilometers (39 miles) west-northwest and the other 78 kilometers (49 miles) north-northwest.

A description of the x and y coordinate system, the category of aircraft operations that occur, and a screening of the probability density function values for the four airports and five landing strips is presented in Table E.3.3–1. All nine airports are either outside the probability density function boundary for all categories of aircraft or the activity at the facility was sufficiently low so it was bounded by the in-flight activity. These airports, therefore, were not included in aircraft crash analysis. Only non-airport (in-flight) aircraft were included in the analysis as required by the Draft DOE Standard (DOE 1996g).

E.3.3.1 *Aircraft Crash Affected Environment*

An adjustment to the Near-Airport and Non-Airport Models consisted of manipulation of the flight modes (i), aircraft categories (j), and aircraft sources (k) to fit the NTS. The flight mode, i, was set equal to one flight mode.

$i = 1$ In-flight

The aircraft categories are very similar to Pantex Plant except helicopters have been omitted because they are not shown to be penetrating missiles.

$j = 1$ Commercial: Air Carrier

$j = 2$ Commercial: Air Taxi

$j = 3$ Military: Large (Bomber, Cargo, and Tanker aircraft)

$j = 4$ Military: Small (Attack, Fighter, and Trainer aircraft)

$j = 5$ General: Fixed-wing, reciprocating, single-engine

$j = 6$ General: Fixed-wing, reciprocating, multi-engine

$j = 7$ General: Fixed-wing, turboprop

$j = 8$ General: Fixed-wing, turbojet

Here the aircraft source, k, was summed over one phase

$k = 1$ Non-Airport Aircraft

An estimate of an aircraft crash into the DAF was generated using the probability equation defined in Section E.2.1. Using this information, the probability equation becomes:

$$F = \Sigma_{i=1}\Sigma_{j=1,8}\Sigma_{k=1} N_{ijk} \cdot A_{ij} \cdot f_{ijk}(x,y) \cdot P_{ijk}$$

The model for the aircraft in-flight was changed from a Solomon Model basis in the July 1995 version of the Draft DOE Standard (DOE

1995z) to the curve-fitted empirical Non-Airport Model in the July 1996 version of the Draft DOE Standard (DOE 1996g) based on crashes that have occurred throughout the country. The July 1996 Draft DOE Standard includes NPf(x,y) values for each DOE site. Only the area of the facility is calculated. The crash rate probabilities per square mile for NTS are provided in Table E.3.3.1–1.

E.3.3.2 *Area Calculation*

The DAF was modeled conservatively as a single facility with a length of 201 meters (659 feet), a width of 76 meters (250 feet), and a height of 9 meters (30 feet). (PC 1994). Using the methodology developed above for Pantex Plant for a rectangular facility:

$$A_t = (2 \cdot L \cdot W \cdot WS) \div R + (L \cdot W)$$

$$A_{sh} = (WS+R) \cdot H\cot\phi$$

$$R = (L^2 + W^2)^{0.5}$$

$$A_{sk} = (WS + R) \cdot S$$

An impact angle, ϕ, dependent on the aircraft category and the flight mode was used here as was done in the Pantex Plant analysis. Also, the representative maximum wingspan dimensions, WS, for each aircraft category used are also the same.

The total area for the structures includes the contribution from the skid area with the skid distances from the Draft DOE Standard (DOE 1996g). For large military aircraft, the take-off skid distance was used for in-flight aircraft since it was conservative. Table E.3.3.2–1 presents aircraft operational data for in-flight aircraft.

E.3.3.3 *Impact Probability Calculation*

With substitution of the above data into the probability equation, the impact probabilities listed in Table E.3.3.3–1 were obtained. Since the frequency of hitting the DAF, 1.5×10^{-6}, was greater than 10^{-7}, in accordance with the Draft DOE Standard (DOE 1996g) further analysis was required.

E.3.3.4 *Structural Calculation*

Given that an aircraft impacts into the DAF, there is only a risk to human health if the storage facility is penetrated and the storage containers are damaged sufficiently to release plutonium into the environment. Since the pits will be stored in AT–400A, a certified Type B shipping container, minor damage to the storage facility is not anticipated to cause container failure. However, significant damage to the storage facility may damage containers sufficiently enough to cause a plutonium release.

A local response structural analysis for the facility was performed according to the Draft DOE Standard, using a wall thickness of 46 centimeters (18 inches) (DOE 1986). This wall thickness was selected since it is the minimum thickness for the bays and cells where plutonium would be stored. An overburden of 1.5 meters (5 feet) was included for three sides and the roof of the facility. On the fourth side of the facility only the wall was modeled. The analysis was performed for the maximum penetrator missile for each of the eight aircraft categories. Commercial air carrier, large military, and small military aircraft were the only three aircraft that could produce missiles capable of penetrating the side of the facility without an overburden. The aircraft penetrators modeled, and if they penetrate the facility, are presented in Table E.3.3.4–1.

E.3.3.5 *Release Probability Calculation*

The impact probability calculation was repeated for the commercial air carrier, large military, and small military aircraft categories to determine the release probability. Only the side of the facility without an overburden was included. With substitution of the above data into the probability equation, the release probabilities were 1.3×10^{-8}, 3.7×10^{-9}, and 6.3×10^{-8}, respectively.

E.3.3.6 *Consequence Calculation*

The probability of an aircraft hitting the DAF at NTS is 1.5×10^{-6}. The probability of damaging the DAF due to perforation is 8.1×10^{-8}. The P-Tunnel was not analyzed since pits stored there would be immune from aircraft accidents. Consistent with the Draft DOE Standard (DOE 1996g), a consequence analysis has not been performed for this site.

E.3.4 Savannah River Site

There are four airports in the vicinity of the P-Reactor at SRS. Bush Field, the major commercial airfield in the area, has two runways and is approximately 38 kilometers (24 miles) west-northwest of the P-Reactor. The airport is used by commercial, military, and general aviation aircraft. In 1994, Bush Field had 39,461 aircraft operations (take-offs and landings) (PC 1996a). The closest airport, the county airport near Barnwell, has three runways used by general aviation aircraft, and is approximately 18 kilometers (11 miles) east of P-Reactor. Similarly, Aiken Airport, near Aiken, is approximately 46 kilometers (29 miles) north-northwest and has three runways used by general aviation aircraft. The North Army Base is approximately 61 kilometers (38 miles) northeast and has one runway used by military aircraft.

A description of the x and y coordinate system, the category of aircraft operations that occur, and a screening of the probability density function values for the four airports is presented in Table E.3.4–1. All four airports are outside the probability density function boundary for all categories of aircraft and therefore were not included in the aircraft crash analysis. Only non-airport (in-flight) aircraft were included in the analysis as required by the Draft DOE Standard (DOE 1996g).

E.3.4.1 *Aircraft Crash Affected Environment*

An adjustment to the Near-Airport and Non-Airport Models consisted of manipulation of the flight modes (i), aircraft categories (j), and aircraft sources (k) to fit the SRS. The flight modes, i, was set equal to one flight mode.

$i = 1$ In-flight

The aircraft categories are very similar to Pantex Plant, except helicopters have been omitted because they are not shown to produce penetrating missiles.

$j = 1$ Commercial: Air Carrier

$j = 2$ Commercial: Air Taxi

$j = 3$ Military: Large (Bomber, Cargo, and Tanker aircraft)

$j = 4$ Military: Small (Attack, Fighter, and Trainer aircraft)

$j = 5$ General: Fixed-wing, reciprocating, single-engine

$j = 6$ General: Fixed-wing, reciprocating, multi-engine

$j = 7$ General: Fixed-wing, turboprop

$j = 8$ General: Fixed-wing, turbojet

Here the aircraft source, k, was summed over one phase

$k = 1$ Non-Airport Aircraft

An estimate of an aircraft crash into the P-Reactor was generated using the probability equation defined in Section E.2.1. Using this information, the probability equation becomes:

$$F = \Sigma_{i=1}\Sigma_{j=1,8}\Sigma_{k=1} N_{ijk} \cdot A_{ij} \cdot f_{ijk}(x,y) \cdot P_{ijk}$$

The model for the aircraft in-flight was changed from a Solomon Model basis in the July 1995 version of the Draft DOE Standard (DOE 1995z) to the curve-fitted empirical Non-Airport Model in the July 1996 version of the Draft DOE Standard (DOE 1996g) based on crashes that have occurred throughout the country. The July 1996 Draft DOE Standard includes NPf(x,y) values for each DOE site. Only the area of the facility is calculated. The crash rate probability per square mile for SRS is provided in Table E.3.4.1–1.

E.3.4.2 *Area Calculation*

The P-Reactor was modeled conservatively as a facility with a length of 69 meters (225 feet), a width of 57 meters (187 feet), and a height of 9 meters (30 feet). (PC 1996b). Using the methodology developed above for Pantex Plant for a rectangular facility:

$$A_t = (2 \cdot L \cdot W \cdot WS) \div R + (L \cdot W)$$

$$A_{sh} = (WS+R) \cdot H\cot\phi$$

$$R = (L^2 + W^2)^{0.5}$$

$$A_{sk} = (WS + R) \cdot S$$

An impact angle, ϕ, dependent on the aircraft category and the flight mode was used here, as was done in the Pantex Plant analysis. The representative maximum wingspan dimensions, WS, for each aircraft category used are also the same.

The total area for the structures includes the contribution from the skid area with the skid distances from the Draft DOE Standard (DOE 1996g). For large military aircraft, the take-off skid distance was used for in-flight aircraft since it was conservative. Table E.3.4.2–1 presents aircraft operational data for in-flight aircraft.

E.3.4.3 *Impact Probability Calculation*

With substitution of the above data into the probability equation, the impact probabilities listed in Table E.3.4.3–1 were obtained. Since the frequency of hitting the P-Reactor, 1.2×10^{-6}, is greater than 10^{-7}, in accordance with the Draft DOE Standard (DOE 1996g), further analysis was required.

E.3.4.4 *Structural Calculation*

Given that an aircraft crashes into the P-Reactor, there is only a risk to human health if the storage facility is penetrated and the storage containers are damaged sufficiently to release plutonium into the environment. Since the pits will be stored in AT-400A, a certified Type B shipping container, minor damage to the storage facility is not anticipated to cause container failure. However, significant damage to the storage facility may damage containers sufficiently enough to cause a plutonium release.

A local response structural analysis for the facility was performed according to the Draft DOE Standard (DOE 1996g) using a wall thickness of 76 centimeters (30 inches). The analysis was performed for the maximum penetrator missile for each of the eight aircraft categories. Commercial air carrier and large military aircraft were the only two aircraft capable of producing missiles capable of penetrating the facility. The aircraft penetrators modeled, and if they penetrate the facility, are presented in Table E.3.3.4–1.

E.3.4.5 *Release Probability Calculation*

The impact probability calculation was repeated for the commercial air carrier and large military aircraft categories to determine the release probability. With substitution of the above data into the probability equation, the release probabilities were 7.1×10^{-9} and 2.2×10^{-9}, respectively.

E.3.4.6 *Consequence Calculation*

The probability of an aircraft hitting the P-Reactor at SRS is 1.2×10^{-6}. The probability of damaging the P-Reactor by perforation is 9.2×10^{-9}. Consistent with the Draft DOE Standard (DOE 1996g), a consequence analysis has not been performed for this site.

E.3.5 Hanford Site

The FAA maintains a Very High Frequency Omni-Directional Radio Range navigation aid at the Tri-Cities Airport. Several Federal airways pass in proximity of the Fuels and Materials Examination Facility (FMEF). However, the FAA reports that these routes have low usage (WHC 1991). There are no military installations or training routes that would place military aircraft in the vicinity of FMEF.

There are five airports and one landing strip in the vicinity of the FMEF. The Tri-Cities Airport, the major commercial airfield in the area, is approximately 27 kilometers (17 miles) southeast of the FMEF. The airport's two runways are used by commercial, military, and general aviation aircraft. In 1994, the Tri-Cities Airport had 81,867 aircraft operations (take-offs and landings) (PC 1996a). The closest airport, the Richland Airport, is approximately 13 kilometers (8 miles) southeast of FMEF, and has three runways used only by general aviation aircraft. Vista Field in Kennewick, approximately 26 kilometers (16 miles) south-southeast, has two runways used only by general aviation aircraft. Beardsley Field near Prosser, approximately 42 kilometers (26 miles) southwest, has one runway used only by general aviation aircraft. Sunnyside Airport, 48 kilometers (30 miles) west-southwest, has one runway used by general aviation aircraft. There is an unnamed landing strip near Horse Heaven Hills, approximately 32 kilometers (20 miles) south-southwest, which has one runway, and is used only by general aviation aircraft.

A description of the x and y coordinate system, the category of aircraft operations that occur, and a screening of the probability density function values for the five airports and one landing strip is presented in Table E.3.5-1. All four general aviation airports and the landing strip are outside the probability density function boundary for general aviation aircraft and, therefore, were not included in the aircraft crash analysis. For the Tri-Cities Airport, only small military aircraft in the landing mode had a nonzero probability density function value. Therefore, only these aircraft in the landing mode at the Tri-Cities Airport and non-airport (in-flight) aircraft were included in the analysis as required by the Draft DOE Standard (DOE 1996g).

E.3.5.1 *Aircraft Crash Affected Environment*

An adjustment to the Near-Airport and Non-Airport Models consisted of manipulation of the flight modes (i), aircraft categories (j), and aircraft sources (k) to fit the Hanford Site. The flight mode, i, was set equal to two flight modes.

$i = 1$ In-flight

$i = 2$ Landing

The aircraft categories are very similar to Pantex Plant, except helicopters have been omitted because they are not shown to produce penetrating missiles.

j = 1 Commercial: Air Carrier

j = 2 Commercial: Air Taxi

j = 3 Military: Large (Bomber, Cargo, and Tanker aircraft)

j = 4 Military: Small (Attack, Fighter, and Trainer aircraft)

j = 5 General: Fixed-wing, reciprocating, single-engine

j = 6 General: Fixed-wing, reciprocating, multi-engine

j = 7 General: Fixed-wing, turboprop

j = 8 General: Fixed-wing, turbojet

Here the aircraft source, k, was summed over two phases:

k = 1 Tri-Cities Airport Runway 1

k = 2 Non-Airport Aircraft

An estimate of an aircraft crash into the FMEF was generated using the probability equation defined in Section E.2.1. Runway 1 is the preferred runway for take-offs and landings at the Tri-Cities Airport; it was assumed that all operations would occur on this runway. Table E.3.5.1–1 summarizes the 1994 Tri-Cities airport traffic activity (PC 1996a). It was conservatively assumed for this analysis that all of the flights passed in proximity to FMEF. Since the number of operations included only air carrier, air taxi, military, and general aviation aircraft, the number of military and general aviation operations was divided by the same ratio that was determined for Pantex Plant. While this assumption may not necessarily be the most precise, it does not affect the final results for this analysis.

The crash rates values described in Section E.2.1 were used in this analysis. The distance to the runway and number of annual flight operations were modeled conservatively in this aircraft impact probability assessment.

Using this information, the probability equation becomes:

$$F = \Sigma_{i=1}\Sigma_{j=1,8}\Sigma_{k=1}\, N_{ijk} \cdot A_{ij} \cdot f_{ijk}(x,y) \cdot P_{ijk}$$

Data in Table E.3.5.1–1 does not differentiate between take-offs and landings. Hence, it was assumed that half of the tabulated operations are take-offs, and half are landings. Crash rates are provided in Table E.3.5.1–2.

The aircraft crash location probability for each aircraft category and flight mode is presented in Table E.3.5.1–3 (DOE 1996g:B-12 to B-23). Using the coordinate convention in the Near-Airport Model, the center-line and perpendicular distances to the FMEF, are:

Runway 1 16.5 miles, 0.5 miles

Both the air carrier and air taxi crash location probabilities, and the four general aviation categories crash location probabilities, in Table E.3.5.1–3 are identical because their crash location probabilities are grouped into a single category.

The crash location probabilities for general aviation are asymmetrical in the Draft DOE Standard (DOE 1996g). Therefore, in preparing Table E.3.5.1–3, more conservative crash probabilities were used. This conservative convention was also applied to military crash location probabilities.

The model for the aircraft in-flight was changed from a Solomon Model basis in the July 1995 version of the Draft DOE Standard (DOE

1995z) to the curve-fitted empirical Non-Airport Model in the July 1996 version of the Draft DOE Standard (DOE 1996g) based on crashes that have occurred throughout the country. The July 1996 Draft DOE Standard includes NPf(x,y) values for each DOE site. Only the area of the facility is calculated. The crash rate probability per square mile for Hanford are provided in Table E.3.5.1–4.

E.3.5.2 *Area Calculation*

The FMEF was modeled conservatively as a facility with a length of 98 meters (320 feet), a width of 47 meters (155 feet), and a height of 21 meters (70 feet). (DOE 1994). Using the methodology developed above for Pantex Plant for a rectangular facility:

$$A_t = (2 \cdot L \cdot W \cdot WS) \div R + (L \cdot W)$$

$$A_{sh} = (WS+R) \cdot H \cot\phi$$

$$R = (L^2 + W^2)^{0.5}$$

$$A_{sk} = (WS + R) \cdot S$$

An impact angle, ϕ, dependent on the aircraft category and the flight mode was used here as was done in the Pantex Plant analysis. The representative maximum wingspan dimensions, WS, for each aircraft category used are also the same.

The total area for the structures includes the contribution from the skid area with the skid distances from the Draft DOE Standard (DOE 1996g). For large military aircraft, the take-off skid distance was used for in-flight aircraft since it was conservative. Table E.3.5.2–1 presents aircraft operational data for in-flight aircraft and landings.

E.3.5.3 *Impact Probability Calculation*

With substitution of the above data into the probability equation, the impact probabilities listed in Table E.3.5.3–1 were obtained. Since the frequency of hitting the FMEF, 1.2×10^{-6}, was greater than 10^{-7}, in accordance with the Draft DOE Standard (DOE 1996g), further analysis was required.

E.3.5.4 *Structural Calculation*

Given that an aircraft impacts into the FMEF, there is only a risk to human health if the storage facility is penetrated and the storage containers are damaged sufficiently to release plutonium into the environment. Since the pits will be stored in AT–400A, a certified Type B shipping container, minor damage to the storage facility is not anticipated to cause container failure. However, significant damage to the storage facility may damage containers sufficiently enough to cause a plutonium release.

A local response structural analysis for the facility was performed according to the Draft DOE Standard (DOE 1996g), using a wall thickness of 122 centimeters (48 inches). The analysis was performed for the maximum penetrator missile for each of the eight aircraft categories. None of the eight aircraft missiles were capable of penetrating the facility; therefore, the frequency of releasing material from the FMEF was 0. The aircraft penetrators modeled, and if they penetrate the facility are presented in Table E.3.5.4–1.

E.3.5.5 *Consequence Calculation*

The probability of an aircraft hitting the FMEF at Hanford is 1.2×10^{-6}. The probability of damaging the FMEF by perforation is 0. Consistent with the Draft DOE Standard (DOE 1996g), a consequence analysis is not necessary for this site.

REFERENCES

ANPP 1975 — Solomon, K.A., *Estimate of the Probability That an Aircraft Will Impact the PVNGS,* Revision 1, NUS-1416, prepared by NUS Corporation, Sherman Oaks, California, for Arizona Nuclear Power Project, July 25, 1975.

Barnard 1990 — Barnard Dunkelberg and Company, *Airport Master Plan Update, Amarillo International Airport*, Prepared for the City of Amarillo, Amarillo, TX, October 1990.

DOE 1986 — DOE, *Preliminary Safety Analysis Report, Device Assembly Facility,* Nevada Test Site, January 1986.

DOE 1994 — DOE, *FMEF Feasibility Assessment for Plutonium Storage*, February 23, 1994.

DOE 1995a — DOE, *Summary Report of the Overflight Working Group on Recommended Measures to Reduce Overflights of the Pantex Plant*, prepared by the Department of Energy, February 1995.

DOE 1995z — DOE, Draft Final DOE Standard, *Accident Analysis for Aircraft Crash into Hazardous Facilities*, SAFT-0030 prepared under Contract DOE-STD-3014-96, for the U.S. Department of Energy, Washington, DC, July 1995.

DOE 1996 — DOE, Draft Final DOE Standard, *Accident Analysis for Aircraft Crash into Hazardous Facilities*, SAFT-0030 prepared under Contract DOE-STD-3014-96, for the U.S. Department of Energy, Washington, DC, July 1996.

DOT 1985 — National Air Traffic Training Program, *Cooperative Education Student Reference Manual*, Module B Course 55322, Aircraft Identification, U.S. Department of Transportation, Federal Aviation Administration, MB-SRM-2, April 1985.

DOT 1994 — 7110.65H Air Traffic Control, Change 1 Appendix A, B, & C, U.S. Department of Transportation, Federal Aviation Administration, January 6, 1994.

Drake 1994 — Drake, James R., *Aircraft Impacts Effects on Weapons Storage Facilities Final Report*, prepared for Logicon by R&D Associates, Los Angeles, CA, March 1994.

Jacobs 1992 — Pantex Plant, *Hazardous Materials Hazards Assessment for Pantex Radiological Hazards Assessment for Pantex Plant, Amarillo, TX*, prepared by Jacobs Engineering Group, Inc., Albuquerque, NM, in conjunction with Ogden Environmental and Energy Services Company, Albuquerque, NM, for Pantex Plant, Amarillo, TX, November 1992.

Jacobs 1993 Pantex Plant, *Recalculation of Potential Deposition Levels and Dose Exposure levels for Pantex Radiological Hazards Assessment for Pantex Plant, Amarillo, TX*, prepared by Jacobs Engineering Group, Inc., Albuquerque, NM in conjunction with Ogden Environmental and Energy Services Company, Albuquerque, NM, for Pantex Plant, Amarillo, TX, October 1993.

Jacobs 1993a Pantex Plant, *Chemical High Explosives Hazards Assessment for Pantex Radiological Hazards Assessment for Pantex Plant, Amarillo, TX*, prepared by Jacobs Engineering Group, Inc., Albuquerque, NM, in conjunction with Ogden Environmental and Energy Services Company, Albuquerque, NM, for Pantex Plant, Amarillo, TX, October 1993.

Janes 1961-1996 *All the World's Aircraft*, Janes Information Group, Inc., Alexandria, VA, Editions: 51, 53, 60, 62, 70, 71, 75, 81, 85, 86, for the years 1961-62, 1963-64, 1970-71, 1980-81, 1981-82, 1985-86, 1990-91, 1994-95, 1995-96.

JDRC nd J.D. Resource Center of Albuquerque, Inc., *Map of Albuquerque, NM*, "NASA Recorded This Unique Perspective from the Landsat 4 Satellite Orbiting 435 Miles In Space."

KAFB 1993 Los Alamos Technical Associates, Inc., *Phase I Environmental Baseline Survey Manzano Weapons Storage Area*, F29601-89-C-0079 prepared by Los Alamos Technical Associates, Inc., for the Kirtland Air Force Base Research Facilities Engineering Division and Phillips Laboratory, August 1993.

LLNL 1995 Kimura, C.Y., et. al., *Data Development Technical Support Document for the Aircraft Crash Risk Analysis Methodology (ACRAM) Standard*, Draft Lawrence Livermore National Laboratory, Report, April 1995.

Pantex 1996 Pantex Plant, *Safety Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, October 1995 (2nd Revision).

PC 1994 Longmire, P., Warhead Interim Storage Alternative, fax from Paul Longmire, Sandia National Laboratories, Albuquerque, NM, to Harry Season, Department of Energy, Albuquerque Operations Office, Albuquerque, NM, August 19, 1994.

PC 1995 Burns, R, Fax from Randy Burns, Federal Aviation Administration, Amarillo International Airport, to Bret Simpkins, Tetra Tech, Inc., Amarillo, TX, September 11, 1995.

PC 1995a Puroff, C.A., Aircraft Overflight Data, SWEIS request for information, supplied by C.A. Puroff, Amarillo International Airport, to Bret Simpkins, Tetra Tech, Inc., Amarillo, TX, September 25, 1995.

PC 1995b	Battelle Pantex and Mason & Hanger-Silas Mason Co., Inc., *1994 Environmental Report for the Pantex Plant*, DOE/AL/65030-9506, prepared under Contract DE-AC04-91AL65030, by Environmental Protection Department, Environment, Safety and Health Division, for U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, June 1995.
PC 1995c	McNolte, M., Military Takeoff on Runway 4, telephone conversation from M. McNolte, September 21, 1995.
PC 1995d	Tripathi, B., Model for Velocity Reduction in Overburdens, Telephone Conversation from B. Tripathi, September 21, 1995.
PC 1995e	McBride, Dave, "Request for Length, Width and Height of Subject Buildings," SWEIS request for information, supplied by Dave McBride to Davin Greenly, Tetra Tech, Inc., Amarillo, TX, June 8, 1995.
PC 1996	Glover, J., Input for Pantex Plant EIS Document, Internal Memorandum from Jeff Glover, Pantex, Risk Management, to Steve Young, Pantex Risk Management, Amarillo, TX, August 6, 1996.
PC 1996a	Trembley, N., FAA Traffic Control Tower Information, fax from Nancy Trembley, Office of Aviation Policy Plans and Management Analysis, APO-110, to Davin Greenly, Tetra Tech, Inc., Amarillo, TX, May 14, 1996.
PC 1996b	Matthews, R.S., Building Blueprint, fax from R. S. Matthews, SRS, NMP Planning, to Jeff Petraglia, Tetra Tech, Inc., August 1, 1996.
Smith 1995	Smith D., "Assessment of Jupiter Facility," notes provided to Brett Simpkins, July 18, 1995.
SNL 1976	Krivokapich, B.E., *An Assessment of the Probability of Aircraft Impact with Pantex Plant Structures,* SAND76-0120, prepared by Sandia National Laboratories, Albuquerque, NM, June 1976.
USGS 1953	U.S. Geological Survey, *Sevenmile Basin Quadrangle Texas 7.5 Minute Series Topographic Map*, U.S. Department of the Interior, Denver, CO, 1953.
USGS 1953a	U.S. Geological Survey, *Mayer, Texas Quadrangle 7.5 Minute Series Topographic Map*, U.S. Department of the Interior, Denver, CO, 1953.
USGS 1956	U.S. Geological Survey, *Washburn, Texas Quadrangle 7.5 Minute Series Topographic Map*, U.S. Department of the Interior, Denver, CO, 1956.
USGS 1973	U.S. Geological Survey, *Pullman, Texas Quadrangle 7.5 Minute Series Topographic Map*, U.S. Department of the Interior, Denver, CO, 1973.
WHC 1991	Westinghouse Hanford Company, *Aircraft Hazards to the Fast Flux Test Facility,* Richland, WA, November 1991.
USGS 1978	U.S. Geological Survey, *Albuquerque Quadrangle,* N3500-W10600/30x60, U.S. Department of Interior, Denver, CO, 1978.

USGS 1978a — U.S. Geological Survey, *Richland Quadrangle,* N4600-W11900/30x60, U.S. Department of Interior, Denver, CO, 1978.

USGS 1979 — U.S. Geological Survey, *Belen, New Mexico,* N3430-W10600/30x60, U.S. Department of Interior, Denver, CO, 1979.

USGS 1979a — U.S. Geological Survey, *Pahute Mesa, Nevada,* N3700-W11600/30x60, U.S. Department of Interior, Denver, CO, 1979.

USGS 1981 — U.S. Geological Survey, *Aiken, South Carolina–Georgia,* 33081-E1-TM-100x60, U.S. Department of Interior, Denver, CO, 1981.

USGS 1983 — U.S. Geological Survey, *Barnwell, South Carolina–Georgia,* 33081-A1-TM-100, U.S. Department of Interior, Denver, CO, 1983.

USGS 1985 — U.S. Geological Survey, *Pahnanaget Range, Nevada,* 37115-E1-TM-100, U.S. Department of Interior, Denver, CO, 1985.

USGS 1986 — U.S. Geological Survey, *Beatty, Nevada–California,* 36116-E1-TM-100, U.S. Department of Interior, Denver, CO, 1986.

USGS 1988 — U.S. Geological Survey, *Indian Springs, Nevada,* 36115-E1-TM-100, U.S. Department of Interior, Denver, CO, 1988.

TABLE E.2.1–1.—*Aircraft Crash Rates*

AIRCRAFT CATEGORY	CRASH RATE	
	TAKE-OFF (PER TAKE-OFF)	LANDING (PER LANDING)
COMMERCIAL		
Air Carrier	2.0×10^{-7}	2.6×10^{-7}
Air Taxi	1.0×10^{-6}	2.3×10^{-6}
MILITARY		
Large[a]	5.7×10^{-7}	1.6×10^{-6}
Small[b]	1.8×10^{-6}	3.3×10^{-6}
GENERAL AVIATION		
Fixed-wing, single-engine piston	1.1×10^{-5}	2.0×10^{-5}
Fixed-wing, multiple-engine piston	9.3×10^{-6}	2.3×10^{-5}
Fixed-wing, turboprop	3.5×10^{-6}	8.3×10^{-6}
Fixed-wing, turbojet	1.4×10^{-6}	4.7×10^{-6}
HELICOPTERS		
All	2.5×10^{-5}	See Note 1

[a]Large military aircraft include bomber, cargo, and tanker aircraft.
[b]Small military aircraft include fighter, attack, and trainer aircraft
[1]Helicopter crashes are considered per flight crashes and reported under take-off for convenience.
Source: DOE 1996g:B-3

TABLE E.2.1–2.—*DOE Site-Specific Values of NPf(x,y) (in crashes per square mile, per year, centered at the site)*

SITE	AIR CARRIER	AIR TAXI	LARGE MILITARY	SMALL MILITARY	GENERAL AVIATION
Maximum	8×10^{-7}	1×10^{-5}	7×10^{-7}	6×10^{-6}	3×10^{-3}
Minimum	2×10^{-8}	6×10^{-7}	6×10^{-8}	4×10^{-8}	1×10^{-7}
Average CONUS	1×10^{-7}	2×10^{-6}	2×10^{-7}	4×10^{-6}	2×10^{-4}
Argonne National Laboratory	3×10^{-7}	6×10^{-6}	9×10^{-8}	8×10^{-7}	3×10^{-3}
Brookhaven National Laboratory	8×10^{-7}	1×10^{-5}	7×10^{-7}	2×10^{-7}	5×10^{-4}
Hanford Site	5×10^{-8}	2×10^{-6}	1×10^{-7}	4×10^{-8}	1×10^{-4}
Idaho National Engineering Laboratory	2×10^{-8}	6×10^{-7}	9×10^{-8}	7×10^{-7}	9×10^{-5}
Kansas City Plant	1×10^{-7}	2×10^{-6}	2×10^{-7}	1×10^{-6}	7×10^{-4}
Los Alamos National Laboratory	6×10^{-8}	4×10^{-7}	1×10^{-7}	5×10^{-6}	2×10^{-4}
Lawrence Livermore National Laboratory	2×10^{-7}	3×10^{-6}	2×10^{-7}	3×10^{-6}	1×10^{-4}
Mound Plant	2×10^{-7}	5×10^{-6}	1×10^{-7}	2×10^{-6}	3×10^{-4}
Nevada Test Site	2×10^{-7}	3×10^{-6}	2×10^{-7}	6×10^{-6}	8×10^{-5}
Oak Ridge National Laboratory	2×10^{-7}	3×10^{-6}	1×10^{-7}	6×10^{-7}	1×10^{-3}
Pantex Plant	6×10^{-8}	4×10^{-7}	1×10^{-7}	5×10^{-6}	7×10^{-5}
Pinellas Plant	1×10^{-7}	2×10^{-6}	2×10^{-7}	4×10^{-6}	3×10^{-4}
Rocky Flats Plant	6×10^{-8}	9×10^{-7}	9×10^{-8}	9×10^{-7}	2×10^{-3}
Sandia National Laboratories	6×10^{-8}	4×10^{-7}	1×10^{-7}	5×10^{-6}	8×10^{-4}
Savannah River Site	2×10^{-7}	3×10^{-6}	1×10^{-7}	6×10^{-7}	2×10^{-4}

Source: DOE 1996g:B-24, B-25

TABLE E.2.2–1.—*Representative Aircraft Wingspans*

AIRCRAFT CATEGORY	DOE STANDARD WINGSPAN (feet)	REPRESENTATIVE WINGSPAN (feet)
COMMERCIAL		
Air Carrier	98	110.7
Air Taxi	59	65.1
MILITARY		
Large Aircraft[1]	223	150.9
Small Aircraft, high performance[2]	78	39.8
Small Aircraft, low performance[3]	110	N/A
GENERAL AVIATION		
Single-Engine Piston	50	43.1
Multi-Engine Piston	50	40.7
Turboprop	73	63.3
Turbojet	50	45.7
Helicopters	50	50

[1]Includes bomber, cargo, and tanker aircraft.
[2]Includes fighter, attacker, and trainer aircraft.
[3]Includes other small aircraft.
Source: DOE 1996g:B-28

TABLE E.2.2–2.—*Values Of The Mean Of The Cotangent Of The Impact Angle (Cotϕ)*

	COMMERCIAL	GENERAL AVIATION	HELI-COPTERS	MILITARY			
				LARGE AIRCRAFT		SMALL AIRCRAFT	
				TAKE-OFF	LAND-ING	TAKE-OFF	LAND-ING
Mean (cotϕ)	9.6	8.2	0.58	7.4[a]	9.7	8.4[a]	10.4

[a]Used for in-flight crashes since it is conservative.
Source: DOE 1996g:B-29

TABLE E.3.1.2–1.—*Amarillo International Airport Flight Operations by Aircraft Category*

AIRCRAFT CATEGORY	FLIGHT OPERATIONS	RW 22 TAKE-OFFS	RW 22 LAND-INGS	RW 04 TAKE-OFFS	RW 04 LAND-INGS	RW 31 TAKE-OFFS	RW 31 LAND-INGS
Air Carrier	13,174	4,222	4,222	2,365	2,365	0	0
Air Taxi	9,938	2,881	2,881	1,614	1,614	474	474
Large Military	13,494	4,325	4,325	2,422	2,422	0	0
Small Military	27,146	7,870	7,870	4,408	4,408	1,295	1,295
Single-Engine Piston	12,762	3,700	3,700	2,072	2,072	609	609
Multi-Engine Piston	5,766	1,672	1,672	936	936	275	275
Turboprop	4,966	1,440	1,440	806	806	237	237
Turbojet	5,640	1,635	1,635	916	916	269	269
Helicopters	233	0	0	0	0	0	0
Total	93,119	27,745	27,745	15,539	15,539	3,159	3,159

RW - Runway
Source: PC 1996a

TABLE E.3.1.4–1.—*Zone 4 Building Dimensions*

	MRs ROW 1	MRs ROW 2	MRs OTHER	3 SACs ROW 1	5 SACs ROW 1	3 SACs ROW 2
Building Length (ft)	44.7	44.7	44.7	43	43	43
Building Width (ft)	34	34	34	153	278.4	153
Building Height (ft)	15.5	15.5	15.5	17.4	17.4	17.4

MR - Modified Richmond
Source: Pantex 1996

TABLE E.3.1.4–2.—*Zone 4 Aircraft Operational Data: Take-off, In-flight, and Landing*

	AIR CARRIER	AIR TAXI	LARGE MILITARY	SMALL MILITARY	GEN. SINGLE ENGINE	GEN. MULTI-ENGINE	GEN. TURBO-PROP	GEN. TURBO-JET	HELI-COPTERS
DOE Standard Wingspan (ft)	98	59	223	78	50	50	73	50	50
Representative Wingspan (ft)	110.7	65.1	150.9	39.8	43.1	40.7	63.3	45.7	50
Take-off Skid Length (ft)	1,570	1.570	780[a]	246	68	68	68	68	0
Landing Skid Length (ft)	1,570	1.570	368	447[a]	68	68	68	68	0
Mean cotϕ	9.6	9.6	7.4T[a] 9.7 L	8.4T[a] 10.4 L	8.2	8.2	8.2	8.2	0.58
NPf(x,y)	6×10^{-8}	4×10^{-7}	1×10^{-7}	5×10^{-6}	3.1×10^{-5}	1.4×10^{-5}	1.2×10^{-5}	1.4×10^{-5}	N/A
Take-off Effective Areas (mi^2)	0.2893	0.2290	0.2138	0.0577	0.0376	0.0370	0.0430	0.0383	0.0079
Landing Effective Areas (mi^2)	0.2893	0.2290	0.1344	0.0855	0.0376	0.0370	0.0430	0.0383	0.0079
In-flight Effective Areas (mi^2)	0.2725	0.2209	0.2738	0.1108	0.0394	0.0394	0.0455	0.0394	0.0079

NA - Not available

[a]Conservatively used for in-flight.

Source: DOE 1996g

TABLE E.3.1.4–3.—*Zone 4 Aircraft Crash Location Probabilities: Runway 22*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY	
	TAKE-OFF (PER MILE^2)	LANDING (PER MILE^2)
Air Carrier	0.00	2.5×10^{-4}
Air Taxi	0.00	2.5×10^{-4}
Large Military	0.00	1.5×10^{-5}
Small Military	0.00	3.1×10^{-3}
Single-engine piston	0.00	5.0×10^{-4}
Multi-engine piston	0.00	5.0×10^{-4}
Turboprop	0.00	5.0×10^{-4}
Turbojet	0.00	5.0×10^{-4}
Helicopters	N/A	N/A

N/A - not applicable

Source: DOE 1996g:Tables B-2 to B-13

TABLE E.3.1.4–4.—*Zone 4 Aircraft Crash Location Probabilities: Runway 04*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY	
	TAKE-OFF (PER MILE^2)	LANDING (PER MILE^2)
Air Carrier	1.3×10^{-5}	0.00
Air Taxi	1.3×10^{-5}	0.00
Large Military	2.1×10^{-4}	0.00
Small Military	2.4×10^{-4}	0.00
Single-engine piston	0.00	0.00
Multi-engine piston	0.00	0.00
Turboprop	0.00	0.00
Turbojet	0.00	0.00
Helicopters	N/A	N/A

N/A - Not applicable
Source: DOE 1996g:Tables B-2 to B-13

TABLE E.3.1.4–5.—*Zone 4 Aircraft Crash Location Probabilities: Runway 31*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY	
	TAKE-OFF (PER MILE^2)	LANDING (PER MILE^2)
Air Carrier	N/A	N/A
Air Taxi	0.00	0.00
Large Military	N/A	N/A
Small Military	0.00	0.00
Single-engine piston	0.00	0.00
Multi-engine piston	0.00	0.00
Turboprop	0.00	0.00
Turbojet	0.00	0.00
Helicopters	N/A	N/A

N/A = Not applicable for air carrier and large military aircraft because these aircraft do not operate on this runway.
Source: DOE 1996g:Tables B-2 to B-13

TABLE E.3.1.4–6.—*Zone 4 Aircraft Crash Probabilities*

AIRCRAFT CATEGORY	CRASH PROBABILITY (PER YEAR)			
	RW 22 LANDING	RW 04 TAKE-OFF	NON-AIRPORT	TOTAL ZONE 4
Air Carrier	7.9×10^{-8}	1.8×10^{-9}	1.7×10^{-8}	9.8×10^{-8}
Air Taxi	3.8×10^{-7}	4.8×10^{-9}	8.8×10^{-8}	4.7×10^{-7}
Large Military	1.1×10^{-8}	9.6×10^{-8}	2.7×10^{-8}	1.3×10^{-7}
Small Military	6.2×10^{-6}	1.4×10^{-7}	5.5×10^{-7}	6.9×10^{-6}
Single-engine piston	1.4×10^{-6}	0.00	1.2×10^{-6}	2.6×10^{-6}
Multi-engine piston	7.1×10^{-7}	0.00	5.5×10^{-7}	1.3×10^{-6}
Turboprop	2.6×10^{-7}	0.00	5.4×10^{-7}	8.0×10^{-7}
Turbojet	1.5×10^{-7}	0.00	5.3×10^{-7}	6.8×10^{-7}
Helicopters	0.00	0.00	1.4×10^{-7}	1.4×10^{-7}
Total	9.2×10^{-6}	2.4×10^{-7}	3.6×10^{-6}	1.3×10^{-5}

Source: Calculated Values

TABLE E.3.1.4–7.—*Aircraft Missile Characteristics*

AIRCRAFT CATEGORY	IMPACT VELOCITY (FT/SEC)	ENGINE WEIGHT (LB)	ENGINE DIAMETER (IN)
Air Carrier	422	4,746	53
Air Taxi	422	775	28
Large Military	338	4,452	57
Small Military	422	917	28
Single-engine piston	152	408	26
Multi-engine piston	152	466	22
Turboprop	152	365	21
Turbojet	152	654	35
Helicopters	203	158	23

Sources: LLNL 1995; Jane's 1961-1996

TABLE E.3.1.4–8.—*Zone 4 Structural Scabbing Calculation*

BUILDING	MR ROOF	MR WALLS	SAC ROOF	SAC WALLS	MR AND SAC FRONT DOOR
Overburden (ft)	3	13	3	13	0
Thickness (in)	11	8	0.3[a]	0.3[a]	36
Air Carrier	D	ND	N/A	N/A	D
Air Taxi	ND	ND	N/A	N/A	ND
Large Military	D	ND	N/A	N/A	D
Small Military	D	ND	N/A	N/A	ND
Single-engine piston	ND	ND	N/A	N/A	ND
Multi-engine piston	ND	ND	N/A	N/A	ND
Turboprop	ND	ND	N/A	N/A	ND
Turbojet	ND	ND	N/A	N/A	ND
Helicopters	ND	ND	N/A	N/A	ND

[a]Steel
D = Damage
ND = No Damage
N/A = Not applicable
Source: Pantex 1996

TABLE E.3.1.4–9.—*Zone 4 Structural Perforation Calculation*

BUILDING	MR ROOF	MR WALLS	SAC ROOF	SAC WALLS	MR AND SAC FRONT DOOR
Overburden (ft)	3	13	3	13	0
Thickness (in)	11	8	0.3[a]	0.3[a]	36
Air Carrier	D	ND	D	ND	ND
Air Taxi	ND	ND	ND	ND	ND
Large Military	ND	ND	D	ND	ND
Small Military	ND	ND	D	ND	ND
Single-engine piston	ND	ND	ND	ND	ND
Multi-engine piston	ND	ND	ND	ND	ND
Turboprop	ND	ND	ND	ND	ND
Turbojet	ND	ND	ND	ND	ND
Helicopters	ND	ND	ND	ND	ND

[a]Steel
D = Damage
ND = No Damage
Source: Pantex 1996

TABLE E.3.1.4–10.—*Zone 4 Reduced Effective Areas (in square miles)*

	AIR CARRIER	AIR TAXI	LARGE MILITARY	SMALL MILITARY	GEN. SINGLE ENG.	GEN. MULTI-ENG.	GEN. TURBO-PROP	GEN. TURBO-JET	HELI-COPTERS
SCABBING/EXPLOSION AREAS									
Take-off	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In-flight	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERFORATION/EXPLOSION AND PERFORATION/FIRE AREAS									
Take-off	0.0113	0.00	0.0154	0.0093	0.00	0.00	0.00	0.00	0.00
In-flight	0.0108	0.00	0.0188	0.0110	0.00	0.00	0.00	0.00	0.00
Landing	0.0113	0.00	0.0129	0.0080	0.00	0.00	0.00	0.00	0.00

Source: Calculated Values

TABLE E.3.1.4–11.—*Zone 4 Aircraft Crash Probability per Year for Perforation Leading to Fire*

AIRCRAFT	RW 22 LANDING	RW 04 TAKE-OFF	NON-AIRPORT	TOTAL ZONE 4
Air Carrier	6.6×10^{-9}	1.5×10^{-10}	1.3×10^{-9}	8.1×10^{-9}
Air Taxi	0.00	0.00	0.00	0.00
Large Military	8.7×10^{-10}	5.8×10^{-9}	1.6×10^{-9}	8.3×10^{-9}
Small Military	4.5×10^{-7}	1.8×10^{-8}	4.4×10^{-8}	5.1×10^{-7}
Single-engine piston	0.00	0.00	0.00	0.00
Multi-engine piston	0.00	0.00	0.00	0.00
Turboprop	0.00	0.00	0.00	0.00
Turbojet	0.00	0.00	0.00	0.00
Helicopters	0.00	0.00	0.00	0.00
Total	4.6×10^{-7}	2.4×10^{-8}	4.7×10^{-8}	5.3×10^{-7}

Source: Calculated Values

TABLE E.3.1.4–12.—*Zone 4 Aircraft Crash Probability per Year for Perforation Leading to Explosion*

AIRCRAFT	RW 22 LANDING	RW 04 TAKE-OFF	NON-AIRPORT	TOTAL ZONE 4
Air Carrier	3.1×10^{-9}	7.0×10^{-11}	6.5×10^{-10}	3.8×10^{-9}
Air Taxi	0.00	0.00	0.00	0.00
Large Military	1.0×10^{-9}	6.9×10^{-9}	1.9×10^{-9}	9.8×10^{-8}
Small Military	5.9×10^{-7}	2.3×10^{-8}	5.5×10^{-8}	6.6×10^{-7}
Single-engine piston	0.00	0.00	0.00	0.00
Multi-engine piston	0.00	0.00	0.00	0.00
Turboprop	0.00	0.00	0.00	0.00
Turbojet	0.00	0.00	0.00	0.00
Helicopters	0.00	0.00	0.00	0.00
Total	5.9×10^{-7}	3.0×10^{-8}	5.8×10^{-8}	6.8×10^{-7}

Source: Calculated Values

TABLE E.3.1.5–1.—*Zone 12 Reduced Skid Distances*[1]

BUILDING	REDUCED SKID DISTANCES (FEET)
12-64	Commercial: 1,338
12-84	Commercial, Military: 210
12-99	Commercial, Large Military (T): 484
12-104	No Reduction
12-44	Commercial, Large Military (T): 758
12-85	Commercial, Large Military (T): 645
12-96	Commercial, Large Military (T), and Small Military: 307
12-98	No Reduction
12-41	No Reduction
12-50	Commercial, Large Military (T): 581
12-60	Commercial, Military (T): 678
12-94	Commercial, Large Military (T): 565
12-104A	No Reduction
12-44 Cell 8	Commercial, Military (T): 758
12-26 Pit Vault	No Reduction
12-42 North Vault	No Reduction
12-42 South Vault	No Reduction
12-116	No Reduction
12-58	Commercial, Large Military (T): 600

[1]The DOE Standard mean skid distances (in feet) are:
Commercial: 1,570
General Aviation: 68
Large Military: 780 (Take-off) 368 (Landing)
Small Military: 246 (Take-off) 447 (Landing)
Source: DOE 1996g:B-29, Figure 4.15.1.1-2

TABLE E.3.1.5–2.—*Zone 12 Building Dimensions*

BUILDING	BUILDING LENGTH (ft)	BUILDING WIDTH (ft)	BUILDING HEIGHT (ft)
12-64	360	73	23
12-84W	242	70	24
12-84E	155	60	24
12-99	204	70	20
12-104N	161	70	20
12-104S	161	70	20
12-44	400	120	38
12-85	114	72	38
12-96	114	72	38
12-98	270	102	39
12-50	35	35	44
12-60	140	100	14.2
12-41	182	67	21
12-94	80	63	15
12-44-8	114	72	38
12-26PV	22	21	14.5
12-42NV	30	22	10
12-42SV	30	22	10
12-104A	311	162	28
12-116	197	136	37
12-58	62	42	11

Sources: Pantex 1996; PC 1995e

TABLE E.3.1.5–3.—*Zone 12 Aircraft Operational Data: Take-off, In-Flight, and Landing*

	AIR CARRIER	AIR TAXI	LG MILITARY	SM. MILITARY	GEN. SINGLE ENG.	GEN. MULTI-ENG.	GEN. TURBO-PROP	GEN. TURBO-JET	HELI-COP-TERS
DOE Standard Wingspan (ft)	98	59	223	78	50	50	73	50	50
Representative Wingspan (ft)	110.7	65.1	150.9	39.8	43.1	40.7	63.3	45.7	50
Take-off Skid Length (ft)	1,570	1,570	780[a]	246	68	68	68	68	0
Landing Skid Length (ft)	1,570	1,570	368	447[a]	68	68	68	68	0
Mean cotφ	9.6	9.6	7.4 T[a] 9.7 L	8.4 T[a] 10.4 L	8.2	8.2	8.2	8.2	0.58
NPf(x,y)	6×10^{-8}	4×10^{-7}	1×10^{-7}	5×10^{-6}	3.1×10^{-5}	1.4×10^{-5}	1.2×10^{-5}	1.4×10^{-5}	N/A
Take-off Effective Areas (mi^2)	0.2794	0.2351	0.2379	0.0847	0.0577	0.0571	0.0634	0.0585	0.0157
Landing Effective Areas (mi^2)	0.2794	0.2351	0.1504	0.1074	0.0577	0.0571	0.0634	0.0585	0.0157
In-flight Effective Areas (mi^2)	0.2670	0.2292	0.2759	0.1270	0.0597	0.0597	0.0661	0.0597	0.0157

[a]Conservatively used for in-flight.
Source: DOE 1996g

TABLE E.3.1.5–4.—*Zone 12 Aircraft Crash Location Probabilities: Runway 22*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY	
	TAKE-OFF (PER MILE^2)	LANDING (PER MILE^2)
Air Carrier	0.00	1.7×10^{-4}
Air Taxi	0.00	1.7×10^{-4}
Large Military	0.00	8.3×10^{-5}
Small Military	0.00	2.6×10^{-3}
Single-engine piston	0.00	5.6×10^{-4}
Multi-engine piston	0.00	5.6×10^{-4}
Turboprop	0.00	5.6×10^{-4}
Turbojet	0.00	5.6×10^{-4}
Helicopters	N/A	N/A

N/A - Not applicable
Source: DOE 1996g:Tables B-2 to B-13

TABLE E.3.1.5–5.—*Zone 12 Aircraft Crash Location Probabilities: Runway 04*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY	
	TAKE-OFF (PER MILE^2)	LANDING (PER MILE^2)
Air Carrier	1.2×10^{-5}	0.00
Air Taxi	1.2×10^{-5}	0.00
Large Military	9.8×10^{-4}	1.1×10^{-5}
Small Military	1.5×10^{-3}	0.00
Single-engine piston	0.00	0.00
Multi-engine piston	0.00	0.00
Turboprop	0.00	0.00
Turbojet	0.00	0.00
Helicopters	N/A	N/A

Source: DOE 1996g:Tables B-2 to B-13

TABLE E.3.1.5–6.—*Zone 12 Aircraft Crash Location Probabilities: Runway 31*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY	
	TAKE-OFF (PER MILE^2)	LANDING (PER MILE^2)
Air Carrier	N/A	N/A
Air Taxi	0.00	0.00
Large Military	N/A	N/A
Small Military	0.00	0.00
Single-engine piston	0.00	0.00
Multi-engine piston	0.00	0.00
Turboprop	0.00	0.00
Turbojet	0.00	0.00
Helicopters	N/A	N/A

N/A = Not applicable for commercial and large military aircraft because these aircraft do not operate on this runway.
Source: DOE 1996:Tables B-2 to B-13

TABLE E.3.1.5–7.—*Zone 12 Aircraft Crash Probabilities*

AIRCRAFT CATEGORY	CRASH PROBABILITY (PER YEAR)				
	RW 22 LANDING	RW 04 LANDING	RW 04 TAKE-OFF	NON-AIRPORT	TOTAL ZONE 12
Air Carrier	5.2×10^{-8}	0.00	1.6×10^{-9}	1.6×10^{-8}	7.0×10^{-8}
Air Taxi	2.7×10^{-7}	0.00	4.6×10^{-9}	9.2×10^{-8}	3.6×10^{-7}
Large Military	6.7×10^{-8}	4.9×10^{-9}	5.0×10^{-7}	2.9×10^{-8}	6.0×10^{-7}
Small Military	6.6×10^{-6}	0.00	1.3×10^{-6}	6.7×10^{-7}	8.5×10^{-6}
Single-engine piston	2.4×10^{-6}	0.00	0.00	1.8×10^{-6}	4.2×10^{-6}
Multi-engine piston	1.2×10^{-6}	0.00	0.00	8.3×10^{-7}	2.1×10^{-6}
Turboprop	4.2×10^{-7}	0.00	0.00	7.9×10^{-7}	1.2×10^{-6}
Turbojet	2.5×10^{-7}	0.00	0.00	8.1×10^{-7}	1.1×10^{-6}
Helicopters	0.00	0.00	0.00	2.7×10^{-7}	2.7×10^{-7}
Total	1.1×10^{-5}	4.9×10^{-9}	1.8×10^{-6}	5.3×10^{-6}	1.8×10^{-5}

Source: Calculated Values

TABLE E.3.1.5–8.—*Zone 12 Structural Scabbing Calculation*

BUILDING	OVER-BURDEN (FT)	THICK-NESS (IN)	AIR CARR-IER	AIR-TAXI	LARGE MILI-TARY	SMALL MILI-TARY	GEN-ERAL: SINGLE ENG.	GEN-ERAL: MULTI-ENG.	GEN-ERAL: TURBO-PROP	GEN-ERAL: TURBO-JET	HELI-COPTER
12-84W, 12-99, 12-104, W	13	18	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-84W, 12-99, 12-104, R	2	18	D	ND	D	ND	ND	ND	ND	ND	ND
12-64R	2	9	D	D	D	D	ND	ND	ND	ND	ND
12-64 W	13	18	D	ND	ND	ND	ND	ND	ND	ND	ND
12-84E R	2	18	D	ND	D	ND	ND	ND	ND	ND	ND
12-84E W	0	36	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-44, 12-85, 12-96, 12-98 R & W	17	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-50 R	2	14	D	ND	D	D	ND	ND	ND	ND	ND
12-50 W	13	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-60 R	2	0.3[a]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12-60 W	13	0.3[a]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12-41 R	0	0.1	D	D	D	D	D	D	D	D	D
12-41 W	0	0.1	D	D	D	D	D	D	D	D	D
12-94 R	0	36	D	ND	D	ND	ND	ND	ND	ND	ND
12-94 W	0	30	D	ND	D	ND	ND	ND	ND	ND	ND
CELL 8	17	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-26 PIT VAULT R&W	0	12	D	D	D	D	D[b]	D	D[b]	D	D[b]
NORTH & SOUTH VAULT R&W	0	8	D	D	D	D	D	D	D	D	D
12-104A R & W	3	18	D	ND	ND	ND	ND	ND	ND	ND	ND
12-116 R & W	0	24	D	D	D	D	ND	ND	ND	ND	ND
12-58 R	3	12	D	ND	D	D	ND	ND	ND	ND	ND
12-58 W	25	12	ND	ND	ND	ND	ND	ND	ND	ND	ND

[a]Steel
[b]Scabbing occurs for the walls, but not the roof.
D = Damage: scabbing occurs. ND = No Damage: scabbing does not occur.
R = Roof W = Walls
N/A = Not applicable because it is a steel structure.
Source: Pantex 1996

TABLE E.3.1.5–9.—*Zone 12 Structural Perforation Calculation*

BUILDING	OVER-BURDEN (FT)	THICK-NESS (IN)	AIR CAR-RIER	AIR-TAXI	LARGE MILI-TARY	SMALL MILI-TARY	GEN-ERAL: SINGLE ENG.	GEN-ERAL: MULTI-ENG.	GEN-ERAL: TURBO-PROP	GEN-ERAL: TURBO-JET	HELI-COPTER
12-84W, 12-99, 12-104, W	13	18	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-84W, 12-99, 12-104, R	2	18	D	ND	ND	ND	ND	ND	ND	ND	ND
12-64R	2	9	D	ND	D	D	ND	ND	ND	ND	ND
12-64 W	13	18	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-84E R	2	18	D	ND	ND	ND	ND	ND	ND	ND	ND
12-84E W	0	36	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-44, 12-85, 12-96, 12-98 R & W	17	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-50 R	2	14	D	ND	ND	ND	ND	ND	ND	ND	ND
12-50 W	13	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-60 R	2	0.3[a]	D	D	D	D	ND	ND	ND	ND	ND
12-60 W	13	0.3[a]	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-41 R	0	0.1	D	D	D	D	D	D	D	D	D
12-41 W	0	0.1	D	D	D	D	D	D	D	D	D
12-94 R	0	36	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-94 W	0	30	D[b]	ND	ND	ND	ND	ND	ND	ND	ND
CELL 8	17	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-26 PIT VAULT R&W	0	12	D	D	D	D	ND	ND	ND	ND	ND
NORTH VAULT R&W SOUTH VAULT R&W	0	8	D	D	D	D	ND	ND	ND	ND	ND
12-104A R & W	3	18	ND	ND	ND	ND	ND	ND	ND	ND	ND
12-116 R & W	0	24	D	ND	D	ND	ND	ND	ND	ND	ND
12-58 R	3	12	D	ND	ND	ND	ND	ND	ND	ND	ND
12-58 W	25	12	ND	ND	ND	ND	ND	ND	ND	ND	ND

[a]Steel
[b]Perforation occurs for the walls but not the roof.
D = Damage; perforation occurs.
ND = No Damage; perforation does not occur.
R = Roof
W = Walls
Sources: Pantex 1996; PC 1995e

TABLE E.3.1.5–10.—*Zone 12 Reduced Effective Areas (in square miles)*

	AIR CARRIER	AIR TAXI	LARGE MILITARY	SMALL MILITARY	GEN. SINGLE ENG.	GEN. MULTI-ENG.	GEN. TURBO-PROP	GEN. TURBO-JET	HELI-COPTERS
SCABBING/EXPLOSION AREAS									
Take-off	0.0329	0.00	0.0257	0.0011	0.00	0.00	0.00	0.00	0.00
In-Flight	0.0319	0.00	0.0326	0.0015	0.00	0.00	0.00	0.00	0.00
Landing	0.0329	0.00	0.0206	0.0009	0.00	0.00	0.00	0.00	0.00
PERFORATION/EXPLOSION AREAS									
Take-off	0.0626	0.0439	0.0335	0.0135	0.0043	0.0043	0.0045	0.0043	0.0007
In-Flight	0.0608	0.0434	0.0374	0.0206	0.0044	0.0044	0.0046	0.0044	0.0007
Landing	0.0626	0.0439	0.0205	0.0184	0.0043	0.0043	0.0045	0.0043	0.0007
PERFORATION/FIRE AREAS									
Take-off	0.0513	0.0179	0.0351	0.0028	0.00	0.00	0.00	0.00	0.00
In-Flight	0.0480	0.0168	0.0454	0.0065	0.00	0.00	0.00	0.00	0.00
Landing	0.0513	0.0179	0.0197	0.0043	0.00	0.00	0.00	0.00	0.00

Source: Calculated Values

TABLE E.3.1.5–11.—*Zone 12 Aircraft Crash Probability per Year for Scabbing Leading to Explosion*

AIRCRAFT	RW 22 LANDING	RW 04 LANDING	RW 04 TAKEOFF	NON-AIRPORT	TOTAL ZONE 12
Air Carrier	6.1×10^{-9}	0.00	1.9×10^{-10}	1.9×10^{-9}	8.3×10^{-9}
Air Taxi	0.00	0.00	0.00	0.00	0.00
Large Military	9.1×10^{-9}	6.8×10^{-10}	5.4×10^{-8}	3.3×10^{-9}	6.7×10^{-8}
Small Military	5.4×10^{-8}	0.00	1.6×10^{-8}	7.7×10^{-9}	7.8×10^{-8}
Single-engine piston	0.00	0.00	0.00	0.00	0.00
Multi-engine piston	0.00	0.00	0.00	0.00	0.00
Turboprop	0.00	0.00	0.00	0.00	0.00
Turbojet	0.00	0.00	0.00	0.00	0.00
Helicopters	0.00	0.00	0.00	0.00	0.00
Total	6.9×10^{-8}	6.8×10^{-10}	7.0×10^{-8}	1.3×10^{-8}	1.5×10^{-7}

Source: Calculated Values

TABLE E.3.1.5–12.—*Zone 12 Aircraft Crash Probability per Year for Perforation Leading to Explosion*

AIRCRAFT	RW 22 LANDING	RW 04 LANDING	RW 04 TAKEOFF	NON-AIRPORT	TOTAL ZONE 12
Air Carrier	1.2×10^{-8}	0.00	3.6×10^{-10}	3.7×10^{-9}	1.6×10^{-8}
Air Taxi	4.9×10^{-8}	0.00	8.5×10^{-10}	1.7×10^{-8}	6.8×10^{-8}
Large Military	9.1×10^{-9}	6.7×10^{-10}	7.0×10^{-8}	3.7×10^{-9}	8.4×10^{-8}
Small Military	1.1×10^{-6}	0.00	2.1×10^{-7}	1.0×10^{-7}	1.4×10^{-6}
Single-engine piston	1.8×10^{-7}	0.00	0.00	1.3×10^{-7}	3.1×10^{-8}
Multi-engine piston	9.2×10^{-8}	0.00	0.00	6.1×10^{-8}	1.5×10^{-8}
Turboprop	3.0×10^{-8}	0.00	0.00	5.5×10^{-8}	8.6×10^{-8}
Turbojet	1.9×10^{-8}	0.00	0.00	5.9×10^{-8}	7.8×10^{-8}
Helicopters	0.00	0.00	0.00	1.1×10^{-8}	1.1×10^{-8}
Total	1.5×10^{-6}	6.7×10^{-10}	2.8×10^{-7}	4.4×10^{-7}	2.2×10^{-6}

Source: Calculated Values

TABLE E.3.1.5–13.—*Zone 12 Aircraft Crash Probability per Year for Perforation Leading to Fire*

AIRCRAFT	RW 22 LANDING	RW 04 LANDING	RW 04 TAKE-OFF	NON-AIRPORT	TOTAL ZONE 12
Air Carrier	9.6×10^{-9}	0.00	2.9×10^{-10}	2.9×10^{-9}	1.3×10^{-8}
Air Taxi	2.0×10^{-8}	0.00	3.5×10^{-10}	6.7×10^{-9}	2.7×10^{-8}
Large Military	8.7×10^{-9}	6.5×10^{-10}	7.3×10^{-8}	4.5×10^{-9}	8.7×10^{-8}
Small Military	2.6×10^{-7}	0.00	4.3×10^{-8}	3.4×10^{-8}	3.4×10^{-7}
Single-engine piston	0.00	0.00	0.00	0.00	0.00
Multi-engine piston	0.00	0.00	0.00	0.00	0.00
Turboprop	0.00	0.00	0.00	0.00	0.00
Turbojet	0.00	0.00	0.00	0.00	0.00
Helicopters	0.00	0.00	0.00	0.00	0.00
Total	3.0×10^{-7}	6.5×10^{-10}	1.2×10^{-7}	4.8×10^{-8}	4.7×10^{-7}

Source: Calculated Values

TABLE E.3.2-1.—*Distance to Airports in Vicinity of Manzano WSA*

AIRPORT	NUMBER OF RUNWAYS	DISTANCE AND DIRECTION FROM MANZANO WSA	RUNWAYS	AIRCRAFT CATEGORIES USING RUNWAYS	COMPARISON TO PROBABILITY DENSITY FUNCTION		INCLUDED IN ANALYSIS
					X COOR-DINATE	Y COOR-DINATE	
Albuquerque International Airport	2	5 miles W	Runway 1 (east-west)	All Categories	4 to 5 miles	0 to 1 mile	Y
			Runway 2 (north-south)	All Categories	0 to 1 mile	5 to 5 miles	Y
Coronado Airport	2	12 miles NNW	Runway 1	General Aviation	11 to 12 miles	4 to 5 miles	N
			Runway 2	General Aviation	4 to 5 miles	11 to 12 miles	N
Alameda Airport	2	15 miles NW	Runway 1	General Aviation	10 to 11 miles	10 to 11 miles	N
			Runway 2	General Aviation	10 to 11 miles	7 to 8 miles	N

Sources: USGS 1978; USGS 1979

TABLE E.3.2.1-1.—*1994 Albuquerque International Airport Traffic Activity*

AIRCRAFT CATEGORY	NUMBER OF FLIGHTS
Air Carrier	77,978
Air Taxi	41,349
Military	29,929
Large (33.2%)	9.936
Small (66.8%)	19,993
General Aviation	71,658
Single-Engine (43.8%)	31,386
Multi-Engine (19.8%)	14,188
Turboprop (17.0%)	12,182
Turbojet (19.4%)	13,902
Total	220.914

Source: PC 1996a

TABLE E.3.2.1–2.—*Aircraft Crash Rates*

AIRCRAFT CATEGORY	CRASH RATE	
	TAKE-OFF (PER TAKE-OFF)	LANDING (PER LANDING)
Air Carrier	2.0×10^{-7}	2.6×10^{-7}
Air Taxi	1.0×10^{-6}	2.3×10^{-6}
Military: Large	5.7×10^{-7}	1.6×10^{-6}
Military: Small	1.8×10^{-6}	3.3×10^{-6}
General: Single-Engine	1.1×10^{-5}	2.0×10^{-5}
General: Multi-Engine	9.3×10^{-6}	2.3×10^{-5}
General: Turboprop	3.5×10^{-6}	8.3×10^{-6}
General: Turbojet	1.4×10^{-6}	4.7×10^{-6}

Source: DOE 1996g:Table B-1

TABLE E.3.2.1–3.—*Manzano WSA Aircraft Crash Location Probability*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY			
	RUNWAY 1 TAKE-OFF (PER MILE^2)	RUNWAY 1 LANDING (PER MILE^2)	RUNWAY 2 TAKE-OFF (PER MILE^2)	RUNWAY 2 LANDING (PER MILE^2)
Air Carrier	1.1×10^{-2}	3.4×10^{-2}	0.00	0.00
Air Taxi	1.1×10^{-2}	3.4×10^{-2}	0.00	0.00
Military: Large	3.9×10^{-2}	1.6×10^{-2}	0.00	9.5×10^{-4}
Military: Small	2.5×10^{-2}	1.6×10^{-3}	1.1×10^{-4}	3.3×10^{-4}
General: Single-Engine	4.3×10^{-3}	6.8×10^{-3}	0.00	0.00
General: Multi-Engine	4.3×10^{-3}	6.8×10^{-3}	0.00	0.00
General: Turboprop	4.3×10^{-3}	6.8×10^{-3}	0.00	0.00
General: Turbojet	4.3×10^{-3}	6.8×10^{-3}	0.00	0.00

Source: DOE 1996g:Tables B-2 to B-13

TABLE E.3.2.1–4.—*Sandia National Laboratories In-Flight Aircraft Crash Rate Probabilies(NPf(x,y))*

AIRCRAFT	CRASH RATE PROBABILITY[1]
Air Carrier	6.0×10^{-8}
Air Taxi	4.0×10^{-7}
Military: Large	1.0×10^{-7}
Military: Small	5.0×10^{-6}
General: Single-Engine	8.0×10^{-4}
General: Multi-Engine	8.0×10^{-4}
General: Turboprop	8.0×10^{-4}
General: Turbojet	8.0×10^{-4}

[1]In crashes per square mile, per year, centered at the site.
Sources: DOE 1996g:Tables B-14 and B-15

TABLE E.3.2.2–1.—*Manzano WSA Aircraft Operational Data: Take-off, In-Flight, and Landing*

	AIR CARRIER	AIR TAXI	MILITARY: LARGE	MILITARY: SMALL	GENERAL: SINGLE ENGINE	GENERAL: MULTI-ENGINE	GENERAL TURBO-PROP	GENERAL: TURBOJET
Maximum Wingspan (ft)	211	75	223	93	50	50	80	78
Skid Length (ft)	0	0	0	0	0	0	0	0
Mean Take-off Impact Angle cotϕ (degree)	9.6	9.6	7.4	8.4	8.2	8.2	8.2	8.2
Mean In-flight Impact Angle cotϕ (degree)	9.6	9.6	7.4	8.4	8.2	8.2	8.2	8.2
Mean Landing Impact Angle cotϕ (degree)	9.6	9.6	9.7	10.4	8.2	8.2	8.2	8.2
Take-off Effective Areas (mi^2)	0.0291	0.0140	0.0361	0.0176	0.0127	0.0127	0.0163	0.0160
In-flight Effective Areas (mi^2)	0.0291	0.0140	0.0361	0.0176	0.0127	0.0127	0.0163	0.0160
Landing Effective Areas (mi^2)	0.0291	0.0140	0.0301	0.0152	0.0127	0.0127	0.0163	0.0160

Sources: Jane's 1961-1996: DOE 1996g:Tables B-17 and B-18: Calculated Values

TABLE E.3.2.3–1.—*Manzano WSA Aircraft Crash Probabilities*

AIRCRAFT CATEGORY	CRASH PROBABILITY (PER YEAR)					
	RUNWAY 1 TAKE-OFF	RUNWAY 1 LANDING	RUNWAY 2 TAKE-OFF	RUNWAY 2 LANDING	IN-FLIGHT	TOTAL
Air Carrier	2.5×10^{-6}	0.00	7.7×10^{-6}	0.00	1.7×10^{-9}	1.0×10^{-5}
Air Taxi	3.2×10^{-6}	0.00	9.9×10^{-6}	0.00	5.6×10^{-9}	1.3×10^{-5}
Military: Large	4.0×10^{-6}	0.00	1.6×10^{-6}	2.3×10^{-7}	3.6×10^{-9}	5.9×10^{-6}
Military: Small	7.9×10^{-6}	5.5×10^{-8}	5.1×10^{-7}	1.7×10^{-7}	8.8×10^{-8}	8.7×10^{-6}
General: Single-Engine	9.4×10^{-6}	0.00	1.5×10^{-5}	0.00	4.4×10^{-6}	2.9×10^{-5}
General: Multi-Engine	3.6×10^{-6}	0.00	5.7×10^{-6}	0.00	2.0×10^{-6}	1.1×10^{-5}
General: Turboprop	1.5×10^{-6}	0.00	2.4×10^{-6}	0.00	2.2×10^{-6}	6.1×10^{-6}
General: Turbojet	6.7×10^{-7}	0.00	1.1×10^{-6}	0.00	2.5×10^{-6}	4.2×10^{-6}
Total	3.3×10^{-5}	5.5×10^{-8}	4.4×10^{-5}	4.0×10^{-7}	1.1×10^{-5}	8.8×10^{-5}

Source: Calculated Values

TABLE E.3.2.4–1.—*Aircraft Missile Characteristics for Manzano WSA*

AIRCRAFT CATEGORY	IMPACT VELOCITY (FT/SEC)	ENGINE WEIGHT (LBS)	ENGINE DIAMETER (IN)	PERFORATE
Air Carrier	422	3,495	26	N
Air Taxi	422	861	31	N
Military: Large	338	4,234	34	N
Military: Small	422	4,201	51	N
General: Single-Engine	152	483	20	N
General: Multi-Engine	152	488	20	N
General: Turboprop	152	465	19	N
General: Turbojet	152	2,574	37	N

Sources: LLNL 1995; Jane's 1961-1996; Calculated Values

TABLE E.3.3–1—*Distance to Airports in Vicinity from DAF*

AIRPORT	NUMBER OF RUNWAYS	DISTANCE AND DIRECTION FOR DAF	RUN-WAYS	AIRCRAFT CATE-GORIES USING RUNWAYS	COMPARISON TO PROBABILITY DENSITY FUNCTION	INCLUDED IN ANALYSIS
McCarran International Airport	Not determined	~76 miles SE	Not determined	All Categories	Distance is outside all categories	N
North Las Vegas Airport	Not determined	~76 miles SE	Not determined	All Categories	Distance is outside all categories	N
Nellis Air Force Base	Not determined	~76 miles SE	Not determined	Military	Distance is outside all categories	N
Beatty Airfield	1	42 miles W	Runway 1	General Aviation	Distance is outside general aviation category	N
Indian Springs AF Auxiliary Field	2	30 miles SE	Runway 1	Military	Distance is outside military category	N
Desert Rock Airstrip	1	19 miles S	Runway 1	General Aviation	Distance is outside general aviation category	N
Landing Strip (near Yucca Lake)	1	4 miles N	Runway 1	General Aviation	Activity is restricted and is bounded by in-flight operations	N
Landing Strip	1	17 miles S	Runway 1	General Aviation	Distance is outside general aviation category	N
Landing Strip	1	39 miles WNW	Runway 1	General Aviation	Distance is outside general aviation category	N
Landing Strip	1	49 miles NNW	Runway 1	General Aviation	Distance is outside general aviation category	N

Sources: USGS 1985; USGS 1986; USGS 1988; USGS 1979a

TABLE E.3.3.1–1.—*NTS In-Flight Aircraft Crash Rate Probabilities (NPf(x,y))*

AIRCRAFT CATEGORY	CRASH RATE PROBABILITY[1]
Air Carrier	2.0×10^{-7}
Air Taxi	3.0×10^{-6}
Military: Large	2.0×10^{-7}
Military: Small	6.0×10^{-6}
General: Single-Engine	8.0×10^{-5}
General: Multi-Engine	8.0×10^{-5}
General: Turboprop	8.0×10^{-5}
General: Turbojet	8.0×10^{-5}

[1]In crashes per square mile, per year, centered at the site.
Sources: DOE 1996g:Tables B-14 and B-15

TABLE E.3.3.2–1.—*NTS Aircraft Operational Data: In-flight*

	AIR CARRIER	AIR TAXI	MILITARY: LARGE	MILITARY: SMALL	GEN.: SINGLE ENGINE	GEN.: MULTI-ENGINE	GEN.: TURBO-PROP	GEN.: TURBOJET
Maximum Wingspan (ft)	211	75	223	93	50	50	80	78
In-flight Skid Length (ft)	1,570	1,570	780	447	68	68	68	68
Mean In-flight Impact Angle cotφ (degree)	9.6	9.6	7.4	8.4	8.2	8.2	8.2	8.2
In-flight Effective Areas (mi^2)	0.0669	0.0560	0.0433	0.0261	0.0142	0.0142	0.0150	0.0150

Sources: Jane's 1961-1996: DOE 1996g:Tables B-17 and B-18; Calculated Values

TABLE E.3.3.3–1. —*NTS Aircraft Crash Probabilities*

AIRCRAFT CATEGORY	CRASH PROBABILITY (PER YEAR) IN-FLIGHT
Air Carrier	1.3×10^{-8}
Air Taxi	1.7×10^{-7}
Military: Large	8.7×10^{-9}
Military: Small	1.6×10^{-7}
General: Single Engine	5.0×10^{-7}
General: Multi-Engine	2.3×10^{-7}
General: Turboprop	2.0×10^{-7}
General: Turbojet	2.3×10^{-7}
Total	1.5×10^{-6}

Source: Calculated Values

TABLE E.3.3.4–1. —*Aircraft Missile Characteristics for DAF*

AIRCRAFT CATEGORY	IMPACT VELOCITY (FT/SEC)	ENGINE WEIGHT (LBS)	ENGINE DIAMETER (IN)	PERFORATE
Air Carrier	422	3,495	26	Y[a]
Air Taxi	422	861	31	N
Military: Large	338	4,234	34	Y[a]
Military: Small	422	4,201	51	Y[a]
General: Single-Engine	152	483	20	N
General: Multi-Engine	152	488	20	N
General: Turboprop	152	465	19	N
General: Turbojet	152	2,574	37	N

[a]Perforation or scabbing is only from the side of the facility where there is no overburden.
Sources: LLNL 1995; Jane's 1961-1996; Calculated Values

TABLE E.3.4–1.—*Distance to Airports in Vicinity of P-Reactor*

AIRPORT	NUMBER OF RUNWAYS	DISTANCE AND DIRECTION FROM SRS	RUNWAYS	AIR-CRAFT CATE-GORIES USING RUNWAYS	COMPARISON TO PROBABILITY DENSITY FUNCTION		INCLUDED IN ANALYSIS
					X COOR-DINATE	Y COOR-DINATE	
Bush Field	2	24 miles WNW	Runway 1	All Categories	13 to 14 miles	20 to 21 miles	N
			Runway 2	All Categories	20 to 21 miles	13 to 14 miles	N
North Army Base	1	38 miles NE	Runway 1	Military	Distance is outside military category		N
County Airport (near Barnwell)	3	11 miles E	Runway 1	General Aviation	Distance is outside general aviation category		N
			Runway 2	General Aviation	Distance is outside general aviation category		N
			Runway 3	General Aviation	Distance is outside general aviation category		N
Aiken Airport (near Aiken)	3	26 miles SW	Runway 1	General Aviation	Distance is outside general aviation category		N
			Runway 2	General Aviation	Distance is outside general aviation category		N
			Runway 3	General Aviation	Distance is outside general aviation category		N

Sources: USGS 1983; USGS 1981

TABLE E.3.4.1–1. —SRS In-Flight *Aircraft Crash Rate Probabilities (NPf(x,y))*

AIRCRAFT CATEGORY	CRASH RATE PROBABILITY[1]
Air Carrier	2.0×10^{-7}
Air Taxi	3.0×10^{-6}
Military: Large	1.0×10^{-7}
Military: Small	6.0×10^{-7}
General: Single-Engine	2.0×10^{-4}
General: Multi-Engine	2.0×10^{-4}
General: Turboprop	2.0×10^{-4}
General: Turbojet	2.0×10^{-4}

[1]In crashes per square mile, per year, centered at the site.
Source: DOE 1996g:Tables B-14 and B-15

TABLE E.3.4.2–1. —*SRS Aircraft Operational Data: In-flight*

	AIR CARRIER	AIR TAXI	MILI-TARY: LARGE	MILI-TARY: SMALL	GEN.: SINGLE-ENGINE	GEN.: MULTI-ENGINE	GEN.: TURBO-PROP	GEN.: TURBOJET
Maximum Wingspan (ft)	211	75	223	93	50	50	80	78
In-flight Skid Length (ft)	1,570	1,570	780	447	68	68	68	68
Mean In-flight Impact Angle cotϕ (degree)	9.6	9.6	7.4	8.4	8.2	8.2	8.2	8.2
In-flight Effective Areas (mi^2)	0.0353	0.0253	0.0225	0.0115	0.0054	0.0054	0.0060	0.0060

Sources: Jane's 1961-1996; DOE 1996g:Tables B-17 and B-18: Calculated Values

TABLE E.3.4.3–1. —*SRS Aircraft Crash Probabilities*

AIRCRAFT	CRASH LOCATION PROBABILITY (PER YEAR) IN-FLIGHT
Air Carrier	7.1×10^{-9}
Air Taxi	7.6×10^{-8}
Military: Large	2.3×10^{-9}
Military: Small	6.9×10^{-9}
General: Single-Engine	4.8×10^{-7}
General: Multi-Engine	2.2×10^{-7}
General: Turboprop	2.1×10^{-7}
General: Turbojet	2.3×10^{-7}
Total	1.2×10^{-6}

Source: Calculated Values

TABLE E.3.4.4–1.—*Aircraft Missile Characteristics for P-Reactor*

AIRCRAFT	IMPACT VELOCITY (FT/SEC)	ENGINE WEIGHT (LBS)	ENGINE DIAMETER (IN)	PERFORATE
Air Carrier	422	3,495	26	Y
Air Taxi	422	861	31	N
Military: Large	338	4,234	34	Y
Military: Small	422	4,201	51	N
General: Single-Engine	152	483	20	N
General: Multi-Engine	152	488	20	N
General: Turboprop	152	465	19	N
General: Turbojet	152	2,574	37	N

Sources: LLNL 1995; Jane's 1961-1996; Calculated Values

TABLE E.3.5–1.—*Distance to Airports in Vicinity of FMEF*

AIRPORT	NUMBER OF RUNWAYS	DISTANCE AND DIRECTION FROM FMEF	RUNWAYS	AIRCRAFT CATEGORIES USING RUNWAYS	COMPARISON TO PROBABILITY DENSITY FUNCTION		INCLUDED IN ANALYSIS
					X COORDINATE	Y COORDINATE	
Tri-Cities Airport	3	17 miles SE	Runway 1	All Categories	16 to 17 miles	0 to 1 mile	Y[a]
			Runway 2	All Categories	0 to 1 mile	16 to 17 miles	N
			Runway 3	All Categories	0 to 1 mile	16 to 17 miles	N
Vista Field	2	16 miles SSE	Runway 1	General Aviation	15 to 16 miles	4 to 5 miles	N
			Runway 2	General Aviation	4 to 5 miles	15 to 16 miles	N
Richland Field	3	8 miles SSE	Runway 1	General Aviation	8 to 9 miles	2 to 3 miles	N
			Runway 2	General Aviation	Runway 1 bounds Runway 2		N
			Runway 3	General Aviation	Runway 1 bounds Runway 3		N
Beardsley Airfield (near Prosser)	1	26 miles SW	Runway 1	General Aviation	Distance is outside general aviation category		N
Sunnyside Airport	1	30 miles WSW	Runway 1	General Aviation	Distance is outside general aviation category		N
Landing Strip (near Horse Heavens Hills)	1	20 miles SSW	Runway 2	General Aviation	Distance is outside general aviation category		N

[a]Only small military aircraft in the landing mode had a nonzero probability density value.
Source: USGS 1978a

TABLE E.3.5.1–1.—*1994 Tri-Cities Airport Traffic Activity*

AIRCRAFT CATEGORY	NUMBER OF FLIGHTS
Air Carrier	2,645
Air Taxi	21,807
Military	2,597
Large (33.2%)	862
Small (66.8%)	1,735
General Aviation	54,818
Single Engine (43.8%)	24,010
Multi-Engine (19.8%)	10,854
Turboprop (17.0%)	9,319
Turbojet (19.4%)	10,635
Total	81,867

Source: PC 1996a

TABLE E.3.5.1–2.—*Aircraft Crash Rates*

AIRCRAFT CATEGORY	CRASH RATE	
	TAKE-OFF (PER TAKE-OFF)	LANDING (PER LANDING)
Air Carrier	2.0×10^{-7}	2.6×10^{-7}
Air Taxi	1.0×10^{-6}	2.3×10^{-6}
Military: Large	5.7×10^{-7}	1.6×10^{-6}
Military: Small	1.8×10^{-6}	3.3×10^{-6}
General: Single-Engine	1.1×10^{-5}	2.0×10^{-5}
General: Multi-Engine	9.3×10^{-6}	2.3×10^{-5}
General: Turboprop	3.5×10^{-6}	8.3×10^{-6}
General: Turbojet	1.4×10^{-6}	4.7×10^{-6}

Source: DOE 1996g:Table B-1

TABLE E.3.5.1–3.—*Hanford Site Aircraft Crash Location Probability*

AIRCRAFT CATEGORY	CRASH LOCATION PROBABILITY
	RUNWAY 1 LANDING (PER MILE^2)
Air Carrier	0
Air Taxi	0
Military: Large	0
Military: Small	1.1×10^{-3}
General: Single-Engine	0
General: Multi-Engine	0
General: Turboprop	0
General: Turbojet	0

Source: DOE 1996g:Table B-12

TABLE E.3.5.1–4.—*Hanford Site In-Flight Aircraft Crash Rate Probabilities (NPf(x,y))*

AIRCRAFT CATEGORY	CRASH RATE PROBABILITY[1]
Air Carrier	5.0×10^{-8}
Air Taxi	2.0×10^{-6}
Military: Large	1.0×10^{-7}
Military: Small	4.0×10^{-8}
General: Single-Engine	1.0×10^{-4}
General: Multi-Engine	1.0×10^{-4}
General: Turboprop	1.0×10^{-4}
General: Turbojet	1.0×10^{-4}

[1]In crashes per square mile, per mile, centered at the site.
Source: DOE 1996g:Tables B-14 and B-15

TABLE E.3.5.2–1.—*Hanford Site Aircraft Operational Data: In-flight and Landing*

	AIR CARRIER	AIR TAXI	MILITARY: LARGE	MILITARY: SMALL	GEN.: SINGLE ENGINE	GEN.: MULTI-ENGINE	GEN.: TURBOPROP	GEN.: TURBOJET
Maximum Wingspan (ft)	211	75	223	93	50	50	80	78
In-flight Skid Length (ft)	1,570	1,570	780	447	68	68	68	68
Landing Skid Length (ft)	1,570	1,570	368	447	68	68	68	68
Mean In-flight Impact Angle cotϕ (degree)	9.6	9.6	7.4	8.4	8.2	8.2	8.2	8.2
Mean Landing Impact Angle cotϕ (degree)	9.6	9.6	9.7	10.4	8.2	8.2	8.2	8.2
In-flight Effective Areas (mi^2)	0.0442	0.0331	0.0314	0.0175	0.0103	0.0103	0.0112	0.0112
Landing Effective Areas (mi^2)	0.0442	0.0331	0.0201	0.0160	0.0103	0.0103	0.0112	0.0112

Sources: Jane's 1961-1996; DOE 1996g:Tables B-17 and B-18; Calculated Values

TABLE E.3.5.3–1.—*Hanford Site Aircraft Crash Probabilities*

AIRCRAFT CATEGORY	CRASH PROBABILITY (PER YEAR)		
	RUNWAY 1 LANDING	IN-FLIGHT	TOTAL
Air Carrier	0.00	2.2×10^{-9}	2.2×10^{-9}
Air Taxi	0.00	6.6×10^{-8}	6.6×10^{-8}
Military: Large	0.00	3.1×10^{-9}	3.1×10^{-9}
Military: Small	2.5×10^{-8}	7.0×10^{-10}	2.6×10^{-8}
General: Single-Engine	0.00	4.5×10^{-7}	4.5×10^{-7}
General: Multi-Engine	0.00	2.1×10^{-7}	2.1×10^{-7}
General: Turboprop	0.00	1.9×10^{-7}	1.9×10^{-7}
General: Turbojet	0.00	2.1×10^{-7}	2.1×10^{-7}
Total	2.5×10^{-8}	1.1×10^{-6}	1.2×10^{-6}

Source: Calculated Values

TABLE E.3.5.4–1.—*Aircraft Missile Characteristics for FMEF*

AIRCRAFT CATEGORY	IMPACT VELOCITY (FT/SEC)	ENGINE WEIGHT (LBS)	ENGINE DIAMETER (IN)	PERFORATE
Air Carrier	422	3,495	26	N
Air Taxi	422	861	31	N
Military: Large	338	4,234	34	N
Military: Small	422	4,201	51	N
General: Single-Engine	152	483	20	N
General: Multi-Engine	152	488	20	N
General: Turboprop	152	465	19	N
General: Turbojet	152	2,574	37	N

Sources: LLNL 1995; Jane's 1961-1996; Calculated Values

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APPENDIX F

Transportation Risk Analysis

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APPENDIX F
TRANSPORTATION RISK ANALYSIS

F.1 INTRODUCTION

This appendix contains additional material for support of the impact analyses in the transportation sections of the EIS. Further information regarding Pantex Plant related transportation activities, including nonradiological hazardous wastes and materials, is provided in the Pantex Plant *Safety Information Document* and the *Ross Aviation Transportation Analysis Report* (Pantex 1996a; Ross 1994).

F.2 PACKAGING

Pantex Plant utilizes many different containers for packaging of nuclear explosives, explosives and explosive components, and radioactive materials. These containers provide protection against accidental release of hazardous material. Each container is designed for a specific application, and some have firm guidelines for their construction. Specifications for containers used during offsite transportation of radioactive materials are contained in 10 CFR 71. The following are examples of packaging guidelines for intersite shipment of radioactive material.

F.2.1 Limited Quantity/ Instruments and Articles

These materials are packaged in strong, tight packages that will not leak the radioactive contents during normal transportation.

F.2.2 Type A Packaging

Type A packages must be designed according to the requirements of 49 CFR Sections 173.24, 173.411, and 173.412. This package type must be adequate to prevent any loss of radioactive material or shielding while subjected to normal (i.e., incident-free) transport conditions. This packaging will be in appropriate inner containers to prevent leakage of the contents with the inner containers overpacked in one of the following containers:

- Strong fiberboard box.
- Tightly sealed can or drum.
- Strong wooden box.
- Approved Department of Transportation (DOT)–7A equivalent packaging.
- Original containers received from manufacturer, if in good condition.

Materials shall be cushioned to prevent movement, and containers shall be securely closed.

F.2.3 Type B Packaging

Type B packages must meet all of the requirements for Type A packaging as well as withstand test conditions that simulate serious accident damage. The test results must show that only a limited loss of shielding and essentially no loss of material occurs. The test conditions are determined by the Nuclear Regulatory Commission (NRC) in regulation 10 CFR 71.73 and include the following:

- A 9-meter (30-foot) free drop onto an unyielding surface.
- A dynamic crush test consisting of dropping a 500-kilogram (1,100-pound) mass from a height of 9 meters (30 feet) onto the container.
- A puncture test consisting of a free drop greater than 1 meter (3.3 feet) onto a 15-centimeter (6-inch) diameter steel pin.

- A 30-minute thermal exposure at 800 °C (1,475 °F).
- Immersion in water for 8 hours (for fissile materials packaging only).

In addition to requirements for accident survivability, the DOT places limits on the external radiological hazards posed by radioactive materials shipments. For both Type A and Type B radioactive materials packaging, the dose rate at any point on the outer surface of the package may not exceed:

- 200 millirem per hour on the surface of the package.
- 10 millirem per hour at 1 meter (3.3 feet).

If the packages are transported in an "exclusive use" closed transport vehicle, with the exception of aircraft, then the following maximum dose rates are allowed:

- 1,000 millirem per hour on the accessible package surface.
- 200 millirem per hour at the external surface of the transport vehicle.
- 10 millirem per hour at 2 meters (6.6 feet) from the external surface of the transport vehicle.
- 2 millirem per hour in any area of the vehicle that a person occupies.

The Pantex Plant *Safety Information Document* provides a comprehensive listing of containers used at Pantex Plant (Pantex 1996a).

F.3 PIT CONTAINERS

Pit containers are used as a protective barrier for interim pit storage at Pantex Plant and as Type B packages for offsite shipments. The following is a discussion of the pit containers currently in use or planned for future use at Pantex Plant.

F.3.1 AL–R8 Container

These containers were developed by DOW Chemical in the late 1960's and are shown in Figure F.3.1–1. The AL–R8 container was certified as a Type B package in 1974, and was used mainly for movement of pits between Rocky Flats and Pantex Plant. In 1988, a Revised Safety Analysis Report for Packaging was issued stating that the AL–R8 container did not meet all the Federal transportation regulations. In 1991, the use of the AL–R8 for intersite shipments was discontinued. The AL–R8 is now the primary container used for pit staging at Pantex Plant. The containers have a uniform, nominal outside diameter of 51 centimeters (20 inches). All AL–R8 containers are constructed of 18-gauge carbon steel. Within an AL–R8 container, a pit is secured on a metal frame and is surrounded by Celotex (a high-density cane-fiber pressboard) insulation. The AL–R8 does not have an inner containment vessel.

F.3.2 FL-Type Container

The FL-Type container is currently the only certified container used for pit transport and shown in Figure F.3.2–1. This Type B package has a 16-gauge stainless steel outer containment drum surrounding a 12-gauge stainless steel inner containment drum. Celotex insulation is present between the inner and outer containment drums. The inner containment drum measures 35.1 centimeters (13.8 inches) in diameter and 97 centimeters (38 inches) in height. The outer containment drum measures 57.2 centimeters (22.5 inches) in diameter and 127 centimeters (50 inches) in height. Both the internal and external containment drums are constructed of stainless steel. The inner containment vessel is sealed with dual concentric silicone O-rings. DOE has only 300 of these containers. They are currently used for transporting pits from Pantex Plant to Los Alamos National Laboratory (LANL).

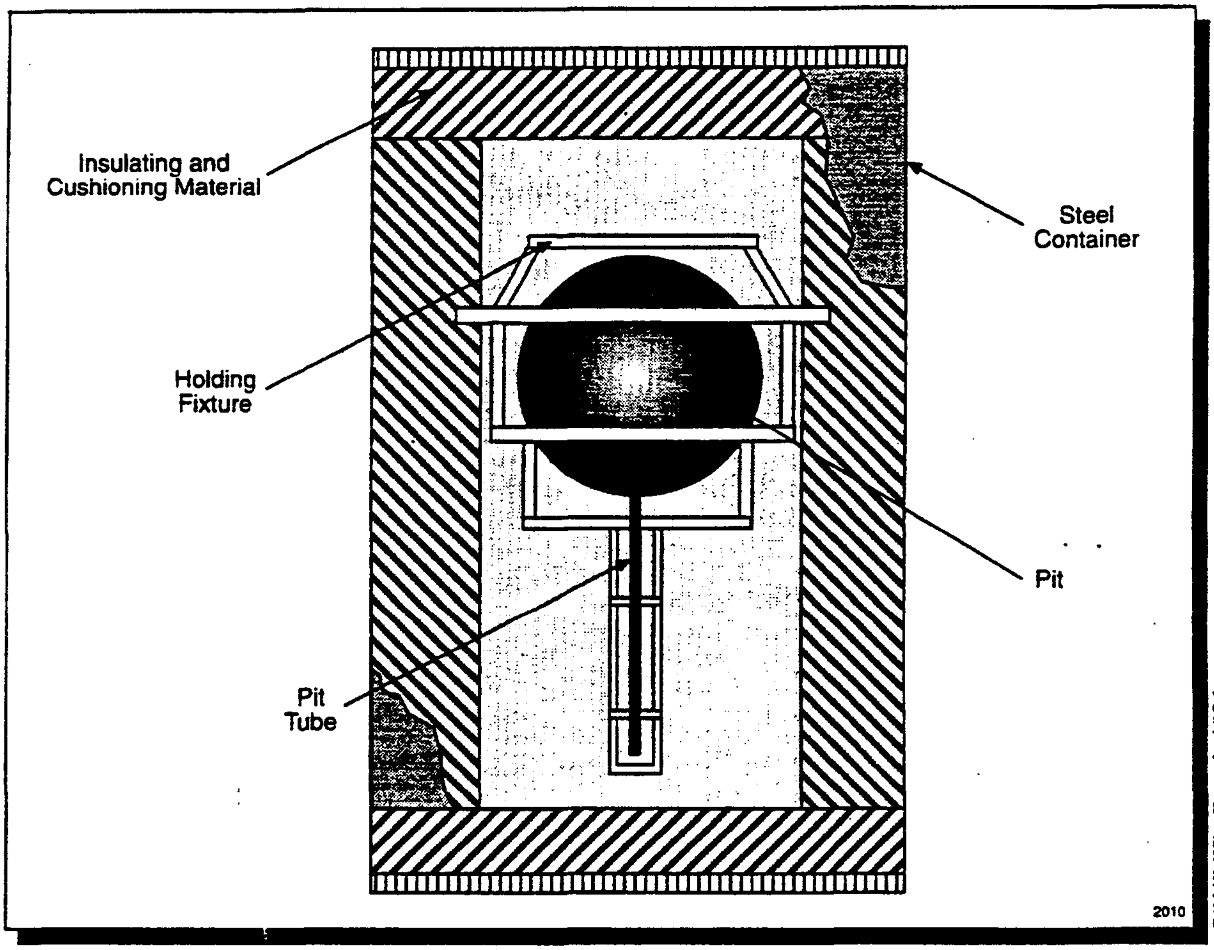


FIGURE F.3.1–1.—*Cross-Sectional View of an AL–R8 Container.*

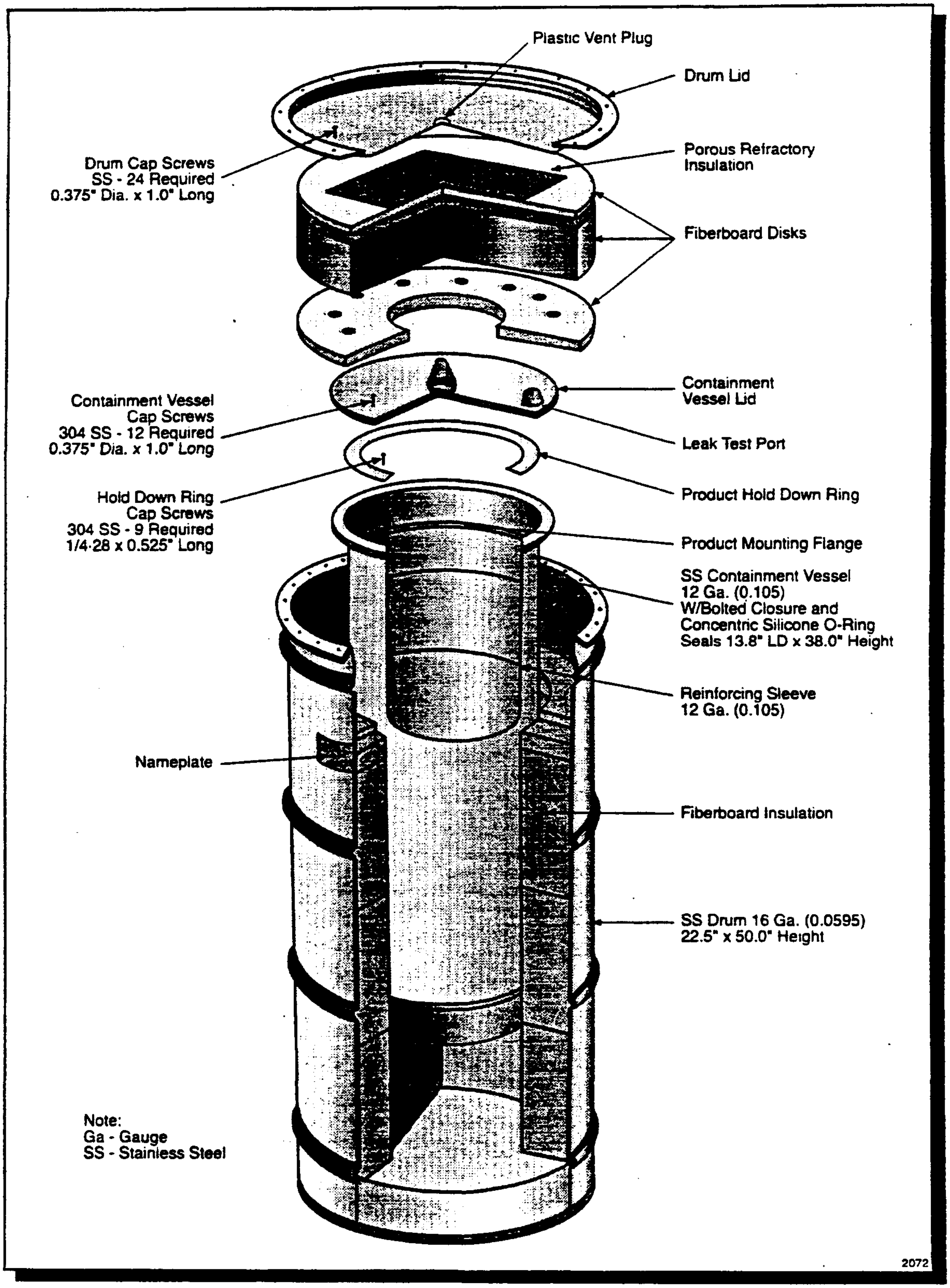


FIGURE F.3.2–1.—*Cross-Sectional View of an FL-Type Container.*

F.3.3 AT–400A Container

DOE commissioned Sandia National Laboratories, Lawrence Livermore National Laboratory, and LANL to design and build the AT–400A container. This container is expected to replace the AL–R8 for pit staging at Pantex Plant, and be the primary container for offsite shipments. The AT–400A is constructed from 304L stainless steel with a high density insulator foam liner and a welded inner containment vessel (see Figure F.3.3–1). This pit storage container is a container within a container. The pit is contained within an inner containment vessel that slightly resembles a small propane tank used for camping. The wall of the inner containment vessel is 0.635 centimeters (0.250 inches) thick, with a 34.29- centimeter (13.5-inch) inner diameter. A sampling tube exists at the top that is used to periodically sample the gas inside. The environment within the inner containment vessel is controlled and guaranteed via an inert gas backfill. The inner containment vessel sits between two foam filled inserts inside the outer container. The outer container dimensions are approximately 51 centimeters (20 inches) in diameter by 71 centimeters (28 inches) high. This containment vessel is totally fabricated from 304L stainless steel. The AT–400A is scheduled for use at Pantex Plant in late 1996. Sandia National Laboratories has tested prototypes of the AT-400A and a DOT Type B certification is pending. Initial performance testing of the AT–400A package indicates that the container can withstand a considerably more severe accident environment than the FL-type container. The inner

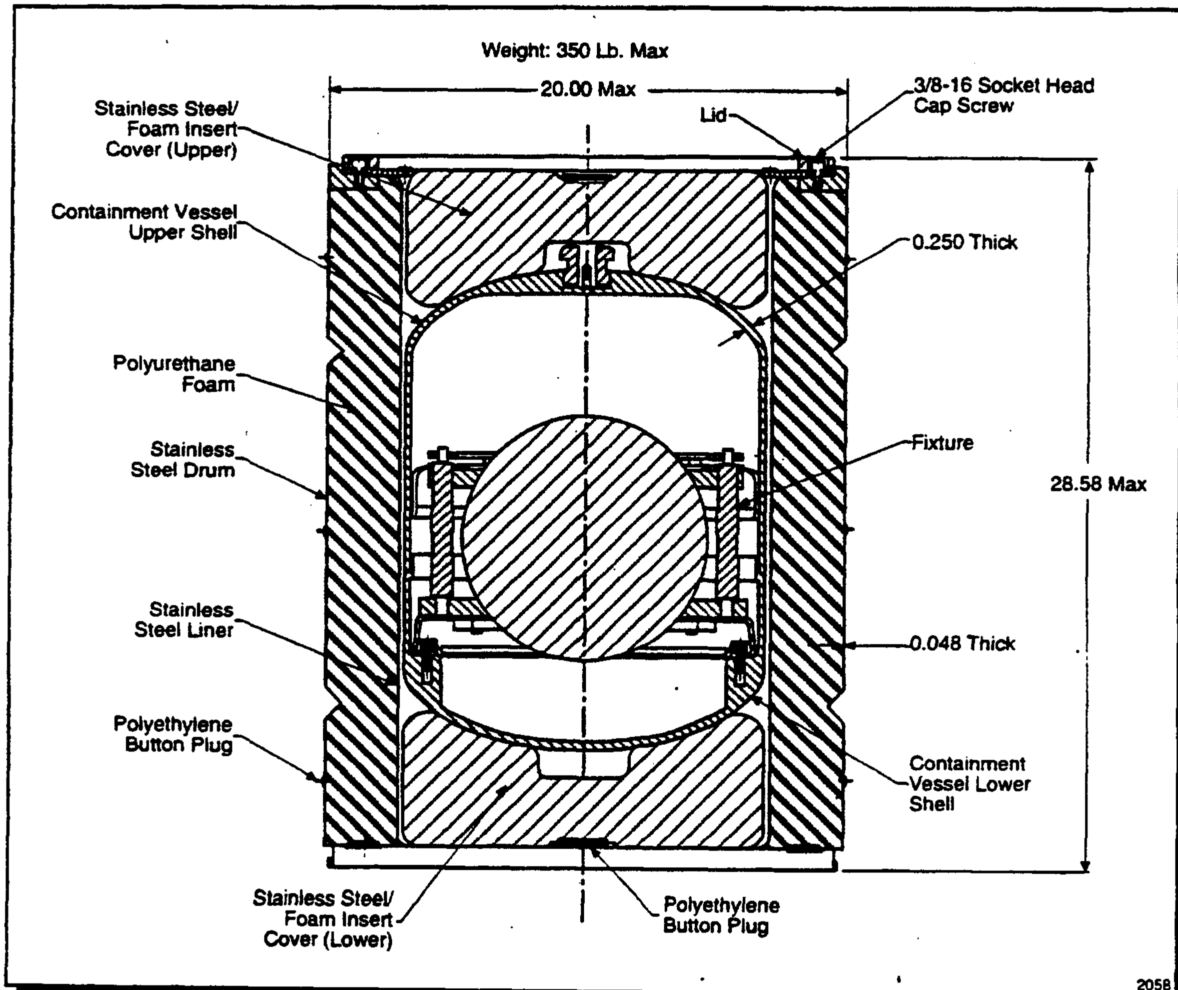


FIGURE F.3.3–1.—*Cross-Section of an AT–400A Container.*

containment vessel of the AT–400A is completely welded, which provides superior behavior in fire environments. The AT–400A container also performs significantly better than the FL container in impact, puncture, and crush environments.

F.4 TRANSPORTATION VEHICLES AND SAFETY AND SUPPORT EQUIPMENT

Vehicles used for onsite transportation include hardened trailers, flatbed trailers, Safe Secure Tractor Trailers (SSTs), forklifts, tow motors, Stage Right trailers, tractors, electric carts, and transportation carts. This section discusses the Stage Right equipment that is in use at Pantex Plant. Further information on transportation vehicles and equipment is provided in the *Safety Information Document* and the *Transportation Evaluation Report for Ross Aviation, Inc.* (Pantex 1996a; Ross 1994).

F.4.1 Stage Right Forklift

The Stage Right forklift is a technologically advanced electric forklift, specifically designed for the Stage Right project for pit storage. This forklift is larger than the other electric forklifts at Pantex Plant and is fully enclosed. The Stage Right forklift rides on a special rail system that keeps it in a straight line throughout its operation. This rail system contains a sensor system that detects the position of the forklift on the rails throughout its operation. The Stage Right forklift can perform its loading operations only when it is correctly positioned between these light sensors. The operator has a display in front of him to notify him when the forklift is in position.

The Stage Right forklift has one boom arm for lifting the Stage Right pallets. This boom arm has a unique safety feature to prevent an inadvertent puncture of a pit container. On the extreme end of the boom there exists a compression sensor that, when compressed, completely stops the action of the Stage Right forklift. The pressure of a person's outstretched arm is enough to compress the sensor and shut down the forklift. The boom has to be in exactly the correct position to fit into the Stage Right pallet boom slot. Once positioned, the Stage Right forklift can continue with its operation. The Stage Right forklift will be replaced by an automated guided vehicle when development at Pantex Plant is completed.

F.4.2 Stage Right Trailer

Pits are transferred between Zone 12 South and Zone 4 in either a double-axle, non-hardened pallet trailer or a hardened trailer. These pallet trailers are able to withstand a 2,722-kilogram (6,000-pound) load or more, and are towed by stakebed trucks. The trailer box is approximately 127 centimeters (50 inches) wide, 203 centimeters (80 inches) high, and 356 centimeters (140 inches) long. The frame of the trailer is the load-bearing structure so that the outer skin and rivets are not subject to any load other than their own weight. An emergency electric braking system is in place to stop the trailer in the event that the connection with the tow vehicle is broken. These Stage Right trailers are specifically built to hold Stage Right pallets (see Figure F.4.2–1).

F.4.3 Stage Right Pallet

Two types of these pallets exist. The first can accommodate four AL–R8 containers, and the second can hold six AL–R8 containers. In this pallet's design, the containers sit both in it and on it depending on the pallet's positioning (see Figure F.4.3–1).

A new Stage Right pallet that will be able to accommodate both the AL–R8 and AT–400A containers is in the design phase at Pantex Plant. This new pallet will be constructed of stainless steel. The Stage Right pallet that can accommodate four containers is approximately

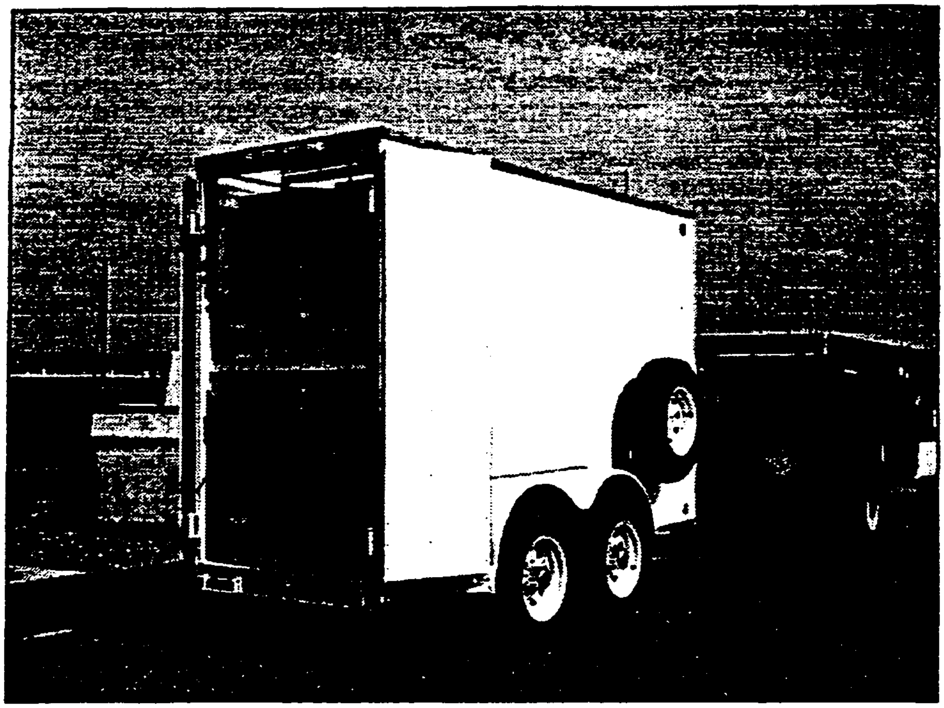


FIGURE F.4.2–1.—*Stage Right Trailer.*

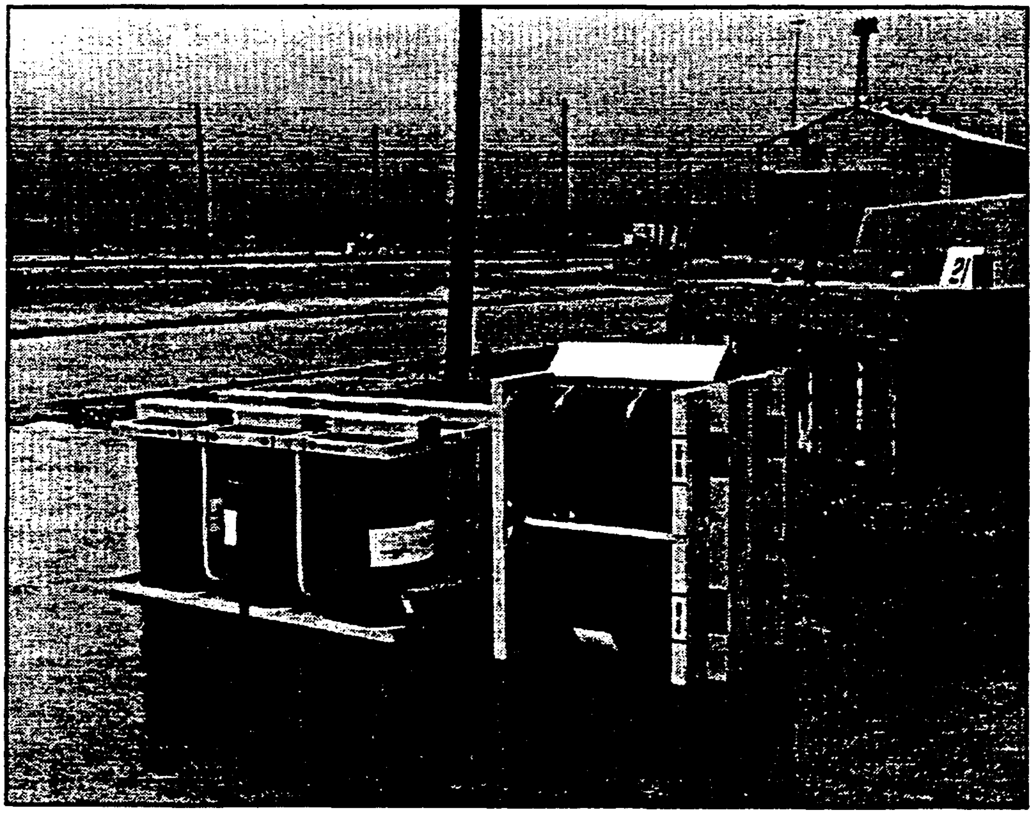


FIGURE F.4.3–1.—*Stage Right Pallet.*

104 centimeters by 99 centimeters by 74 centimeters (41 inches by 39 inches by 29 inches), and the Stage Right pallet that can accommodate six containers is approximately 155 centimeters by 99 centimeters by 74 centimeters (61 inches by 39 inches by 29 inches).

F.5 INTERSITE TRANSPORTATION IMPACT ASSESSMENTS

The Analysis of Dispersal Risk Occurring in Transportation (ADROIT) code was developed specifically for the Defense Programs Transportation Risk Analysis program and is currently being used in the development of safety analysis for DOE transportation activities. The code was designed specifically to evaluate event trees and conduct consequence assessments for SST shipments and air transport of tritium reservoirs. The code can also be used to evaluate the effect on the assessed risk of modifications to equipment or procedures (positive measures), changes in shipment campaigns, improvements in understanding of cargo, etc.

The assessment covers transportation of nuclear explosives and pits by SST and tritium reservoirs by DC–9 aircraft for the period fiscal year (FY) 1997–2006. Annual risks are computed based on projected shipments associated with current 10-year weapon planning documents.

For nuclear explosives, the baseline 10-year shipments were obtained from current weapons activity schedules. For security reasons, detailed information on the specific weapon systems and routes is classified.

For tritium reservoirs, the baseline shipment schedule corresponds to those for nuclear explosives. The number of tritium reservoirs to be transported between Pantex Plant and the Savannah River Site (SRS) is assumed to be equal to the number of nuclear explosives transported to or from Pantex Plant. All tritium reservoirs will be transported in DC–9 aircraft. Up to 75 tritium reservoirs may be transported per flight. The projected baseline shipments of tritium reservoirs was obtained from current 10-year weapons activity schedules.

Assessments were conducted for pit transportation from Pantex Plant to four alternative storage sites: Nevada Test Site (NTS), SRS, Hanford Site, and Kirtland Air Force Base (KAFB). An assessment was also conducted for transportation of pits between Pantex Plant and LANL and return (for the purpose of quality assurance and testing). Pits are expected to be transported in a DOT-certified container, such as, the AT–400A container.

The estimated risks for nuclear explosive shipments, pit shipments, and tritium reservoir shipments are documented in the following sections. All calculations were conducted with the ADROIT code, Version 1.1, which was developed specifically for transportation of Defense Programs materials. A description of the methodology used in the ADROIT code appears in section F.6.

F.5.1 Nuclear Explosive Shipments

F.5.1.1 *Incident-Free Risk*

Tables F.5.1.1–1 and F.5.1.1–2 summarize incident-free risks. The health risk from incident-free exposure is obtained by multiplying the exposure by the dose-health effects factor, which is typically taken to be 0.0005 latent cancer fatalities (LCFs) per person-rem (NAP 1990). It should be noted that for greater accuracy the ADROIT code uses a distribution curve rather than a single point estimate of 0.0005.

TABLE F.5.1.1–1.—*Baseline Incident-Free Risk, Nuclear Explosive Shipments*[1]

PERIOD	COLLECTIVE HEALTH RISK, LCF	MAXIMUM INDIVIDUAL HEALTH RISK, LCF
1997	2×10^{-4}	5×10^{-7}
1998	6×10^{-5}	2×10^{-7}
1999	5×10^{-5}	2×10^{-7}
2000	6×10^{-5}	2×10^{-7}
2001	8×10^{-5}	2×10^{-7}
2002	4×10^{-5}	9×10^{-8}
2003	4×10^{-5}	9×10^{-8}
2004	9×10^{-5}	3×10^{-7}
2005	2×10^{-4}	3×10^{-7}
2006	3×10^{-5}	9×10^{-8}
10-Year Total	9×10^{-4}	2×10^{-6}
Annual Average	9×10^{-5}	2×10^{-7}

[1] With a dose rate of 3.0 mrem/hr at the surface of an SST.

TABLE F.5.1.1–2.—*Baseline Incident-Free Exposure, Nuclear Explosive Shipments*[1]

PERIOD	COLLECTIVE DOSE, PERSON-REM	MAXIMUM INDIVIDUAL DOSE, REM
1997	0.5	2×10^{-3}
1998	0.2	5×10^{-4}
1999	0.1	3×10^{-4}
2000	0.2	4×10^{-4}
2001	0.2	4×10^{-4}
2002	0.1	3×10^{-4}
2003	0.1	3×10^{-4}
2004	0.3	5×10^{-4}
2005	0.3	6×10^{-4}
2006	0.1	2×10^{-4}
10-Year Total	2	5×10^{-3}
Annual Average	0.2	5×10^{-4}

[1] With a dose rate of 3.0 mrem/hr at the surface of an SST.

F.5.1.2 *Accident Fatality Risk—Nuclear Explosive Shipments*

Table F.5.1.2–1 summarizes the accident fatality risk. The estimated risk for the baseline shipment schedule is highest in FYs 1997 and 2005, which are the years in which the shipment volume is greatest. The risk curves for accident fatality risk in FY 1997 are shown in Figure F.5.1.2–1.

TABLE F.5.1.2–1.—*Baseline Accident Fatality Risk, Nuclear Explosive Shipments*

PERIOD	HEALTH RISK, FATALITIES
1997	1×10^{-3}
1998	5×10^{-4}
1999	4×10^{-4}
2000	5×10^{-4}
2001	6×10^{-4}
2002	3×10^{-4}
2003	3×10^{-4}
2004	9×10^{-4}
2005	1×10^{-3}
2006	3×10^{-4}
10-Year Total	6×10^{-3}
Annual Average	6×10^{-4}

F.5.1.3 *Accident Dispersal Risk—Nuclear Explosives*

Table F.5.1.3–1 summarizes the dispersal risk from weapons shipments. The estimated risk for the baseline is FY 1997, which is the year with the greatest shipment volume. The risk curves for accident fatality risk in FY 1997 are shown in Figure F.5.1.3–1. The probability of

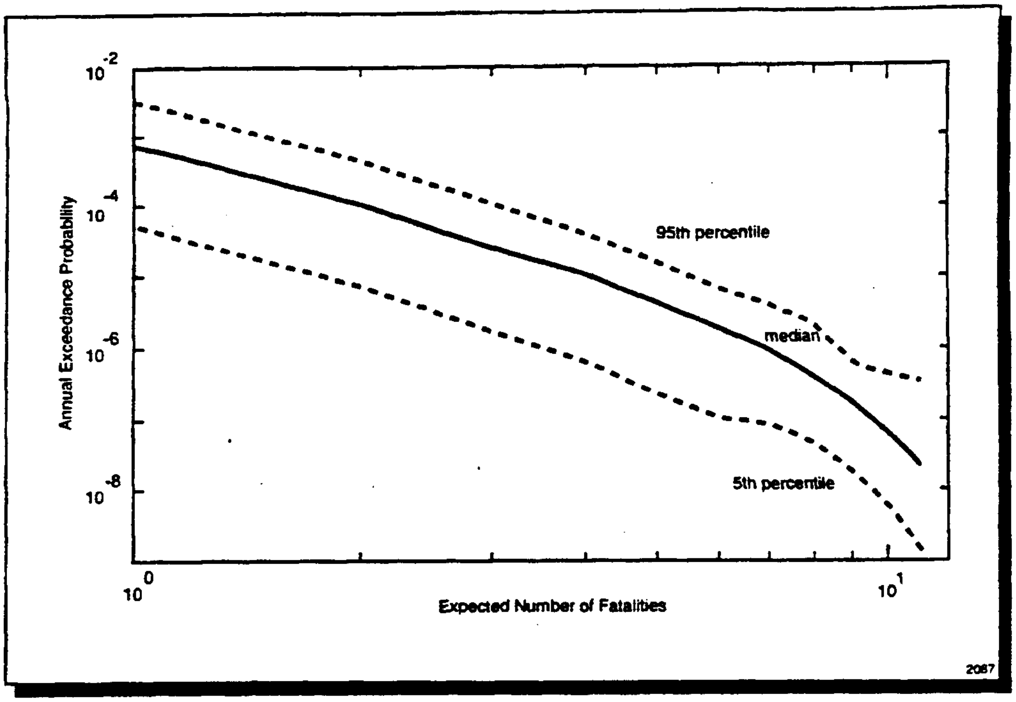


FIGURE F.5.1.2–1.—*Accident Fatality Risk Curves for 1997.*

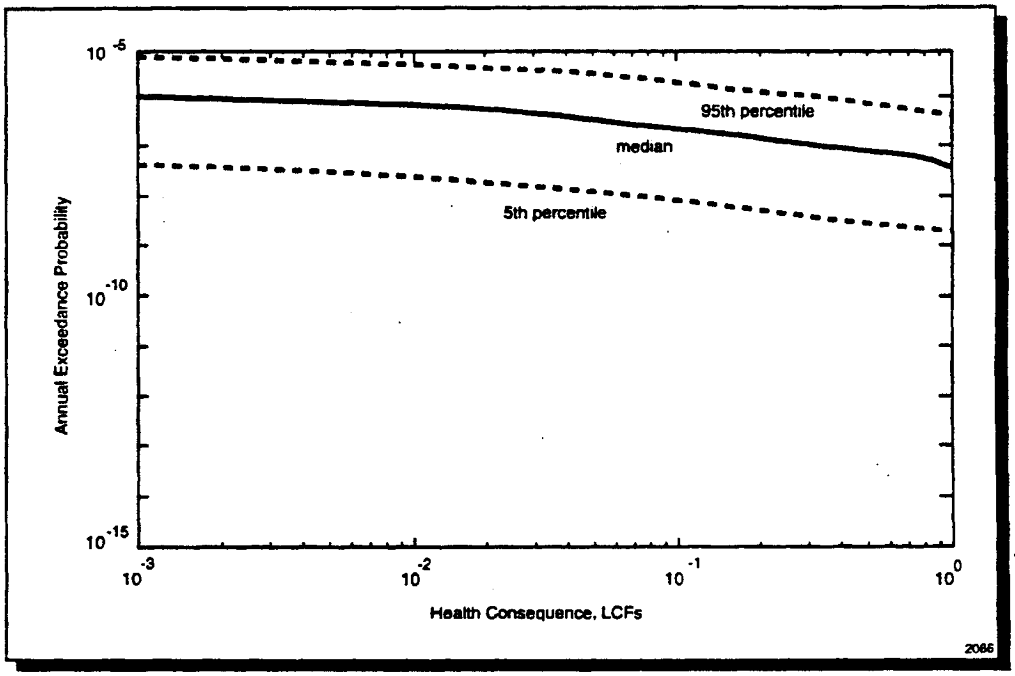


FIGURE F.5.1.3–1.—*Baseline Accident Dispersal Risk Curves for 1997, Weapons Shipments.*

having more than one LCF arising from a dispersal event associated with nuclear explosive shipments to or from Pantex Plant is most likely between 2 x 10^{-9} and 5 x 10^{-7} (the 5th and 95th percentiles) with a median estimate of approximately 4 x 10^{-8}. The shape of each individual risk curve reflects randomness in the outcome. The difference between the 5th percentile, median, and 95th percentile risk curves reflects the calculated uncertainty in the estimates. The baseline risk values given in Table F.5.1.3–1 are the average values of the areas under the complete set of risk curves for each year considered.

TABLE F.5.1.3-1.—*Baseline Accident Dispersal Risk, Nuclear Explosive Shipments*

PERIOD	ACCIDENT DISPERSAL RISK	
	COLLECTIVE HEALTH RISK, LCF	MAXIMUM INDIVIDUAL HEALTH RISK, LCF
1997	5 x 10^{-7}	1 x 10^{-9}
1998	2 x 10^{-8}	1 x 10^{-10}
1999	2 x 10^{-8}	1 x 10^{-10}
2000	2 x 10^{-8}	1 x 10^{-10}
2001	5 x 10^{-8}	3 x 10^{-10}
2002	2 x 10^{-8}	1 x 10^{-10}
2003	2 x 10^{-8}	1 x 10^{-10}
2004	5 x 10^{-8}	4 x 10^{-10}
2005	9 x 10^{-8}	5 x 10^{-10}
2006	2 x 10^{-8}	1 x 10^{-10}
10-Year Total	8 x 10^{-7}	3 x 10^{-9}
Annual Average	8 x 10^{-8}	3 x 10^{-10}

The dominant risk environments are highway accidents involving severe collisions and fires and accidents involving very long duration fires. There is no single, dominant scenario associated with credible ($>10^{-7}$ yr^{-1}), high-consequence events. For the purposes of this discussion high-consequence is defined to be greater than 1 LCF. Instead there are a collection of scenarios that together constitute credible, high-consequence events. These scenarios have the following common characteristics:

- The accident includes either a severe collision and fire (such as a collision with a heavy truck or fixed object that also involves a fuel fire) or a very long duration fuel fire (such as an accident with a fuel tanker or train that involves a fuel fire).
- The accident results in violent reaction of the high explosive.

Similarly, there is no single dominant scenario associated with credible, moderate consequence event. For the purposes of this discussion moderate consequence is defined to be less than 1 LCF. The scenarios that dominate the moderate-consequence events have the following common characteristics:

- The accident includes either a severe collision and fire (such as a collision with a heavy truck or fixed object that also involves a fuel fire) or a very long duration fuel fire (such as an accident with a fuel tanker or train that involves a fuel fire).
- The accident results in a fire-driven dispersal and/or the accident occurs in a rural area.

F.5.2 Pit Shipments

F.5.2.1 *Incident-Free Risk*

Table F.5.2.1–1 provides unit risk factors for intersite pit shipments. The incident-free exposure health risk is obtained by multiplying the exposure by the dose-health effects factor,

TABLE F.5.2.1–1.—*Incident-Free Unit Risk Factors for 2,000 Pit Shipments per Year*

PERIOD	FROM PANTEX TO				
	NTS	SRS	HANFORD	KAFB	LOS ALAMOS[1]
Collective Health Risk, LCF	1×10^{-4}/yr	1.5×10^{-4}/yr	1.5×10^{-4}/yr	2.5×10^{-5}/yr	2.0×10^{-6}/yr
Maximum Individual Health Risk, LCF	1.5×10^{-7}/yr	1.5×10^{-7}/yr	1.5×10^{-7}/yr	1.5×10^{-7}/yr	1.5×10^{-8}/yr
Collective Dose[2], Person-Rem	0.20/yr	0.30/yr	0.30/yr	0.05/yr	0.005/yr
Maximum Individual Dose, rem	4×10^{-4}/yr	4×10^{-4}/yr	4×10^{-4}/yr	4×10^{-4}/yr	3×10^{-5}/yr
Mean Accident Fatality Risk	4×10^{-4}/yr	6×10^{-4}/yr	4×10^{-4}/yr	8×10^{-5}/yr	1×10^{-5}/yr

[1]Only 30 pits to and from Los Alamos.
[2]Using unit dose rate of 1 mrem/hr at 1 meter from the trailer side.

which is typically taken to be 5.0×10^{-4} LCFs per person-rem (NAP 1990).

Approximately 63 percent of the collective exposure (and health risk) is received by people on the roadway. About 33 percent is received by members of the public at rest stops. The balance of the collective exposure is received by people off the roadway. By contrast, the maximum individual dose (and risk) is received by an individual off the roadway. This is because all of the shipments are either to or from Pantex Plant, so an individual living in the vicinity of the plant near the roadway is assumed to be exposed to the intrinsic radiation from all the shipments, whereas the people sharing the roadway or at rest stops are not likely to include the same individuals for all (or even most) shipments.

F.5.2.2 *Accident Fatality Risk*

Table F.5.2.1–1 summarizes the accident fatality risk. The estimated risk is highest for the alternative involving interim storage at SRS. The risk curves for annual accident fatality risk for 2,000 pit shipments to SRS are shown in Figure F.5.2.2–1.

F.5.2.3 *Accident Dispersal Risk*

The accident dispersal risk for pit shipments is based on the performance characteristics of the FL-Type container because performance data on the AT–400A could not be incorporated into the risk assessment in time for this EIS. However, performance testing of the AT–400A indicates that it can withstand considerably more severe accident environments than the FL-type container. The containment vessel in the AT–400A container is completely welded, which provides superior behavior in fire environments (in terms of preventing a dispersal). The AT–400A container also performs significantly better than the FL-type container in impact, puncture, and crush environments. Consequently, the estimates provided here for accident dispersal risk (based on the FL-type container) are believed to significantly overstate the actual risk of shipping pits in the AT–400A container. In fact, the probability of releasing plutonium from a pit

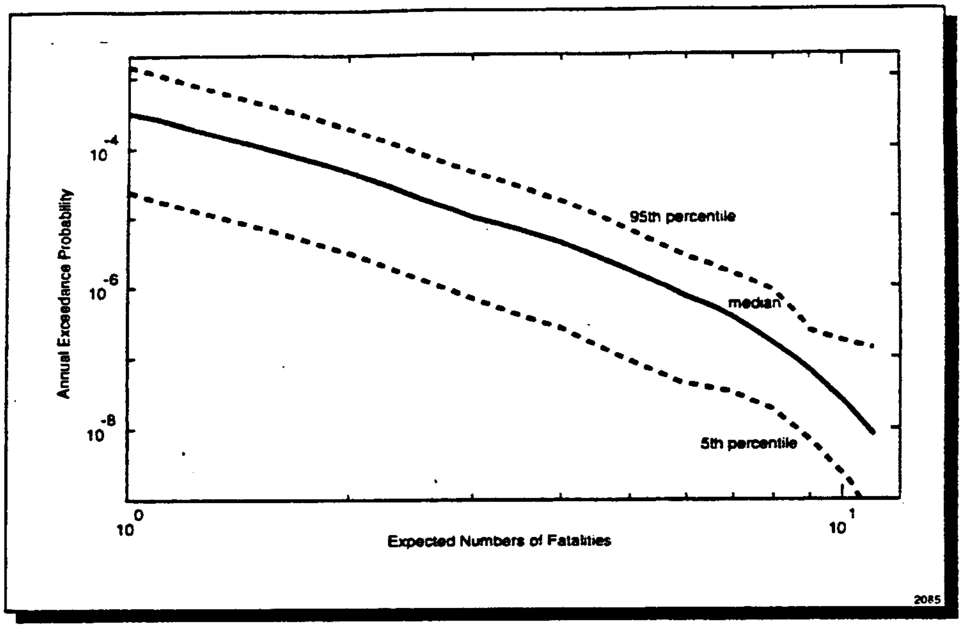


FIGURE F.5.2.2–1.—*Fatality Risk Curves for 2,000 Pit Shipments to the Savannah River Site.*

in an AT–400A container during SST transportation may be negligible.

Table F.5.2.3–1 summarizes the accident dispersal risk for pit shipments in the FL-type container. The estimated risk is highest for the alternative involving interim storage at the Hanford Site. The risk curves for annual accident dispersal risk associated with 2,000 pit shipments between Pantex Plant and Hanford Site are shown in Figure F.5.2.3–1. The probability of having more than 1 LCF arising from a dispersal event associated with pit shipments from Pantex Plant is most likely less than 7×10^{-8} (the 95th percentiles). The shape of each individual risk curve reflects randomness in the outcome whereas the difference between the median and 95th percentile risk curves reflects the calculated uncertainty in the estimates. The mean risk values given in Table F.5.2.3–1 are the average

TABLE F.5.2.3–1.—*Unit Risk Factors for Dispersal Health Risk from 2,000 Pit Shipments per Year*

	FROM PANTEX TO				
	NTS	SRS	HANFORD	KAFB	LOS ALAMOS[1]
Collective Health Risk, LCF	4×10^{-8}/yr	5×10^{-8}/yr	8×10^{-8}/yr	4×10^{-9}/yr	2×10^{-10}/yr
Maximum Individual Health Risk, LCF	4×10^{-11}/yr	1×10^{-10}/yr	1×10^{-10}/yr	1×10^{-11}/yr	5×10^{-13}/yr

[1]Only 30 pits a year to and from LANL.

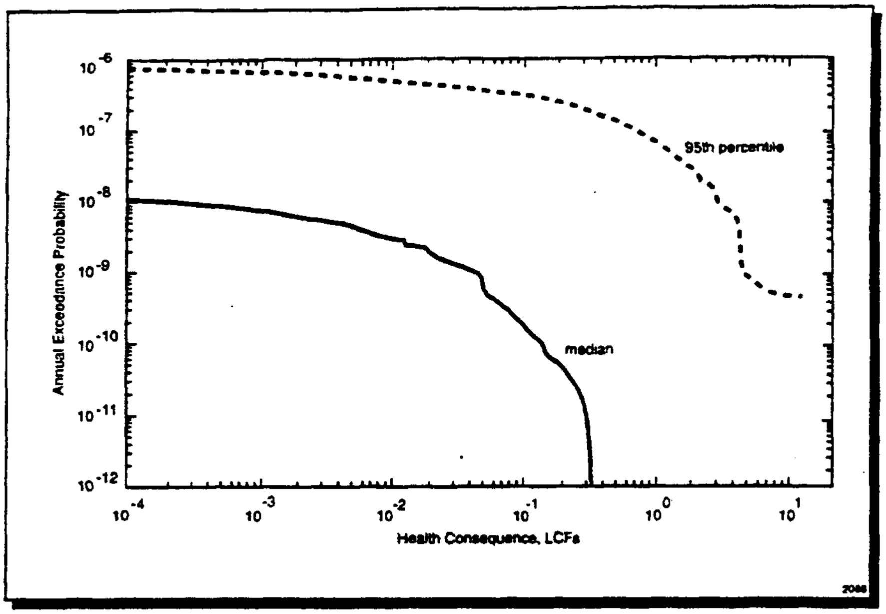


FIGURE F.5.2.3–1.—*Accident Dispersal Curves for 2,000 Pit Shipments to the Hanford Site.*

values of the areas under the complete set of risk curves for each year considered.

The dominant risk environments are highway accidents involving severe collisions and fires and accidents involving very long duration fires. There are no credible ($>10^{-7}$ yr^{-1}), high-consequence events. For the purposes of this discussion high consequence is defined to be greater than 1 LCF.

There is no single dominant scenario associated with credible, moderate-consequence event. For the purposes of this discussion moderate consequence is defined to be less than 1 LCF. The scenarios that dominate the moderate-consequence events have the following common characteristics:

- The accident includes either a severe collision and fire (such as a collision with a heavy truck or fixed object that also involves a fuel fire) or a very long duration fuel fire (such as an accident with a fuel tanker or train that involves a fuel fire).
- The accident results in a fire-driven dispersal.

F.5.3 Tritium Reservoir Shipments

Tritium reservoirs are shipped using DC–9 aircraft operated by a DOE contractor. Because members of the public are not in close proximity to the aircraft, intrinsic radiation and accident fatalities are much less of a hazard to members of the general public than they are in highway transportation. Therefore, the incident-free risk and the accident fatality risk are not calculated for tritium reservoir shipments.

F.5.3.1 *Accident Dispersal Risk*

Table F.5.3.1–1 summarizes the accident dispersal risk. The estimated risk for the baseline shipments is highest in FY 1997, the year that the shipment volume is greatest. The risk curves for accident dispersal risk in FY 1997 are shown in Figure F.5.3.1–1. The probability of having more than 1 LCF arising from a dispersal event associated with tritium reservoir shipments to and from Pantex Plant is most likely between 4×10^{-12} and 2×10^{-9} (the 5th and 95th percentiles) with a median estimate of about 4×10^{-11}. The shape of each individual risk curve reflects randomness in the outcome.

TABLE F.5.3.1–1.—*Baseline Accident Dispersal Risk, Tritium Reservoir Shipments*

PERIOD	COLLECTIVE HEALTH RISK, LCF	MAXIMUM INDIVIDUAL HEALTH RISK, LCF
1997	1×10^{-8}	9×10^{-11}
1998	4×10^{-9}	4×10^{-11}
1999	3×10^{-9}	3×10^{-11}
2000	4×10^{-9}	4×10^{-11}
2001	4×10^{-9}	4×10^{-11}
2002	2×10^{-9}	2×10^{-11}
2003	2×10^{-9}	2×10^{-11}
2004	5×10^{-9}	5×10^{-11}
2005	6×10^{-9}	6×10^{-11}
2006	1×10^{-9}	1×10^{-11}
10-Year Total	4×10^{-8}	4×10^{-10}
Annual Average	4×10^{-9}	4×10^{-11}

The difference between the 5th percentile, median and 95th percentile risk curves reflects the calculated uncertainty in the estimates. The mean risk values given in Table F.5.3.1.–1 are the average values of the areas under the complete set of risk curves for each year considered. The dominant risk environment is accidents at or near an airport that involve severe crashes and/or fires. There are no credible ($>10^{-7}$ yr^{-1}), high-consequence events. For the purposes of this discussion high-consequence is defined to be greater than 1 LCF.

There is not a single dominant scenario associated with credible, moderate consequence event. For the purposes of this discussion moderate consequence is defined to be less than 1 LCF. The scenarios that dominate the moderate consequence events have the following common characteristics:

- The accident includes either a severe crash and/or a fire.

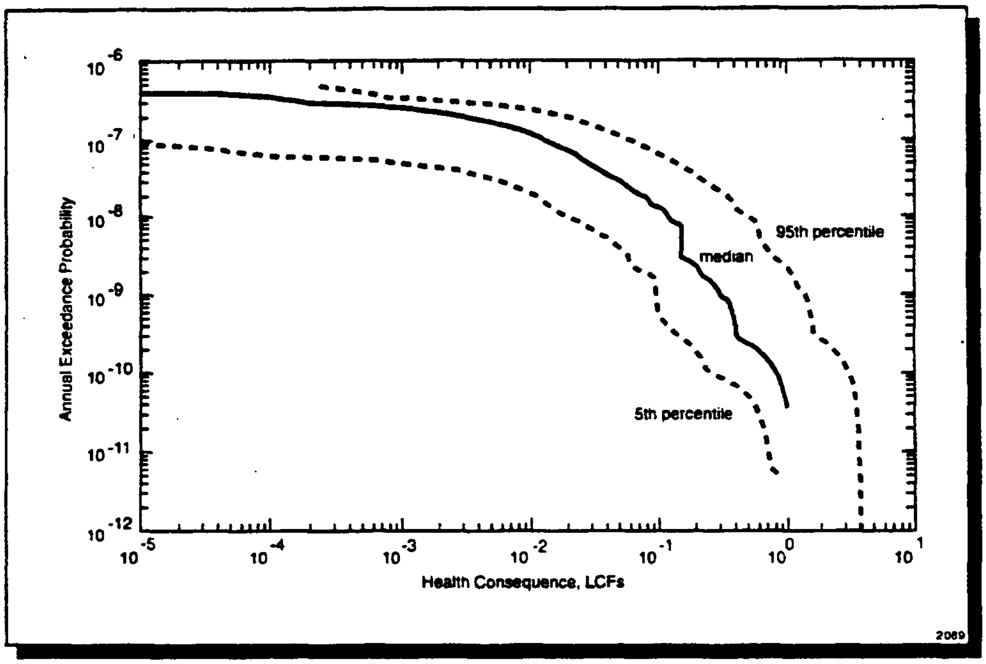


FIGURE F.5.3.1–1.—*Accident Dispersal Risk Curves for Fiscal Year 1997, Tritium Shipments.*

- The accident occurs either at or near the airport.

F.6 ADROIT METHODOLOGY

The ADROIT code was used to calculate the incident-free risk, the dispersal risk, and the accident risk from intersite shipments expected in the timeframe of this EIS.

F.6.1 Incident-Free Risk

The ADROIT code utilizes the RADTRAN–IV methodology to calculate incident-free exposures. The transportation of radioactive material results in some radiological exposure to the general public along the route. Included in the ADROIT computer code incident-free risk calculations for transport are models describing exposures to persons (e.g., residents) adjacent to the transport route (off-link exposures), exposures to persons (e.g., passengers on passing vehicles) sharing the transport route (on-link doses), and exposures to persons at stops (e.g., residents and truck crews not directly involved in the shipment).

For calculational purposes, each SST is modeled as a point radiation source located at the geometric center of the trailer. The source strength of the radiation is usually given in terms of the Transportation Index, which is a measure of the source strength 1 meter (3.3 feet) from the "package" surface (For weapon shipments, a dose rate of 3 millirem per hour at the surface of the trailer was used (PC 1995a). For pit shipments, a dose rate of 1 millirem per hour at 1 meter from the trailer surface was used).

As an SST carrying radioactive material traverses its route, people in the area adjacent to the route will receive low levels of radiation. The dose each person receives depends on his distance from the route and the speed of the source as it passes them. A combination of geometric dispersion and absorption of the radiation in the environment outside of the SST produces a rapid drop-off of radiation dose with distance from the source. Also, the faster the shipment passes the less exposure time there is for people along the route. Data from the 1990 Census was used to compute population density as a function of location along the roadway.

Vehicles sharing the roadway with the shipment have the potential for exposure to the radiation source. The basic approach for treating people on the roadway is very similar to that used for people off the roadway. An effective population density for the roadway is obtained and in all the calculations the population distribution is treated as a continuum. To keep the model both simple and conservative, the shielding provided by the vehicles transporting people on the roadway is neglected.

Typical SST shipment schedules include stops for fuel, meals, and rest/driver change. During those stops the public in the vicinity of the SST is exposed to a stationary source of radiation. The total rest stop time is taken to be 25 percent of the total driving time.

F.6.2 Accident Fatality Risk

The probability of fatalities due to direct effects of the accident environment (i.e., blunt trauma and/or burns to vehicle occupants, pedestrians and/or bystanders) is calculated using the ADROIT code based on the event tree shown in Figure F.6.2–1.

The probability of a fatal accident involving an SST is calculated, first, by estimating the annual probability, based on a given shipment campaign, of an SST accident severe enough to require that the vehicle cannot be driven. This value is obtained from the overall SST tow-away rate per mile for a given type of roadway and the distance traveled on specific types of roadways. The probability of a fatal accident and the number of fatalities given a tow-away accident is obtained from historical databases

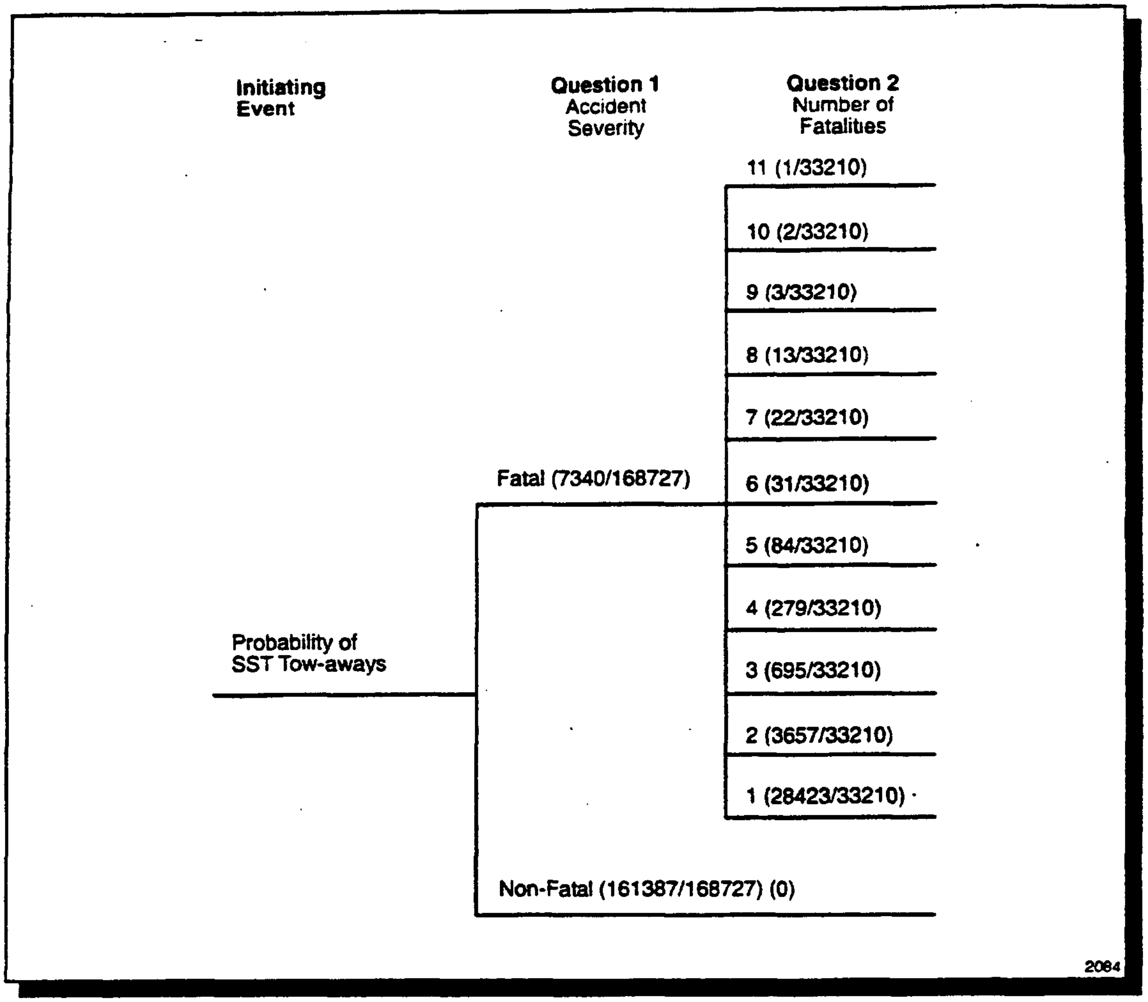


FIGURE F.6.2–1.—*Event Tree for Calculation of Fatality Risk.*

describing tractor-trailer accident severities (NAP 1990; SNL 1993).

F.6.3 Accident Dispersal Risk

Radioactive materials transported between sites include plutonium, uranium, and tritium. Other than relatively low levels of intrinsic radiation (which is considered in the incident-free analysis), plutonium and uranium do not pose a significant health hazard unless they are converted to an aerosol with respirable size particles. Three mechanisms by which aerosol may be generated and released are considered in the ADROIT code: violent reaction of high explosive(s) (HE), oxidation in a fire, and spalling and breakup of the surface oxide layer by mechanical forces.

There are three basic elements of the accidental dispersal risk assessment: *Probabilities, Consequences, and Uncertainties*. *Probabilities* of release by the three mechanisms that can produce respirable-sized aerosols and specific consequence scenarios are developed based on an event tree analysis. *Consequences* are evaluated for each end event in the tree through an assessment which integrates dispersal calculations, route characterization, population data, and dose-health effects models to provide an estimate of excess LCFs. *Uncertainties* are evaluated by incorporating Latin hybercube sampling into the calculations for probabilities and consequences.

F.6.3.1 *Event Tree*

The basis for the probability analysis in the ADROIT code is an event tree analysis. An event tree is a logic diagram that describes accident sequences that can lead to specific consequence scenarios. The event tree is composed of questions that define the types and severities of transportation accidents that occur, the resulting damage to the transporter and cargo, release mechanisms, accident locations, and the meteorological conditions. The event tree developed for the ADROIT code to analyze transportation of radioactive material in SSTs consists of 17 questions. These questions are depicted in Figures F.6.3.1–1 through F.6.3.1–4. A similar event tree is used for air transportation but is not discussed further.

The initiating events for the tree are traffic accidents in one of four operating environments. The operating environments are based on road type and population area. Although the structure of the tree is the same for all four initiating events, the quantification of some of the branches depends on the operating environment. The initiating events are quantified in terms of an annual probability of occurrence. All other branches of the tree are quantified in terms of conditional probabilities.

The remainder of this discussion is regarding the initiating events and the branches of the event tree. Details of the response of the packaging system (the packaging system includes the SST, container, and cargo) are limited because of the sensitive nature of the information involved in the evaluation of package response.

F.6.3.2 *Initiating Event Probabilities*

Highway transportation accidents are evaluated in four operating environments based on road type and population (SNL 1994a). Road types are divided into limited access roads and non-limited access roads. The distinction in road type is made because accident rates and the frequency of different accident types vary significantly with road type. Population areas are divided into urban and rural areas. The distinction in population area is retained primarily to capture the difference in the size of the population exposed given a dispersal event.

The initiating event probabilities are calculated as the product of the following: the overall tow-away accident rate per mile for SST transport; the fraction of tow-away accidents that have severities comparable to fatal accidents; influence factors that relate the overall accident rate to the operating environment of interest; and the mileage in the operating environment of interest.

The operating history with SST transport is sufficiently long to define an overall tow-away accident rate. The mean estimate for the rate of tow-away accidents involving an SST is 0.066 per million miles (SNL 1994a). However, the number of accidents experienced with SST transports is not sufficient to quantify the accident rate in the operating environments of interest or the types and severities of accidents. Thus, general commerce data for heavy truck transportation is used as a surrogate for SST data to quantify the relative accident rates in different operating environments and the types and severities of accidents.

The most comprehensive database available on heavy truck accidents is the Trucks Involved in Fatal Accidents (TIFA) database (UM 1991; UM 1993), which is maintained by the University of Michigan Transportation Research Institute. This database contains information on fatal accidents. Fatal accidents provide a good match with accidents of sufficient severity to threaten cargoes carried within SSTs.

Because of the lack of details for SST accident rates in operating environments of interest and the types and severities of accidents it was

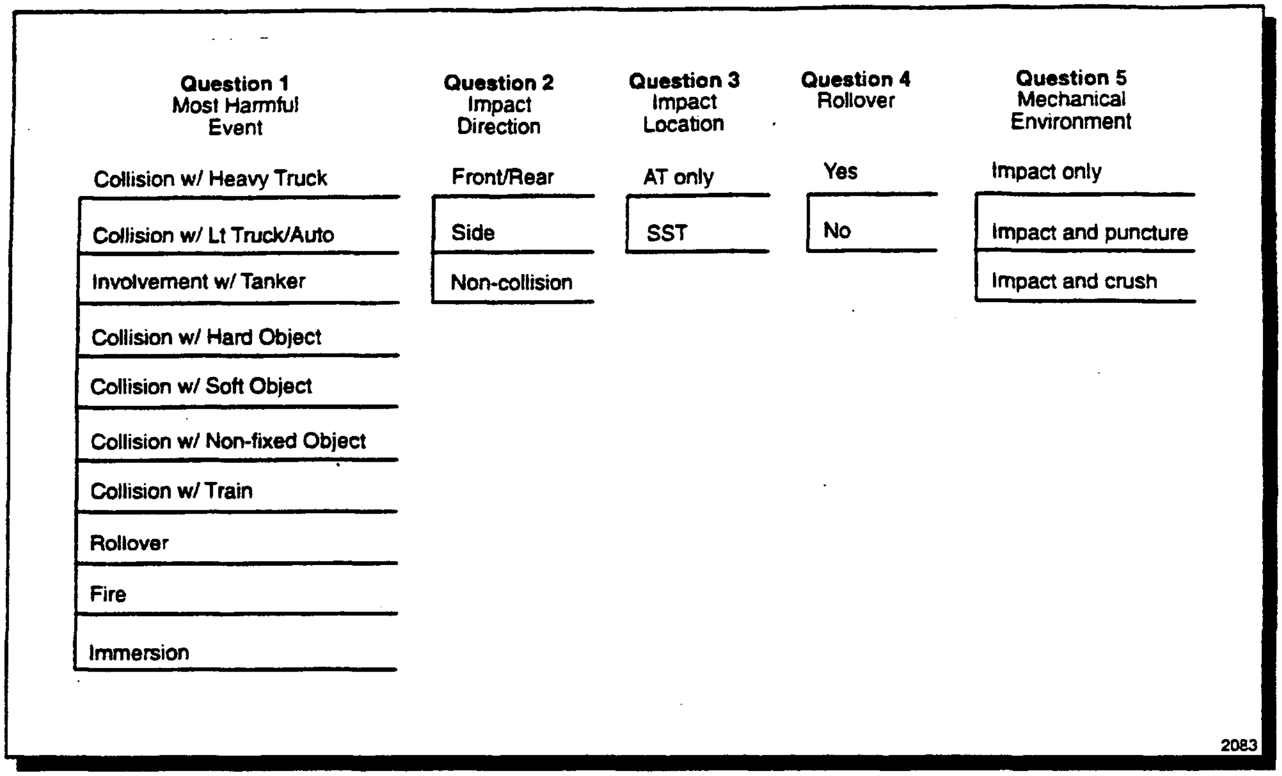


FIGURE F.6.3.1–1.—*ADROIT Dispersal Event Tree Questions 1–5.*

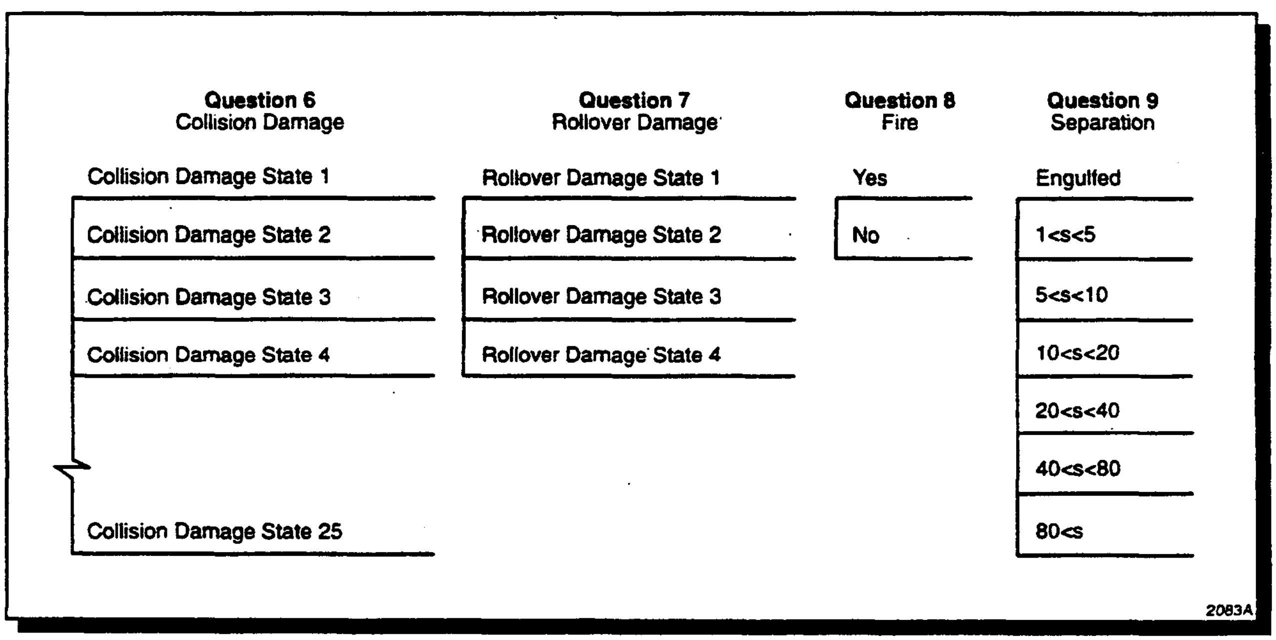


FIGURE F.6.3.1–2.—*ADROIT Dispersal Event Tree Questions 6–9.*

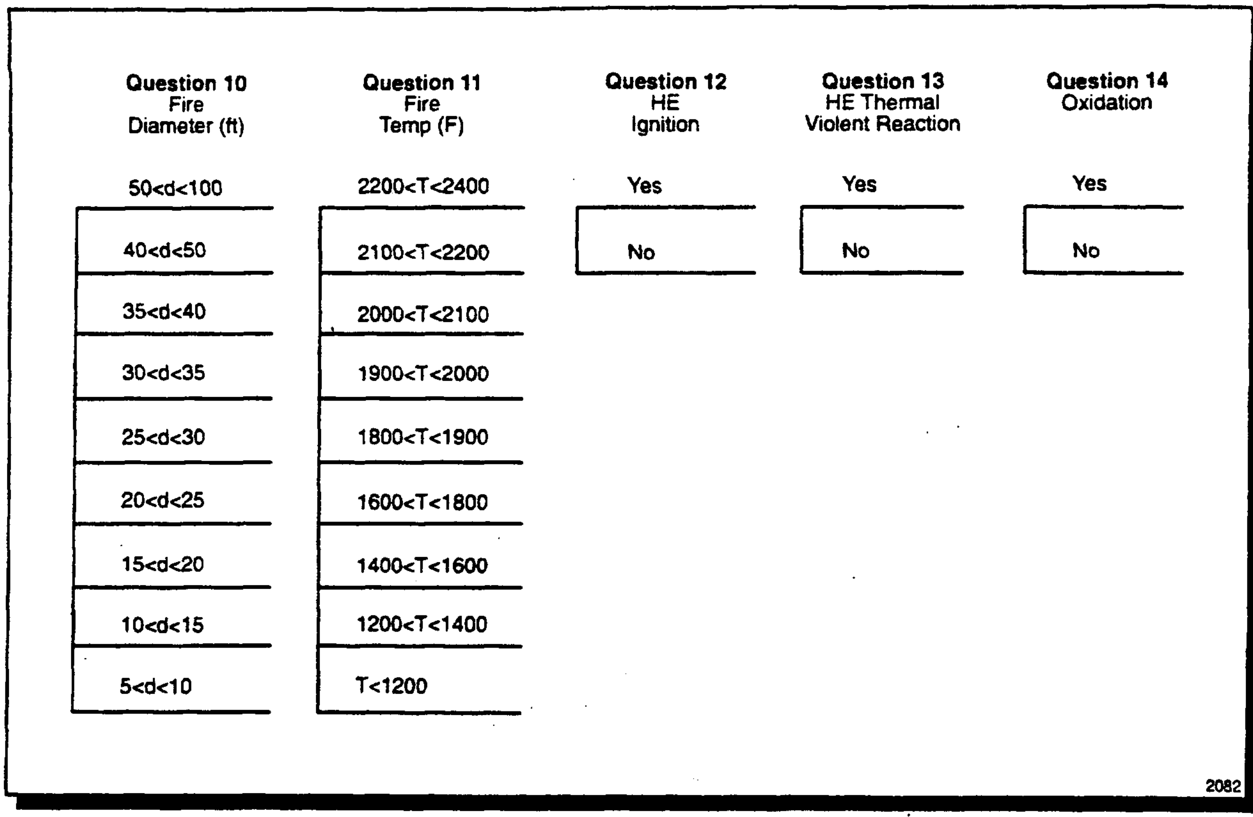


FIGURE F.6.3.1–3.—*ADROIT Dispersal Event Tree Questions 10–14.*

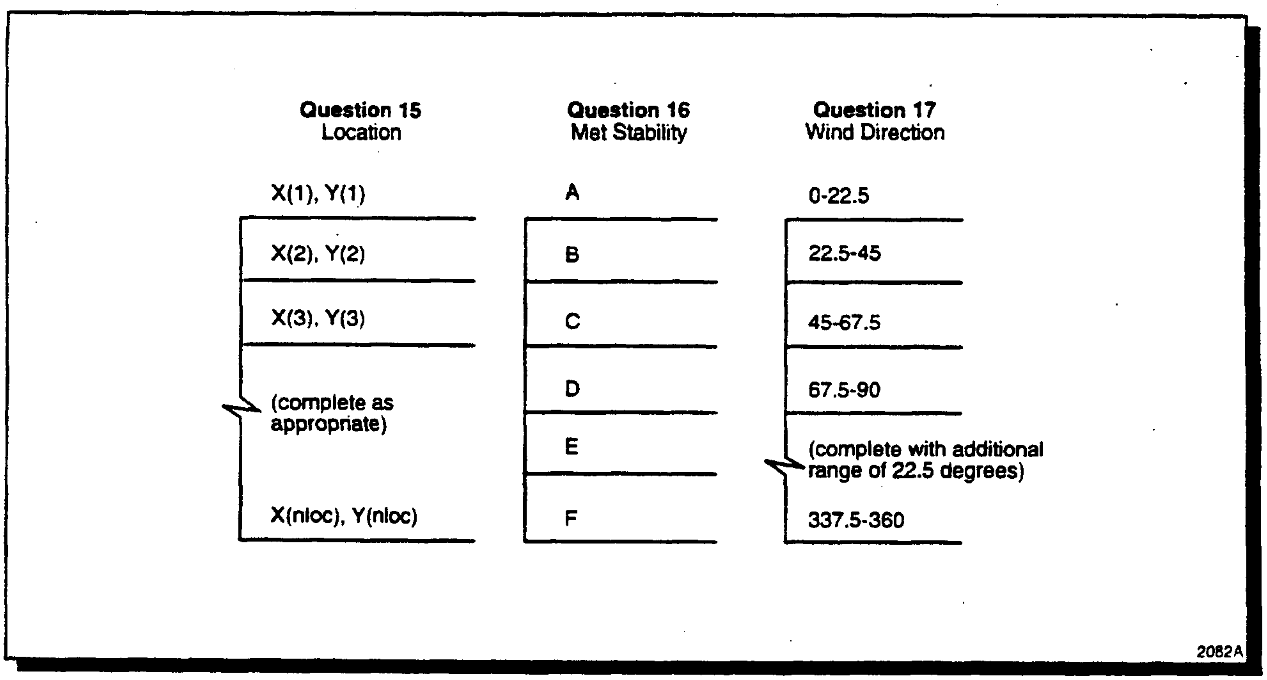


FIGURE F.6.3.1–4.—*ADROIT Dispersal Event Tree Questions 15–17.*

necessary to introduce a factor which could provide a bridge between the tow-away accident rate and the severities and operating environments of interest. The bridge is provided by modifying the tow-away accident rate with an estimate of the fraction of tow-away accidents that are considered to have severities comparable to fatal accidents. The fraction is estimated to be between 0.042 and 0.51 (SNL 1994b). In general, the tow-away rate includes accidents of lesser severity than those associated with fatal accidents.

Because the probability of occurrence of accidents of varying severities is different for different road types and the consequences of accidents differ because of differing population densities, highway transportation accidents were evaluated in four operating environments based on road type and population area. Table F.6.3.2-1 presents the four influence factors (SNL 1994a).

The mileage in each operating environment is derived from shipment projections and route characterization. The TIGER/Line files (Census 1991; Census 1991a) were used to develop route segmentation data files, which include information on geographic location, operating environment, and applicable meteorological stations as a function of route mile marker (cumulative distance from the route origin) at closely-spaced points.

F.6.3.3 *Accident Environments*

Radioactive materials are shipped in packaging systems that mitigate accident environments and help prevent releases to the environment. Normal transportation environments do not produce environments that threaten the integrity of the packaging system. However, the environments produced from very severe traffic accidents could exceed the capabilities of the packaging system and cause a release of radioactive material.

The risk assessment implemented in the ADROIT code considers impact, puncture, crush, and thermal environments. In traffic accidents, impact, puncture, and crush environments are associated with collision and rollover events; thermal environments are associated with fires involving the fuel system, cargo, or other elements of the vehicles and/or objects involved in the accident. The response of the packaging system to these environments is interdependent. For example, the response of the packaging system to a fire reflects damage to the packaging system caused by collision and rollover.

The accident data needed to define the probability of packaging system failure include probabilities of various accident types and distributions of collision, rollover, and fire severity. The response of the packaging system and the collision, rollover, and fire severity depend on the type of accident. There are a large number of accident variables that can be used to characterize the accident. In the ADROIT code, the emphasis is placed on defining the minimum number of accident characterizations that would provide sufficient definition of the accident environment to analyze the response of the packaging system and also provide reasonable differentiation of the collision, rollover, and fire severities. As a result, the variables used to characterize

TABLE F.6.3.2-1.—*Influence Factors*

ROAD AND POPULATION TYPE	LIMITED URBAN	LIMITED RURAL	OTHER URBAN	OTHER RURAL
Influence Factor	0.63	0.93	3.91	3.83

accidents were selected based in part on specific features of the packaging system used by DOE to transport radioactive material.

The packaging system used by DOE to transport radioactive material includes the cargo, containers, and the SST. The most important features of the SST that protect the cargo in accident environments include the walls of the trailer, which provides significant thermal protection in fire environments, and the cargo tie-down system, which provides a means of holding the cargo in place. In general, damage to the packaging system in an accident depends on a number of factors:

- If the accident involves a collision, accident characteristics that may affect the response of the packaging system include the location of the principal impact, the impact direction, the collision energy absorbed, the peak contact velocity, and the collision duration. Specifically, damage to the trailer walls depends on the location of the principal impact, the impact direction, and the collision energy absorbed. The damage to the container and cargo depends on the peak contact velocity and the collision duration.
- If the accident involves a rollover, the primary characteristic of the rollover used to evaluate the response of the packaging system (primarily damage to trailer walls) is the skid distance.
- If the accident involves a fire, additional accident characteristics that affect the response of the packaging system include the effective fire temperature, the size of the fire, the separation between the fire and the trailer, and the duration of the fire.

The types of vehicles and/or other objects involved, collision occurrence, angle of impact, location of principal impact, rollover occurrence, and fire occurrence are factors that define the types of accidents. The peak contact velocity, skid distance, effective fire temperature, fire size, fire separation, and fire duration are factors that define the severity of the accident.

The branches of Questions 1–4 and 8 in the ADROIT event tree define the factors used to characterize the type of accident. Questions 9–11 are used to describe the fire separation, fire size, and fire temperature. The peak contact velocity, skid distance, and fire duration are used in the evaluation of the branch probabilities for Questions 6, 7, 12, and 14. Details of the statistical distributions used to describe these input variables can be found in *A Statistical Description of the Types and Severities of Accidents Involving Tractor Semi-Trailers* (SNL 1994b).

F.6.3.4 *Response of Packaging System to Accident Environments*

The response of the packaging system to the accident environments is addressed in Question 5–7 and 12–14. The possible responses to collisions, rollovers, and fires are considered. The response states address mechanisms that lead to release of radioactive material (e.g., violent reaction of HE by either mechanical or thermal initiation) as well as damage to the SST walls and cargo that may affect subsequent thermal response to a fire.

Question 5 is used to define the type of mechanical environments to which the cargo may be subject. Question 6 addresses the damage to the packaging system associated with collision events. Twenty-five collision damage states, which are determined from combinations of SST wall damage and cargo damage, are represented in the event tree. The damage states are hierarchical and are listed from the most severe to no significant damage. For scenarios in which a collision occurs, the branch probabilities are obtained by the split fraction method, which entails evaluating the probability that the peak contact velocity is greater than a calculated threshold value for the damage state of interest.

Question 7 is used to define the SST wall damage from rollover. Damage due to rollover is limited to the outer skin and insulation; the probability of opening in the SST walls or damage to the cargo from rollover is considered negligible. For scenarios in which a rollover occurs, the branch probability is obtained by evaluating the probability that the skid distance is greater than the threshold value for the damage state of interest.

The response of the cargo to fire environments is addressed in Questions 12–14. For scenarios in which a fire occurs, the probability that the fire duration is greater than the minimum fire duration for HE ignition t*, which depends on the cargo of interest, cargo damage, total wall damage, effective fire temperature, fire separation, and fire size. Since collision and rollover can occur in the same accident, the total wall damage is obtained from the combination of the wall damage from collision with that from rollover. The computer code MELTER was developed to calculate t* (SNL 1994).

Question 13 is used to define the probability of a thermally initiated violent reaction of the HE given ignition. If a violent reaction of the HE does not occur, Question 14 is used to assess the probability that aerosol is generated by oxidation of the radioactive material.

F.6.3.5 *Consequence Scenario*

For a given release mechanism, Questions 15–18 provide the remaining conditions needed to define a consequence scenario. For a given scenario (which defines the operating environment and the route), specific locations are sampled randomly from that segment of the route and operating environment considered. The sampling density is higher in urban areas than in rural areas. The location of the accident affects both the distribution of meteorological stability and the exposed population. The probabilities of the meteorological stability classes depend on the accident location and are obtained from data recorded at stations operated by the National Climatic Data Center.

F.6.3.6 *Consequence Assessment*

A consequence assessment estimates the health and environmental effects from radioactive materials transport. Health consequences are given in terms of the expected number of excess LCFs produced in the exposed population. The number of excess LCFs is determined from the collective committed effective dose and the latest dose-to-risk conversion factors. The ADROIT code performs dispersal analysis using the Explosive Release Atmospheric Dispersion (ERAD) code and exposed populations determined from route characterization and population counts obtained from 1990 Census data. The dispersal analysis depends on the dispersal mechanism, meteorological stability, and the cargo of interest. The exposed population depends on the accident location and wind direction.

F.7 OCCUPATIONAL RADIATION IMPACTS FROM MATERIAL HANDLING

Occupational exposure to radiation from interzone material movements at Pantex Plant and alternative sites was estimated using historical annual exposure information for transportation and staging workers. This information was correlated with the number of nuclear explosive and pit movements to obtain a dose per material movement. This determination was performed to ensure a bounding estimate that at the same time provides a realistic estimate of future impacts. Historical information was used instead of time and motion estimates to preclude the introduction of a large number of uncertainties in the estimates. Historical information from similar activities provides a more accurate estimate of future exposures.

Historical dosimetry information indicates a conservative dose estimate of 6.5×10^{-4} person-rem per handling operation for the transportation and staging department. Handling operations include interzone transfers of weapons and weapons components with associated vehicle loading/unloading as well as SST loading/unloading. For the 10-year period under evaluation in this EIS, a conservative estimate of 94,000 handling operations was made resulting in a cumulative dose of 61 person-rem to the transportation and staging workers.

The bounding estimate of handling operations for the Proposed Action includes the transfer of 20,000 pits from Zone 4 to Zone 12 with a subsequent return to Zone 4 for the pit repackaging project. The estimate also includes the transfers of weapons and weapons components at an operational level of 2,000 weapons per year. The conservative estimates for both dose per handling and quantity of handling events were made to bound the impacts expected from Zone 4 operations with associated material handling and interzone transfers.

Because there were no identifiable historical doses exclusively relating to large numbers of SST pit container loading or unloading operations, these radiological exposures were obtained using time and position estimates for placing and securing pit containers within an SST. Figure F.7–1 shows the required restraint for pit containers within an SST. The following assumptions were used to estimate worker exposures for pit container loading/unloading operations:

- To position and restrain a pit container within an SST requires 15 minutes.
- An AT–400A pit container dose rate of 1.5 millirem per hour at 1 meter (3 feet) was used.
- Two personnel are required for the pit container restraint operation.
- During the loading operation, the workers spend 5 minutes at a distance of approximately 1 meter (3 feet), and 10 minutes at approximately 0.3 meter (1 foot) from the pit containers.
- During the loading operations, the workers are exposed to the pit container being loaded and the nearest seven pit containers.
- Impacts from unloading operations are the same as for loading operations
- No credit is taken for protective gear (e.g., lead aprons).

F.8 REGULATIONS

This section briefly describes the regulatory environment for transporting radioactive materials and wastes out of Pantex Plant. These materials must comply with both DOE requirements and DOT regulations governing offsite shipments.

DOT has the responsibility for establishing transportation regulations, but the enforcement of these regulations is shared with the Federal Highway Administration, the Federal Aviation Administration, the National Highway Traffic Safety Administration, the Native American tribes, and the states. Other aspects of radioactive and mixed materials or wastes transportation are regulated by NRC, the Environmental Protection Agency, and the Occupational Safety and Health Administration. The Environmental Protection Agency is responsible for hazardous wastes, and Occupational Safety and Health Administration is concerned with the safety of workers. The Federal Emergency Management Agency has the responsibility of coordinating the Federal assistance, planning, and training for any and all types of emergency response situations (including transportation accidents) with local, tribal, and state governments.

The DOT and NRC share the regulatory responsibility for radioactive materials and wastes containers. The NRC regulates, reviews, and certifies Type B containers. The DOT, with the NRC's consultation, regulates all other radioactive materials packaging. DOE has the authority of DOT (under 49 CFR section 173.7) to give approval for certain packaging and certain operational aspects of its research, defense, and contractor-related shipments of materials requiring Type B containers. However, in this process the DOE must use NRC-equivalent standards and procedures.

Because of the stringent regulations on transport packaging manufacture, shipment identification, package and vehicle inspections, and routing and driver training, there has never been a documented death or significant injury associated with radioactive materials transport in the DOE complex for more than 40 years.

Table F.8–1 is a list of regulations and standards that govern the transportation processes at Pantex Plant.

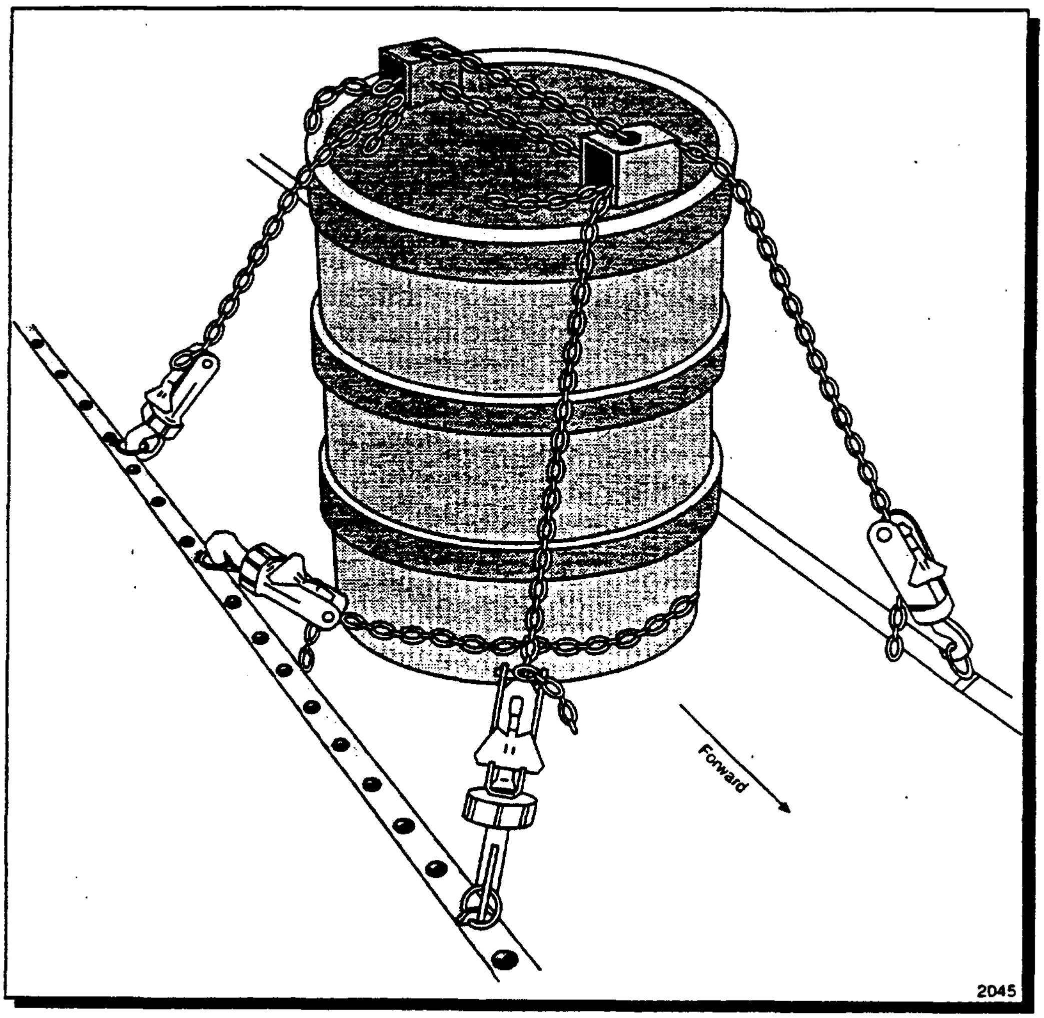


FIGURE F.7–1.—*Restraint of Pit Containers within a Safe Secure Tractor Trailer.*

TABLE F.8–1.—*Regulations or Guidance for the Transportation of Hazardous, Radioactive, and Mixed Materials or Wastes*

REGULATIONS OR GUIDANCE	RESPONSIBLE AGENCY
10 CFR Part 71, Subpart H, "Packaging and Transportation of Radioactive Material"	Nuclear Regulatory Commission
29 CFR Part 1910, "Occupational Safety and Health Standards"	
49 CFR Part 172, "Hazardous Materials Tables, Hazardous Materials Communication Requirements, and Emergency Response Information Requirements"	DOT
49 CFR Part 173, "Shippers—General Requirements for Shipment and Packages"	DOT
49 CFR Part 177, "Carriage by Public Highway"	DOT
49 CFR Part 178, "Specifications for Packaging"	DOT
49 CFR Part 390, "Federal Motor Carrier Safety Regulations"	DOT
49 CFR Part 391, "Qualifications of Drivers"	DOT
49 CFR Part 392, "Driving of Motor Vehicles"	DOT
49 CFR Part 393, "Parts and Accessories Necessary for Safe Operation"	DOT
49 CFR Part 395, "Hours of Service of Drivers"	DOT
49 CFR Part 396, "Inspection, Repair, and Maintenance"	DOT
49 CFR Part 397, "Transportation of Hazardous Materials; Driving and Parking Rules"	DOT
ANSI-MH2.13, *Specification for 30-Gallon Full-Removable-Head Universal Drum (DOT-17H)*	American National Standards Institute
DOE/EV/06194, *Explosives Safety Manual*	DOE
DOE/EH-02561, U.S. *DOE Radiological Control Manual*	DOE
DOE/DNA STP 4551D, *Transportation of Nuclear Weapons Material, Shipment by Safe Secure Trailer*	DOE
DOE Order 5480.11, "Radiation Protection for Occupational Workers"	DOE
DOE Order 5610.12, "Packaging and Offsite Transportation of Nuclear Components, and Special Assemblies Associated with the Nuclear Explosive and Weapon Safety Program"	DOE
DOE-STD-3009-YR, "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Analysis Reports"	DOE
Pantex Plant Standard STD-1463, "Explosive Limits"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-1700, "Outbound Shipments (Non Weapons)"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3120, "Scrap Explosives and Contaminated Waste Materials"	Mason & Hanger-Silas Mason Co., Inc.

TABLE F.8–1.—*Regulations or Guidance for the Transportation of Hazardous, Radioactive, and Mixed Materials or Wastes*-Continued

REGULATIONS OR GUIDANCE	RESPONSIBLE AGENCY
Pantex Plant Standard STD-3140, "Notification, Investigation, and Reporting of Occurrences"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3161, "Electrical Storm and Severe Weather Precautionary Procedures"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3180, "Traffic Safety Program"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3470, "Onsite Packaging and Transportation of Hazardous Materials, Substances, and Wastes"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3484, "Certification of Mixed Waste Shipments"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3485, "Waste Certification Program"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3486, "Waste Acceptance Criteria"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3487, "Guidance for Marking and Labeling of Radioactive Waste Packages"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3488, "Training Requirements for Radioactive and Mixed Waste Management"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3489, "WCO Surveillance Program"	Mason & Hanger-Silas Mason Co., Inc.
Pantex Plant Standard STD-3490, "Material Characterization"	Mason & Hanger-Silas Mason Co., Inc.
MNL RS-001, "Pantex Plant Radiological Control Manual"	Mason & Hanger-Silas Mason Co., Inc.
EPP-1000, Pantex Plant Emergency Management Plan	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 3-1070.5, "Waste Characterization Plan of NTS Wastes"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 6-5000, "General Safety Requirements for Zone 11"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-0028, "Receiving, Inspection & Packaging of MAA Wastes"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-0029, "Compacting Procedures for Waste Generated in the MAA"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-0034, "Waste Management, Monitoring and Decontamination of Weapon Components"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-0034.1, "Receiving and Inspection of NTS Waste"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5000, "General Safety Requirements—Production and Support Activities"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5080, "Safety Requirements—Onsite Transportation of Chemical Explosives, Nuclear Explosives, and Weapon Components"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5600, "Area E (Firing Site)—General Safety Requirements"	Mason & Hanger-Silas Mason Co., Inc.

TABLE F.8–1.—*Regulations or Guidance for the Transportation of Hazardous, Radioactive, and Mixed Materials or Wastes*-Continued

REGULATIONS OR GUIDANCE	RESPONSIBLE AGENCY
O&I Standard 7-5638.1, "General Safety Requirements for Handling Nuclear Explosives and NELAs"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5640, "General Safety Requirements for Transportation of Nuclear Explosives by Motor Vehicle"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5650, "General Safety Requirements for Zone 4"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5655, "Zone 4 Storage and Disposal of HE Material"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5656, "Low-Level Radioactive Component Waste Packaging"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5660, "Burning Ground Operating Procedure"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5660.2, "Handling, Transportation, and Staging of Hazardous Waste Awaiting Offsite Shipment"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5660.3, "Preshipment Transportation, Handling and Staging of NTS Material"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5660.4, "Radioactive Waste Shipment"	Mason & Hanger-Silas Mason Co., Inc.
O&I Standard 7-5660.5, "Loading of NTS Material for Offsite Shipment"	Mason & Hanger-Silas Mason Co., Inc.

Source: Pantex 1994

REFERENCES

10 CFR 71.73	Nuclear Regulatory Commission, "Packaging and Transportation of Radioactive Material", *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
10 CRF 71, Subpart H	Nuclear Regulatory Commission, "Packaging and Transportation of Radioactive Material", *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
49 CFR 173.24	U.S. Department of Transportation, "Shippers-General Requirements for Shipment and Packages", *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
49 CFR 173.411	U.S. Department of Transportation, "Shippers-General Requirements for Shipment and Packages", *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
49 CFR 173.412	U.S. Department of Transportation, "Shippers-General Requirements for Shipment and Packages", *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
49 CFR 173.7	U.S. Department of Transportation, "Shippers-General Requirements for Shipment and Packages", *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
Census 1991	Bureau of the Census, 1990 TIGER/Line Census Files, Technical Documentation, U.S. Department of Commerce Washington, DC, 1991.
Census 1991a	Bureau of the Census, 1990 TIGER/Line Census Files, [machine-readable data files], U.S. Department of Commerce, Washington, DC, 1991.
Founds 1996	Vu-Graph Transparency of Al–R8 container provided by N. Founds of DOE Albuquerque Operations Office.
NAP 1990	*Health Effects of Exposures to Low Levels of Ionizing Radiation: BIER V*, Committee on the Biological Effects of Ionizing Radiations, Board on Radiation Effects Research, Commission on Life Sciences, National Research Council, National Academy Press, Washington, DC, 1990.
Pantex 1994	*On-Site Transportation Safety Risk Assessment*, Pantex Plant, Amarillo, TX, 1994.
Pantex 1996a	Pantex Plant, *Safety Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1996.

Pantex nd — Pantex Plant, EIS Facts, Stage Right, Newsletter, Amarillo, TX, nd.

PC 1995 — McBride, D., "Transportation Certificate for FL-Pit Container," SWEIS request for information supplied by D. McBride, Pantex Plant, Amarillo, TX, May 1, 1995.

PC 1995a — Petraglia, J., Dose Rates, SWEIS Request for Information Supplied by J. Petraglia, Battelle Pantex, TX, TR-006, January 3, 1995.

Ross 1994 — DOE, *Transportation Evaluation Report for Ross Aviation, Inc.*, prepared under Contract DE-AC04-89AL52318 by Ross Aviation, Inc., for the U.S. Department of Energy, Albuquerque Operations Office, February 1, 1994.

SNL 1993 — Neuhauser, K.S. and F.L. Kanipe, *RADTRAN 4 Volume II: Technical Manual*, SAND89-2370, Sandia National Laboratories, August 1993.

SNL 1994 — Larsen, M.E., *MELTER: A Model of the Thermal Response of Cargoes Transported in the Safe-Secure Trailer Subject to Fire Environments for Risk Assessment Applications*, SAND93-0737, Sandia National Laboratories, August 1994.

SNL 1994a — Phillips, J.S., D.B. Clauss and D.F. Blower, *Determination of Influence Factors and Accident Rates for the Armored Tractor/Safe Secure Trailer*, SAND93-0111, Sandia National Laboratories, April 1994.

SNL 1994b — Clauss, D.B., R.K. Wilson D.F. Blower and K.L. Campbell, *A Statistical Description of the Types and Severities of Accidents Involving Tractor Semi-Trailers*, SAND93-2580, Sandia National Laboratories, June 1994.

UM 1991 — Blower, D., *Trucks Involved in Fatal Accidents, Codebook 1980-88, By Power Unit Type*, UMTRI-91-36, University of Michigan, Transportation Research Institute, 1991.

UM 1993 — Sullivan, K.P. and D.L. Massie, *Trucks Involved in Fatal Accidents, 1990 Factbook*, UMTRI-93-1, University of Michigan, Transportation Research Institute, 1993.

APPENDIX G

Pollution Prevention and Waste Minimization

APPENDIX G
POLLUTION PREVENTION AND WASTE MINIMIZATION

G.1 INTRODUCTION

This appendix addresses the current status of Pantex Plant's Pollution Prevention and Waste Minimization (PP/WM) program. This section discusses the program's background; current elements, including source reduction, process change, material substitution, administrative policies, pollution prevention opportunity assessments (PPOAs), technology transfer, recycling/reuse, treatment, energy and water conservation, and future programs.

G.2 BACKGROUND

NEPA emphasizes minimizing the impacts that result from Federal activities. The *Pollution Prevention Act of 1990* and the *Hazardous and Solid Waste Amendments of 1984* enabled Federal agencies to develop and implement PP/WM programs. NEPA's original purpose, which was to "promote efforts which will prevent or eliminate damage to the environment..." was complemented by both acts (42 U.S.C. 4321; PC 1995a:1). This relationship was further strengthened in a 1993 memorandum from the Council on Environmental Quality, which recommended that Federal agencies incorporate pollution prevention principles, techniques, and mechanisms throughout their NEPA planning and decision making processes (PC 1993a:2).

To help facilities meet regulatory requirements, the Environmental Protection Agency (EPA) has published strategies and guidelines on PP/WM. The *Pollution Prevention Act* establishes an environmental protection hierarchy, with pollution prevention/source reduction as the most desirable environmental management option. If pollution cannot be prevented, then, in descending order of preference, environmentally sound recycling, treatment, and disposal are listed as alternative waste management options (PC 1993:Attach. 2).

Waste minimization centers on source reduction or recycling of solid wastes regulated by the *Resource Conservation and Recovery Act* (RCRA). Pollution prevention complements the concept of waste minimization by focusing on the following: source reduction and other practices that reduce or eliminate pollutants through increased efficiency in the use of raw materials, energy, water, or other resources or protection of natural resources by conservation (PC 1993:2). Waste minimization is an implied element of the pollution prevention process.

The State of Texas established the *Waste Reduction Policy Act of 1991*, Senate Bill 1099, which amended the *Texas Solid Waste Disposal Act* (Texas Statutes, Article 4477-7) to include requirements for the elimination of hazardous waste generation through source reduction and waste minimization. TNRCC serves to enforce this act by requiring:

- Operators of hazardous waste disposal facilities to maintain records necessary to determine the amount of hazardous waste disposed.
- Large quantity generators of industrial solid or hazardous waste to provide recordkeeping and use a manifest or other appropriate system to ensure that waste is transported to an authorized facility.
- Large quantity generators to provide plans for the reduction of the release of pollutants or contaminants into the air and water and to establish reasonable goals for the reduction in volume of generated hazardous waste and the amount of pollutants and contaminants using

source reduction and waste minimization.

TNRCC promotes the Clean Texas 2000 program, which emphasizes pollution prevention programs as well as recycling and waste minimization activities (MH 1994:2-24). The goal of this program is to create a cleaner Texas by the year 2000.

DOE has developed an overall pollution prevention strategy and framework that is consistent with EPA's recommendations and other requirements (e.g., Executive Order 12856 and 12902) around which its facilities must structure their own programs. DOE Orders 5400.1, 5400.3, and 5820.2A establish policy requirements for environmental protection and waste management. This framework is the basis of Pantex Plant's strategy to implement PP/WM elements and techniques into all operations at the plant. Pantex Plant pollution prevention policy states its commitment to use available technology to reduce waste generation, monitor operations to encourage sound practices that discourage waste generation, develop an awareness of environmental concerns and practices, and comply with existing laws governing environmental protection (Battelle 1994:5). Chapter 6, Environmental Compliance Requirements for Implementing the Proposed Action and the Alternatives, provides additional information on these regulations.

G.3 PANTEX PLANT POLLUTION PREVENTION AND WASTE MINIMIZATION PROGRAM

The Pantex Plant PP/WM program is consistent with DOE and other legal requirements and designed to eliminate or minimize pollutant releases to all media and incorporate a pollution prevention ethic into the plant (Battelle 1994:1). In 1996, the PP/WM program at Pantex Plant received the White House Closing the Circle Award for achievements in recycling and waste prevention (MH 1996). A simplified schematic of the program is given in Figure G.3–1. Table G.3–1 presents the 16 elements of the Pantex Plant PP/WM program.

G.3.1 Source Reduction

Pollution prevention encompasses all actions necessary to keep pollutants from being released into the environment (Battelle 1994:22). Source reduction emphasizes the aspect of preventing and reducing the creation of wastes through process change, material substitution, and administrative policies. Table G.3.1–1 provides a comprehensive list of source reduction techniques at Pantex Plant. The list contains 34 specific measures taken at Pantex Plant to reduce waste at the source.

Efforts to reduce and eliminate emissions and waste at Pantex Plant have greatly reduced emissions and waste generation (e.g., from 1987 to 1994, the plant's generation of hazardous waste decreased by more than 96 percent). These reductions have meant significant savings on the cost of waste disposal as well as benefiting the environment. Disposal costs in 1994 were less than a third of those in 1992, saving more than $2 million (DOE 1995a:3-6). Table G.3.1–2 provides waste generation data for the 1992–1995 period. All waste types were reduced with the exceptions of hazardous and *Toxic Substances Control Act* (TSCA) waste. Hazardous waste has increased as a result of the remediation of contaminated soils under the Environmental Restoration program (DOE 1996:17). An increase in TSCA waste reflects asbestos removal during facility modifications (DOE 1996:22). Overall wastes are down by 53 percent since 1993.

Waste reduction goals are listed for all types of waste in Table G.3.1–3. In accordance with Executive Order 12856, *Federal Compliance with Right-to-know Laws and Pollution Prevention Requirements*, Pantex Plant is required to reduce the volume of toxic

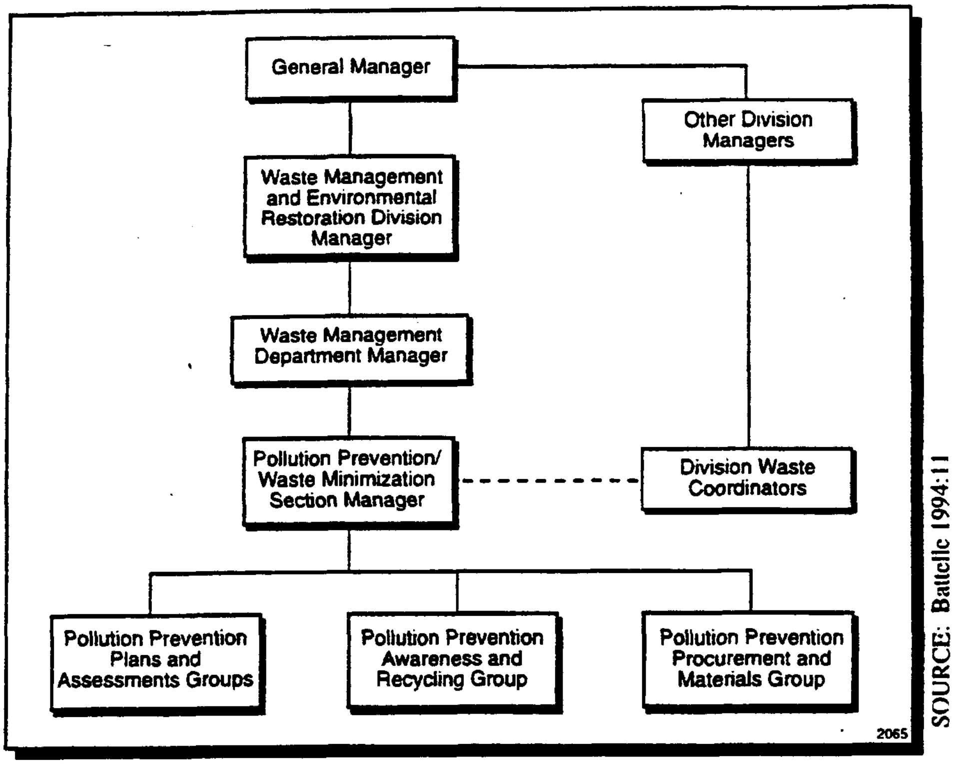


FIGURE G.3–1.—*Simplified Schematic of the Pantex Plant Pollution Prevention and Waste Minimization Program.*

TABLE G.3–1.—*Sixteen Elements of the Pantex Plant Pollution Prevention and Waste Minimization Program*

1.	Foster a philosophy to conserve resources and create a minimum of waste/pollution in achieving site strategic objectives.
2.	Reduce the volume of hazardous, radioactive, and mixed wastes.
3.	Promote the use of nonhazardous materials in plant operations to minimize the potential risks to human health and the environment.
4.	Reduce or eliminate the generation of waste materials through input substitution, product reformulation, process modification, improved housekeeping, and onsite closed-loop recycling to achieve minimal adverse effects on the air, water, and land.
5.	Enhance communication of waste minimization objectives, goals, and ideas laterally and vertically among site organizations.
6.	Promote integration and coordination of waste generators and waste managers on waste minimization matters.
7.	Characterize wastestreams and establish a baseline of waste generation data.
8.	Identify and implement methods and technologies for waste minimization.
9.	Target policies, procedures, or practices that may be barriers to waste minimization.
10.	Create incentives for pollution prevention.
11.	Develop and implement employee pollution prevention awareness and occupational training programs.
12.	Collect and exchange waste minimization information through technology transfer, outreach, and educational networks.
13.	Develop mechanisms for fully disseminating current technical information to site users.
14.	Enhance employee awareness of pollution prevention goals, objectives, and methods.
15.	Develop specific goals and schedules for waste minimization activities.
16.	Comply with Federal and State regulations and DOE requirements for waste minimization.

Source: Battelle 1994:6

TABLE G.3.1–1.—*Source Reduction at Pantex Plant*

SOURCE REDUCTION TECHNIQUES	SPECIFIC SOURCE REDUCTION MEASURES
PROCESS CHANGES	
Affirmative Procurement	Inventory reduction. Recycled material purchased. Recyclability of material considered before purchased. Content of hazards considered before products are purchased. Product durability considered.
Technical Redesign	Fireloop construction project. Firing range lead removal.
Procedural Controls	Reduced repackaging hazardous reagents into smaller containers. Documented waste codes in standard operating procedures for all excess materials generated. Accurately defining the Radioactive Materials Management Area. Redefining high explosive-contaminated waste.
Maintenance Procedures	Oil and grease analyzer.
MATERIAL SUBSTITUTION	
Chemical Control Program	Replaced hazardous solvents with Safety Kleen Premium Solvent. Replaced hazardous solvents with a citrus-based nonhazardous solvent. Substituted water-based nonhazardous paints to replace solvent-based enamels.
ADMINISTRATIVE POLICIES	
PP/WM Team	Set goals for reducing volume of wastes and other pollutants. Perform PPOAs. Perform life cycle assessments. Coordinate technology transfer efforts.
Employee Incentives	Cash rewards for new waste minimization solutions.
Program Feedback	Quarterly newsletter, *Waste Minimizer*, published that lists achievements and needs. Annual reports on waste generation and waste minimization progress.
Employee Training	One hundred percent of Pantex Plant employees received PP/WM training. Computer-based training course.
Database Tracking System	Ability to track air releases, material usage, volume, cost, and operation records of treatment and recycling systems.
Cost Allocation	Under development.
Technology Transfer	Workshops (i.e., Waste Reduction Information Exchange). Field trips. Dissemination of the *Waste Minimizer.* Use of the Pollution Prevention Information Clearinghouse distribution center for EPA documents and other information. Use of the Pollution Prevention Information System.
Waste Characterization	Monitoring mixed waste for radiation, allows for declassification of waste. Segregation of waste. Reviewing/revising Pantex Plant specific waste codes to reflect RCRA definition.
Implementation and Evaluation	Program review and update.

Sources: PC 1995:1 thru 10; Pantex1996:14.4

TABLE G.3.1–2.—*Waste Volumes from Routine Operations (in cubic meters [cubic yards])*

WASTE TYPE[1]	1992	1993	1994	1995	PERCENTAGE CHANGE 1993–1995
Low-Level Waste[2]	265 (348)	287 (375)	232 (303)	185 (242)	-20
Low-Level Mixed Waste[3]	51 (67)	38 (50)	25 (33)	29 (38)	+16
Solid Waste (Nonhazardous)	6,489 (8,488)	10,885 (14,238)	4,664 (6,101)	4,039 (5,283)	-13
Hazardous Waste	589 (770)	370 (484)	193 (252)	460 (602)	+138
TSCA Waste	95 (124)	113 (148)	8[4] (10)[4]	357 (467)	+4,363
Sanitary Waste	494 (646)	612 (800)	835 (1,092)	740 (968)	-11
TOTAL	7,984 (10,443)	12,305 (16,095)	5,957 (7,792)	5,810 (7,599)	-3

[1]Conversions of different waste types from weight to volume were made using a conversion factor of 0.72 kg of waste per liter (6 lbs waste per gallon).
[2]Volumes from past years have been revised to include nonproduction waste.
[3]Mixed waste contains both radioactive and hazardous waste components.
[4]Generation of asbestos waste decreased in 1994.
Source: DOE 1996:18

TABLE G.3.1–3.—*Waste Reduction Goals for 1994–1999 (in percent)*

WASTE TYPE	1994	1995	1996	1997	1998	1999
Low-Level Radioactive Waste	6	5	4	4	4	4
Low-Level Mixed Waste	4	4	4	4	4	4
Hazardous Waste	3	2	2	2	2	2
TSCA Waste	29*	8	8	8	8	8

*Destruction of old steam plant building resulted in a dramatic increase from 1992 waste generation levels. Completion of this activity, in addition to regularly planned PP/WM activities, results in an unusually high reduction goal for the following year.
Source: Battelle 1994:A-1

chemicals requiring disposal by 50 percent. Table G.3.1–3 details the required reduction through 1999. In any given year, wastes are expected to be reduced by 2 to 40 percent.

G.3.2 Process Changes

Process changes (i.e., affirmative procurement, technical redesign, procedural controls, and maintenance procedures) were examined to ensure that wastes are minimized to an extent that is technically and economically feasible (Battelle 1994:21). With the 1994 implementation of new procedural controls (i.e., a required visual inspection) for high explosive(s) (HE)-contaminated waste, a 99 percent reduction in the generation of HE-contaminated hazardous waste was achieved. This decrease has resulted in the use of fewer active thermal treatment units and reduced air emissions at the Burning Ground (DOE 1995a:3-7). The savings are estimated at $80,000 per year (PC 1995:8). The fireloop construction project utilized process changes (reevaluation of solid waste management unit data, rerouting piping, and recharacterization of wastes) that resulted in reducing the amount of hazardous and Class 1 wastes by 215 cubic meters (281 cubic yards) at a savings of $516,750 in January of 1995 (PC 1995:4).

G.3.3 Material Substitution

Material substitution is achieved by reviewing existing products and searching for environmentally preferable products that are as efficient as current products. One type of material substitution concerns solvents and cleaners used for removing several types of contaminants before preparing, removing, or replacing parts or components. Since 1995, Safety Kleen Premium Solvent has replaced several hazardous solvents (i.e., toluene, Blue Gold, LPS, acetone, and Freon TF) in the Vehicle Maintenance Facility, instrument shop, bicycle shop, and DOE's transportation couriers. The use of Safety Kleen Premium Solvent resulted in an estimated annual savings of $103,000 and reduced volatile organic compound emissions. Additionally the generation of hazardous waste was reduced by 8,706 liters (2,300 gallons) per year. In 1993, the security division substituted a citrus-based nonhazardous solvent in place of the old hazardous solvent and reusable rags in place of disposable kimwipes, which resulted in a 90 percent decrease of hazardous waste and an annual savings of $2,400 (PC 1995:3, 6).

G.3.4 Administrative Policies

Top management is committed to take appropriate action to support the objectives of the PP/WM program by ensuring the availability of adequate personnel, budget, training, and materials. Administrative policies (e.g., Waste Minimization Plant Procedure) at Pantex Plant ensure involvement of all employees in the plant's PP/WM program through the implementation of a PP/WM team, employee incentives, program feedback, employee training, database tracking system, and cost allocation. Two important projects utilized to ensure continuous commitment are PPOAs and technology transfer.

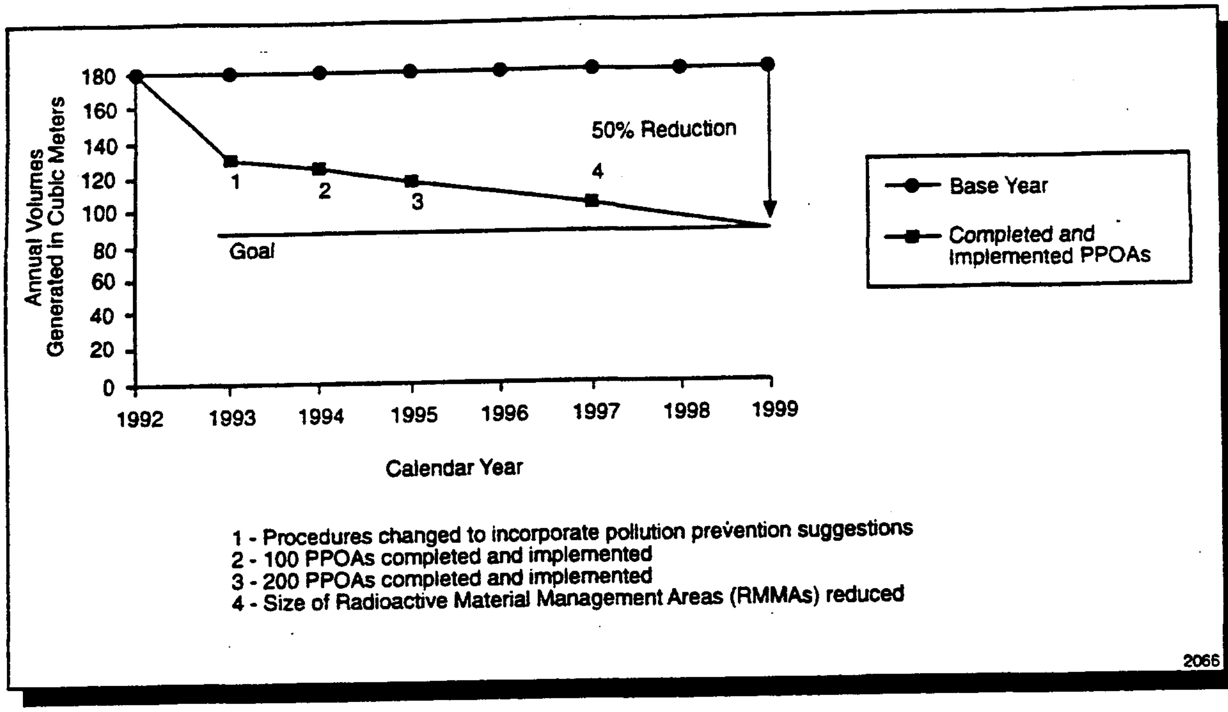
G.3.5 Pollution Prevention Opportunity Assessments

Pantex Plant created a PP/WM team to coordinate and track a PP/WM program that promotes the exchange of related information. This team, made up of waste coordinators from each division as well as the plant PP/WM Coordinator, is responsible for the coordination of waste assessment teams that conduct PPOAs.

The function and purpose of PPOAs are to identify viable PP/WM projects (Battelle 1994:15). This program is designed to achieve maximum effectiveness with minimal procedural constraints (Battelle 1994:16). PPOA is an ongoing program that identifies, screens, and analyzes options to reduce generated wastes.

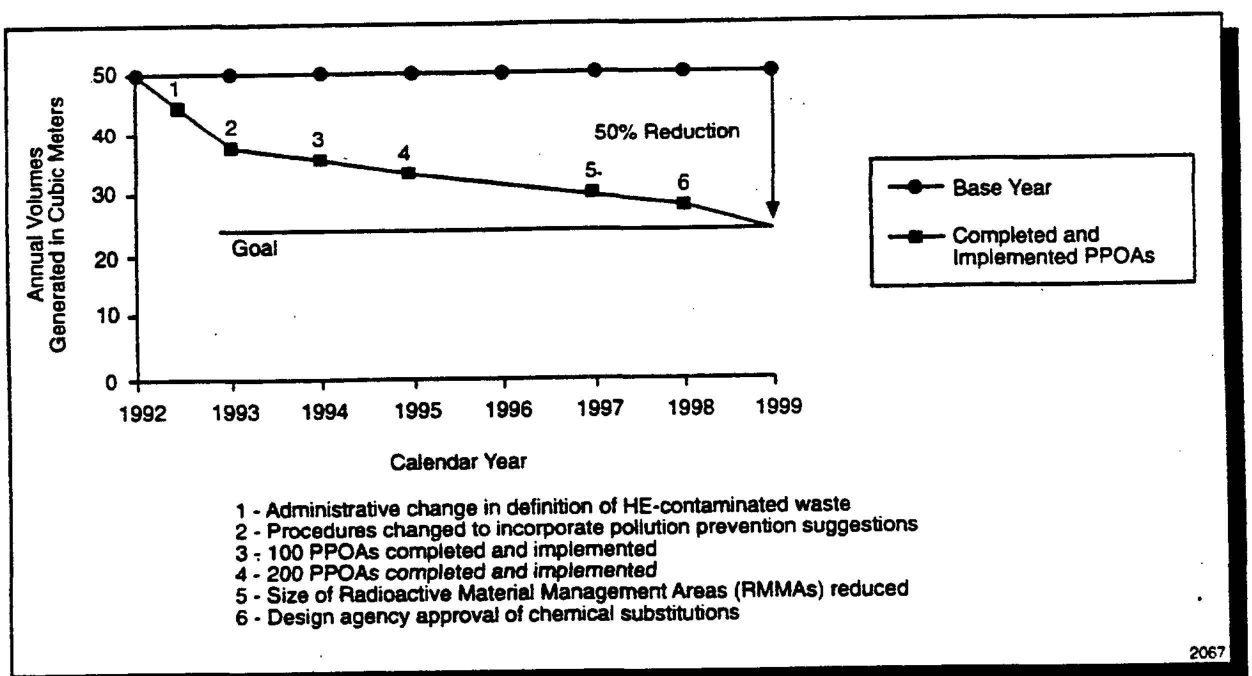
Pantex Plant prioritized specific sources responsible for the consumption of materials and waste generation. Weighted sums were derived from three screening criteria: volume of waste produced (40 percent), toxicity of waste (30 percent), and per unit disposal cost (30 percent). The top 150 entries were designated as priority targets for PPOAs in the first 2 years (Battelle 1994:15). Of the top 150 PPOAs for the 1992–1994 period, 45 were from the Manufacturing Division, 41 were from the Facility Operations Division, 38 were from the Explosive Technology Division, 23 were from the Environmental Safety and Health Division, and 3 were from the Quality Division.

Graphs depicting the projected waste reduction by the implementation of the PPOAs are provided in Figures G.3.5–1 through G.3.5–4. A separate graph is provided for each waste type under consideration. Activities expected to impact waste generation volumes are noted on each graph as well as the 50 percent reduction goals and past progress made toward meeting those goals.



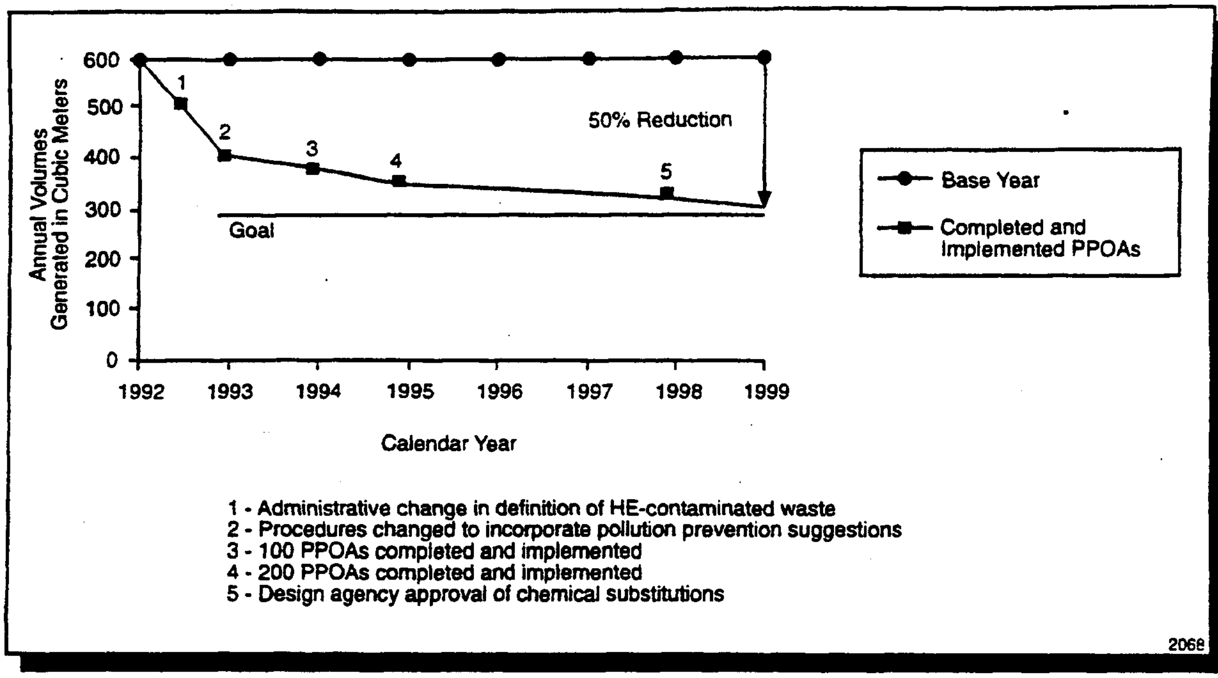
SOURCE: Battelle 1994

FIGURE G.3.5–1.—*Tasks Required to Reach Waste Reduction Goal for Low-Level Radioactive Waste.*



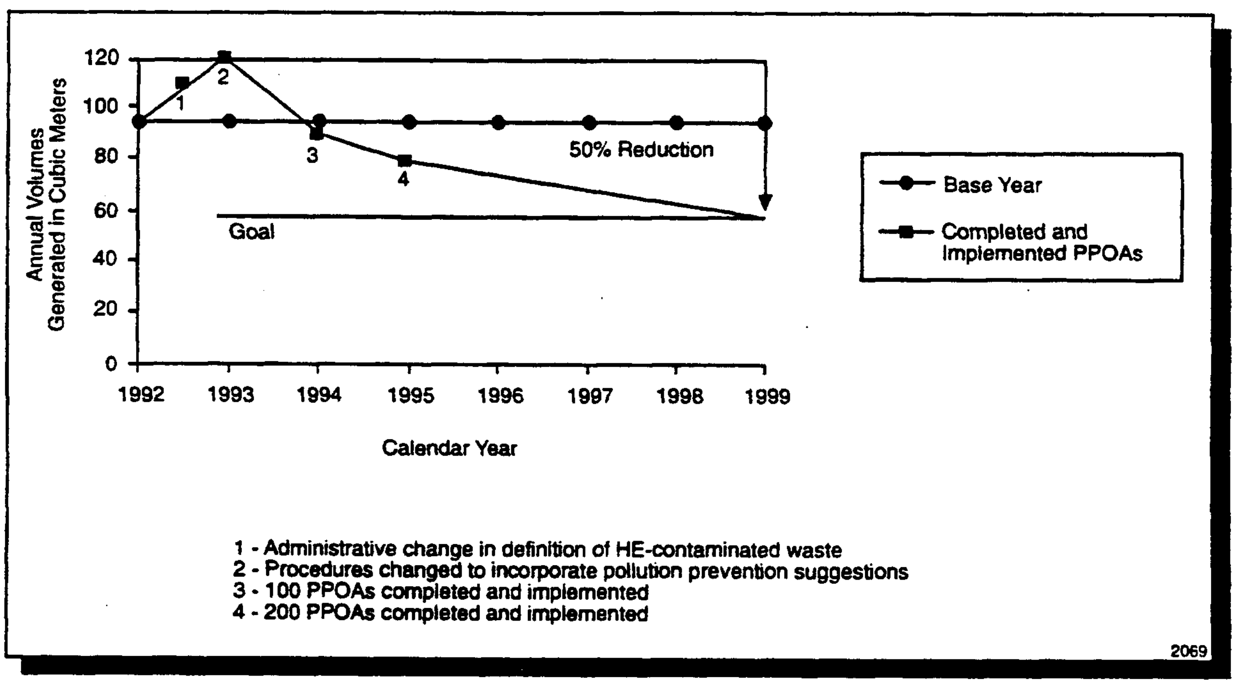
SOURCE: Battelle 1994

FIGURE G.3.5–2.—*Tasks Required to Reach Waste Reduction Goal for Low-Level Mixed Waste.*



SOURCE: Battelle 1994

FIGURE G.3.5–3.—*Tasks Required to Reach Waste Reduction Goal for Hazardous Waste.*



SOURCE: Battelle 1994

FIGURE G.3.5–4.—*Tasks Required to Reach Waste Reduction Goal for Toxic Substance Control Act Waste.*

G.3.6 Technology Transfer

A key Pantex Plant mission, initiated through administrative policies consistent with the *Stevenson-Wydler Technology Innovation Act of 1980* (15 U.S.C. 3701), is technology transfer. Activities involving technology transfer are coordinated through the PP/WM team and the Federal Laboratory Consortium (Battelle 1994:27). The consortium promotes technology transfer through links to the public and private sectors and support services such as training and assistance in implementing partnership opportunities. The purpose of technology transfer programs is to enhance the competitiveness of U.S. industries in the global economy.

Technology transfer opportunities will also aid in reducing DOE's cost for maintaining nuclear competence by making onsite facilities available to U.S. industries through User Facility Agreements. Some facilities that could have dual use are Metrology, Nondestructive Evaluation Testing, Analytical Laboratories, Synthesis and Formulation, Machining, and Explosives Testing. Cooperative Research and Development Agreements with local colleges and universities for teaching and research will provide DOE with a trained and highly qualified labor pool that could help maintain and enhance the capabilities at Pantex Plant (DOE 1995:14).

To reduce future emissions and stabilize wastes to meet land disposal restrictions standards (LDRs), DOE technology transfer efforts include the development of DOE and/or commercially developed technologies. Macroencapsulation and stabilization are technologies which are being considered for development at Pantex Plant.

For operations, technology transfer efforts are currently being explored in conjunction with future programs (see Table G.3.11–1) at Pantex Plant. An example of this is with the Nondestructive Evaluation Facility, proposed for construction in 1997. Approximately 30 percent of the workload at this facility would result from technology transfer operations such as high energy radiography, computer tomography, and digital imaging (DOE 1994a:1, I.b-4).

G.3.7 Recycling and Reuse

Waste reduction and elimination is promoted through the implementation of onsite and offsite recycling, reuse, and reclamation activities. The scope of the recycling program focuses on hazardous and office-generated waste (e.g., aluminum cans and office paper). Many of the recycling programs currently in place, such as the recovery and sale of precious metal, show a profit (Battelle 1994:22). Table G.3.7–1 provides examples of Pantex Plant's recycling and reuse activities, accomplishments, and savings. As an example of PP/WM, Building 11–29 recovers silver from photo solutions and wastewater previously discharged to the wastewater treatment facility and Playa 1. The closed-loop system is an ion exchange process. Another example of PP/WM is the recovery of dimethyl sulfoxide and HMX high explosives from Class 1 nonhazardous industrial solid waste solutions resulting from weapon dismantlement operations (PC 1996:1, 2).

G.3.8 Treatment

Low-level mixed waste (LLMW) and hazardous waste (HW) are generated as a result of plant operations associated with the dismantlement of weapons, associated support, and environmental restoration activities. LLMW contains both radionuclides and hazardous constituents (Pantex 1996:14.5). HW is any material that is a solid waste and a listed HW or exhibits any of the characteristics of ignitibility, corrosivity, reactivity, or toxicity (Pantex 1996:14.5).

Limited physical treatment and processing of waste (e.g., compaction, sorting, repackaging, and wastewater filtration) is currently

TABLE G.3.7–1.—*Pantex Plant Recycling/Reuse Activities, Accomplishments, Amount Reduced, and Savings*

RECYCLING/REUSE CATEGORIES	ACCOMPLISHMENTS	AMOUNT REDUCED	SAVINGS
RECYCLING			
Metals	Weapons metal (gold, aluminum, copper, nickel, lead titanium, tantalum, and beryllium). Aluminum (cans). Silver (photo, x-rays). Steel and plastic. HE-contaminated scrap metal. Lead.	41 metric tons (40 tons)	$2,100,000
Vehicle Maintenance	Used oil. Used and scrap tires. Antifreeze. Batteries. Freon.	2,877 liters (760 gallons) 875 tires 8,158 liters (2,155 gallons) 19,010 kilograms (41,887 pounds) 112 kilograms (300 pounds)	$3,040 $33,325 $3,000
Office	Digital photographic equipment. Office paper. Replace offset printer. Toner cartridges.	12,513 kilograms of HW (27,571 pounds) 1,321 metric tons (1,300 tons) 682 kilograms of HW (1,503 pounds) 41 metric tons (40 tons)	$472,223 $23,400 $40,000 $70,000
Chemicals	Unused chemicals. Pesticide containers. Dimethyl sulfoxide.	20 drums 20 drums of HW 1,493 kilograms (4,000 pounds)	$69,380 $3,240 $14,000
Weapons Materials	HE excess.	14,928 kilograms (40,000 pounds)	NR
Infrastructure	Fluorescent lights.	6,000	NR
REUSE			
Water Conservation Program	Wastewater.	Under study.	NR

NR - Not Reported
Sources: PC 1995:1 thru 10; Pantex 1996:14.4

performed. HW produced must be shipped offsite for treatment, processing, and disposal. Some LLMW has been sent by DOE to a permitted offsite commercial facility; the remaining LLMW, regulated under the *Federal Facility Compliance Act* (42 U.S.C. 6901), is currently being stored at Pantex Plant (Battelle 1995:13, 15).

With the completion of the proposed Hazardous Waste Treatment and Processing Facility in 1999, Pantex Plant would conduct LLMW processing and treatment operations using DOE developed technologies that would enable stored and future generated LLMW to meet LDRs and be disposed of offsite (Battelle 1995:15). When applicable, Pantex Plant would pursue commercial LLMW treatment. HW would continue to be shipped offsite for treatment and disposal at commercial facilities when the Hazardous Waste Treatment and Processing Facility is operational. The new facility would allow for enhanced waste sorting/ repackaging, sampling, compacting, drum rinsing and crushing, and waste minimization opportunities (e.g., solvent recovery) (Battelle 1995:13). Benefits include reduced air emissions and stabilized wastes.

HE-contaminated waste material may be characterized as a RCRA HW that exhibits the characteristic of reactivity pursuant to RCRA under 40 CFR 261.23 (Pantex 1996:14.5). This waste is thermally treated by open burning/open detonation (OB/OD). Discussions of the affected environment and impacts are presented in chapter 4.

A Best Available Control Technology (BACT) analysis for air emissions from explosives treatment at Pantex Plant Burning Ground was conducted and documented in a DOE letter to TNRCC dated October 15, 1993. The BACT review concluded that controlled open thermal treatment with existing administrative controls constituted BACT. In March 1994, a formal literature search was conducted to investigate treatment/processing methods for HE other than OB/OD. The review identified processes currently in use (e.g., OB/OD and chemical treatment) as well as those in various stages of development. The results of the literature search were forwarded to TNRCC.

At that time, the alternatives were determined to be either technically infeasible for Pantex Plant explosives or economically infeasible on a cost-per-unit mass of air pollutants that could be controlled (Radian 1994:1). The alternative emerging explosive treatment technologies were identified as: advanced thermal treatment methods (i.e, molten salt destruction, supercritical water oxidation, and advanced plasma incineration), chemical/biological treatment methods (e.g., base hydrolysis, chemical/electrochemical oxidation, and biological oxidation), and explosives recovery/ reuse technologies (e.g., critical fluid extraction, explosives as supplemental fuels, and solvent recovery).

Since 1994, the development of refined procedures for HE chemical treatment has warranted the further investigation of a base hydrolysis treatability study program to be housed in building 11–36. Though the most commonly generated HEs resulting from dismantlement processes are HMX based, this treatability study can accommodate other types of HE (e.g., RDX, TNT, HNS, TATB, and some of their respective formulations). The total amount of waste that will be used in this study program is 1,000 kilograms (2,200 pounds) where 52 kilograms (115 pounds) will be the maximum per process. As a result of this study, the plant will expect to:

- Obtain the information required to determine the feasibility of treating explosives by base hydrolysis.
- Confirm the composition of the residues from the process.
- Confirm the constituents of the gases emitted to the atmosphere.
- Define the optimum operating parameters for the explosives to be treated (MH 1995:2, 3, 4, 6).

G.3.9 Energy Conservation

In 1995, Pantex Plant consumed 80,046 megawatthours of electricity, compared to 82,224 megawatthours in 1993. Electrical usage decreased as the plant population increased. Pantex Plant employed a total of 3,470 people in 1993, and it employed approximately 3,800 in 1995. It is expected that by the year 2004, electricity consumption will decrease to 62,000 megawatthours. This decrease in consumption is consistent with Executive Order 12902, *Energy Efficiency and*

Water Conservation at Federal Facilities (DOE 1994:1, 7; Pantex 1996:2.0, 9.0).

Pantex Plant used 515,277 thousand cubic feet of gas in 1994, as compared to 468,969 thousand cubic feet in 1995, representing a net decrease of 9 percent. The future forecast predicts a net decrease of gas usage by 11 percent from 468,969 thousand cubic feet in 1995 to 416,000 thousand cubic feet in FY 2005 (DOE 1995:10, Pantex 1996:9-0).

G.3.10 Water Conservation

In 1993, 920 million liters (243 million gallons) of water was pumped from the Ogallala aquifer. In 1994, this decreased by 9 percent to 836 million liters (221 million gallons) of water. Table G.3.10–1 provides information on the amounts of water used at Pantex Plant from 1989 to 1994. Texas Tech University consumed about 25 percent of the water used annually. It is predicted that, by the year 2004, 738 million liters (195 million gallons) of water will be pumped, and by 2005 it will decrease to 568 million liters (190 million gallons) (DOE 1994:7; DOE 1995:10). This reduction in water usage parallels the criteria for Executive Order 12902 which mandates both energy efficiency and water conservation at Federal facilities.

Wastewater decreased by 19 percent from 587 million liters (155 million gallons) generated in 1993 to 477 million liters (126 million gallons) in 1994. In the year 2004, Pantex Plant plans to generate 473 million liters (125 million gallons) of wastewater instead of the 477 million liters (126 million gallons) generated in 1994 (DOE 1994:7; DOE 1995:10).

G.3.11 Future Programs

Future programs consist of evaluating PPOAs, identifying and implementing new technology transfer efforts, employee training, program feedback, and program evaluation. Table G.3.11–1 provides information on 7 future projects at Pantex Plant and their relationship to PP/WM efforts. These planned and tentative projects utilize various facets (e.g., source reduction, treatment, recycle/reuse, energy conservation, and technology transfer) of the PP/WM program to provide for future reductions in waste. Please see appendix H (Environmental Considerations subsections) for additional information regarding each project's compliance with Executive Order 12902.

TABLE G.3.10–1.—*Amount of Water Used at Pantex Plant from 1989–1994 (in million liters [million gallons])*

YEAR	WATER PUMPED	WATER SOLD TO TEXAS TECH UNIVERSITY	NET PLANT USE
1989	1,052 (278)	261 (69)	791 (209)
1990	1,147 (303)	303 (80)	844 (223)
1991	1,192 (315)	344 (91)	848 (224)
1992	1,033 (273)	276 (73)	757 (200)
1993	920 (243)	235 (62)	685 (181)
1994	836 (221)	132 (35)	704 (186)
1995	87 (230)[1]	250 (66)[1]	617 (163)[1]

[1]Denotes inconsistent data.
Source: Pantex 1996:9.3

TABLE G.3.11-1.— *Future Projects at Pantex Plant*

PROJECT	FISCAL YEAR	DESCRIPTION	PP/WM ELEMENTS
Plutonium Resource Center	1995	Transfer of appropriate technology developed from material disposition research and development to private industry.	TT, EC
Gas Analysis Laboratory	1999	Vacuum Technology Group.	TT, EC
Hazardous Waste Treatment and Processing Facility	1999	Process waste to minimize waste volume sent offsite.	SR, T, TT, EC
Materials Compatibility Assurance Facility	2000	Testing is performed on HE and weapon components from other DOE facilities.	TT, EC
Nondestructive Evaluation Facility	2000	Thirty percent of workload from technology transfer operations.	TT, EC
Pit Reuse Facility	2000	Recycle/Reuse.	RR, EC
Metrology and Health Physics Calibration and Acceptance Facility	2001	Energy Conservation Analysis.	EC

Denotations: SR - Source Reduction, T - Treatment, RR - Recycle/Reuse, EC - Energy Conservation, TT - Technology Transfer
Sources: DOE 1994b:7-6, 7-29 to 7-34, 7-37 to 7-42, 9-4, 9-5, 9-31 to 9-34, 9-37 to 9-40, 13-5, and 13-25; DOE 1995b:I.A.1; DOE 1994c:1, App. A.2; E.O. 12902

G.4 SUMMARY

DOE has developed an overall pollution prevention strategy and framework consistent with EPA's recommendations and other requirements (e.g., Executive Order 12856) around which its facilities must structure their own programs. This framework is the basis of Pantex Plant's strategy to implement PP/WM elements and techniques which will use a preventive approach to reduce waste by 50 percent. The program has successfully reduced waste and saved taxpayer dollars. In 1994 alone, Pantex Plant saved $2,000,000 in disposal costs. Source reduction (i.e., process change, material substitution, and administrative policies), recycling/reuse, and treatment are not designed as end products but are means for continued success.

REFERENCES

15 U.S.C. 3701 — *Stevenson-Wydler Technology Innovation Act of 1980*, 15 U.S.C 3701.

42 U.S.C. 4321 — *National Environmental Policy Act of 1969*, 42 United States Code Section 4321.

42 U.S.C. 6901 — *Federal Facility Compliance Act*, RCRA amended, 42 United States Code Section 6901

Battelle 1994 — Battelle Pantex, *Waste Minimization and Pollution Prevention Awareness Plan*, prepared by Pollution Prevention/Waste Minimization Section, Waste Management Department, Waste Management and Environmental Restoration Division, May 25, 1994.

Battelle 1995	Battelle, *Draft Reference Document for the Hazardous Waste Treatment and Processing Facility*, Version 1.0, prepared for Pantex Plant, Amarillo, TX, April 1995.
DOE 1994	DOE, *Pantex Plant FY 1994 Site Development Plan*, prepared under Contract DE-AC04-91AL-65030 by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, Amarillo, TX, March 1994.
DOE 1994a	DOE, *Conceptual Design Report, Facilities Capability Assurance Program (FCAP), Non-Destructive Evaluation Facility, Pantex Plant, Part I-Design Concept, Part II-Project Management Plan*, Project No. 88-D-122 (97-AA-02), prepared by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, December 1994.
DOE 1994b	DOE, *Pantex Plant FY 1996 CAMP Report Capital Asset Management Process*, prepared under Contract DE-AC04-91AL-65030 by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, April 1994.
DOE 1994c	DOE, "Awards Anticipated and DOE Budget", *Noncompetitive Solicitation National Resource Center for Plutonium*, Draft, prepared for the U.S. Department of Energy, January 1, 1994.
DOE 1995	DOE, *FY 1995 Pantex Plant Site Development Plan*, prepared under Contract DE-AC04-91AL-65030, by Mason & Hanger-Silas Mason, Company, Inc., Amarillo, TX, for the U.S. Department of Energy, Amarillo, TX, 1995.
DOE 1995a	DOE, *1994 Environmental Report for Pantex Plant*, prepared under Contract DE-AC04-91AL65030 by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, Amarillo, TX, June 1995.
DOE 1995b	DOE, *Conceptual Design Report, Pit Reuse Facility, Pantex Plant*, Authorization No. A56, Volumes I and II, prepared by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, January 1995.
DOE 1996	Battelle Pantex and Mason & Hanger-Silas Mason Co., Inc., *1995 Environmental Report for the Pantex Plant*, DOE-AL-65030-9602, prepared under Contract DE-AC04-91AL65030, by the Environmental Protection Department, Environment, Safety and Health Division, for the U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, May 1996.
DOE Order 5400.1	DOE, "General Environmental Protection Program", Washington, DC, November 9, 1988, Revised June 29, 1990.
DOE Order 5400.3	DOE, "Hazardous and Radioactive Mixed Waste Program", Washington, DC, February 22, 1989.
DOE Order 5820.2A	DOE, "Radioactive Waste Management," Washington, DC, September 26, 1988.
EO 12856	Office of the Federal Register, National Archives and Records Administration, Executive Order 12856, Government Printing Office, Washington, DC.

EO 12902 — Office of the Federal Register, National Archives and Records Administration, "Energy Efficiency and Water Conservation at Federal Facilities", Codification of Presidential Proclamations and Executive Orders, Executive Order 12902, Government Printing Office, Washington, DC, March 8, 1994.

MH 1994 — Mason & Hanger-Silas Mason Company, Inc., *Pantex Plant Final Draft Pollution Prevention/Waste Minimization Program Management Plan*, prepared under Contract Number H86496, Task 39, Subtask 02, by Jacobs Engineering Group, Inc., Albuquerque, NM, April 1994.

MH 1995 — Mason & Hanger-Silas Mason Company, Inc., *Notification of Treatability Study Base Hydrolysis of Explosives,* Prepared for the U.S. Department of Energy, Pantex Plant, Amarillo, TX, June 1995.

MH 1996 — Mason & Hanger-Silas Mason Company, Inc. *Pantexan*, Volume 43, Issue 5, May 1996.

Pantex 1996 — Pantex Plant, *Environmental Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1996.

PC 1993 — Sanderson, R., "EPA Office of Federal Activities' Guidance on Incorporating EPA's Pollution Prevention Strategy into the Environmental Review Process", Memo from Richard Sanderson, Director of Federal Activities, USEPA, Washington, DC, to Federal Agency NEPA Liaisons, February 24, 1993.

PC 1993a — Deland, M., "Pollution Prevention and the National Environmental Policy Act", Memo from Michael Deland, Executive Office of the President, Council on Environmental Quality, Washington, DC, to Heads of Federal Departments and Agencies, January 12, 1993.

PC 1995 — Stickrod, A, "Pollution Prevention/Waste Minimization Accomplishments", SWEIS request for information from Anna Stickrod for George Greenly, June 6, 1995.

PC 1995a — Garson, H., "Integrating Pollution Prevention into the National Environmental Policy Act Process and Documentation", Memo from Henry Garson to Leader, EIS Office, Albuquerque Operations Office, File: 5441.11, February 23, 1995.

PC 1996 — Johnson, Jerry, Notification of Intended Waste Storage and Recycling Activities in Building 12-19E, Letter from Jerry Johnson, DOE Amarillo Area Office, Amarillo, TX to Texas Natural Resource Conservation Commission, Austin, TX, April 11, 1996.

Radian 1994 — Battelle Pantex, *Status Review of Potential Alternatives to Open Burning of Energetic Materials at the Pantex Burning Ground*, prepared by Radian Corporation, for Battelle Pantex, Amarillo, TX, March 23, 1994.

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APPENDIX H

Proposed Facility Construction and Upgrades at the Pantex Plant

APPENDIX H
PROPOSED FACILITY CONSTRUCTION AND UPGRADES AT PANTEX PLANT

H.1 INTRODUCTION

This appendix presents detailed descriptions of the proposed facility construction and upgrades at Pantex Plant as discussed in the Proposed Action and No Action Alternatives for this EIS. Along with each project description is an assessment of the environmental impacts associated with that project. Section H.2 identifies the relationship of projects associated with the Proposed Action and the Alternatives, and sections H.3 through H.8 discuss the individual projects.

H.1.1 Purpose

The proposed facility construction and upgrades are evaluated in this EIS because of the integral nature of these projects' specific missions to the overall Pantex Plant mission. This EIS serves as the NEPA documentation for these projects. In addition, the EIS evaluates the cumulative impacts of these projects and the main mission of Pantex Plant. The purpose of this appendix is to provide the decision maker and the public with project-specific information in one report even though the impact analysis also appears under individual environmental resources and issue areas in the main body of this EIS.

H.1.2 Detailed Project Descriptions

The proposed facility construction and upgrade projects would be located in or near Zones 11 and 12 in the southeast quadrant of Pantex Plant (see Figure 3.1.1–1). Facilities designed to meet current explosives safety, seismic, and tornado criteria are needed to replace deteriorating facilities. The proposed facility upgrades are intended to modernize Pantex Plant, streamline efficiency of continued operations, maximize worker safety, reduce the footprint, and meet all regulatory requirements.

The proposed facilities discussed in this appendix include:

- A new Hazardous Waste Treatment and Processing Facility (HWTPF) between Zones 11 and 12 that would accommodate treatment and processing of hazardous waste, low-level waste, and low-level mixed waste. It would routinely treat and process only those wastes currently identified in the plant's *Resource Conservation and Recovery Act* (RCRA) permit application, as amended.
- Modifications of existing facilities to provide a Pit Reuse Facility in Zone 12. This facility would allow modification of certain pits obtained from nuclear weapons dismantlement in order to enhance their safety and allow their future reuse. Pantex Building 12–104 would be modified to accommodate this project.
- Construction of a new Gas Analysis Laboratory near Zone 11. The facility would provide new analytical laboratory space with the requisite environmental controls for sophisticated apparatus.
- Construction of a new Materials Compatibility Assurance Facility near Zone 11. The facility would be used for the environmental aging and compatibility testing of non-nuclear weapon components.
- Construction of a new Nondestructive Evaluation Facility in Zone 12. The facility would house operations such as radiography, ultrasound, digital imaging,

penetrant testing, laser sampling, radiometry, and computer tomography of non-nuclear weapon materials.

- Construction of a new Metrology and Health Physics Calibration and Acceptance Facility in Zone 12. The facility would provide the capability and capacity to perform health physics calibration and product acceptance control in support of the disassembly and assembly programs. The Health Physics Laboratory of this facility would provide necessary calibration and maintenance support for radiological instrumentation and monitors. The Product Acceptance Control Laboratory will provide the capability for calibration and support of product acceptance testing and equipment.

No decisions have been made regarding use of the replaced facilities after implementation of the Proposed Action. The decision to reuse, modify, or demolish the replaced facilities will be addressed in future NEPA documentation.

H.1.3 Affected Environment

Detailed discussions of each environmental resource in the overall affected environment at Pantex Plant are presented in chapter 4 of volume I of this EIS. The affected environment for Pantex Plant is the same as would be discussed for each of the proposed projects if they were discussed individually. In the interest of brevity, those discussions will not be repeated in this appendix.

H.1.4 Analysis of Environmental Impacts

While the discussion of the affected environment might be the same for the overall Pantex Plant and the individual projects, the impacts of the projects have been evaluated individually. Each project description is followed by a brief discussion of the environmental impacts associated with that project. The impacts are compiled from the resource-specific impact sections in chapter 4 of volume I of this EIS.

H.2 Relationship of Projects to Alternatives

The Proposed Action and Pit Storage Relocation Alternatives both include the construction and operation of the entire set of projects. The No Action Alternative includes none of these projects.

H.3 Hazardous Waste Treatment and Processing Facility

The *Draft Reference Document* for the HWTPF and the Conceptual Design Report for the HWTPF provide in-depth environmental information concerning the construction and operation of the HWTPF (Battelle 1995, DOE 1995). These documents have been extensively used in the following project description and are not cited repeatedly.

The normal operations at Pantex Plant generate low-level mixed waste (LLMW), low-level radioactive waste (LLW), hazardous waste (HW), and nonhazardous waste (NHW). These wastes need to be properly treated and/or disposed of to reduce their impact to human health and the environment. Excluding Burning Ground capabilities, only limited treatment and processing of wastes are currently performed at Pantex Plant. Additionally, these operations are conducted in facilities not originally designed for waste treatment and processing and are considered operationally limited (Battelle 1995:1; Pantex 1996:App C).

H.3.1 Purpose and Need for Action

The Department needs to enhance the efficiency and safety of its current waste operations. The

Department proposes to meet its need by constructing the HWTPF. The proposed facility would consolidate current waste operations, provide a state-of-the-art facility to conduct hazardous operations, provide for the treatment and processing of stored wastes, improve waste minimization, and expand plant capabilities for waste treatment and processing to meet future demand goals (Battelle 1995:9). This centralized facility would concentrate like activities in one area, thus providing safer and more efficient working conditions (Battelle 1995:13). An alternative which assesses the facility design with largest potential for impact was used to bound the impacts discussed in volume I of the EIS. The proposed HWTPF is smaller in scope. Both are detailed below.

H.3.2 Bounding Alternative

The bounding HWTPF would, along with the Burning Ground, provide the necessary treatment capacity to meet future demands. The HWTPF would utilize a range of DOE developed treatment and processing technologies.

The HWTPF is presently under preliminary design at Pantex Plant. The purpose of the facility is to treat and process the numerous wastestreams onsite. These wastestreams would include LLMW, LLW, and HW. The HWTPF would enhance the waste sorting and repackaging, sampling, compacting, drum rinsing and crushing, wastewater solidification, and waste minimization capabilities at Pantex Plant. DOE developed technologies for treatment and processing of wastes would consist of basic technologies involving chemical stabilization and macroencapsulation. Wastes would be minimized or stabilized for offsite disposal with the maximum amount of materials undergoing recycling or reuse offsite. It is estimated that the construction of the 2,648-square meter (28,500-square foot) facility would take 24 months, involve approximately 129 workers, and encompass approximately 0.53 hectares (1.31 acres) of land disturbance (PC 1995:Table 1).

H.3.2.1 *DOE Developed Technologies*

DOE developed technologies may include chemical stabilization, macroencapsulation, waste management processes (e.g., compactor, solvent recovery), and offsite DOE and commercial treatment and processing technologies. Expanded discussions are available in the Draft Reference Document for the HWTPF and the FFCA Agreed Order and approved Plans.

Chemical Stabilization

The Agreed Order identifies stabilization as involving immobilization of the debris with reagents that reduce the leachability of the hazardous contaminants to levels deemed appropriate by Federal, State, and local regulations (DOE 1995e:35). To minimize the risk of contaminants leaching into the environment, wastes can be treated to limit the leachability of toxic heavy metal constituents, as well as to produce a hard, water resistant solid that can be deposited in a landfill. This process is called chemical stabilization. Waste generated at Pantex Plant could utilize this process. The process could be batched or continuous and would require a mixer, a waste feed system, and feeders for the reagents and water mixing (Battelle 1995:47-48).

Macroencapsulation

The FFCA Agreed Order identifies macro-encapsulation as enclosing solid waste in an inert envelope to reduce exposure to potential leaching media in a landfill (DOE 1995e:37). This process is achieved by coating waste surfaces with materials (resins, plastics) that enclose it in a jacket of organic material. Jacketing of the entire waste container to seal wastes is also under consideration. This reduces the exposure of solid waste to elements that would cause the waste to leach into a landfill. This is the land disposal restriction treatment standard for debris and radioactive solids (Battelle 1995:49).

Other Waste Management Processes

Table H.3.2.1–1 lists additional waste management processes that are under consideration and could be used to treat and process waste generated at Pantex Plant. Treatment and disposal options include

TABLE H.3.2.1–1.—*Waste Management Processes Under Consideration*

TECHNOLOGY	WASTESTREAMS/ACTIONS
Thermal Desorption	Solids, soils, and sludges contaminated with organics.
LLW and LLMW Sorting/Repackaging	Containers would be opened, the LLW and LLMW waste removed and repackaged into appropriate containers.
LLW and LLMW Sampling	After the containers are opened samples would be collected to facilitate the characterization process.
LLMW Drum Crusher	The LLMW drum crusher would be able to crush approximately 50 85-gallon drums per day. These drums would contain LLW containment residuals.
LLMW Aerosol Can-Puncturing Station	Around 100 cans per month containing flammable solvents would be punctured at this station. The cans would be considered to be radioactively contaminated.
LLW and LLMW Compactor	These compactors would compact waste within a 55-gallon drum in order to reduce volume and conserve storage and shipping space. These compactors would be used to compact solid wastes without free liquids.
LLW Wastewater Solidification	A mixer and drum rotator would be used for low level radioactive wastewater in-drum solidification.
HW Sorting/Repackaging/Sampling	Part of the Hazardous Waste Operations Bay would be used to open HW containers, removing the waste material and repackaging it into other containers. Another area within this bay would be used to sample the materials to facilitate characterization.
HW Aerosol Can Puncturing Station	This station would puncture around 100 cans per month which contain a flammable solvent. Currently this procedure is being conducted at the 11–7N Pad, but it would be relocated to the HWTPF.
HW Compactor	This machine would reduce the volume of waste in a container by compacting the material within a 55-gallon drum. This operation is currently being conducted at the 11–7N Pad, and would be relocated to the HWTPF.
HW Drum Rinsing System	The empty hazardous waste containers would be cleaned prior to reuse, and the secondary rinse water from this procedure would be collected.
HW Solvent Recovery	This is a procedure that purifies used solvents and prepares them for reuse. Pantex currently has this operation in use but would relocate it to the HWTPF. This area would require steam heat at 150 psi delivered at a rate of up to 100 pounds/hour.

Source: Battelle 1995:47-54

commercial facilities and facilities at other DOE sites in accordance with the FFCA Agreed Order and approved Plans.

H.3.3 Facility Description

The bounding HWTPF would be a one-story building located north of the Steam Plant and west of South 13th Street. The facility would be designed for a life of not less than 25 years. The gross area of the facility is 2,650 square meters (28,500 square feet). The HWTPF would be divided into administrative and operations sections. These areas would be separated by a 3-hour fire wall on the exterior of the process areas, an access ramp, and a 1-hour fire wall on the administrative side of the ramp (Battelle 1995:16; DOE 1995:I.E 5).

The building design would be specific to facilitate decontamination and decommissioning. The walls and ceilings would be painted with a pinhole free epoxy paint, and cracks and joints would be sealed with a like material. The floors would be covered in a seamless material, and the walls would be designed for ease in dismantlement and packaging. All of the electrical devices in the operations area would be designed for a wet environment to facilitate washdown activities (Battelle 1995:29, 30). Prefabricated portable buildings for flammable liquid and hazardous liquid storage could be located in close proximity to the HWTPF. Approximately 24 to 30 55-gallon drums would be stored in each building (DOE 1995:I.E. 30-31).

H.3.3.1 *Administration Section*

This section would house offices, record storage, vestibule, locker rooms, a break room, a conference room, and a janitor's closet. This area would be accessible to handicapped individuals. The office area would house 12 employees, use modular furniture, and would comprise approximately 116 square meters (1,250 square feet). Record storage would be approximately 19 square meters (200 square feet) in area. The vestibule would be a 9-square meter (100-square foot) entryway that would provide the facility with a sheltered access. It would comply with handicap access requirements providing the appropriate door opening devices and access ramps.

Men's and women's locker rooms would occupy approximately 56 square meters (600 square feet) of space each, and would provide approximately 10 workers with a shower and locker area, and 8 workers with toilet facilities. The break room would be about 37 square meters (400 square feet) and would provide an eating area for an occupancy of 20 individuals. The conference room is a 42-square meter (450-square foot) open area that would provide a meeting and training space for up to 30 people. The janitor's closet would utilize approximately 9 square meters (100 square feet) of space for the storage of cleaning supplies (Battelle 1995:22-23).

H.3.3.2 *Operations Section*

The Operations Section would contain a shipping and receiving dock, a LLMW and LLW treatment and processing bay, two bays for treatment and processing operations, an HW treatment and processing bay, and a building services area (Battelle 1995:16). Because of the need for rapid evacuation, this building would not be designed to facilitate disabled persons (Battelle 1995:18).

Shipping and Receiving Area

This area would have three truck stalls for shipping, receiving, and crushed dumpster loading. The dock would handle staging of one truckload of material at a time, and the load could be staged for up to a week at the dock. Trucks ranging in size from tractor trailers to pickups would be accommodated. The area would have a forklift ramp for forklift access. The material would be weighed and certified prior to being loaded into the trucks. Other items for shipment might include bar-coded containers of newly generated waste materials. The containers would be coded for tracking and accountability, and the exterior would be checked for radioactive contamination (Battelle 1995:18).

Radioactive Waste Processing Bay

This area would treat and handle both LLW and LLMW, and may include variations of the following activities: LLW and LLMW sorting and repackaging, LLW and LLMW sampling, LLMW aerosol can puncturing, LLW and LLMW compacting, and low-level wastewater solidification (Battelle 1995:19). The area would have a high-efficiency particulate air (HEPA) filtered intake into the heating, ventilation, and air-conditioning (HVAC) system, as well as exhausts or hood vents to contain the contamination as necessary. Controls, such as cleaning the sorting and repackaging area between wastestreams, would be implemented, and the bay would contain monitors and alarms to alert personnel to the presence of airborne radioactive or chemical hazards (Battelle 1995:19).

Radioactive Waste Treatment Bays

Two bays would be designed to handle the treatment and processing of wastes. One of the bays would process Class 1 flammable liquids utilizing an open system while the other bay would process nonflammable wastes. The bays would contain individual airlocks with sloped accesses. The airlocks would contain a 4.5-metric ton (5-ton) overhead hoist, two overhead automatic doors (measuring, at a minimum, 4.3 meters [14 feet] in width by 4.3 meters [14 feet] in height), and would be HEPA filtered and have an interlocked alarm that would sound if more than one door was opened at a time (Battelle 1995:20-21).

Hazardous Waste Operations Bay

This area would be used for the treatment and handling of HW, such as aerosol can puncturing, HW sorting/repackaging, HW sampling and compacting, HW drum rinsing, and HW solvent recovery. This bay would also have monitors and alarm systems to alert personnel to airborne contamination (Battelle 1995:20).

Building Support Services Area

This area includes the mechanical room, electrical room, storage rooms, personnel airlocks, forklift airlocks, and a supply corridor, with the mechanical and electrical rooms housing the majority of the facilities utility services. The storage rooms would store and stage inert materials, tools, supplies and would be monitored for chemical and radiation contamination. Personnel airlocks, with decontamination showers and eyewash stations and interlocked alarm systems, would be located in each operations bay. Interlocked forklift airlocks would allow forklift and saddletruck access to the bays. If necessary, decontamination of this equipment could be performed inside the airlocks. The supply corridor (ramp) would be the main path for materials handling and personnel access, and would also be the utility corridor for the majority of water, steam, electricity, and HVAC systems (Battelle 1995:21-22).

Flammable Liquid Storage Building

The Flammable Liquid Storage Building could be a 2.4-meter (8-foot) by 6.1-meter (20-foot), prefabricated, portable storage unit located about 24.4 meters (80 feet) southwest of the HWTPF. It would have a storage capacity of 24 55-gallon drums that would be separated by material storage. The stored materials may include polybutadiene, bitumen, polystyrene, epoxy and methylene di-isocyanate, and would be transported to the HWTPF by forklift or dolly. The building would contain an automatic, dry chemical fire suppression system, would be heated to a minimum temperature of 10 °C (50 °F), and would have a secondary containment unit that would drain into a sump. This would be a Factory Mutual approved, UL classified structure built to satisfy the following codes: Uniform Building Code, National Electric Code, National Fire Protection Association, Occupational Safety and Health Administration (OSHA), and the Environmental Protection Agency (Battelle 1995:24).

Hazardous Liquid Storage Building

The Hazardous Liquid Storage Building could be a 3.0-meter (10-foot) by 4.9-meter (16-foot) prefabricated building situated about 23 meters (75 feet) west of the HWTPF. Twenty 30-gallon containers, safety segregated by hazard, could be stored in this structure. The liquids stored would be used for the neutralization of certain wastestreams, including hydrochloric acid, sulfuric acid, phosphoric acid, glacial acid, and nitric acid. The structure would be heated to a minimum of 10 °C (50 °F), would have a secondary containment which would drain into a sump, and would utilize a mechanical ventilation system to ensure that hazardous fumes are not present (Battelle 1995:24-25).

H.3.3.3 *Environmental Considerations*

This facility would meet all present environmental codes and regulations, and its normal operation would not have cumulative or long-term adverse effects on the environment. Operation of this facility would be in compliance with Federal and State pollution control standards. Permitting requirements for the protection of the air, water, and environment would be readdressed prior to operation of this facility (DOE 1995:I.E 37-40).

The HWTPF conceptual design report for the bounding alternative has established the following schedule: air permit, 6 months; water permit, 6 months; and waste permit, 6 months. If the permits are handled as expected, the consolidated effort would occur within one year. If funding is delayed by one year, the permit modifications would likely begin a year or so later (DOE 1995:I.E 40).

The design of this facility includes an energy conservation analysis. A reduction goal of 10 percent in the average annual energy requirement per gross square foot has been established. Executive Orders 12003 and 12902 and the Pantex Fuel Policy will be followed. The design of the facility includes requirements of 10 CFR 435, Energy Conservation Voluntary Performance Standard for New Buildings; Mandatory for Federal Buildings, as amended. Appendix G, Pollution Prevention and Waste Minimization, presents an additional discussion of water and energy conservation (DOE 1995:I.E 35-36).

H.3.3.4 *Health and Safety*

This facility would operate under an approved Final Safety Analysis Report. The building would be protected by an automatic fire suppression system, alarms, emergency lighting, and fire extinguishers. The process areas would be kept under negative pressure and surfaces would be specially protected for minimizing releases. Airlocks, HEPA filters, emergency showers, eyewash stations, and requirements for personnel protective equipment would be utilized (DOE 1995:I.E 43-44).

H.3.3.5 *Safeguards and Security*

No special requirements are needed since the facility would not handle classified material or documents (DOE 1995:I.E 46).

H.3.4 Relationship to Other Projects

The bounding HWTPF would be constructed with a common dock area with the RCRA Hazardous Waste Staging Facility (currently under construction). The HWTPF would not be dependent upon the adjacent facility. Coordination of fire protection and other utilities and services would be accomplished (DOE 1995:I.C 1).

The High Pressure Fire Protection Water Supply System expansion project would coordinate with the HWTPF project (DOE 1995:I.C 1).

H.3.5 Environmental Impacts

H.3.5.1 *Infrastructure*

Electrical usage would increase from 411 to 598 megawatthours per year. No natural gas would be used at the facility. Steam usage would increase from 3.4 million kilograms per year (7.4 million pounds per year) to 4.5 million kilograms per year (9.9 million pounds per year). The steam generation would increase the use of water from 451,000 liters per year (119,000 gallons per year) to 564,000 liters per year (149,000 gallons per year). It would also increase the use of natural gas from 0.2 million cubic meters per year (7.1 million cubic feet per year) to 0.3 million cubic meters per year (9.5 million cubic feet per year) (PC 1995:Table 3).

H.3.5.2 *Land Resources*

The proposed building site is located between Zones 11 and 12 North adjacent to the recently constructed Hazardous Waste Staging Facility, which is surrounded by a buffer zone. The facility is designed to be 2,648 square meters (28,500 square feet). The facility would consolidate and improve operations and increase the safety to the worker, the public and the environment. No environmental impacts are expected from the proposed construction on the surrounding land resources (PC 1995:Table 1; DOE 1993:11).

H.3.5.3 *Geology and Soils*

There could be very minor impacts to the soils due to erosion during construction. The area of temporarily disturbed soil would be 5,295 square meters (57,000 square feet) (PC 1995:Table 1). Mitigation measures such as sediment traps, diversion of surface water runoff from the construction area, dikes, silt fences, and covering the disturbed area with rip rap would be used to minimize soil erosion.

H.3.5.4 *Water Resources*

Water use is expected to increase from 685,000 liters per year (181,000 gallons per year) to 4,312,000 liters per year (1,141,000 gallons per year). The generation of wastewater is expected to increase from 685,000 liters per year (181,000 gallons per year) to 3,802,000 liters per year (1,006,000 gallons per year). The proposed facility construction site is not located within a known, playa-associated 100-year floodplain (PC 1995:Table 3; Battelle 1995:16, 88).

H.3.5.5 *Air Quality*

Airborne particulate matter (i.e., dirt and equipment emissions) levels would be elevated during the construction period. During operation, the facility design would minimize the possibility of any unplanned or nonsudden release of HW or HW constituents to the air (40 CFR 264.31). The RCRA facility design requirements include emission standards for process vents, equipment leaks, and containers (40 CFR 264 Subparts AA, BB, and CC). The design criteria include HEPA filters in the radioactive and hazardous waste processing areas ventilation systems, use of negative pressure, interlocked/alarmed air locks, radioactive and hazardous constituents ventilation system monitoring with alarms, and HEPA filter efficiency monitoring and testing (Battelle 1995:57-58). Additionally, the fume level within the building would be limited by the Hazardous Waste Permit (HW-50284). The permit would stipulate the number of waste containers that can be opened at any one time (DOE 1993:11).

Air emissions from current waste management activities are addressed in section 4.7, Air Quality. Waste management air emissions result from drum handling and processing, bulk transport, and fugitive emissions. Hazardous air pollutants include chlorinated solvents like trichloroethane, aromatic solvents like toluene, xylene, ketones, alcohols, ethers, and other organic solvents. Impacts of these activities and air pollutants were modeled and the results were presented in section 4.7.2.1 of volume I, Impacts of Continued Operations. The HWTPF through consolidation and use of state-of-the-art emission control equipment would impact the environment to a lesser degree.

H.3.5.6 *Acoustics*

Noise levels would temporarily increase during construction from operation of heavy construction equipment such as graders, cement mixers, and construction vehicle traffic. During waste handling operations, noise would be emanating from forklift operations and loading dock operations. Local worker and transportation traffic would contribute to the ambient noise in the area. The majority of the noise sources are expected during the operation of the HVAC system and other processing equipment which includes a waste compactor, a drum crusher, and an aerosol can puncturing station (Battelle 1995:75-76). The operational areas design will include noise controls pursuant to OSHA standards (29 CFR 1910.95).

H.3.5.7 *Biotic Resources*

Flora and fauna that currently use the facility construction site would be permanently removed or displaced by construction. The general site area has been disturbed by construction of the existing roads utilities and plant activities including the RCRA Hazardous Waste Staging Facility Treatment (Battelle 1995:73). The building site does not contain any unique, unusual, or critical habitats for known threatened or endangered species, nor does it adversely restrict known or established migratory corridors used by wildlife (DOE 1993:10; Battelle 1995:73).

H.3.5.8 *Cultural Resources*

No archaeological sites or historical resources have been identified in or near the proposed construction site (Battelle 1995:80, 81).

No decisions have been made regarding use of existing facilities that may qualify as a historic resources. The decision to reuse, modify, or demolish will be addressed in future NEPA documentation.

H.3.5.9 *Socioeconomic Resources*

The construction cost of this facility would be approximately $13.5 million. Construction of the facility is expected to employ 129 short-term employees and would probably result in a small temporary increase in local employment (Battelle 1995:85; PC 1995:Table 1). A substantial portion of the material costs would enter the wholesale and retail trade sector of the regional economy. Approximately 25 to 30 percent of this cost would be labor in all aspects of the construction process. This facility is designed for 20 employees. Five of the employees are considered new employees and would represent 0.16 percent of 3,800 employees currently working at Pantex Plant (Battelle 1995:85-86).

H.3.5.10 *Transportation*

The construction of this facility would result in a temporary increase in onsite and area traffic during a 12- to 18-month period. Normal day shift work hours, Monday through Friday, are expected. Since construction of the facility is in a Limited-Access Area, plant security personnel would accompany construction workers to and from the construction site. Wastes would be transported from several storage and accumulation areas in Zones 4, 11, and 12 and back to storage after treatment. Material supplies would be transported through Building 16–15 Central Shipping and Receiving. During operation, five new employees would travel to the plant from the local area. Impact analysis of onsite waste transportation is addressed in section 4.12 of volume I.

H.3.5.11 *Waste Management*

This facility is designed to handle approximately 500-700 cubic meters (650-910 cubic yards) of waste per year. The total volume handled annually is not expected to vary; however, the volume of each type (i.e., low-level mixed, low-level, and hazardous) of waste handled is expected to vary (PC 1996).

Annually, the amount of low-level mixed waste generated at the 2,000 weapons activity level (presented in table 4.13.1.2–3 from section 4.13, Waste Management, in volume I) is 183.2 cubic meters (239.6 cubic yards). A majority of these wastes could be expected to undergo some form of processing or treatment in the HWTPF before disposal as described in section H.3.2.1. The LLMW could undergo sorting and repackaging, waste sampling and certification, marking and labeling to meet Department of Transportation (DOT) requirements, waste compacting, etc. In addition, some waste streams may be solidified. Detailed descriptions of waste volumes by treatability groups and potential DOE treatment technologies, including offsite options, are presented, in whole or in part, in the following documents: 1996 *Pantex Plant Environmental Information Document*, Pantex Plant's *Agreed Order Site Treatment Plan-Compliance Plan*, and the April 1995 *Draft Reference Document for the Hazardous Waste Treatment and Processing Facility* (Pantex 1996a, DOE 1995e, Battelle 1995).

Annually, the amount of low-level waste and hazardous waste generated at the 2,000 weapons level (presented in table 4.13.1.2–3 from section 4.13, Waste Management, in volume I) is 249 cubic meters (326 cubic yards) and 191.6 cubic meters (250.5 cubic yards), respectively. A majority of these wastes could be expected to undergo some form of processing or treatment in the HWTPF before disposal as described in section H.3.2.1. The LLW and HW could undergo sorting and repackaging, waste sampling and certification, marking and labeling to meet DOT requirements, waste compacting, etc. In addition, some waste streams may be solidified (Battelle 1995:41, 42).

H.3.5.12 *Human Health Risks*

There would be no radiation risks during construction, since construction activities would not involve the use of any radioactive materials or waste. Chemical human health risks during construction would be mitigated through compliance with OSHA Chapter 1926 regulations and an approved project-specific health and safety plan. The Contractor Safety and Health Program requires a written plan for approval by the Fire, Waste Management, Industrial Hygiene, and Safety Departments. The plan establishes permits for safety, excavation, fire department, radiation work, confined space entry and hot work (e.g. welding) as necessary (Pantex 1992).

Potential sources of radiological exposures during operation would be limited to alpha-, beta-, and gamma-emitting materials like depleted uranium, thorium, and tritium.

External and internal occupational exposure to radiation would be limited to the standards promulgated in DOE Order 5480.11. Through the use of engineering controls and administrative controls, personnel exposure would be as low as reasonably achievable (ALARA). Potential sources of chemical exposures during operations would be from HW, HW constituents, and chemicals and materials used in treating the waste. Personal protective clothing and equipment would be used to mitigate the potential health risks in compliance with 40 CFR 264 Subparts A, C, and D (Battelle 1995:94-96).

Section 4.14 of volume I bounds human health risks for the entire plant, including waste management operations. A detailed description of the human health risks of waste treatment-related activities is contained in the June 1995 *Environmental Assessment for the Operation of the Glass Melter Thermal Unit at the U.S. Department of Energy's Mound Plant* (DOE 1995d).

H.3.6 No Action Alternative

In the Draft Pantex Plant EIS, the proposed construction of the HWTPF was considered necessary for enhancing waste operational efficiency and safety and meeting regulatory requirements established in the Agreed Order. With offsite disposal shipments of mixed waste in 1994 and two shipments in 1996, as noted in volume I, section 4.13.2.3, and changes contained in the August 1996 Federal Facility Compliance Act (FFCA) Compliance Plan Annual Update document (DOE 1995e), construction of the HWTPF is no longer considered a regulatory requirement.

However, without the HWTPF, waste treatment and processing capabilities remain greatly limited and do not meet the Department's purpose and need. As a result, Pantex Plant would continue to conduct limited treatment and processing of wastes onsite at Building 11–9 and 11–7 Pad. Pantex Plant would continue to rely on offsite contractors and facilities to treat and process waste for offsite disposal. The current waste management practices would continue as would the currently identified problems. Section 4.13 of volume I contains detailed descriptions of the current waste management practices and associated impacts.

H.3.7 Proposed Action—A Scaled Down Version of the Hazardous Waste Treatment and Processing Facility Alternative

The Proposed Action is the construction of a scaled down HWTPF. The proposed HWPTF would conduct the same treatment and processing of waste as the bounding alternative. The construction period would be expected to last 12 months. At an estimated cost of $5 million, the scaled down HWTPF would operate mainly the macroencapsulation and stabilization technologies, as well as the following waste management operations: LLW and LLMW sorting/repackaging, LLW and LLMW sampling, LLMW drum crusher, LLMW aerosol can-puncturing station, LLW and LLMW compactor, LLW wastewater solidification, HW sorting/repackaging/sampling, HW aerosol can puncturing station, HW compactor, HW drum rinsing system, and HW solvent recovery. The lifecycle is assumed to be 10–15 years less than the bounding alternative facility (PC 1996). Section 4.13 of volume I contains detailed descriptions of the current waste management practices and associated impacts.

This facility would utilize design features and administrative controls to protect employees and the environment and would meet all present environmental codes and regulations, as well as pollution control standards. Its normal operation would not have cumulative adverse effects on the environment. However, modifications to air, water, and waste permits are expected. Air and water permits are usually reviewed and approved within 6 months. Since this would involve new treatment processes being implemented and current processes occurring in a new facility, the site's Hazardous Waste Permit would have to be modified. Under the current permit, these types of changes are categorized as major changes to the permit. Review and approval of waste permits can last more than two years for major changes. Additionally, preparation of the permit modification requires several months. Detailed design reports and facility plans are required and public meetings would be held to address concerns and justify the adequacy of the permit modification.

H.3.8 Alternatives Eliminated from Detailed Study

Three alternatives were eliminated from detailed study. The use of temporary facilities to conduct waste treatment was not considered practical since RCRA requires extensive design features including secondary containment, emission controls, safety requirements, and fire protection. The modification of the existing treatment facility, Building 11–9, was not analyzed extensively since impacts are considered equal to or greater than moving to a newer facility. Additionally, Building 11–9, a wood structure, was built in 1944 and would require historical preservation coordination. The third alternative requires total offsite management of the waste. However, offsite treatment capacities are subject to change.

H.4 PIT REUSE FACILITY

H.4.1 Purpose and Need for Action

The Department needs to develop and demonstrate the capability to modify and upgrade pits generated from certain nuclear weapons dismantlement processes into a viable configuration for enhanced safety and reuse (Pantex 1996:App C). Existing weapons have a finite stockpile life, and at the conclusion of this life, these weapons must be disassembled. DOE has not produced new pits since the closure of the Rocky Flats Plant. As a result, the method for maintaining a minimum stockpile weapon count is to reuse these pits obtained from disassembled weapons (DOE 1995b:I.B 2; Pantex 1996:App C).

H.4.2 Proposed Action

The Proposed Action is to modify an existing facility to provide a state-of-the-art facility to modify and upgrade pits to meet future weapon stockpile requirements. The proposed Pit Reuse Facility would provide the necessary capabilities.

This project would consist of the design and construction of the additions and modifications necessary to convert a portion of Building 12–104, Zone 12, into the Pit Reuse Facility (DOE 1995b:I.A 1). A total area of 494 square meters (5,314 square feet) would be affected by the facility upgrades. This area would be modified to meet the requirements of a "moderate hazard, non-reactor nuclear facility," as specified in DOE Order 6430.1A, General Design Criteria.

The conceptual design calls for pit modifications to be conducted in a specially designed workstation with a glovebox-type enclosure in the Glovebox Bays. Two additional bays, a Pit Qualification Bay and a Purge and Backfill Bay would also be provided to clean, weigh, radiograph, leak check, inspect and backfill the pits. A fourth bay, known as the Auxillary Bay, would be provided to support training and production as needed (DOE 1995b:I.A 1).

New structures are proposed as a component of this project to provide support to the operations in this facility. A proposed new support area would include two changerooms, a decontamination area, a mechanical room, storage rooms, a janitor's closet, and an office area. Existing support areas include combustible storage rooms, electrical and uninterruptible power supply rooms, fan rooms, and a mechanical room. A new security area would be established to control access into this facility. The existing ramp and connecting road would be relocated to allow direct access from the Pit Reuse Facility to the new support area. The minimum space requirements are 122.1 square meters (1,314 square feet) for the new support building and 370 square meters (4,000 square feet) for the new relocated ramp, for a total space requirement of 494 square meters (5,314 square feet) (DOE 1995b:I.A 1-2).

The Pit Reuse Facility's ventilation system would be modified to allow the facility to be operated at a negative pressure. The workstations and welding areas would have HEPA-filtered exhausts. An argon supply system would be installed to facilitate an argon atmosphere in the workstations (DOE 1995b:I.A 1-2).

Physical modification of the bays would include flooring modification and repair, upgrading the existing exits to comply with Life Safety Code 101, restructuring to withstand a Design Basis Event, and improving stormwater drainage capacity around Building 12–104 to ensure adequate drainage relative to the Pit Reuse Facility upgrades (DOE 1995b:I.A 2).

This project would also upgrade equipment for health and safety; all fire protection, electrical, and mechanical systems would be seismically qualified. Radiation alarm monitors and Continuous Air Monitoring Systems would be installed in workstations, exhaust systems, and the rest of the facility to detect alpha, beta, gamma and neutron emitting radionuclides (DOE 1995b:I.A 2).

H.4.2.1 *Environmental Considerations*

This facility would meet all present environmental codes and regulations, and its normal operation would not have cumulative or long-term adverse effects on the environment. Operation of this facility would be in compliance with Federal and State pollution control standards. The proposed facility upgrades would provide an increased level of protection for the environment in the event of an accident because the new pit reuse operation would meet the requirements of a category 2, nonreactor nuclear facility. Additionally, a dual redundant HEPA filtration system would be utilized to protect the environment from a release of particles. No permits for air, water, or waste are expected.

For a discussion on water and energy conservation at Pantex Plant see appendix G, Pollution Prevention and Waste Minimization.

H.4.2.2 *Health and Safety*

This facility would operate under an approved Final Safety Analysis Report. The building would be protected by an automatic fire suppression system, alarms, emergency lighting, and fire extinguishers. The process areas would be kept under negative pressure with inert gas atmospheres and a glove box enclosure to minimize releases. HEPA filters, emergency showers and eyewash stations, and requirements for personnel protective equipment would be utilized. Approximately 60 percent of the tasks would be conducted in the workstations by remote handling to limit worker exposure (DOE 1995b:I.A 2, I.B 1).

H.4.2.3 *Safeguards and Security*

A new security area would be established through the use of barricades to detect and control unauthorized access into the pit reuse area. The four existing bays after modification would collectively be considered one vault area. As a result, when a pit is moved from one bay to another it would never leave the vault area. These barricades would limit access to qualified plant personnel (DOE 1995b:I.B 2).

H.4.3 Relationship to Other Projects

The proposed project has no direct relationship with other planned or current construction projects at Pantex Plant. The vacuum system technology utilized in the Pit Reuse Facility is similar to that of another project, Building 12–116. Other examples of similar operations and technologies include automated pit handling (robotics), automation and shielding (reducing operator exposure time and levels), and gas mixing. These technologies would be incorporated into the Pit Reuse Facility design where possible (DOE 1995b:I.C.1). The SSM EIS (DOE 1996) considers pit reuse capabilities at Savannah River Site (SRS) and Los Alamos National Laboratory (LANL).

H.4.4 Environmental Impacts

H.4.4.1 *Infrastructure*

Electrical usage would increase from 0 to 192 megawatthours per year. No natural gas or steam would be used at the facility (PC 1995:Table 3). The Pit Reuse operations would occupy an existing facility.

H.4.4.2 *Land Resources*

The Pit Reuse operations would occupy an existing facility.

H.4.4.3 *Geology and Soils*

Since this project involves interior modification of an existing building, no impacts to geology and soils are anticipated.

H.4.4.4 *Water Resources*

Water use is expected to increase from 0 liters per year (0 gallons per year) to 320,000 liters per year (84,000 gallons per year). The generation of wastewater is also expected to increase from 0 liters per year (0 gallons per year) to 320,000 liters per year (84,000 gallons per year) (PC 1995:Table 3).

H.4.4.5 *Air Quality*

Airborne particulate matter (i.e., dirt and equipment emissions) levels would be elevated during the construction period. However the majority of the construction work would be completed inside an existing building. Only very small amounts of chemicals (e.g. isopropyl alcohol) would be used during operations. Inert gases (i.e. helium, argon and nitrogen) would be used during routine glovebox operations. Two HEPA filters used in series would remove particulates prior to exhausting through the stack. The total effective dose equivalent to a maximally exposed offsite individual would be less than 0.1 millirem per year. The effective dose equivalent permissible limit is 10 millirem per year (DOE 1994c:31-32, 34-36).

H.4.4.6 *Acoustics*

Noise levels would temporarily increase during construction from operation of heavy construction equipment such as air compressors, cement mixers, and construction vehicle traffic. During pit reuse operations, noise would be emanating from air handling equipment and welding equipment. Local worker and transportation traffic would contribution to the ambient noise in the area. The operational areas design would include noise controls pursuant to OSHA standards (29 CFR 1910.95) (DOE 1994c:30, 32).

H.4.4.7 *Biotic Resources*

Flora and fauna that currently use the facility construction equipment laydown area would be temporarily removed or displaced by construction. No net loss of biotic resources are expected since the project will occupy an existing facility.

H.4.4.8 *Cultural Resources*

No archaeological sites or historical resources have been identified in or near the proposed construction site.

H.4.4.9 *Socioeconomic Resources*

The construction cost of this facility would be approximately $8.6 million. Construction of the facility is expected to employ 15 to 50 short-term employees and would probably result in a small temporary increase in local employment (PC 1995:Table 1). A substantial portion of the material costs would enter the wholesale and retail trade sector of the regional economy. This facility is designed for seven new employees who would represent 0.18 percent of 3,800 employees currently working at the Pantex Plant (PC 1995:Table 3).

H.4.4.10 *Transportation*

The construction of this facility would result in a temporary increase in onsite and area traffic during a 18-month construction period. Since construction is in the high security Material Access Area, normal day shift work hours, Monday through Friday, may not be possible. Also Pantex Plant personnel may report during a modified day shift or second shift depending on workloads, safety, and security issues. Based on previous construction activities in the Material Access Area, no major impacts would be expected. Regardless, plant security personnel would accompany construction workers to and from the construction site. Material supplies would be transported through Building 16–15 Central Shipping and Receiving. During operation, seven new employees would travel to the plant from the local area.

H.4.4.11 *Waste Management*

The construction debris and trash generated by the construction/modification activities would be disposed of at the onsite landfill and the Amarillo landfill, respectively. Generation of these wastes would not impact Pantex Plant or Amarillo waste management. The annual operation of this facility is expected to generate 0.5 cubic meters (0.6 cubic yards) of LLMW, 1.5 cubic meters (1.9 cubic yards) of LLMW, 0.6 cubic meters (0.8 yards) of HW, and 6.0 cubic meters (7.8 cubic yards) of NHW (PC 1995:Table 3).

H.4.4.12 *Human Health Risks*

There are no radiation risks during construction, since construction activities would not involve the use of any radioactive materials or waste. Chemical human health risks during construction are mitigated through compliance with OSHA Chapter 1926 regulations and an approved project-specific health and safety plan. The Contractor Safety and Health program requires a written plan for approval by the Fire, Waste Management, Industrial Hygiene, and Safety Departments. The plan establishes permits for safety, excavation, fire department, radiation work, and hot work as necessary (Pantex 1992).

The facility's contribution to risk is expected to be small. Potential sources of radiological exposures during operation would be alpha-, gamma-, and neutron-emitting materials. External and internal occupational exposure to radiation would be limited to the standards promulgated in DOE Order 5480.11. Through the use of engineering controls and administrative controls, personnel exposure would be ALARA. Potential sources of chemical exposures during operations would be from chemicals and materials used in managing special nuclear material. Personal protective clothing and equipment would be used to mitigate the potential health risks (DOE 1995b:I.A.2, I.B.1). Section 4.14 presents Human Health risks associated with all plant activities.

H.4.5 No Action Alternative

One of the alternatives to the construction of the Pit Reuse Facility is to take no action, i.e., not build any facility and allow the limited component life of pits to expire. No source of replacement pits would exist because the production of new pits has been discontinued.

H.4.6 Alternatives Eliminated from Detailed Study

Two alternatives were eliminated from detailed study. The use of temporary facilities to conduct pit reuse operations was not considered practical since DOE requires extensive design features for radiation control, emission controls, safety requirements, security, and fire protection. The second alternative requires offsite facilities located at LANL, or other DOE sites. However, the option was eliminated because of the need to provide close support for assembly and disassembly operations, location near storage facilities, and concern with safety and security associated with the potential for moving pits on National highways (DOE 1995b:I.D 1).

H.5 GAS ANALYSIS LABORATORY

H.5.1 Purpose and Need for Action

The Department needs a new Gas Analysis Laboratory because the existing one is outmoded; the building lacks proper temperature controls, has insufficient storage, and the roof leaks. Furthermore, the existing gas laboratory does not have an adequate ventilation system from health, safety, and environmental standpoints. The current use of mercury in the laboratory is a potential health and safety hazard since there is common ventilation between the laboratory area and the analytical bay. If there were a spill, the mercury vapor could affect the entire laboratory. Building 12–21 does not preclude contamination between bays or work areas. The gas laboratory in Building 12–21 produces mercury contaminated waste from the glass racks and the waste is stored in equipment rooms that have no temperature control, no access control, and inadequate ventilation.

H.5.2 Proposed Action

The new Gas Analysis Laboratory would provide new analytical laboratory space with requisite environmental controls for the sophisticated apparatus (highly calibrated electronic apparatus that facilitates the quantitative and qualitative studies) that would be housed in the proposed facility; provide sufficient work area for all gas phase analytical testing, leak detection of sample cylinders, leak detection of weapon components, cryogenic fractionation, gas mixing, gas transfer, and vacuum technology development work at Pantex Plant; and meet all present environmental codes and regulations in compliance with Federal, State, and local waste management and air and water pollution control standards. The work at the new Gas Analysis Laboratory would be performed to support new assembly, retrofit or repair, surveillance, disassembly, stockpile verification, personnel safety, and compliance with environmental protection requirements.

The new Gas Analysis Laboratory would be located in Zone 11 and would replace the functions currently performed in the existing Gas Analysis Laboratory in the east end of

Building 12–21. When the project is complete, several Chemistry Department testing efforts would be consolidated and all of the analytical chemistry functions would be sited together. Gas analysis would be performed on the following gas sample types: weapon repairs, modifications, and disassembles; 35 account gases; materials compatibility testing; weapons aging testing; laser sampling project samples; and special design agency samples. Other activities would include determination of volume, leak detection, bottle evacuations, backfilling premix and standard bottles for instrumentation, hydrogen getter uptake testing, and residual gas analyzes (DOE 1995a:I.B 12). The building would provide staging areas for the compressed gases, chemicals, HW, spare parts for instrumentation and vacuum systems, manifolds, moisture and pressure readouts, and other items used in the Gas Analysis Laboratory and its operation areas.

Part of the new Gas Analysis Laboratory would house the Vacuum Technology Group. Group operations include designing and testing vacuum systems, computer systems and software, and providing support for line operations, such as the vacuum chambers, manifold bays, pit reuse, and Cell 8.

The proposed Gas Analysis Laboratory would be a 2,537-square meter (27,304-square foot) single-story building, located on the west side of Zone 11 that would house highly calibrated electronic apparatus to analyze and test the contents of gas sampling containers. It would also house computer and vacuum laboratories. The proposed building would be a steel frame structure with a solid filled masonry wall and concrete roof cap. A staff of 20 people are anticipated to be working at the Gas Analysis Laboratory on a permanent basis. The Gas Analysis Laboratory would be designed to meet all applicable standards for personnel and public safety as well as environmental control (DOE 1995a:I.A 7-9, I.E 20).

The proposed facility would be divided into the following five areas: Gas Sample Testing Area, supporting laboratories, laboratory support areas, container receiving and issue, and administrative area (DOE 1995a:I.B 11, 20).

H.5.2.1 *Gas Sample Testing Area*

The Gas Sample Testing Area would consist of four rooms that would be used to house gas analysis equipment. Most of this equipment would be relocated from the existing gas laboratory. The Gas Sample Testing Area would contain an analytical glass rack, glass rack bay, mass spectrometer, and a gas chromatography/mass spectrometer, over a net usable area of 390.6 square meters (4,202 square feet). The analytical glass rack room and glass rack bay would house glass racks with associated ventilation systems to perform cryogenic fractionation analysis. The main purpose of an analytical glass rack is to cryogenically separate the components of a gas sample. Cryogenic fractionations are performed on compatibility containers, new disassembly samples desiccants, and any other samples requested by the design agencies. The separation allows for more exact laboratory analysis (e.g., mass spectrometer, gas chromatograph, or gas chromatograph/mass spectrometer) and very accurate determination of the volumes of gas removed from a container. Other functions of the glass rack are to get accurate volumes of samples that are not fractionated and for sample container transfer. An area within the glass rack room would be dedicated for handling hazardous waste generated from the cleaning process. Contained waste would then be moved to the hazardous waste staging sites in the building. The Gas Sample Testing Area would contain up to a maximum of 10 pounds of HE in the glass rack bay (DOE 1995a:I.A 8, I.E 12, 22, 23).

H.5.2.2 *Supporting Laboratories*

Supporting Laboratories would include a glass fabrication laboratory, general laboratory, computer room, and vacuum laboratory, for a net usable area of 153 square meters (1,646 square feet). The general laboratory would be designed to support any type of testing or analysis that would be required, such as for hydrogen getters, pressure variation checks on manometers, backfilling standards and premixes for instrumentation, and for performing volume determinations on non-high explosive(s) (HE) containers and sample bottles. The vacuum laboratory would be used to test vacuum systems, develop evacuation and leak detection techniques, and support disassembly, reuse, and retrofit operations. HW generated in the supporting laboratories would be moved to the HW staging sites within the building (DOE 1995a:I.A 8, I.E 23).

H.5.2.3 *Laboratory Support Area*

The Laboratory Support Area would contain a monitor room, inert staging area, 10 corridors, 2 vacuums, a waiting room, compressed gas staging area, sample bottle preparation and storage area, vestibule, training/conference room, chemical staging area, waste staging area, copier/fax machine, restrooms, janitor's closet, electrical room, mechanical room, break room, control data area, shipping/receiving area, and a ramp that would extend from the main entrance of the Gas Analysis Laboratory to the main entrance of the Materials Compatibility Assurance Facility (MCAF). Specific dimensions and detailed descriptions for each of these supporting areas are provided in the *Conceptual Design Report for the Gas Analysis Laboratory* (DOE 1995a:I.A 8-9; I.E 23-27). The proposed net usable area for laboratory support in the Gas Analysis Laboratory would be 1,431.8 square meters (15,403 square feet).

H.5.2.4 *Container Receiving/Issue Area*

The Container Receiving/Issue Area has been designed to have a 40.2-square meter (432-square foot) net usable area.

H.5.2.5 *Administrative Area*

The Administrative Area would consist of two offices and their corresponding office areas for a net usable area of 233.5 square meters (2,512 square feet).

H.5.2.6 *Environmental Considerations*

The proposed Gas Analysis Laboratory would be a new stand-alone facility designed specifically to meet all present environmental codes and regulations, and its normal operation would not have cumulative or long-term adverse effects on the environment. Normal operation of this facility would be in compliance with Federal, State, and local air and water pollution control standards. Mercury contaminated waste generated in this proposed facility would be collected in appropriate containers. When full, these containers would be moved to a RCRA-permitted hazardous waste treatment, storage, or disposal facility. Operators of the Gas Analysis Laboratory are evaluating possible nonhazardous alternatives to mercury in their processes, but have not yet discovered a viable alternative (DOE 1995a:I.E 30).

The project site would be graded to drain surface water into the existing plant stormwater drainage system. Sanitary waste would be directed and processed through the plant sanitary sewer system. The closed cooling water system blowdown/overflow/drain would also discharge to the sanitary sewer.

Construction debris and nonhazardous waste would be taken to the onsite landfill. All other wastes would be managed through appropriate facilities, including offsite disposal.

The glass rack bay would be the only room to contain HE and would be designed to minimize the spread of HE contamination through proper ventilation. The facility ventilation would be designed so that areas of higher potential HE have higher negative pressure and the flow of air would be from uncontaminated to contaminated areas. Facility design would incorporate ALARA concepts. Airborne effluents from process areas would not be treated prior to exhaust to atmosphere (DOE 1995a:I.E 30).

Pollution and soil erosion controls would be implemented during construction activities to mitigate impacts on air, water, and other environmental resources to assure compliance with Federal, State, and local laws and regulations. Construction site refuse and other solid waste would be collected and hauled to the Pantex Plant landfill on a regular basis. No open burning of construction refuse or other Class 2 and Class 3 would be allowed. Temporary facilities for disposal of sanitary wastewater would be provided during construction (DOE 1995a:I.E 30-31).

The design of this facility includes an energy conservation analysis. A reduction goal of 10 percent in the average annual energy requirement per gross square foot has been established. Executive Orders 12003 and 12902 and the Pantex Fuel Policy will be followed. Appendix G, Pollution Prevention and Waste Minimization, presents an additional discussion of water and energy conservation (DOE 1995a:I.E 29).

No permits are currently required and no new permits are expected to be needed.

H.5.2.7 *Health and Safety*

The proposed facility would be designed in accordance with the requirements of DOE Order 5480.7A, Fire Protection. However, the fire water run-off containment requirement would not apply because of the very small quantity of polluting liquids in the building (DOE 1995a:I.B 17, I.E 30).

Under the proposed project, speakers would be installed in the building and connected to the Pantex Plant site-wide public address system. An emergency plan for this facility would be incorporated into the Pantex Site Emergency Preparedness Plan (DOE 1995a:I.B 17, I.E 34).

The proposed Gas Analysis Laboratory would have the capacity to store the waste in a specially designed room with proper ventilation (e.g., ventilation hoods and local exhaust manifolds) and access control, so the waste would not have access to floor drains. The Glass Rack Bay would be designed for Hazard Class 2 activities (DOE 1995a:I.B 17, I.E 33).

H.5.2.8 *Safeguards and Security*

The proposed Gas Analysis Laboratory would be sited within the inhabited building distance from explosive buildings in Zone 11. Since this facility would serve more than one explosive area (Zones 11 and 12), it would be located within the inhabited building distance to explosive Building 11–45 and would be designed to protect its occupants to a level greater than or equal to that required by DOD 6055.9, Chapter 2, for inhabited building distance. Safety analysis reports for the Gas Analysis Laboratory would be developed and implemented prior to the start of facility operation (DOE 1995a:I.E 33).

The proposed facility would also provide upgrades to security. The proposed Gas

Analysis Laboratory would be located within an established Limited-Access Area at Pantex Plant. Classified weapons parts in the bays and classified and sensitive information in the offices of the existing gas laboratory are not subject to security devices, such as motion detectors, to ensure protection during off-shift hours. The design and construction of this project would follow established security practices for Pantex Plant (DOE 1995a:I.B 17, I.E 35).

H.5.3 Relationship to Other Projects

The proposed Gas Analysis Laboratory would be a stand-alone project to replace the existing gas laboratory in Building 12–21. The MCAF would be located in close proximity to the Gas Analysis Laboratory due to sequel process functions and a shared labor force. The relationship between the MCAF and the Gas Analysis Laboratory is important because they share a common funding year and schedule for design and construction. These two facilities are linked by means of a ramp. In addition, the proposed roof height of the Gas Analysis Laboratory also complements that of the MCAF in a further effort to unify the two buildings (DOE 1995a:I.A 7, I.C 18).

The Gas Analysis Laboratory would have a remote monitoring system to provide rapid response to an alarm situation. It would be operational 24 hours a day, 7 days a week to monitor the environmental chambers located in Buildings 12–94, 12–104, Bay 20, and the MCAF (DOE 1995a:I.B 12).

H.5.4 Environmental Impacts

H.5.4.1 *Infrastructure*

Electrical usage would remain the same at 548 megawatthours per year. No natural gas would be used at the facility. Steam usage would remain the same at 4.5 million kilograms per year (9.9 million pounds per year). The generation of this steam involves the use of 564,000 liters per year (149,000 gallons per year) of water and 0.3 million cubic meters per year (9.5 million cubic feet per year) of natural gas (PC 1995:Table 3).

H.5.4.2 *Land Resources*

The building site is located adjacent to the southwestern corner of Zone 11. This facility will be adjacent to the proposed Material Compatibility Assurance Facility, which is surrounded by a buffer zone. The facility is designed to be 2,537 square meters (27,304 square feet). The facility would consolidate and improve operations and increase the safety to the worker, the public, and the environment. There are no expected environmental impacts of the Proposed Action on the surrounding land resources.

H.5.4.3 *Geology and Soils*

There could be very minor impacts to the soils due to erosion during construction. The area of temporarily disturbed soil would be 5,074 square meters (54,608 square feet) (PC 1995:Table 1). Mitigation measures such as sediment traps, diversion of surface water runoff from the construction area, dikes, silt fences, and covering the disturbed area with rip rap would be used to minimize soil erosion.

H.5.4.4 *Water Resources*

Water use is not expected to increase from its current usage of 912,000 liters (214,000 gallons). The generation of wastewater is also not expected to increase from its current rate of 912,000 liters per year (241,000 gallons per year) (PC 1995:Table 3). The facility construction site is not located within a known, playa-associated 100-year floodplain (DOE 1995a:I.E 30).

H.5.4.5 *Air Quality*

Airborne particulate matter (i.e., dirt and equipment emissions) levels would be elevated during the construction period. Air pollution controls would be implemented during construction activities to mitigate air quality impacts (DOE 1995a:I.E.-30). No special nuclear material is expected to be tested in this facility. This facility is expected to generate the same types of air emissions as the existing facility it would replace. Therefore, there would be no change in the impacts from the current level (PC 1995:Table 3).

H.5.4.6 *Acoustics*

Noise levels would temporarily increase during construction from operation of heavy construction equipment such as air compressors, cement mixers, and construction vehicle traffic. During facility operations, noise would be emanating from air handling equipment (hoods) and analytical equipment. Local worker and transportation traffic would contribute to the ambient noise in the area. The operational areas design will include noise controls pursuant to OSHA standards (29 CFR 1910.95).

H.5.4.7 *Biotic Resources*

Flora and fauna that currently use the facility construction site would be permanently removed or displaced by construction. The general site area has been disturbed by construction of the existing roads, utilities, and proposed plant activities, including the Materials Compatibility Assurance Facility. In accordance with the FY 1995 *Pantex Plant Site Development Plan* natural resource management requirements, the building site does not contain any unique, unusual, or critical habitats for known threatened or endangered species, nor does it adversely restrict known or established migratory corridors used by wildlife (DOE 1995c).

H.5.4.8 *Cultural Resources*

No archaeological sites or historical resources have been identified in or near the proposed construction site and no impacts to cultural resources are expected.

No decisions have been made regarding use of existing facilities which may qualify as historic resources. The decision to reuse, modify, or demolish will be addressed in future NEPA documentation.

H.5.4.9 *Socioeconomic Resources*

The construction cost of this facility would be approximately $13.3 million. Construction of the facility is expected to employ 36 to 61 short-term employees and would probably result in a small temporary increase in local employment (PC 1995:Table 1). A substantial portion of the material costs would enter the wholesale and retail trade sector of the regional economy. This facility is designed for 20 employees. No new employees are expected since all of them would relocate from the existing facilities at the plant site (PC 1995:Table 3).

H.5.4.10 *Transportation*

The construction of this facility would result in a temporary increase in onsite and area traffic during a 26-month period. Normal day shift work hours, Monday through Friday, are expected. However, since Zone 11 conducts HE operations, some schedule changes can be expected due to workloads and HE safety issues. Since construction of the facility is in a Limited-Access Area, plant security personnel would accompany construction workers to and from the construction site. Material supplies would be transported through Building 16–15, Central Shipping and Receiving.

H.5.4.11 *Waste Management*

This facility is expected to generate the same types and quantities of wastes as the existing facility it would replace. Therefore, there would be no changes in the impacts from current levels (PC 1995:Table 3).

H.5.4.12 *Human Health Risks*

There are no radiation risks during construction, since construction activities would not involve the use of any radioactive materials or waste. Chemical human health risks during construction are mitigated through compliance with OSHA Chapter 1926 regulations and an approved project-specific health and safety plan. The Contractor Safety and Health program requires a written plan for approval by the Fire, Waste Management, Industrial Hygiene, and Safety Departments. The plan establishes permits for safety, excavation, fire department, radiation work, and hot work as necessary (Pantex 1992).

No potential sources of radiological exposures during operations are expected. Potential sources of chemical exposures during operations would be from chemicals and materials used in analysis of materials. Personal protective clothing and equipment (e.g. ventilation hoods) would be used to mitigate the potential health risks.

H.5.5 No Action Alternative

One of the alternatives to the construction of the Gas Analysis Laboratory is to conduct operations in the existing facilities without temperature control. Laboratory operations would continue under crowded conditions with a lack of adequate equipment. Quality assurance and quality control will continue to present operational and administrative problems. Finally, maintenance will most likely increase due to the age and condition of the existing building.

H.5.6 Move to An Existing Facility Alternative

This alternative to the Proposed Action would involve the modification of an existing facility not currently used for this purpose. This facility would likely be newer than Building 12–21, which was built after 1951. If a suitable facility is identified, this facility would meet all present environmental codes, regulations, and pollution control standards. Its normal operation would not have cumulative adverse effects on the environment. This facility would utilize design features and administrative controls to protect employees and the environment. However, modifications of any existing building to suit the needs of the Gas Analysis Laboratory is estimated to cost more than the construction of a new building.

H.5.7 Alternatives Eliminated from Detailed Study

Three alternatives were eliminated from detailed study. The use of temporary facilities to conduct gas analysis operations was not considered practical since DOE requires extensive design features for HE safety, emission controls, safety requirements, security, and fire protection. The second alternative requires the use of commercial laboratory facilities. However, no commercial laboratories conduct nuclear weapon analyses. If an offsite laboratory provided the necessary analyses, security and analyses turnaround would be of great concern. The third alternative is the construction of a smaller laboratory. The impacts of a smaller facility would be less than the Proposed Action, but the facility may not meet the anticipated future needs of Pantex Plant.

H.6 MATERIALS COMPATIBILITY ASSURANCE FACILITY

H.6.1 Purpose and Need for Action

The Department needs to improve the efficiency, capacity, and safety of its current environmental aging and material compatibility testing for HE, materials used to build weapons components, and weapon components received from other sites in the DOE weapons complex.

H.6.2 Proposed Action

The Department proposes to meet its need by constructing a new MCAF. The proposed facility would consolidate environmental aging and compatibility testing of nonnuclear components. This centralized facility would concentrate assembly, leak detection, internal atmospheric sampling, test container disassembly, and other physical testing. This would provide for safer and more efficient worker conditions.

The proposed facility upgrade would provide a new 2,015-square meter (21,690-square foot) facility for the environmental aging and compatibility testing of non-nuclear weapon components. The proposed facility would consist of four major areas: the HE Material Compatibility Area, Insensitive HE (IHE) Material Compatibility Area, Support Area, and an Administrative Area (DOE 1994b:I.E 20).

The HE Materials Compatibility Area would have a net usable area of 430.8 square meters (4,637 square feet) and would consist of five bays for testing HE materials: the HE Staging Bay, Container Operations Bay, HE Assembly Bay, Leak Detection Bay, and HE Chamber Bay. The HE Staging Bay would be designed to store components of HE, HE powders, and IHE. The HE Staging Bay would have a bay explosive limit of 45 kilograms (100 pounds) of HE. The Container Operations Bay would be designed for assembly of HE or IHE components into containers and would have an explosive limit of 113 kilograms (250 pounds) of HE.

The HE Assembly Bay would be used to assemble pressed HE components; the proposed design calls for an explosive limit of 18 kilograms (40 pounds) of HE. Containerized components would be moved into a Leak Detection Bay, designed for an explosive limit of 23 kilograms (50 pounds) of HE. After a component is containerized, it would be moved to the HE Chamber Bay and placed into an environmental chamber. Designed for an explosive limit of 227 kilograms (500 pounds), the HE Chamber Bay would be monitored periodically, and some of the gases from the containerized components would be removed and analyzed in the proposed Gas Analysis Laboratory (DOE 1994b:I.A 8, I.E 23-24).

The HE Materials Compatibility Area is classified as Class 4 by the DOE Explosive Safety Manual. This portion of the facility would consist of a 172.2-square meter (1,854-square foot) area that is designed to withstand the effects from blast overpressures, structural collapse, and missile (hazardous) fragments from adjacent explosive facilities and bays (DOE 1994b:I.A 8, I.E 25).

Support areas in the MCAF would support the aging activities in the building, and would include a waiting room, monitor, data preparation and filing area, space for a fax and photocopier, corridor, classified material storage room, container cleaning room, shipping and receiving area, hazardous waste storage area, conference room, break room, restrooms, janitor's closet, mechanical systems areas, and mechanical and electrical support areas. The conceptual design calls for a net usable support area of 898.7 square meters (9,674 square feet) (DOE 1994b:I.A 8, I.E 25-26).

The 72-square meter (778-square foot) Administrative Area would provide support to the MCAF's Material Compatibility Assurance Areas and the support activities (DOE 1994b:I.A 8, I.E 25-27).

The proposed facility would be designed as a poured-in-place concrete structure. This system was selected to contain the explosives and the effects from an accidental explosion. The MCAF roof lines were determined by evaluating vertical height requirements in the testing and processing portions of the building and by consideration of adjacent building profiles. The new MCAF building has the functional goal of providing a safe environment for personnel performing materials compatibility testing. This proposed facility design follows the recommendation for decontamination and decommissioning outlined in DOE Order 6430.1A, Section 1300–11, etc. (DOE 1994b:I.A 7, I.E 20).

H.6.2.1 *Environmental Considerations*

The MCAF is a new stand-alone facility designed specifically to meet all present environmental codes and regulations. Its normal operation would not have cumulative or long-term adverse effects on the environment. Normal operation of this facility would be in compliance with Federal, State, and local air and water pollution control standards.

Mercury contaminated HW would be generated at this facility and collected in appropriate containers. Full containers would be taken offsite to a RCRA permitted HW treatment, storage, or disposal facility.

The project would be located on the west side of Zone 11, away from areas subject to flooding (EO 11988). The facility design would provide normal protection from natural phenomena and satisfy the DOE loss limitation criteria (DOE Order 6430.1A, Section 0110-99.0.7; DOE 1994b:I.E 30).

The MCAF project site would be graded to drain surface water into the existing plant stormwater drainage system. Sanitary waste would be directed and processed through the plant sanitary sewage system. Cooling tower overflow, drain, and blowdown would be discharged to the sanitary sewer. Nonhazardous construction (Class 3) waste would be taken to the plant sanitary landfill for disposal (DOE 1994b:I.E-30). All other wastes will be managed through appropriate facilities, including offsite disposal.

The MCAF would be designed to minimize the spread of HE contamination. The conceptual design calls for a ventilation system that creates a higher negative pressure in areas of higher potential HE so that air flows from uncontaminated to contaminated areas. Design of the facility and the ventilation of HE and hazardous constituents incorporate ALARA concepts.

Pollution and soil erosion controls would be implemented during construction activities to mitigate impacts on air, water, and other environmental resources to assure compliance with Federal, State, and local laws and regulations. Construction site refuse and other solid waste would be collected and hauled to the Pantex Plant landfill on a regular basis. No open burning of construction refuse or other Class 2 and Class 3 would be allowed. Temporary facilities for disposal of sanitary wastewater would be provided during construction (DOE 1994b:I.E 30).

The design of this facility includes an energy conservation analysis. A reduction goal of 10 percent in the average annual energy requirement per gross square foot has been established. Executive Orders 12003 and 12902 and the Pantex Fuel Policy will be followed. The design of the facility includes requirements of 10 CFR 435, Energy Conservation Voluntary

Performance Standard for New Buildings; Mandatory for Federal Buildings, as amended. Appendix G, Pollution Prevention and Waste Minimization, presents an additional discussion of water and energy conservation (DOE 1995:I.E 28-29).

H.6.2.2 *Health and Safety*

The MCAF would be sited within the inhabited building distance from explosive Building 11–45. Since this facility would serve more than one explosive area (Zones 11 and 12), it would be designed to protect its occupants to a level greater than or equal to that required by DOD 6055.9, Chapter 2, for inhabited building distance. Safety Analysis Reports for the MCAF project would be developed and implemented prior to the start of facility operation (DOE 1994b:I.E 32).

The explosive areas of this facility would be designed for Hazard Class 2 activities. Fire protection would be provided by a wet-pipe automatic sprinkler system throughout the building; the source of water for fire protection would be extended from the existing Pantex Plant distribution main. Fire alarm controls would be connected to the existing plant Fire Alarm System. Public address speakers would be installed in the building and connected to the Pantex Plant site-wide Public Address System. An Emergency Plan for this facility would be incorporated into the Pantex Site Emergency Preparedness Plan (DOE 1994b:I.E 33).

The proposed facility would have hazardous materials and would incorporate measures to limit dispersion and simplify decontamination and decommissioning, disposal, and reuse through specialized finishes on floors, walls, and ceilings. Ventilation hoods and local exhaust manifolds would be used for containment and collection of fumes from hazardous processing equipment (DOE 1994b:I.E 33).

H.6.2.3 *Safeguards and Security*

The MCAF would also provide upgrades to security; it would be located within an established Limited-Access Area at Pantex Plant. Seal eyelets would be installed on the outside of all exterior doors. The HE Staging Room, Container Operations Room, Leak Detection Room, Isothermal Development Chamber, IHE Chambers, and Classified Material Storage Room would be designated as vault-type rooms for securing classified material. In addition, the facility would be connected to the plant's existing security alarm network (DOE 1994b:I.E 34).

H.6.3 Relationship to Other Projects

The MCAF is located in close proximity to the Gas Analysis Laboratory due to sequel process functions and a shared labor force. The relationship between the MCAF and the Gas Analysis Laboratory is important because they share a common funding year and schedule for design and construction. These two facilities would be linked by means of a ramp. In addition, the proposed roof height of the Gas Analysis Laboratory also complements that of the MCAF in a further effort to unify the two buildings (DOE 1994b:I.A 7, I.C 17). Gas test samples, processed in the proposed MCAF would be analyzed in the adjacent Gas Analysis Laboratory. Coordination between the two facility designs would be required (DOE 1994b:I.C 17).

H.6.4 Environmental Impacts

H.6.4.1 *Infrastructure*

Electrical usage would remain the same at 1,096 megawatthours per year as for the existing facility. No natural gas would be used at the facility. Steam usage would remain the same at

4.4 million kilograms per year (9.6 million pounds per year), involving the use of 564,000 liters per year (149,000 gallons per year) of water and 0.3 million cubic meters per year (9.2 million cubic feet per year) of natural gas (PC 1995:Table 3).

H.6.4.2 *Land Resources*

The building site is located adjacent to the southwestern corner of Zone 11. This facility will be adjacent to the proposed Gas Analysis Laboratory, which is surrounded by a buffer zone. The facility would consolidate and improve operations and increase the safety to the worker, the public, and the environment. There are no expected environmental impacts of the Proposed Action on the surrounding land resources.

H.6.4.3 *Geology and Soils*

There could be very minor impacts to the soils due to erosion during construction. The area of temporarily disturbed soil would be 4,030 square meters (43,380 square feet) (PC 1995:Table 1). Mitigation measures such as sediment traps, diversion of surface water runoff from the construction area, dikes, silt fences, and covering the disturbed area with rip rap would be used to minimize soil erosion.

H.6.4.4 *Water Resources*

Water use is expected to remain at its current level of 8,630,000 liters per year (2,283,000 gallons per year). The generation of wastewater is also expected to remain at its current level of 7,610,000 liters per year (2,013,000 gallons per year). The facility construction site is not located within a known, playa-associated 100-year floodplain (DOE 1994b:I.E 30).

H.6.4.5 *Air Quality*

Airborne particulate matter (i.e., dirt and equipment emissions) levels would be elevated during the construction period. Air pollution controls will be implemented during construction activities to mitigate air quality impacts (DOE 1995a:I.E 30). No special nuclear material is expected to be tested in this facility. This facility is expected to generate the same types of air emissions as the existing facility it would replace. Therefore, there would be no change in the impacts from the current level (PC 1995:Table 3).

H.6.4.6 *Acoustics*

Noise levels would temporarily increase during construction from operation of heavy construction equipment such as air compressors, cement mixers, and construction vehicle traffic. During the facility operations, noise would be emanating from air handling equipment (hoods) and analytical equipment. Local worker and transportation traffic would contribute to the ambient noise in the area. The operational areas design will include noise controls pursuant to OSHA standards (29 CFR 1910.95).

H.6.4.7 *Biotic Resources*

Flora and fauna that currently use the facility construction site would be permanently removed or displaced by construction. The general site area has been disturbed by construction of the existing roads and utilities. In accordance with the *Pantex Plant Site Development Plan* natural resource management requirements, the building site does not contain any unique, unusual or critical habitats for known threatened or endangered species, nor does it adversely restrict known or established migratory corridors used by wildlife (DOE 1995c).

H.6.4.8 *Cultural Resources*

No archaeological sites or historical resources have been identified in or near the proposed construction site and no impacts to cultural resources are anticipated.

No decisions have been made regarding use of existing facilities which may qualify as historic resources. The decision to reuse, modify, or demolish will be addressed in future NEPA documentation.

H.6.4.9 *Socioeconomic Resources*

The construction cost of this facility would be approximately $20.6 million. Construction of the facility is expected to employ 38 to 104 short-term employees and would probably result in a small temporary increase in local employment (PC 1995:Table 1). A substantial portion of the material costs would enter the wholesale and retail trade sector of the regional economy. This facility is designed for an estimated 40 employees; no new employees are expected. Employees working in existing facilities would be relocated to new facilities (PC 1995:Table 3).

H.6.4.10 *Transportation*

The construction of this facility would result in a temporary increase in onsite and area traffic during a 31-month period. Normal day shift work hours, Monday through Friday, are expected. However, since Zone 11 conducts HE operations, some schedule changes can be expected due to workloads and HE safety issues. Since construction of the facility is in a Limited-Access Area, plant security personnel would accompany construction workers to and from the construction site. Material supplies would be transported through Building 16–15, Central Shipping and Receiving.

H.6.4.11 *Waste Management*

This facility is expected to generate the same types and quantities of wastes as the existing facility it would replace. Therefore, there would be no changes in the impacts from current levels (PC1995:Table 3).

H.6.4.12 *Human Health Risks*

There are no radiation risks during construction, since construction activities would not involve the use of any radioactive materials or waste. Chemical human health risks during construction are mitigated through compliance with OSHA Chapter 1926 regulations and an approved project-specific health and safety plan. The Contractor Safety and Health program requires a written plan for approval by the Fire, Waste Management, Industrial Hygiene, and Safety Departments. The plan establishes permits for safety, excavation, fire department, radiation work, and hot work as necessary (Pantex 1992).

No potential sources of radiological exposures during operation are expected. Potential sources of chemical exposures during operations would be from chemicals and materials used in analysis of materials. Personal protective clothing and equipment (e.g. ventilation hoods) would be used to mitigate the potential health risks.

H.6.5 No Action Alternative

One of the alternatives to the construction of the MCAF is the continued operation in seven buildings. Environmental chambers would continue to operate at or near capacity with little schedule flexibility. Overcrowding will be managed through administrative and scheduling controls. The DOE Explosive Safety Manual (DOE 1991) exemption would continue for Building 12–19. Operational conflicts with material aging operations and explosive formulation operations would continue. Future weapon program quality assurance and quality control explosive quantity requirements are expected to exceed building design safety limits. Finally, maintenance would likely increase due to the age and condition of the facilities.

H.6.6 Move to an Existing Facility Alternative

This alternative to the Proposed Action involves the modification of an existing facility not currently used for this activity. Buildings 12–19, 12–94, and 12–104 have been identified as possible alternative locations for current operations. These facilities would require installation of a blast shield and missile netting. The construction period is considered minor and no cost analysis has been completed. These facilities will meet all present environmental codes and regulations, pollution control standards, and the normal operations would not have cumulative adverse effects on the environment. Buildings 12–94 and 12–104 utilize design features and administrative controls to protect employees and the environment. Building 12–19 would rely on administrative controls.

H.6.7 Alternatives Eliminated from Detailed Study

Two alternatives were eliminated from detailed study. The use of temporary facilities to conduct material compatibility operations was not considered practical since DOE requires extensive design features for HE safety, emission controls, safety requirements, security, and fire protection. The second alternative required the use of a design agency laboratory facility. However, material compatibility capacities at current design agencies are considered inadequate.

H.7 NONDESTRUCTIVE EVALUATION FACILITY

H.7.1 Purpose and Need for Action

The Department needs a facility in which to conduct nondestructive evaluation activities. The existing facility where these activities are currently conducted does not meet the design criteria for Class 2 operations, as required in the DOE Explosive Safety Manual (DOE 1991).

H.7.2 Proposed Action

This project would provide a new Nondestructive Evaluation Facility (NDEF) that would be located in Zone 12, north of Building 12–121 and west of Building 12–108. The purpose of the proposed facility is to provide replacement capabilities for radiography and other nondestructive evaluation activities on weapons, components, and other objects. Specific operations would include: radiography, ultrasonic, digital imaging penetrant testing, laser sampling radiometry, and computer tomography of non-nuclear weapon materials. The existing nondestructive evaluation activities housed in Building 12–21 are inadequate for operations by current criteria because the existing structure is not designed to meet the DOE Explosives Safety Manual for Class 2 Operations. Other facilities at the plant were not viable due to the cost of compliance with the DOE Explosive Safety Manual (DOE 1994:I.A.1; Pantex 1996:App C).

This facility would consist of two, single-story structures joined by a ramp with a gross area of 3,734 square meters (40,196 square feet) and a net usable area of 3,009 square meters (32,386 square feet). The NDEF would have five explosive bays for nondestructive evaluation activities and areas for a vault, electronic repair and spare parts staging area, office area, film reading room, dark room, conference room, offices, computer area and waste accumulation. The five proposed bays are: the 420 kV X-ray Bay, Miscellaneous Test Bay, High/Medium Energy Radiography Bay, High/Medium Energy Computer Tomography Bay, and Explosives Component Staging Bay. X-ray functions would be housed in three of the five explosives bays. Each of these bays are described below (DOE 1994:I.A 1-2).

The 420 kV X-Ray Bay would be used for radiography of medium size components, such as fire sets, and would have a net usable area of 107 square meters (1,151 square feet) with 6-meter (20-foot) ceilings. Operations in this bay would include radiography and packing and unpacking components. The explosives limits in this bay would not exceed 45 kilograms (100 pounds). There would be no chemicals, gases, or fume or vent hoods required in this bay; however, plant air and vacuum would be required. A 47-square meter (508-square foot) control room would be required primarily to house computer equipment.

The Miscellaneous Test Bay would be used to support the following types of tests: portable penetrant testing, portable ultrasonic testing, eddy current, acoustic emission, magnetic particle, radar testing, 150 kV x-ray, 320 kV Microfocus, temperature chambers, and cabinet x-rays. Operations would include packing and unpacking components as well as testing, radiography, and controlled temperature transfer to components. Room dimensions for this bay are 219 square meters (2,362 square feet) in area and 6 meters (20 feet) in height. The explosives limit in this bay would not exceed 45 kilograms (100 pounds). Chemicals, such as penetrant testing cleaner, developer, and fixer would be required. No gases would be required; however, plant air and vacuum are necessary. A control room would also be required in this bay to house computer equipment (DOE 1994:I.E 7-9).

A High/Medium Energy Radiography Bay would be used to perform radiography on large parts, and to pack/unpack components. Size requirements for this bay include an area of 361 square meters (3,887 square feet) and 7.6 meters (25 feet) in height. Explosives limits in this bay would not exceed 45 kilograms (100 pounds). There would be no chemicals or gases required in this bay; however, plant air and vacuum would be required in this area. Plant air should be the same as in Building 12–84, and Building 12–104A. A separate HE vacuum system or fume or vent hoods would not be required. The control room for this bay would be 71.2 square meters (767 square feet).

A High and Medium Energy Computer Tomography Bay would be used to analyze, determine the contents, and pack/unpack small to large parts. The conceptual design for this bay calls for an area of 364 square meters (3,290 square feet), a height of 7.6 meters (25 feet), and an explosive limit of 45 kilograms (100 pounds). In addition, the bay would be required to provide access to vehicles up to 11 meters (36 feet) long, 4.3 meters (14 feet) high, and have an entrance width of at least 3.6 meters (12 feet); the weight limit would satisfy the State of Texas maximum allowed over-the-road requirements. Gas and chemical requirements for this bay are similar to those described for the High/Medium Energy Radiography Bay. A 55.5-square meter (597-square foot) control room has been proposed in the conceptual design to primarily house computer equipment (DOE 1994:I.E 13-14).

An Explosives Component Staging Bay in the NDEF would occupy a 53-square meter (570-square foot) area, 6.1 meters (20 feet) high, with an explosive limit of 45 kilograms (100 pounds). Since no chemicals or gases would be required in this bay, there would be no fume or vent hood requirements.

The proposed NDEF would also contain a 37-square meter (400-square foot) vault area for film staging and retrieval. No explosives, chemicals, or gases would be stored in this area. Less than 10-percent humidity would be required.

In addition, usable space in the NDEF would also be occupied by administrative, support, and analysis areas. The buildings would be temperature- and humidity-controlled. The facility would be secure to conduct classified activities, and would be designed in accordance with all applicable environmental, safety, and health requirements. The NDEF would be built in an area with no known soil contamination, located in accordance with the *Pantex Plant Site Development Plan* (DOE 1994:I.A 1-2; DOE 1995c).

Current plans are to include technology transfer activities inside the proposed NDEF. Approximately 30 percent of the workload for this facility would result from technology transfer operations. The *Stevenson-Wydler Technology Innovation Act of 1980*, as amended, establishes technology transfer as a mission of the Federal government to enhance the industrial competitiveness of U.S. industries in a global economy by utilizing resources at Federal facilities. One strategy to accomplish the goal is to make news from DOE laboratories and facilities available as an integrated technical resource for existing manufacturing extension and technology outreach systems. To meet this goal, planning for the NDEF has included technology transfer activities in an upgraded facility (DOE 1994:I.B 4-5).

No decisions have been made regarding future use of existing facilities. The decision to reuse, modify, or demolish will be addressed in future NEPA documentation.

H.7.2.1 *Environmental Considerations*

Waste management issues for continued operations in Building 12–21 are of environmental concern. Film processing, performed in this existing facility for many years, has generated waste (e.g., silver, fixer, and developer) that was previously released to a nearby drainage ditch. The release site is one of 144 sites currently under investigation. The waste handling system for Building 12–21 was later redesigned to meet current discharge effluent requirements. However, since the waste accumulation site was not an integral part of the facility design, the piping for waste collection was retrofit. Building 11–29 collects facility-wide film processing wastes for silver recovery. Furthermore, Building 12–21 was not designed for chemical use or accumulation sites.

The current accumulation site, a hallway, is open to all general area traffic. The new NDEF would be a stand-alone facility that would be designed specifically to meet all present environmental codes and regulations. The current waste handling requirements are incorporated into the initial conceptual design criteria. Normal operation of this facility would be in compliance with Federal, State, and local air and water pollution control standards and would not have cumulative or long-term adverse effects on the environment (DOE 1994:I.B 2-3).

The site would be graded to drain surface water into the existing plant stormwater drainage system. Sanitary wastewater would be directed and processed through the plant sanitary sewage system. Solid domestic-type waste would be taken to a municipal sanitary landfill for offsite disposal (DOE 1994:I.E 36).

During construction of the proposed facility, environmental considerations would include pollution and soil erosion controls to mitigate impacts on air, water, and other environmental resources and to ensure compliance with Federal, State, and local laws and regulations. Construction debris would be collected and hauled to the Pantex Plant landfill on a regular basis. No open burning of construction refuse or other Class 2 and Class 3 would be allowed (DOE 1994:I.E 36-37).

The design of this facility includes an energy conservation analysis. Appendix G, Pollution Prevention and Waste Minimization, presents an additional discussion of water and energy conservation (DOE 1994:I.E 36).

No permits are currently required for existing facilities and would not be required for the replacement facility.

H.7.2.2 *Health and Safety*

Most of the safety concerns deal with inadequacies in construction of the existing facility, Building 12–21. This facility is inadequate for operations by current criteria and was not designed to meet the current safety design criteria for explosive operations (DOE Explosive Safety Manual [DOE 1991] for Class 2 level of protection) or radiation protection. Because of the age of the facility, the ability to deal with these design problems in the existing structure is limited. In addition, the current ventilation and fire protection systems are inadequate. There is also contamination in this facility. Lead contamination has resulted from the paint, lead bricks, and screens used in radiography. Explosives contamination has resulted from past HE processing activities, and asbestos is present in the ceiling. The conceptual design for the new NDEF call for Safety Analysis Reports for the NDEF project to be developed and implemented prior to the start of facility operation (DOE 1994:I.B 1-2, I.E 39).

H.7.2.3 *Safeguards and Security*

The NDEF would also provide upgrades to security; it would be located within the Protected Area. Classified material would be stored in the facility within the bays and in the vault. Special nuclear material would not be stored in this facility. In addition, the facility would be connected to the plant's existing security alarm network (DOE 1994:I.E 40).

H.7.3 Relationship to Other Projects

The NDEF would be related to the Gas Analysis Laboratory, which is also located in Building 12–21. Additionally, this project would relocate the Vibration Testing, Hostile Shock Test, Mini-Air Gun Shock Test, and the Centrifuge Test to Building 12–78 as part of an interim plan.

H.7.4 Environmental Impacts

H.7.4.1 *Infrastructure*

Electrical usage would remain the same at 1,150 megawatthours per year as for the existing facility. No natural gas would be used at the facility. Steam usage would remain the same at 2.9 million kilograms per year (6.5 million pounds per year) involving the use of 451,000 liters per year (119,000 gallons per year) of water and 0.2 million cubic meters per year (6.2 million cubic feet per year) of natural gas (PC 1995:Table 3).

H.7.4.2 *Land Resources*

The building site is located in the north end of Zone 12 South, nearly equidistant to the east and west perimeters of Zone 12 South. The facility is north of Building 12–121 and west of Building 12–108. The facility is designed with 3,734 square meters (40,196 square feet). The facility would consolidate and improve operations and increase the safety to the worker, the public, and the environment. There are no expected environmental impacts of the Proposed Action on the surrounding land resources.

H.7.4.3 *Geology And Soils*

There could be very minor impacts to the soils due to erosion during construction. The area of temporarily disturbed soil would be 7,468 square meters (80,392 square feet) (PC 1995:Table 1). Mitigation measures such as sediment traps, diversion of surface water runoff from the construction area, dikes, silt fences, and covering the disturbed area with rip rap would be used to minimize soil erosion.

H.7.4.4 *Water Resources*

Water use is expected to remain at its current level of 9,120,000 liters per year (2,407,000 gallons per year). The generation of wastewater is also expected to remain at its current level of 8,020,000 liters per year (2,107,000 gallons per year) (PC 1995:Table 3). The facility construction site is not located within a known, playa-associated 100-year floodplain (DOE 1994:I.E 36).

H.7.4.5 *Air Quality*

Airborne particulate matter (i.e., dirt and equipment emissions) levels would be elevated during the construction period. This facility is expected to generate the same types and quantities of air emissions as the existing facility it would replace. Therefore, there would be no changes in the impacts from current levels (DOE 1994:I.B 2-3; PC 1995:Table 3).

H.7.4.6 *Acoustics*

Noise levels would temporarily increase during construction from operation of heavy construction equipment such as graders, cement mixers, and construction vehicle traffic. During nondestructive evaluation operations, noise would be emanating from a Real Time Radiography system, x-ray machine, a Microfocus machine, a high/medium energy radiography system, a high/medium energy computer tomography system, and a computer network system (DOE 1994:I.E 92, 94). Local worker and transportation traffic would contribute to the ambient noise in the area. The majority of the ambient noise in the area would be expected during the operation of the heating, ventilation, and air conditioning system (DOE 1994:I.E 70-74, 83). The operational areas design will include noise controls pursuant to OSHA standards (29 CFR 1910.95).

H.7.4.7 *Biotic Resources*

Flora and fauna that currently use the facility construction site would be permanently removed or displaced by construction. Pollution and soil erosion controls will be implemented during construction activities to mitigate impacts on biotic resources (DOE 1994:I.E 36-37, 49-50).

H.7.4.8 *Cultural Resources*

No archaeological sites or historical resources have been identified in or near the proposed construction site and no impacts to cultural resources are anticipated (DOE 1994:I.E 41).

No decisions have been made regarding use of existing facilities which may qualify as historic resources. The decision to reuse, modify, or demolish will be addressed in future NEPA documentation.

H.7.4.9 *Socioeconomic Resources*

The construction cost of this facility would be approximately $51.5 million. Construction of the facility is expected to employ 130 to 224 short-term employees (PC 1995:Table 1). Construction of the facility would probably result in a small temporary increase in local employment. A substantial portion of the material costs would enter the wholesale and retail trade sector of the regional economy. This facility is designed for an estimated 42 employees; no new employees are expected. Employees working in the existing facilities would be relocated to new facilities (PC 1995:Table 3).

H.7.4.10 *Transportation*

The construction of this facility would result in a temporary increase in onsite and area traffic during a 42-month period. Normal day shift work hours, Monday through Friday, are expected. However, since Zone 12 includes the Material Access Area and conducts weapon operations and HE operations, some schedule changes can be expected due to workloads and HE safety issues. Since construction of the facility is in a Material Access Area, plant security personnel would accompany construction workers to and from the construction site. Material supplies would be transported through Building 16–15, Central Shipping and Receiving Facility. Intrasite transportation impacts are presented in section 4.12.

H.7.4.11 *Waste Management*

This facility is expected to generate the same types and quantities of wastes as the existing facility it would replace. Therefore, there would be no changes in the impacts from current levels (PC 1995:Table 3).

H.7.4.12 *Human Health Risks*

There are no radiation risks during construction, since construction activities would not involve the use of any radioactive materials or waste. Chemical human health risks during construction are mitigated through compliance with OSHA Chapter 1926 regulations and an approved project-specific health and safety plan. The Contractor Safety and Health program requires a written plan for approval by the Fire, Waste Management, Industrial Hygiene, and Safety Departments. The plan establishes permits for safety, excavation, fire department, radiation work, and hot work as necessary (Pantex 1992).

Potential sources of radiological exposures during operation are expected. Potential sources of chemical exposures during operations would be from chemicals and materials used in analysis of materials. Personal protective clothing, shielding, and equipment (e.g. ventilation hoods) would be used to mitigate the potential health risks. Plant-wide human health impacts are presented in section 4.14.

H.7.5 No Action Alternative

One of the alternatives to the construction of the Nondestructive Evaluation Facility is to continue operations in a deteriorating building. X-ray operations would continue in the existing facility through establishment of administrative exclusion areas for the protection of employees. The existing building lacks adequate engineering controls. Administrative controls will continue during explosive evaluation operations due to inadequate building design features. Workload scheduling conflicts with the Gas Analysis Laboratory are expected due to overcrowding.

H.7.6 Move to an Existing Facility Alternative

An alternative to the Proposed Action is the modification of an existing facility for evaluation operations. If a suitable facility is identified, it would be required to meet all present environmental codes and regulations and pollution control standards. The facility would be required to utilize design features and administrative controls to protect employees and the environment. No suitable facility so far has been identified for this purpose. If nondestructive evaluation operations were spread through multiple areas of the plant, it would create logistical problems with building management. The facility manager has direct line responsibility for the operation of a facility, including the authority to direct physical changes to that facility, operation reporting requirements, and providing corrective actions (DOE 1994:I.C 2).

H.7.7 Alternatives Eliminated from Detailed Study

Two alternatives were eliminated from detailed study during the preliminary evaluation of the Nondestructive Evaluation Facility project. The first alternative was to send Nondestructive Evaluation operations offsite. However, this option was deemed unacceptable because many of the parts tested are classified. The second alternative was to cease all nondestructive evaluation operations. However, these operations are required to support dismantlement, evaluation, retrofit, repair, modification, and new build activities (DOE 1994:I.C 2, I.D 3).

H.8 METROLOGY AND HEALTH PHYSICS CALIBRATION AND ACCEPTANCE FACILITY

H.8.1 Purpose and Need for Action

The Department needs to conduct metrology and health physics calibration and acceptance activities in support of disassembly and quality assurance testing.

The new facility is needed because the existing metrology and health physics calibration and acceptance activities are inadequate for operation by current criteria because the facilities were designed for assembly and not disassembly and quality assurance testing. The facilities were not designed for the level of control and support for testing facilities. Furthermore, there are no onsite facilities capable of completing calibration of neutron and gamma monitoring equipment (DOE 1994a:I1-2).

H.8.2 Proposed Action

The Department proposes to construct a facility built to current design criteria in which to conduct needed activities. The project consists of a Health Physics Calibration Area and a Product Acceptance Control Area (DOE 1994a:I-3).

This 4,474-square meter (48,156-square foot) facility would provide the capability and capacity to support weapon operations at Pantex Plant. The facility would be appropriately separated into two major areas: Health Physics Calibration and Product Acceptance Control and Storage Area.

H.8.2.1 *Health Physics Laboratory*

This 634-square meter (6,825-square foot) laboratory would provide space inside the Material Access Area for the calibration and maintenance of alpha, beta, gamma, x-ray, and neutron instrumentation, survey meters, and area monitors required for all weapons program operations at Pantex Plant. Due to the calibration source activities and isotopes involved, specially designed facilities are required to obtain National Institute of Standards and Technology traceable calibration while limiting personnel exposure to radiation. The laboratory contains a 92.9-square meter (1,000-square foot) Gamma/X-ray Calibration Laboratory, two 74.3-square meter (800-square foot) Neutron Calibration Laboratories, and a 111.5-square meter (1,200-square foot) Alpha/Beta Calibration Laboratory.

H.8.2.2 *Product Acceptance Control Area*

This 1,780-square meter (19,200-square foot) laboratory would provide the capability for calibration, maintenance, repair, examination, and final qualification of production acceptance measurement and test equipment. The area would provide control of Nuclear Explosive Area measurement and test equipment, cables, and adapters listed on the Albuquerque Operations Office Master Tester List utilized in the weapon operations area as a means of reducing existing nuclear explosive safety concern. Support of design agency special projects pertaining to weapons' test systems will also be performed. The entire facility is designed to have functional capability to meet all nuclear explosive safety requirements and all other applicable requirements. This area would also provide for the calibration of measurement and test equipment used by facility operations in performing required maintenance on facilities located in the Material Access Area. The laboratory contains a 560-square meter (6,000-square foot) Nuclear Explosive Area Tester, Gage Calibration Laboratory, and a 65-square meter (700-square foot) self-contained modular Mechanical Calibration Laboratory.

H.8.2.3 *Storage Area*

This facility would provide a centralized and secure area for the staging, short term storage, and long term storage of nuclear explosives; area measurement and test equipment; and other measurement and testing equipment used in the weapons operations area. This area would reduce existing concerns of nuclear explosives safety pertaining to control and storage of this equipment. The storage area would provide a secured, two-lock area so that nuclear explosives measurement and test equipment can be transferred to and from the Metrology Department, to and from the user of the measurement and test equipment, or be stored when not required. The short-term storage area would provide an area for the storage of measurement and test equipment that is not required by the user for a short period of time. The environmental controls of this area would be such that the equipment would be stored without being packaged for long-term storage. The long-term storage area would provide an area with less stringent environmental control requirements for the storage of measurement and test equipment that has been packaged for long-term storage. The storage area contains three storage areas totalling 920 square meters (9,900 square feet).

H.8.2.4 *Environmental Conditions*

The facility design includes conformance with DOE Standard 1020–94, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities* (DOE 1994d). The new facility would be a stand-alone facility that would be designed specifically to meet all present environmental codes and regulations. The current waste handling requirements are incorporated into the initial conceptual design criteria. Normal operation of this facility would be in compliance with Federal, State, and local air and water pollution control standards and would not have cumulative or long-term adverse effects on the environment. The site would be graded to drain surface water into the existing plant stormwater drainage system. Sanitary waste would be directed and processed through the plant sanitary sewage system. Solid domestic-type waste would be taken to a municipal sanitary landfill for offsite disposal (DOE 1994a:I-35, I-27 to 29).

During construction of the proposed facility, environmental considerations would include pollution and soil erosion controls to mitigate impacts on air, water, and other environmental resources and to ensure compliance with Federal, State, and local laws and regulations. Construction debris waste would be collected and hauled to the Pantex Plant landfill on a regular basis. No open burning of construction refuse or other Class 2 and Class 3 would be allowed (DOE 1994a:I-35, I-27 to 29).

The design of this facility includes an energy conservation analysis, including Life Cycle costing. Appendix G, Pollution Prevention and Waste Minimization presents an additional discussion of water and energy conservation (DOE 1994a:I-26, I-27).

No permits are currently required and no new permits would be required.

H.8.2.5 *Health and Safety*

The facility would operate under an approved Final Safety Analysis Report developed prior to initial operation. Emergency lighting would comply with the National Fire Protection Association code. Fire protection would consist of automatic sprinkler systems and fire alarm systems. Laboratories would not be occupied by personnel while radiation calibration sources are exposed. Engineering controls like interlocks, airlocks, and shielding would be included in the design features. A physical barrier outside the building would be used to establish an exclusion zone. In addition, several emergency body/eyewash stations would be included in the design (DOE 1994a:I-30 to 35).

H.8.2.6 *Safeguards and Security*

The Metrology and Health Physics Calibration and Acceptance Facility would follow established security practices for Pantex Plant. Weapons-grade special nuclear material in the form of calibration sources would be stored under administrative control. In addition, the facility would be connected to the plant's existing security alarm network (DOE 1994a:I-35).

H.8.3 Relationship to Other Projects

This project is not related to any other construction project (DOE 1994a:I-12).

H.8.4 Environmental Impacts

H.8.4.1 *Infrastructure*

Electrical usage would remain the same at its current level of 1,315 megawatthours per year. No natural gas would be used at the facility. Steam usage would remain the same at 4.4 million kilograms per year (9.6 million pounds per year), involving the use of 564,000 liters per year (149,000 gallons per year) of water and 0.3 million cubic meters per year (9.2 million cubic feet per year) of natural gas (PC 1995:Table 3).

H.8.4.2 *Land Resources*

The building site is located in the southeast corner of Zone 12 South. The facility is north of Building 12–41 and east of Building 12–42. The facility would consolidate and improve operations and increase the safety to the worker, the public and the environment. There are no expected environmental impacts of the Proposed Action on the surrounding land resources.

H.8.4.3 *Geology And Soils*

There could be very minor impacts to the soils due to erosion during construction. The area of temporarily disturbed soil would be 8,947.4 square meters (96,312 square feet) (PC 1995:Table 2). Mitigation measures, such as sediment traps, diversion of surface water runoff from the construction area, dikes, silt fences, and covering the disturbed area with rip rap would be used to minimize soil erosion.

H.8.4.4 *Water Resources*

Water use is expected to remain at its current level of 10,400,000 liters per year (2,779,000 gallons per year). The generation of wastewater is also expected to remain at its current level of 9,170,000 liters per year (2,449,000 gallons per year) (PC 1995:Table 3). The facility construction site is not located within a known, playa-associated 100-year floodplain (DOE 1994a:I-27).

H.8.4.5 *Air Quality*

Airborne particulate matter (i.e., dirt and equipment emissions) levels would be elevated during the construction period. This facility is expected to generate the same types and quantities of air emissions as the existing facilities it would replace. Therefore, there would be no changes in the impacts from current operational levels (PC 1995:Table 3).

H.8.4.6 *Acoustics*

Noise levels would temporarily increase during construction from operation of heavy construction equipment such as graders, cement mixers, and construction vehicle traffic. During waste handling operations, noise would be emanating from forklift operations and loading dock operations. Local worker and transportation traffic would contribute to the ambient noise in the area. The majority of the noise sources are expected during the operation of the heating, ventilation, and air conditioning system, computer systems, and analytical equipment (DOE 1994a). The operational areas design will include noise controls pursuant to Occupational Safety and Health standards (29 CFR 1910.95).

H.8.4.7 *Biotic Resources*

Flora and fauna that currently use the facility construction site would be permanently removed or displaced by construction. The facility is sited in accordance with the *Pantex Plant Site Development Plan* (DOE 1995c; DOE 1994a:I-35). The site represents an already disturbed area and no measurable impacts to biotic resources are anticipated.

H.8.4.8 *Cultural Resources*

The facility is sited in accordance with the *Pantex Plant Site Development Plan* (DOE 1995c; DOE 1994a:I-35). The facility would be located in an already disturbed area and no impacts to cultural resources are anticipated.

No decisions have been made regarding the use of existing facilities which may qualify as historic resources. The decision to reuse, modify, or demolish will be addressed in future NEPA documentation.

H.8.4.9 *Socioeconomic Resources*

The construction cost of this facility would be approximately $11.5 million. Construction of the facility is expected to employ 11 to 60 short-term employees (PC 1995:Table 1) and would probably result in a small temporary increase in local employment. A substantial portion of the material costs would enter the wholesale and retail trade sector of the regional economy. This facility is designed for an estimated 48 employees; no new employees are expected. Employees working in existing facilities would be relocated to work in new facilities (PC 1995:Table 3).

H.8.4.10 *Transportation*

The construction of this facility would result in a temporary increase in onsite and area traffic during a 24-month period. Normal day shift work hours, Monday through Friday, are expected. However, since Zone 12 includes the Material Access Area and conducts weapon operations and HE operations, some schedule changes can be expected due to workloads and HE safety issues. Since construction of the facility is in a Material Access Area, plant security personnel would accompany construction workers to and from the construction site. Material supplies would be transported through Building 16–15 Central Shipping and Receiving.

H.8.4.11 *Waste Management*

This facility is expected to generate the same types and quantities of wastes as the existing facility it would replace. Therefore, there would be no changes in the impacts from current levels (PC 1995:Table 3).

H.8.4.12 *Human Health Risks*

There are no radiation risks during construction, because construction activities would not involve the use of any radioactive materials or waste. Chemical human health risks during construction are mitigated through compliance with OSHA Chapter 1926 regulations and an approved project specific health and safety plan. The Contractor Safety and Health Program requires a written plan for approval by the Fire, Waste Management, Industrial Hygiene, and Safety Departments. The plan establishes permits for safety, excavation, fire department, radiation work, and hot work as necessary (Pantex 1992).

Potential sources of radiological exposures during operation are expected. Potential sources of chemical exposures during operations would be from chemicals and materials used in analysis of materials. Personal protective clothing, shielding and equipment (e.g. ventilation hoods) would be used to mitigate the potential health risks. Human health risks associated with all plant activities are presented in section 4.14.

H.8.5 No Action Alternative

One of the alternatives to the construction of the Metrology and Health Physics Calibration and Acceptance Facility is the continued use of decentralized facilities. Administrative controls will continue to provide security and employee safety where facility designs are inadequate. Tritium monitor calibration process emissions will continue at 7 millicuries per year (50 percent greater than a new facility).

H.8.6 Move to an Existing Facility Alternative

Operations are currently decentralized, as discussed in section H.8.5. If a suitable facility is identified, it would be required to meet all present environment codes and regulations, and pollution control standards. The facility would be required to utilize design features and administrative controls to protect employees and the environment. However, according to the Conceptual Design Report, there are no existing operations which could be relocated to accommodate the calibration and storage activities without severely impacting assembly/ disassembly operations (DOE 1994a:I-12 through I-15).

H.8.7 Alternatives Eliminated from Detailed Study

Two alternatives were eliminated from the detailed study. The first alternative was the use of existing plant temporary facilities or the acquisition of new temporary facilities. At best, this would be only a temporary solution that would delay the required facility. Use of the temporary facilities was not considered feasible due to both technical and safety considerations. Facilities would have to be arranged together in an efficient geographic location to negate the need for all functions in one building. The required environmental controls to provide personnel protection from the radiation emitted from radioactive sources used for gamma and neutron monitor calibrations would be very difficult to maintain in temporary facilities.

The second solution would be to use outside contractors. This option has been partially adopted but is considered only a temporary measure. Under this alternative, uncleared individuals would have access to the Health Physics instrumentation. Shipping of equipment could lead to additional costs incurred due to losses or damage, additional instrumentation requirements and associated maintenance. In addition, use of outside contractors could result in extended turnaround time. To ensure that the calibrations are performed correctly and that the instruments are not damaged in transit, a significant amount of capability would still be needed for onsite verification of proper instrument response upon their return (DOE 1994a:I-12 through I-15).

REFERENCES

29 CFR 1910	Office of the Secretary of Labor, "Occupational Safety and Health Standards", *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
10 CFR 435	DOE, "Energy Conservation Voluntary Performance Standards for New Buildings; Mandatory for Federal Buildings, *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington DC.
40 CFR 264 Subparts A,C,D	EPA, "Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities", *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
40 CFR 264 Subparts AA, BB, CC	EPA, "Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities", *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
40 CFR 264	EPA, "Standards for Owners and Operators of Hazardous Waste Treatment Storage and Disposal Facilities", *Code of Federal Regulations,* Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC.
Battelle 1995	Battelle, *Draft Reference Document for the Hazardous Waste Treatment and Processing Facility*, Version 1.0, prepared for Pantex Plant, Amarillo, TX, April 1995.
DOD 6055.9	DOD 6055.9 STD "DOD Ammunition and Explosives Safety Standards," October 1992.
DOE 1991	DOE, *Explosive Safety Manual*, October 1991, DOE/EV/06194.
DOE 1993	DOE, *Environmental Assessment for Hazardous Waste Staging Facility, Pantex Plant, Amarillo, TX,* Project No. 39GF71024-GPD121000000, prepared by Mason and Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, June 1993.
DOE 1994	DOE, *Conceptual Design Report, Part I-Design Concept, Part II-Project Management Plan, Facilities Capability Assurance Program (FCAP) Non-Destructive Evaluation Facility, Pantex Plant,* Project No. 88-D-122 (97-AA-02), prepared by Mason & Hanger-Silas Mason Company, Inc., for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, December 1994.

DOE 1994a — DOE, *Conceptual Design Report, Metrology Health Physics Calibration and Acceptance Facility Pantex Plant,* Volume I of II, prepared by Mason & Hanger-Silas Mason, Company, Inc., for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, October 1994.

DOE 1994b — DOE, *Conceptual Design Report, Materials Compatibility Assurance Facility Pantex Plant,* Authorization No. A37, prepared by Mason & Hanger Engineering Inc., managed by Mason & Hanger-Silas Mason, Company, Inc., for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, April 1994.

DOE 1994c — DOE, *Revised Draft Environmental Assessment, Pit Reuse Project, at the Pantex Plant, Amarillo, TX,* prepared for the U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Pantex Plant, Amarillo, TX, March 1994.

DOE 1994d — DOE, *Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities*, DOE-STD-1020-94, U.S. Department of Energy, Washington, DC, April 1994.

DOE 1995 — DOE, *Conceptual Design Report, Hazardous Waste Treatment and Processing Facility,* Project #92–D–172, Volume I and II, prepared by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, Amarillo, TX 1995.

DOE 1995a — DOE, *Conceptual Design Report, Gas Analysis Laboratory Pantex Plant,* Authorization No. A36, prepared by Mason & Hanger Engineering Inc., managed by Mason & Hanger-Silas Mason, Company, Inc., for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, January 1995.

DOE 1995b — DOE, *Conceptual Design Report, Pit Reuse Facility, Pantex Plant,* Authorization No. A56, Volumes I and II, prepared by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, Amarillo Area Office, Amarillo, TX, January 1995.

DOE 1995c — DOE, *FY 1995 Pantex Plant Site Development Plan,* prepared under Contract DE-AC04-91AL-65030, by Mason & Hanger-Silas Mason Company, Inc., Amarillo, TX, for the U.S. Department of Energy, Amarillo, TX, 1995.

DOE 1995d — DOE, *Environmental Assessment for the Operation of the Glass Melter Thermal Unit at the U.S. Department of Energy's Mound Plant*, Miamisburg Area Office, Miamisburg, OH, June 1995.

DOE 1995e — *Pantex Plant Federal Facility Compliance Act Agreed Order Site Treatment Plan-Compliance Plan*, September 1995 (approved October 3, 1995, revised August 1996).

DOE 1996 — DOE, *Programmatic Environmental Impact Statement for Stockpile Stewardship and Management*, Volume I, prepared under Contract DOE/EIS-0236 for the Department of Energy, February 1996.

DOE Order 5480.11 — DOE, "Radiation Protection for Occupational Workers", Washington, DC, December 21, 1988, Revised June 17, 1992.

DOE Order 5480.7A	DOE "Fire Protection", Washington, DC, February 17, 1993.
DOE Order 6430.1A	DOE, "General Design Criteria", Washington, DC, April 6, 1989.
EO 11988	Office of the Federal Register, National Archives and Records Administration, "Floodplain Management", *Codification of Presidential Proclamations and Executive Orders*, Executive Order 11988, Government Printing Office, Washington, DC, April 13, 1945–January 20, 1989.
EO 12003	Office of Federal Register, National Archives and Records Administration, "Energy Conservation", *Codification of Presidential Proclamations and Executive Orders,* Executive Order 12003, Government Printing Office, Washington, DC.
EO 12902	Office of the Federal Register, National Archives and Records Administration, "Energy Efficiency and Water Conservation at Federal Facilities", *Codification of Presidential Proclamations and Executive Orders,* Executive Order 12902, Government Printing Office, Washington, DC, March 8, 1994.
Pantex 1992	Pantex Plant, *Contractors Safety and Health Program Brochure,* prepared by the Safety Department, Amarillo, TX, September 1992.
Pantex 1996	Pantex Plant, *Programmatic Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1996.
Pantex 1996a	Pantex Plant, *Environmental Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, October 1995 (2nd Revision).
PC 1995	Lincoln, M., "Data Needs for the New Projects at Pantex Plant", SWEIS request for information supplied by Michelle Lincoln, Battelle Pantex, May 17, 1995.
PC 1996	Zimmerman, T., Smaller Version-HWTPF Information, SWEIS request for information supplied by Terry Zimmerman, DOE Amarillo Area Office, September 25, 1996.

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APPENDIX I

Soil Quality Analysis

APPENDIX I
SOIL QUALITY ANALYSIS

This appendix supplements the information presented in the Soil and Sediment Quality at Solid Waste Management Units and 1994 Annual Soil and Sediment Sampling, section 4.5.1, Affected Environment for Geology and Soils.

I.1 SOIL QUALITY

I.1.1 Soil and Sediment Quality at Solid Waste Management Units

Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFIs) are currently being conducted at Pantex Plant, as described in section 4.5.1.3 in volume I. The RFIs include characterization of the nature and extent of contamination at a number of Solid Waste Management Units (SWMUs) associated with the 14 waste release site groupings that have been identified at Pantex Plant. Table I.1.1–1 summarizes the SWMUs contained in each grouping and provides a brief description (Pantex 1996:15.1). RFIs have been completed for 5 of the 14 groupings, which include AL–PX–01 (Burning Ground), AL–PX–02 (High Priority Potential Release Sites), AL–PX–06 (Zone 12 Groundwater), AL–PX–08 (Ditches and Playas), and AL–PX–12 (Miscellaneous Chemical Spills/ Releases). Table I.1.1–2 summarizes the actions taken and recommendations from the five completed RFIs. (All tables are presented after the text.)

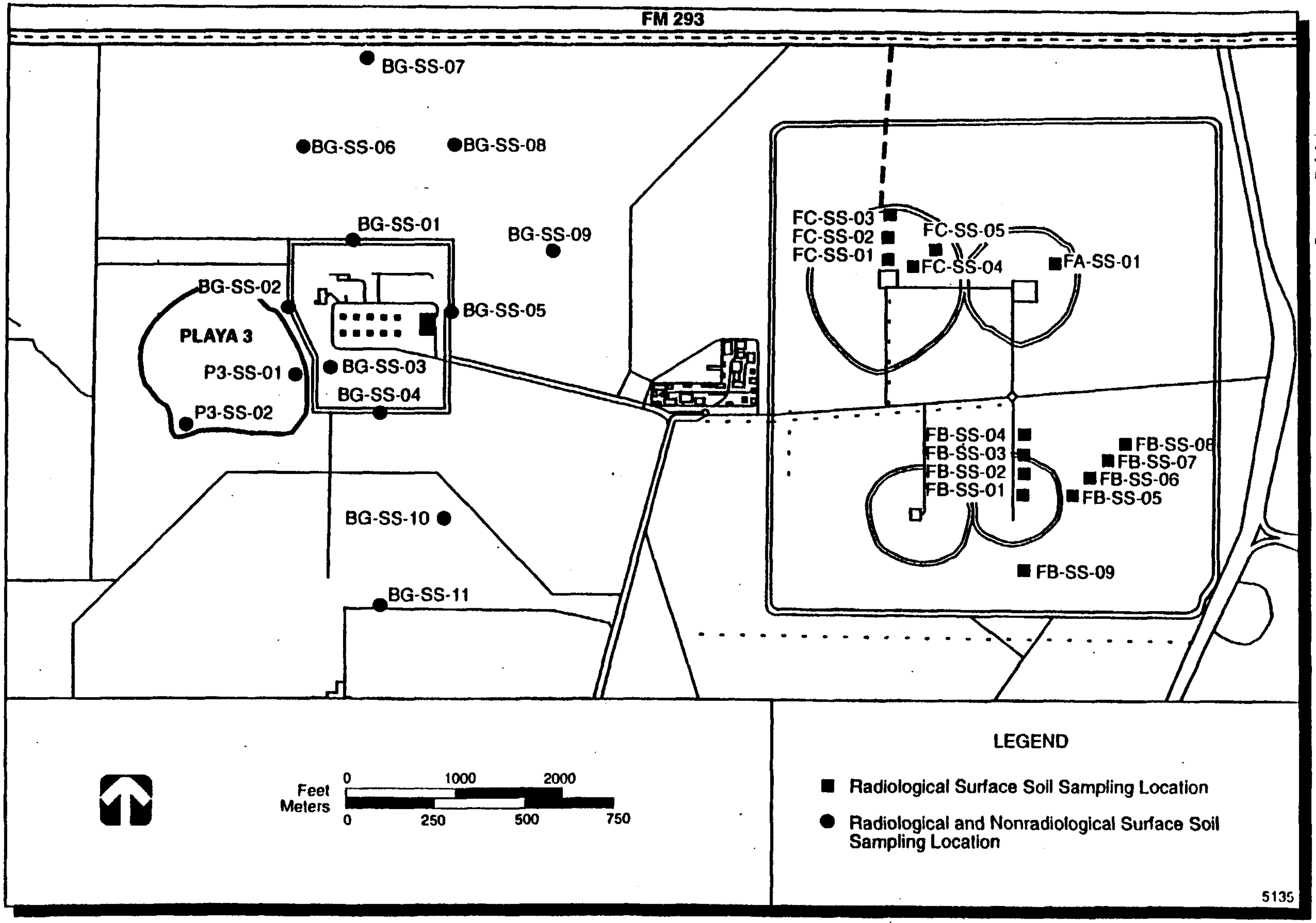
I.1.2 1994 Annual Soil and Sediment Sampling

Soil quality data were reviewed to evaluate the current soil quality at Pantex Plant Site and to compare current soil quality with historical data. This section presents the data and discusses the results of routine and nonroutine (special request) surface soil surveillance at Pantex Plant. The routine soil surveillance program plays an important role in assessing the potential environmental impacts of operations at Pantex Plant. Soil surveillance provides a direct measure of environmental contamination because soil accumulates contaminants that are deposited from the air over time. Thus, soil surveillance allows evaluation of long-term trends (DOE 1995b:12-1). This sampling program is conducted on an annual basis and is separate from the environmental restoration programs which deal specifically with SWMU sampling conducted under RCRA and the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) as discussed in section 4.5.1, Soil and Sediment Quality at Solid Waste Management Units.

I.1.2.1 *Overview of Methods*

From 1988 to 1993, 19 onsite and 32 offsite soil samples were collected annually in five different "routine" areas and analyzed for radionuclides, as summarized in Table I.1.2.1–1. The five areas included Firing Sites 4, 5, and 10, the Burning Ground, and offsite sampling locations. Figures I.1.2.1–1, I.1.2.1–2, and I.1.2.1–3 present the sampling locations. It should be noted that the soil data collected between 1988–1993 do not necessarily include every sample location for each year (DOE 1995b:12-1 through 12-4).

The soil data collected for radionuclides were compiled, summarized, and distributed annually in the *Environmental Report for Pantex Plant* (also referred to as Annual Site Environmental Report [ASER]) (DOE 1995b). From 1988 to 1992, beryllium was the only non-radiological



SOURCE: DOE 1995b:12-6

FIGURE I.1.2.1–1.—*Sampling Locations in the Vicinity of the Firing Sites and Burning Ground.*

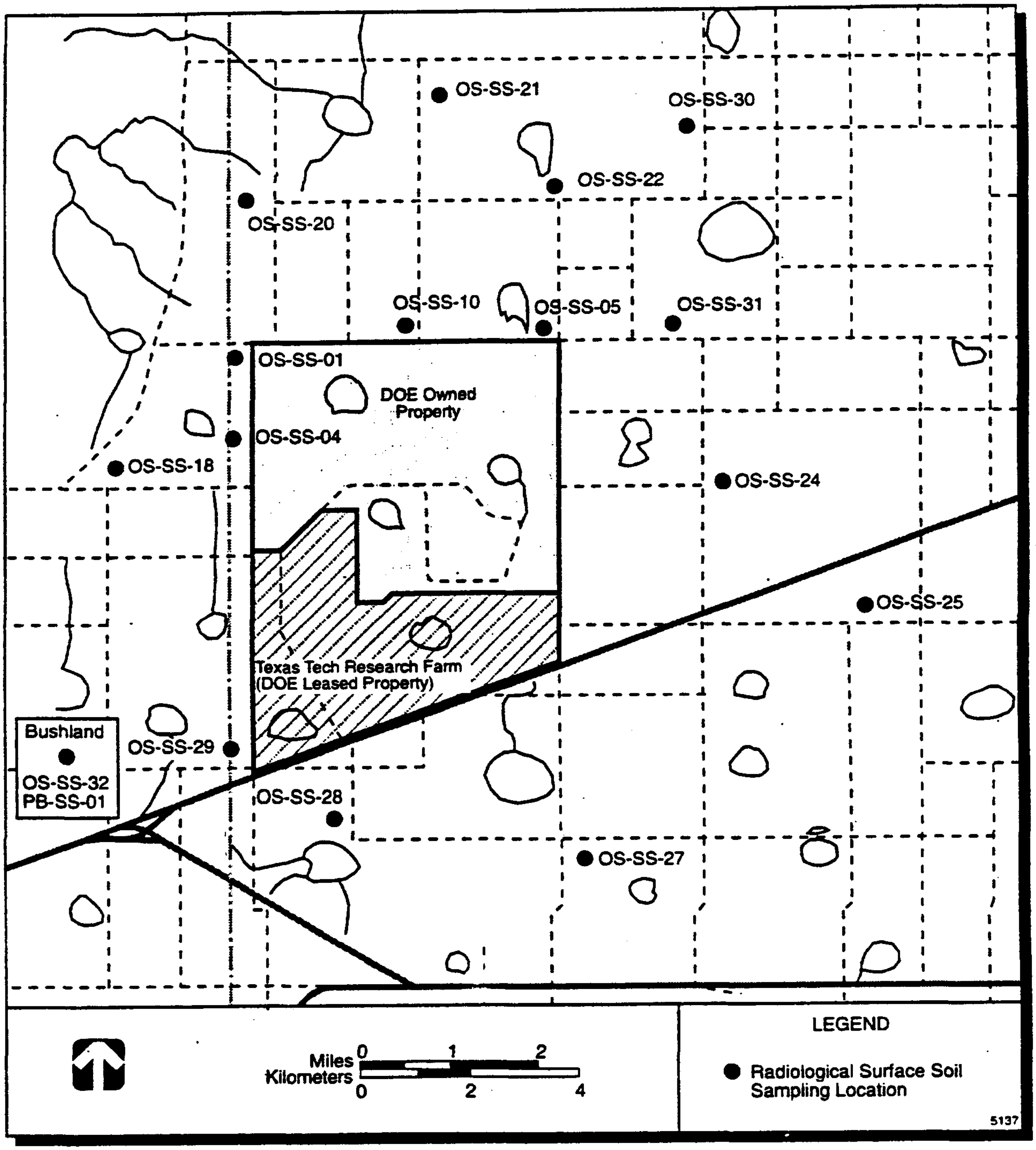
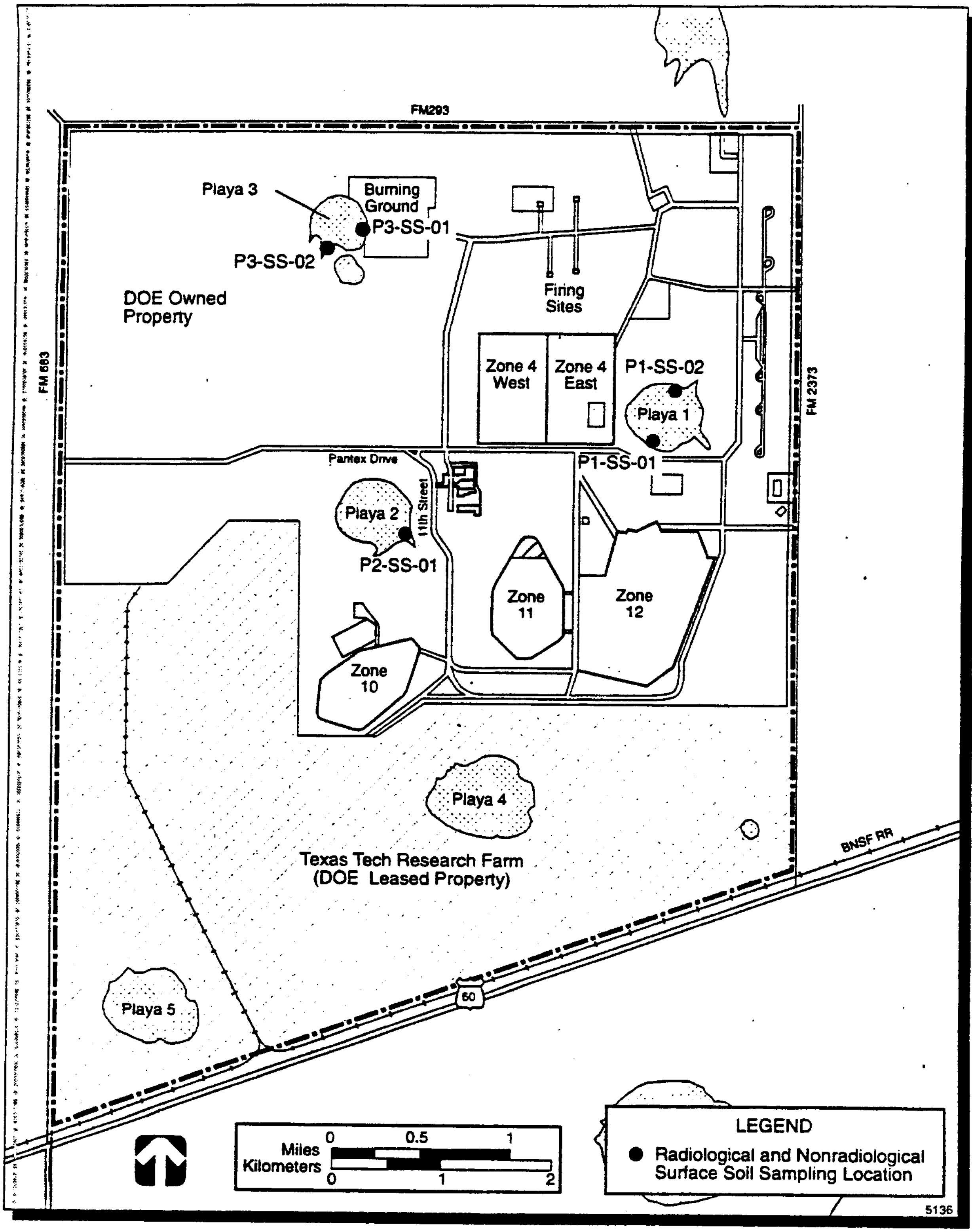


FIGURE I.1.2.1–2.—*Offsite Soil Sampling Locations.*



SOURCE: DOE 1995b:12-5

FIGURE I.1.2.1–3.—*Soil Sampling Locations at Playas 1, 2, and 3.*

contaminant that was sampled and analyzed. It was thought that soil might have been contaminated with beryllium as a result of destructive testing of high explosive test configurations containing beryllium components. Areas included in the sampling program included the three firing sites, the Burning Ground, and offsite locations. Soil was not sampled for beryllium in 1993 or 1994.

During 1994, soil was routinely sampled at 31 onsite and 17 offsite locations. These samples were generally collected from playa bottoms and interplaya uplands. Depending on the location, soil samples were collected monthly or quarterly. Sample locations are shown in Figures I.1.2.1–1, I.1.2.1–2, and I.1.2.1–3 (DOE 1995b:12-1).

Due to a special DOE request, soil data locations for the 1994 ASER were expanded to include "non-routine" sample locations and chemicals of potential concern (COPC) (DOE 1995b:12-1). New areas of sample locations, number of samples collected, and COPC are summarized in Table I.2.1–2. Further detail for these data is presented in Tables I.1.2.1–3, I.1.2.1–4, and I.1.2.1–5 and Figures I.1.2.1–1 and I.1.2.1–2.

Average sample concentrations for radionuclides and uranium ratios in each area were calculated. In the case of discrepancies, the values provided in the ASER prevailed. Calculations for these values are provided in Table I.1.2.1–6.

In order to evaluate chemical concentrations, the average sample result from each sample location was compiled in electronic spreadsheet tables. Sample results below detection limits were omitted from evaluation. Chemical concentrations were then evaluated in two tiers:

- First—The "Cleanup" levels (dated 4/94) for chemicals of concern at Pantex Plant. These levels are based on TNRCC Risk Reduction Standards (DOE 1994).
- Second—The Risk-Based Concentration (RBC) Table (dated 1/95) provided by Environmental Protection Agency (EPA) Region III (EPA 1995).

Tables I.1.2.1–3, I.1.2.1–4, and I.1.2.1–5 present COPCs, "cleanup" levels, and RBCs.

I.1.2.2 *Assumptions*

The following assumptions were made for the soil quality evaluation:

- Collection of each soil sample consistently occurred at the same location over the duration of the sampling program.
- Sample collection and analysis conformed to State sampling procedures and EPA-approved methodologies. Sample results are assumed to be valid.
- Chemical concentrations were assumed to be representative of the soil sampling locations.

I.1.2.3 *Data Source*

The 1988 to 1994 ASERs were used as the data source for concentrations of COPC in soils. "Cleanup" levels from TNRCC, RBCs from EPA Region III, and preliminary remediation goals (PRGs) from EPA Region IX were compared with the sampling results.

I.1.2.4 *Conclusions*

The following conclusions were made based on the information presented in the previously shown tables and Tables I.1.2.4–1, I.1.2.4–2, and I.1.2.4–3:

- **Radionuclides:** Soil samples were collected at three firing sites (4, 5, and 10), the Burning Ground, three playas (1, 2, and 3), and offsite locations, then analyzed for uranium-234, uranium-238, plutonium 239/240, and tritium. Based on the uranium-234:uranium-238 ratio, the highest level of depleted uranium appears to be located at Firing Sites 4, 5, and 10. The averages for 1994 for uranium-234 and -238 were lower than the averages of historical levels. Average concentrations of plutonium-239/240 in 1994 were similar to historical Bushlands averages, indicating no detectable contamination from Pantex Plant in area soils. The results are presented in Table I.1.2.1–2 and summarized in Table I.1.2.1–5. TNRCC or EPA concentration guidelines were not available.

- **Metals:** Soil samples were collected at the Burning Ground, Playa 3, and offsite locations, then analyzed for aluminum, boron, cadmium, chromium, cobalt, copper, magnesium, manganese, molybdenum, mercury, nickel, silver, and zinc. The results and TNRCC/EPA concentration levels are presented in Table I.1.2.1–2 and summarized in Table I.1.2.1–6. TNRCC and EPA concentration levels were not available for magnesium.

  All metals, with the exception of manganese, were below TNRCC and EPA levels. Taking into account the deviations, 11 of the 12 soil samples collected from the Burning Ground were over the RBC residential levels for manganese. It should be noted that two of the offsite results were also higher than residential levels.

- **Explosives:** Soil samples were collected at the Burning Ground, Playa 3, and offsite locations, then analyzed for high melting explosives (HMX), research developed explosives (RDX), pentaerythritol tetranitrate (PETN), and trinitrotoluene (TNT). The majority of results were nondetects. In accordance with guidelines of the National Pollutant Elimination Discharge System (NPDES) and hazardous waste permits, analytical results for groundwater samples are reported to the action levels defined in USEPA SW-846 Method 8330 for the determination of presence and concentration of high explosives (Pantex 1996:4.9). These results that were above detection limits were all below TNRCC and EPA levels. The results and the TNRCC/EPA concentration levels are presented in Table I.1.2.1–5 and summarized in Table I.1.2.4–3.

- **Volatile Organic Compounds (VOCs):** Soil samples were collected at Playa 3 and offsite locations. None of the VOCs were found at levels above the minimum detection limits. Based on these results, no additional analysis was performed.

TABLE I.1.1–1.—*Pantex Solid Waste Management Units and Areas of Concern Grouped by Operable Unit*

WASTE SITE	UNIT NAME/DESCRIPTION
AL-PX-1, Burning Ground	
SWMU 47	Evaporation Pit
SWMU 14-27	Burn Pads
SWMU 37-44	Landfills
AL-PX-2, High Priority Potential Release Sites	
SWMU 11	Surface Impoundment in Zone 5
SWMU 13	Former Surface Impoundment, Building 11-51
SWMU 109	Releases from Building 12-68, Outside Stump
SWMU 136	Subsurface Leaching Beds, Building 12-59
SWMU 139	Photoprocessing Leaching Bed at FS-10
AOC 12	Building 12-5D, Paint Shop Area
Unnumbered	FS-1, FS-22, FS-24
AL-PX-3, Former Cooling Tower	
AOC 13	Former Cooling Tower in Zone 12
AL-PX-4, Old Sewage Treatment Plant (OSTP) Sludge Beds	
SWMU 140	OSTP Sludge Beds
AL-PX-5, Fire Training Area Burn Pits	
AOC 11	Fire Training Area Burn Pit
AL-PX-6, Zone 12 North Groundwater	
Unnumbered	Potential TCE and Chromium in Perched Water/Unknown Source
AL-PX-7, Landfills	
SWMU 54-66	Construction Debris Landfills
SWMU 68a, b, c	Original, Landfill 1, Landfill 2
SWMU 68d	Sanitary Landfill-Hazardous Waste Staging Area
AL-PX-8, Ditches and Playas	
SWMU 1	Drainage Ditch, Building 12-17
SWMU 2	Drainage Ditch, Building 12-43
SWMU 3	Drainage Ditch, Building 11-44
SWMU 4	Drainage Ditch, Building 11-50
SWMU 5	Drainage Ditch, Other (Buildings 12-41, 12-19, Zones 11 and 12)
SWMU 6	Playa 1
SWMU 7	Playa 2
SWMU 8	Playa 3
SWMU 9	Playa 4
SWMU 10	Pantex Lake
SWMU 12	Former 11-14 Pond (Discharge to Ditch) (Inactive), and Pipeline from Building 11-36 to Pond

TABLE I.1.1–1.—*Pantex Solid Waste Management Units and Areas of Concern Grouped by Operable Unit*-Continued

WASTE SITE	UNIT NAME/DESCRIPTION
AL-PX-9, Firing Sites	
SWMU 69	Firing Site 4
SWMU 70	Firing Site 5
SWMU 71	Firing Site 6
SWMU 72	Firing Site 10
SWMU 73	Firing Site 15
SWMU 74	Firing Site 21
SWMU 75	Firing Site 22
AL-PX-10, Leaking USTs at Bldgs 12-35 and 16-1	
AOC 6	Gasoline Leaks at Buildings 12-35 and 16-1
AL-PX-11, Miscellaneous High Explosives (HEs)/Radiation	
SWMU 53	Temporary HE Burn Site
SWMU 82	Nuclear Accident Residue Storage, Zone 4
SWMU 135	Subsurface Leaching Beds, Building 12-44
SWMU 142-146	Zone 10 TNT Settling Pits
SWMU 147-149	Zone 11 TNT Settling Pits
SWMU 11-44	HE Wastewater Treatment Facilities
SWMU 12-43	HE Wastewater Treatment Facilities
SWMU 12-24N	HE Fabrication Building
AL-PX-12, Miscellaneous Chemical Spills/Releases	
SWMU 84*	Scrap and Salvage Yard, Building 10-9
SWMU 103	Former Battery Storage Area, Building 12-81
SWMU 113*	Overflows from 11-36 Collection System/Sump
SWMU 143	Former Waste Drum Storage Areas (10-9 and 10-7)
AOC 1	Transformer Leak near 11-14A
AOC 2	Main Electrical Substation (4-28)
AOC 3	Former Boiler House Areas, Zones 10 and 11
AOC 5	Electrical Equipment Bone Yard near Building 12-5
AOC 7	Sulfuric Acid Spills (12-4, 12-64, and 11-36)
AOC 8	Solvent Leaks (Pads 11-12, 11-13, 11-17, 11-22, and Building 11-36)
AOC 10	Pesticide Rince Area, Buildings 12-51 and 12-43
AOC 14	Battery Storage Area, Scrap/Salvage Yard (10-9)
AOC 15	DDT Release at Building 12-35
Unnumbered*	Capacitor Bank Rupture Zone 12
Unnumbered*	Evaporation Pit, 40 ft. East of Bay 3, Building 11-20
Unnumbered*	Evaporation Pit, South of Bay 11 and West of Bay 6, Building 11-20
Unnumbered*	Former Leaching Bed North of Building 11-50 and West of Building 11-36
New AOC	12-5B Concrete Sump

TABLE I.1.1–1.—*Pantex Solid Waste Management Units and Areas of Concern Grouped by Operable Unit*-Continued

WASTE SITE	UNIT NAME/DESCRIPTION
AL-PX-13, Supplemental/Verification Sites	
Unnumbered*	Denuded Area
Unnumbered*	Zone 11 Parallel Depressions
Unnumbered*	Old Pistol Range
Unnumbered*	Abandoned Zone 10 Landfills
Unnumbered*	Unnumbered Zone 7 Landfills
Unnumbered*	Landfill East of 11-13 Pad (Debris from Buildings 11-12 and 11-13)
Unnumbered*	Magazine Demolition Debris Landfills, Zones 4 and 5
SWMU 67*	Carbon Black Burial Area, Zone 10
AL-PX-14, USTs at Other Locations	
UST 9	Building 12-17 East
UST 7	Building 12-58
UST 38	Building 12-98
UST 39	Building 12-84
SWMU 133	Waste Oil Tank at Building 16-1

SWMU = solid waste management unit identified by the RCRA facility assessment, visual site inspection (VSI), January 1989.
AOC = areas of concern identified in above VSI as modified and added to at meeting with EPA on November 1, 1989.
UST = Underground Storage Tank
*Not identified as a SWMU to be investigated, but included because investigation may be warranted.
Source: Pantex 1996:15.0

TABLE I.1.1–2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*

ALL–PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL–PX–01	Burn Pads: SWMUs 14-27 Burn Trays: SWMUs 28-36 Landfills: SWMUs 37-44, Burn Cages: SWMUs 45-46, Former Chemical Burn Pit Solvent Pit: SWMU–47, Solvent Pans: SWMUs 48-51 Burn Rack/Flashing Pits: SWMU 52, Demonstration Facilities	Draft RFI completed May 1995; **TNRCC requested additional characterization and risk assessment of the site. Draft RFI addendum and Draft Risk Assessment submitted to TNRCC April 1996.**	RFI included: surface geophysical investigations, soils investigations program involving shallow to deep drilling programs, aquifer testing, groundwater sampling, and location surveying. **Sixty-four soil borings drilled: 17 waste characterization borings, 31 shallow borings, 12 intermediate borings, and 4 deep borings. A total of 568 soil and waste wamples were collected and analyzed.**	Consideration for a voluntary removal action or a site-specific risk assessment are recommended for Burn Pads 8 and 10. Soil removal would be limited to a depth of 4 feet below ground surface. Recommend development of alternate cleanup levels through a focused risk assessment for the Solvent Evaporation/ Former Chemical Burn Pit, and implementation of engineering controls for the Burning Ground landfill cells. No immediate action is warranted for the Burning Ground units with the exception of those listed above.
AL–PX–02	SWMU 109, Building 12–68, Concrete Sump (The other 8 SWMUs are addressed in a separate RFI report.)	Draft RFI completed June 1995; Draft Final Closure Reports completed September 1995.	Two 25-foot vertical borings and eight 5-foot auger borings were drilled; 70 soil/ sediment samples were collected and analyzed for metals, hexavalent chromium, pH, grain size distribution and moisture content.	A recommendation of no further action (NFA) was submitted to TNRCC for six of the nine sites. Interim Corrective Measures (ICMs) were performed at each of the three remaining sites. TNRCC is currently reviewing the RFIs and ICM Closure Plans.

TABLE I.1.1-2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL-PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL-PX-03	AOC 13: Former Cooling Tower in Zone 12	Draft RFI completed October 1993.	Five borings drilled to depths of 50 to 60 feet below the ground surface. One boring drilled to a depth of 298 feet below ground surface and completed into a monitoring well as part of the Zone 12 Groundwater Investigation (AL-PX-06). Chemical and physical samples were collected from each boring at incremental depths. Results evaluated to determine contamination present in near-surface and subsurface soils; low levels of metals, VOCs, semivolatile organic compounds (SVOCs), and HEs found. Treatability Study fieldwork began in May 1996; soils to be analyzed for total and hexavalent chromium.	Recommended for NFA; attainment of Risk Reduction Standard (RRS) 1 or 2, as applicable, achieved. Regulatory approval is pending. Treatability/remediation activities will continue into 1997.

TABLE I.1.1–2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL–PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL-PX 04	SWMU 140: Old Sewage Treatment Plant Sludge Beds	Draft RFI completed June 1994.	Two samples were taken from each of the six sludge bed cells, one from near each inlet and one from near each outlet, for a total of 12 samples. These samples were taken at depths of 0.3 to 1.5 feet above the concrete flooring, and analyzed for VOCs, SVOCs, HEs, metals, pesticides, and PCBs. Seven subsurface borings were drilled to depths of 31.5 to 33 feet below ground surface; 35 samples were analyzed for the same contaminants as surface samples.	Corrective Measures Study for OSTP Sludge Beds and adjacent subsurface soils is not recommended. No polychlorinated biphenyls (PCBs), SVOCs, or pesticides were detected above their quantification limits in subsurface soil samples. No HEs were detected in laboratory analysis of the borings. Recommended for NFA. Regulatory approval is pending.
AL PX-05	AOC 11: Fire Training Area Burn Pits	Draft Final Closure Report completed November 1995.	ICM completed in July 1995. Removed the top two feet of soil and backfill and replaced with clean topsoil.	Draft Final ICM Closure Report submitted to TNRCC in November 1995.

TABLE I.1.1-2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL-PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL-PX-06	Zone 12 North Groundwater	Draft RFI completed November 1995.	Characterization of both the groundwater contamination and the source (various SWMUs). A dual phase groundwater extraction/soil vapor extraction treatability system has been installed and implemented to determine the feasibility of several remediation options, including pump and treat, soil vapor extraction of the vadose and dewatered zones, and oxygen augmentation of the vadose and dewatered zones. Injection began in April 1996; initial results indicate that the system is injecting 42,000 gallons/day of treated water into the injection well.	Burning Ground: The presence of contaminants at depth in soil borings indicates a possibility of contaminant leaching into the perched aquifer with time. High Priority Potential Release Sites: The low concentrations and shallow depth of the contamination found during this investigation make it unlikely that any of the sites have contributed to Zone 12 Groundwater contamination. Former Cooling Tower: This area is unlikely to be a significant source of contaminants to Zone 12 Groundwater. Old Sewage Treatment Plant Sludge Beds: Unlikely to be a significant source of contaminants to Zone 12 Groundwater. Fire Training Area Burn Pits: Because of the shallow nature of contamination at this site, it has been concluded that the contamination does not pose a likely threat to Zone 12 Groundwater. Landfills: The findings for Landfill 3 (SWMU 54) identified possible sources of groundwater contamination. Ditches and Playas: Areas of Pantex Plant that may affect Zone 12 Groundwater include areas drained by Flow Systems 1 and 4. Firing Sites: It has been determined that the existing contamination has limited vertical extent and poses little risk to Zone 12 Groundwater. Leaking UST Sites at Buildings 12-35 and 16-1: Benzene has been detected at concentrations of concern in well PTX10-1013 near Building 12-35. Miscellaneous HEs/Radiation Sites: HEs have been detected at depths approaching 100 feet. The vertical extent of contamination has not been determined in the area of Buildings 12-24 and 12-43. These areas may be potential sources of HE contamination in the groundwater. Miscellaneous Chemical Spills/Release Sites: Contamination has been determined to be of a surficial nature that poses little threat to Zone 12 Groundwater. Supplemental Verification Sites: Based on the shallow nature of the contamination, these sites pose little threat to Zone 12 Groundwater. USTs at Other Location: The limited extent and low concentration of contamination at these UST sites have been determined to pose no present or future threat to Zone 12 Groundwater. Hypalon Pond: Several inorganic and organic constituents were found in the soil in excess of closure plan target levels. Low concentrations of 1,2-dichloroethane and trichloroethane were detected at similar concentrations in other Pantex Plant groundwater monitoring wells located upgradient of the 11-14 Pond. Therefore, the constituents detected in the groundwater do not appear attributable to the pond operations.

TABLE I.1.1–2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL–PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL–PX–07	Landfills	Draft Final RFIs completed: June 1995 (Group I Landfills); January 1996 (Group II Landfills); June 1996 (Group III Landfills).	Pending TNRCC response.	Recommendation for NFA for Landfill Nos. 4 and 11 (Group I) was submitted to TNRCC on June 28, 1995. A Draft Final RFIR recommending NFA for Landfills 5, 6, 7, 9, 10, 12, and 15 (Group II) was submitted to TNRCC on January 15, 1996. A Draft Final RFIR for Landfills 1, 2, 3, 13, Original, Abandoned Zone 10, and Sanitary Landfills (Group III) was submitted to TNRCC in June 1996. This RFIR recommended NFA for many of the landfills; however, Landfill 3 may require additional corrective measures.
AL–PX–08	Ditches and Playas	Draft RFI completed September 1995.	Compilation of all data relevant to ditches and playas; evaluation of contaminants of potential concern; and determination of analytes of potential concern, contaminants of concern (COC), the nature and extent of contamination, and further action areas.	Flow System 1, Flow Pathway 1A: Several inorganic and organic COCs were detected in concentrations exceeding the cleanup criteria. Many of these exceedances were found in the source area near Building 11–44. For many of these COCs, contamination extends from this area downstream to SWMUs 12 and the western ditch of SWMU 5/13. Flow Pathway 1B: Several COCs were determined to be present at levels reasonably exceeding the cleanup criteria in SWMU 5/1. However, the contamination does not appear to have migrated very far downstream and, therefore, no further action is necessary for SWMU 5/13. Flow Pathway 1C: COCs include inorganics, pesticides, PCBs, SVOCs, and HE. For several portions of this flow pathway, further action is recommended in conjunction with building closures in those areas. In some cases, there is insufficient information to determine the extent of contamination above the decision criteria; additional sampling may be necessary. Playa 1A Area: Further action is recommended for inorganics and pesticides. Flow System 2: No further action is recommended due to the fact that no target analytes exceed the cleanup criteria. Flow System 3: Contaminants in areas requiring further action are barium and thallium in concentrations reasonably above the cleanup criteria. Further action is recommended for SWMU 8 (Playa 3). Flow System 4: Contaminants in areas requiring further action include chromium, cadmium, and antimony at SWMU 5/6; chromium and antimony at SWMU 5/8; antimony at SWMU 5/9; SWMU 5/15, portions of SWMU 5/12 that flow to Playa 4; and vanadium and antimony at SWMU 5/11. Further action is required for chromium in Playa 4. Flow System 5: Contaminants in areas requiring further action are chromium and mercury in SWMU 5/10; and antimony, cadmium, and chromium at several locations in SWMU 10 (Pantex Lake).
AL–PX–09				

TABLE I.1.1–2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL–PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL–PX–10	Leaking Underground Storage Tanks	Draft Final Corrective Action Plan completed in October 1994.	Five USTs removed from Building 12–35 in 1988 and two USTs were removed from Building 16–1 in 1989. Benzene levels below the site in the perched aquifer exceed RRSs and will be addressed in the Zone 12 groundwater assessment.	Recommend NFA.
AL–PX–11	Miscellaneous Explosive/Radiation Sites	Draft Final RFIR completed in January 1996. Final RFIR to be completed after comments have been received.	An expedited ICM and hotspot activities will begin in October 1996. A feasibility study will be conducted for treatment of HE-contaminated soil followed by an insitu treatability study scheduled for last quarter 1996 and first quarter 1997.	Following successful completion of the feasibility study, and with TNRCC approval, appropriate further recommendations will be proposed.
AL–PX–12	SWMU 84	Draft RFI completed August 1995 and is currently under review by TNRCC.	Soil gas surveys, sediments sampling, surface and subsurface soil sampling.	Additional characterization of PCBs to the immediate north and west of PTX12–2004 is recommended to define surface soil impacts.
	SWMU 143		Soil gas surveys, sediments sampling, surface soil sampling, and soil borings.	This SWMU has not been characterized to background for several analytical groups, including pesticides, PCBs, and metals. Further sampling is recommended to define the extent of constituents identified. Leachability studies of the soils at this site may support NFA. Surface samples northwest of this SMWU should include PCB analysis.

TABLE I.1.1-2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL-PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL-PX-12 (Continued)	SMWU 103		Soil gas surveys, sediments sampling, surface soil sampling, and soil borings.	No additional site characterization is recommended.
	AOC 14		Surface soil samples, shallow soil borings	Since extent of lead contamination is known, no additional site characterization is recommended. Leachability studies for lead could be used to support a subsequent recommendation for NFA.
	SMWU 113		Surface soil samples, soil borings	The extent of soil contamination by the Risk Drivers for the site has not been defined; therefore, additional site characterization is recommended. Since site is active, it is further recommended that any additional characterization be deferred until after operations cease.
	AOC 1		Sediment sampling, surface soil sampling, and soil boring	Additional surface soil samples are recommended to define lateral extent of PCBs.
	AOC 2		Investigation of past waste management practices.	Recommended for NFA and approved by TNRCC. Will not be considered further in the RFI/Corrective Measures Study (CMS) process.
	AOC 5		Sediment sampling, surface soil sampling, and shallow soil borings	No additional site characterization is recommended.
	Capacitor Bank Rupture in Zone 12		Sediment sampling, surface soil sampling, and soil borings	Recommended that no additional site characterization be conducted.
	AOC 3 (a)		Surface soil samples, and shallow soil borings	No further site characterization sampling is recommended. Leachability studies for soils are recommended at the site.
	AOC 3 (b)		Surface soil sampling, and shallow soil borings	Additional surface soil analysis using Synthetic Precipitation Procedure is recommended to define lateral extent of mercury and lead.
	AOC 7 (a)		Surface soil sampling, and soil borings	Recommended for NFA.
	AOC 7 (b)		Surface soil sampling, and soil borings	Recommended for NFA.
	AOC 7 (c)		Sediment sampling, surface soil sampling, and soil borings	Recommended for NFA.
	AOC 8 (a/b)		Soil gas survey, surface soil sampling, and soil borings	NFA recommended for Drum and Storage Pads 11–12 and 11–13 as drum storage areas. Any additional investigations can be more appropriately addressed under the Misc. HE/Radiation Release Sites RFI.

TABLE I.1.1-2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL-PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL-PX-12 (Continued)	AOC 8 (c)		Soil gas survey, surface soil sampling, and soil borings	Recommended for NFA.
	AOC 8 (d)		Soil gas survey, sediment sampling, surface soil sampling, and soil borings	Recommended for NFA.
	AOC 8 (e)		Soil gas survey, surface soil sampling, and soil borings	No further characterization is recommended.
	AOC 10 (a)		Sediment sampling, surface soil sampling, and soil borings	Additional surface sampling is recommended for HE and pesticides to the north along the drainages, and to the south, east, and west of Buildings 12-43 and 12-43A. Subsurface sampling for pesticides is also recommended in the area. HE contamination should be addressed by Misc. HE/Radiation Release Sites RFI. No additional sampling is recommended for PCBs.
	AOC 10 (b)		Surface soil sampling, and soil borings	Additional site characterization is recommended to define the extent of pesticide contamination.
	AOC 15		Sediment sampling, surface soil sampling, and soil borings	Additional characterization is needed to define vertical and lateral extents of benzo(a)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene. Additional characterization is needed to define the extent of pesticide contamination. Additional characterization is needed to determine lateral extent of PCB contamination.
	Evaporation Pits Near Bldg 11-20		Sediment sampling, and soil borings	No further characterization is recommended.
	Former Leaching Bed Near Bldg 11-36		Sediment sampling, surface soil sampling, and soil borings	No additional characterization is recommended for this site.
	Building 12-5 Sump		Surface soil samples and shallow subsurface soil samples	Collection of additional data is recommended to verify the Building 12-5 Sump as a source and to determine the extent of contamination. Additional surface soil samples should be analyzed for cadmium, chromium, and nickel, and leachability studies for surface soils are recommended for lead. Future investigations of this site will be addressed under the Ditches and Playas RFI.
AL PX 13	Supplemental Verification Sites	Draft Final RFIR completed May 1996.		Recommend for NFA.

TABLE I.1.1–2.—*RCRA Facility Investigation Summary Information for Solid Waste Management Units*-Continued

ALL–PX	SWMU/AOC/MISC	STATUS	ACTIONS TAKEN	RECOMMENDATIONS
AL-PX-14	USTs at Other Locations			Recommend NFA for all USTs. Regulatory approval is pending.

Sources: Argonne 1995; EEI 1995; IT 1995; IT 1995a; Radian 1995; Pantex 1994

TABLE I.1.2.1-1.—*Radionuclide Sample Locations Collected from 1988 to 1993*

AREA OF SAMPLE LOCATIONS	NUMBER OF SAMPLE LOCATIONS IN THE AREA		
	URANIUM-234	URANIUM-238	PLUTONIUM-239/240
Firing Site 4	1	1	1
Firing Site 5	9	9	9
Firing Site 10	5	5	5
Burning Ground	4	4	4
Offsite	32	32	32

TABLE I.1.2.1-2.—*Number of Sample Locations for New Chemicals of Potential Concern and Non-Routine Sample Locations for Routine Chemicals of Potential Concern*

AREA OF SAMPLE LOCATIONS	NUMBER OF SAMPLE LOCATIONS IN THE AREA				
	RADIONUCLIDES[1]	TRITIUM	METALS[2]	EXPLOSIVES[3]	VOCs[4]
Firing Site 4	0	0	0	0	0
Firing Site 5	0	0	0	0	0
Firing Site 10	0	0	0	0	0
Burning Ground	7	10	10	10	0
Playa 1	2	0	0	0	0
Playa 2	1	0	0	0	0
Playa 3	2	2	2	2	NK[5]
Offsite	1	2[5]	2	2	NK[5]

[1]Radionuclides includes Uranium-234, Uranium-238, and Plutonium-239/240.
[2]Metals include aluminum, boron, cadmium, chromium, cobalt, copper, magnesium, manganese, molybdenum, mercury, nickel, silver, and zinc.
[3]Explosives include RDX, HMX, PETN, and TNT.
[4]VOCs include 1,1,1-Trichloroethane, 1,2-Dichloroethane, 1,2-Dichloropropane, Benzene, Bromomethane, Carbon Tetrachloride, Chlorobenzene, Chloroform, Ethylbenzene, Methylene Chloride, Perchloroethylene, Styrene, Toluene, Total Xylenes, Trichloroethylene, Trichlorofluoromethane, and Vinyl Chloride.
[5]NK = Not Known. Because all VOCs were non-detects, detailed information on sample locations were not provided.
Source: DOE 1995b; DOE 1994b

TABLE I.1.2.1–3.—*Summary of 1994 Concentration Averages and Historical Averages for Radionuclides in Soils*

AREA/ SAMPLE NO.	URANIUM–234				URANIUM–238				U-234:U-238 RATIO	PLUTONIUM 239/240				TRITIUM			
	1994 AVERAGE (pCi/g)		HISTORICAL AVERAGE[5] (pCi/g)		1994 AVERAGE (pCi/g)		HISTORICAL AVERAGE[5] (pCi/g)		1994 SITE AVERAGE	1994 AVERAGE (pCi/g)		HISTORICAL AVERAGE (pCi/g)		1994 AVERAGE (pCi/g)		HISTORICAL AVERAGE (pCi/g)	
Firing Site 4									0.21								
FA-SS-01	1.02	±0.16	4.96	±0.53	6.33	±0.60	35.8	±2.45		0.03	±0.03	0.01	±0.02	NS[3]		NS[3]	
Average			4.96	±0.53			35.8	±2.45									
Firing Site 5									0.21								
FB-SS-01	5.13	±0.55	3.86	±0.33	38.6	±3.30	26.2	±1.07		0.03	±0.02	0.01	±0.02	NS[3]		NS[3]	
FB-SS-02	0.84	±0.13	1.67	±0.21	5.36	±0.49	9.27	±0.62		0.04	±0.03	0.01	±0.02	NS[3]		NS[3]	
FB-SS-03	0.84	±0.13	1.36	±0.18	4.93	±0.47	6.93	±0.43		0.03	±0.02	0.02	±0.02	NS[3]		NS[3]	
FB-SS-04	0.9	±0.15	1.31	±0.17	5.85	±0.57	6.02	±0.36		0.03	±0.03	0.02	±0.02	NS[3]		NS[3]	
FB-SS-05	1.19	±0.17	3.09	±0.42	8.02	±0.71	20.7	±1.26		0.04	±0.03	0.01	±0.02	NS[3]		NS[3]	
FB-SS-06	0.49	±0.10	1.66	±0.18	2.4	±0.27	5.3	±0.40		0.03	±0.03	0.01	±0.02	NS[3]		NS[3]	
FB-SS-07	0.42	±0.09	0.99	±0.16	2.04	±0.23	3.25	±0.29		0.03	±0.03	0.01	±0.02	NS[3]		NS[3]	
FB-SS-08	0.35	±0.08	0.82	±0.14	0.92	±0.14	2.06	±0.22		0.03	±0.03	0.01	±0.02	NS[3]		NS[3]	
FB-SS-09	1.16	±0.16	3.01	±0.26	7.48	±0.68	18.8	±1.05		0.03	±0.03	0.01	±0.02	NS[3]		NS[3]	
Average			1.97	0.23			10.95	0.63				0.01	0.02				
Firing Site 10									0.43								
FC-SS-01	0.33	±0.08	0.85	±0.14	1.14	±0.17	2.11	±0.21		0.04	±0.05	0.02	±0.02	NS[3]		NS[3]	
FC-SS-02	0.21	±0.06	0.78	±0.13	0.44	±0.09	1.52	±0.19		0.03	±0.03	0.02	±0.02	NS[3]		NS[3]	
FC-SS-03	0.18	±0.06	0.85	±0.15	0.26	±0.07	1.28	±0.15		0.02	±0.03	0.02	±0.02	NS[3]		NS[3]	
FC-SS-04	0.59	±0.10	1.16	±0.16	2.91	±0.31	4.55	±0.32		0.02	±0.03	0.01	±0.02	NS[3]		NS[3]	
FC-SS-05	0.39	±0.09	1.77	±0.17	1.43	±0.19	12.3	±0.39		0.04	±0.03	0.01	±0.02	NS[3]		NS[3]	
Average			1.08[2]	0.15			4.35	0.25				0.02	0.02				
Burning Ground									1.03								
BG-SS-01	0.3	±0.07	0.55	±0.12	0.35	±0.07	0.7	±0.13		0.02	±0.02	0.01	±0.02	0.16	±0.56	NS[2]	
BG-SS-02	0.39	±0.08	0.56	±0.12	0.46	±0.08	0.64	±0.12		0.02	±0.03	0.01	±0.02	-0.03	±0.56	NS[2]	
BG-SS-03	0.34	±0.07	0.62	±0.13	0.34	±0.07	0.78	±0.14		0.05	±0.03	0.02	±0.02	NS[3]		NS[2]	
BG-SS-04	0.31	±0.07	0.67	±0.14	0.33	±0.07	1.14	±0.15		0.04	±0.03	0.02	±0.02	0.12	±0.61	NS[2]	

TABLE I.1.2.1-3.—*Summary of 1994 Concentration Averages and Historical Averages for Radionuclides in Soils*-Continued

AREA/ SAMPLE NO.	URANIUM-234 1994 AVERAGE (pCi/g)		URANIUM-234 HISTORICAL AVERAGE[5] (pCi/g)		URANIUM-238 1994 AVERAGE (pCi/g)		URANIUM-238 HISTORICAL AVERAGE[5] (pCi/g)		U-234:U-238 RATIO 1994 SITE AVERAGE	PLUTONIUM 239/240 1994 AVERAGE (pCi/g)		PLUTONIUM 239/240 HISTORICAL AVERAGE (pCi/g)		TRITIUM 1994 AVERAGE (pCi/g)		TRITIUM HISTORICAL AVERAGE (pCi/g)	
BG-SS-05	0.33	±0.09	FS[2]		0.42	±0.08	FS[2]			0.04	±0.04	FS[2]		0.13	±0.65	FS[2]	
BG-SS-06	0.49	±0.09	FS[2]		0.47	±0.09	FS[2]			0.03	±0.04	FS[2]		0.14	±0.49	FS[2]	
BG-SS-07	0.41	±0.08	FS[2]		0.42	±0.08	FS[2]			0.02	±0.03	FS[2]		0.06	±0.48	FS[2]	
BG-SS-08	0.52	±0.10	FS[2]		0.51	±0.09	FS[2]			0.03	±0.04	FS[2]		0.27	±0.54	FS[2]	
BG-SS-09	0.37	±0.08	FS[2]		0.4	±0.08	FS[2]			0.02	±0.03	FS[2]		0.23	±0.46	FS[2]	
BG-SS-10	0.48	±0.10	FS[2]		0.51	±0.10	FS[2]			0.01	±0.03	FS[2]		0.25	±0.56	FS[2]	
BG-SS-11	0.43	±0.09	FS[2]		0.44	±0.09	FS[2]			0.01	±0.03	FS[2]		0.11	±0.62	FS[2]	
Average			0.6	0.13			0.82	0.14				0.02	0.02	0.14	0.55		
Playa 1									1.30[4]								
P1-SS-01	0.73	±0.13	FS[2]		0.43	±0.09	FS[2]			0.02	±0.03	FS[2]		NS[3]		NS[3]	
P2-SS-02	1.44	±0.20	FS[2]		0.76	±0.13	FS[2]			0.02	±0.03	FS[2]		NS[3]		NS[3]	
Average	1.09	±0.17			0.595	0.11				0.02	±0.03						
Playa 2									0.59[4]								
P2-SS-01	0.28	±0.08	FS[2]		0.27	±0.07	FS[2]			0.05	±0.04	FS[2]		NS[3]		NS[3]	
Playa 3									0.86[4]								
P3-SS-01	0.49	±0.10	FS[2]		0.39	±0.09	FS[2]			0.03	±0.03	FS[2]		0.05	±0.57	FS[2]	
P3-SS-02	0.49	±0.10	FS[2]		0.46	±0.09	FS[2]			0.04	±0.04	FS[2]		0.12	±0.62	FS[2]	
Average	0.49	±0.10			0.43	±0.09				0.04	±0.04			0.09	±0.60		
Offsite Averaged	0.25	±0.07	0.61[6]	±0.12[6]	0.21	±0.07	0.64[6]	±0.12[6]	1.22	0.02	±0.03	0.01[6]	±0.02[6]	NS[3]		NS[3]	
Bushland									1.07								
OS-SS-32	0.35	±0.08	0.58	±0.11	0.33	±0.08	0.74	±0.11		0.02	±0.03	0.01	±0.02	0.16	±0.90	FS[2]	
PB-SS-01	0.32	±0.07	FS[2]		0.34	±0.07	FS[2]			0.03	±0.03	FS[2]		0.10	±1.04	FS[2]	

[1](±): Counting error at 95% confidence level.
[2]FS = first year sampled.
[3]NS = no sample collected.
[4]Ratios were not provided in the *1994 Environmental Report for Pantex Plant* (DOE 1995b). The most conservative ratio was calculated using 1994 sample averages.
[5]Historical averages were calculated using routine surveillance data from 1988–1993 provided in the *1994 Environmental Report for Pantex Plant*. (DOE 1995b)
[6]Averages were not provided in the *1994 Environmental Report for Pantex Plant* (DOE 1995b) and were calculated.
Source: DOE 1995b:12-8 through 12-14

TABLE I.1.2.1–4.—*Summary of 1994 Concentration Averages for Metals in Soils*

AREA / SAMPLE NO.	ALUMINUM (mg/kg)		BORON[7] (mg/kg)		CADMIUM (mg/kg)		CHROMIUM[4] (mg/kg)		COBALT (mg/kg)		COPPER (mg/kg)		MAGNESIUM (mg/kg)		MANGANESE (mg/kg)		MOLY-BDENUM (mg/kg)		MERCURY (mg/kg)		NICKEL (mg/kg)		SILVER (mg/kg)		ZINC (mg/kg)	
"CLEANUP" LEVELS[2]																										
Surf Soil (0'-2')	not determined		not determined		1.59		27.8[5]		not determined		19.4		not determined		not determined		not determined		0.2		21.5		51.1		3070	
Subsurf Soil (2'-432')	not determined		not determined		4.0		69.0[5]		not determined		48.6		not determined		not determined		not determined		0.2		55.0		51.1		3070	
RBC LEVELS[3]																										
Industrial	1,000,000		180,000		not reported		not reported		120,000		not reported		not determined		10,000		10,000		not reported		not reported		not reported		not reported	
Residential	78,000		7,000		not reported		not reported		4,700		not reported		not determined		390		390		not reported		not reported		not reported		not reported	
BURNING GROUND																										
BG-SS-01	16,333	±3,300	NC[1]		NC[1]		21	±7.6	6.7	±0.7	14	±1.4	3,200	±350	330	±47	NC[1]		NC[1]		13	±1.9	NC[1]		52	±5.6
BG-SS-02	13,485	±4,200	NC[1]		0.7	±0.1	20	±8.7	7.1	±0.8	13	±2.8	2,800	±530	450	±54	NC[1]		NC[1]		13	±2.2	NC[1]		51	±11.0
BG-SS-04	15,116	±5,600	NC[1]		NC[1]		21	±9.1	7.3	±0.6	13	±1.4	2,800	±670	420	±31	NC[1]		NC[1]		14	±2.2	NC[1]		49	±12.0
BG-SS-05	16,350	±4,000	13	±7	0.7	±0.1	20	±7.2	7.5	±0.9	14	±1.7	3,000	±570	440	±45	NC[1]		NC[1]		13	±1.6	NC[1]		55	±8.7
BG-SS-06	13,842	±3,300	NC[1]		NC[1]		20	±6.6	7.7	±0.5	11	±1.3	2,300	±370	480	±48	NC[1]		NC[1]		13	±2.8	NC[1]		47	±6.9
BG-SS-07	15,342	±2,900	NC[1]		NC[1]		20	±5.0	7.8	±0.2	13	±5.2	2,500	±570	480	±48	NC[1]		NC[1]		14	±1.5	NC[1]		50	±4.3
BG-SS-08	14,850	±2,600	NC[1]		NC[1]		20	±5.8	7.5	±0.5	12	±0.9	2,500	±390	460	±40	NC[1]		NC[1]		13	±1.9	NC[1]		51	±3.6
BG-SS-09	15,283	±3,800	NC[1]		NC[1]		21	±7.6	7.4	±0.5	12	±0.8	2,600	±470	440	±37	NC[1]		NC[1]		14	±2.4	NC[1]		49	±5.4
BG-SS-10	17,700	±2,000	NC[1]		NC[1]		22	±5.3	7.6	±0.5	13	±0.4	3,000	±170	430	±33	NC[1]		NC[1]		15	±1.6	NC[1]		52	±4.6
BG-SS-11	15,316	±7,700	NC[1]		NC[1]		19	±7.7	7.9	±1.6	13	±3.4	2,800	±1,100	520	±150	NC[1]		NC[1]		13	±3.6	NC[1]		52	±14.0
PLAYA 3																										
P3-SS-01	19,250	±4,900	NC[1]		---[1]		22	±6.6	9.6	±3.0	18	±1.8	3,800	±620	640	±310	NC[1]		NC[1]		16	±2.4	NC[1]		73	±13.0
P3-SS-02	15,085	±5,000	NC[1]		0.8	±0.2	18	±8.6	6.5	±0.9	15	±2.4	2,700	±620	280	±120	NC[1]		NC[1]		12	±2.1	NC[1]		76	±18.0
OFFSITE (BUSHLAND)																										
OS-SS-32	19,000	±3,600	NC[1]		NC[1]		26	±6.1	7.2	±0.9	15	±1.5	3,800	±460	380	±120	NC[1]		NC[1]		14	±0.6	NC[1]		54	±4.4
PB-SS-01	21,000	±4,000	NC[1]		NC[1]		26	±7.2	7.1	±0.9	16	±5.9	4,000	±500	390	±190	NC[1]		NC[1]		14	±1.5	NC[1]		58	±9.2

[1]NC = mean was not calculated if fewer than four observations were above detection limits.
[2]"Cleanup" Levels are based on TNRCC Risk Reduction Standards (DOE 1994).
[3]EPA III - Risk Based Concentrations (RBCs): Soil Ingestion by Residential Standards (EPA 1995). RBCs were reported in the table only if "cleanup" levels were not determined for that parameter.
[4]Assume metal is Chromium III. Note: "Cleanup" levels for Hexavalent Chromium is 10 mg/kg for surface and subsurface soils. RBCs for Chromium IV is 10,000 mg/kg for Industrial levels and 390 mg/kg for Residential levels.
[5]"Cleanup" Levels for Chromium IV are 10 mg/kg for both surface and subsurface soils.
[6]RBC Levels for Chromium IV: Industrial is 10,000 mg/kg and Residential is 390 mg/kg.
[7]Boron, listed in summary table 12.7 in *1994 Environmental Report for Pantex Plant* (DOE 1995b) as a metal, is not a metal.
Note that shaded sample concentrations are above the Residential RBC levels (taking deviation values into account).
Sources: DOE 1995b:12-15 through 12-19; DOE 1994; EPA 1995

TABLE I.1.2.1-5.—*Summary of 1994 Concentration Averages for Explosive Compounds in Soils*

AREA/SAMPLE NO.	HMX[4] (mg/kg)	RDX[5] (mg/kg)	PETN (mg/kg)	TNT (mg/kg)
"CLEANUP" LEVELS[2]				
Surface Soil (0'-2')	not determined	not determined	not determined	5.1
Subsurface Soil (2'-432')	not determined	not determined	not determined	5.1
RBCs[3]				
Industrial Levels	100,000	52	not determined	not reported
Residential Levels	3,900	5.8	not determined	not reported
BURNING GROUND				
BG-SS-01	NC[1]	NC[1]	NC[1]	NC[1]
BG-SS-02	0.11	NC[1]	NC[1]	NC[1]
BG-SS-04	0.53	NC[1]	NC[1]	NC[1]
BG-SS-05	3.54	NC[1]	NC[1]	NC[1]
BG-SS-06	NC[1]	NC[1]	NC[1]	NC[1]
BG-SS-07	NC[1]	NC[1]	NC[1]	NC[1]
BG-SS-08	0.14	NC[1]	NC[1]	NC[1]
BG-SS-09	NC[1]	NC[1]	NC[1]	NC[1]
BG-SS-10	NC[1]	NC[1]	NC[1]	NC[1]
BG-SS-11	NC[1]	NC[1]	NC[1]	NC[1]
PLAYA 3				
P3-SS-01	NC[1]	NC[1]	NC[1]	NC[1]
P3-SS-02	NC[1]	NC[1]	NC[1]	NC[1]
Offsite				
Bushland				
OS-SS-32	NC[1]	NC[1]	NC[1]	NC[1]
PB-SS-01	NC[1]	NC[1]	NC[1]	NC[1]

[1]NC = mean was not calculated if fewer than four observations were above detection limits.
[2]"Cleanup" Levels are based on TNRCC Risk Reduction Standards (DOE 1994).
[3]EPA III - Risk Based Concentrations (RBCs): Soil Ingestion by Residential Standards (EPA 1995).
[4]HMX (High Melting Explosives) - Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazoine.
[5]RDX (Research Developed Explosives) - Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Sources: DOE 1995b:12-20, 12-21; DOE 1994; EPA 1995

TABLE 1.1.2.1–6.—*Backup Calculations of Historical Averages*[1] *for Offsite Samples Including Bushland*

NO.	SAMPLE NO.	U-234 (pCi/g)		U-238 (pCi/g)		P-239/240 (pCi/g)	
		CONCENTRATION	DEVIATION	CONCENTRATION	DEVIATION	CONCENTRATION	DEVIATION
1	OS-SS-01	0.68	0.11	0.66	0.12	0.01	0.02
2	OS-SS-04	0.64	0.12	0.73	0.13	0.01	0.01
3	OS-SS-05	0.59	0.12	0.64	0.12	0.01	0.02
4	OS-SS-10	0.61	0.11	0.66	0.12	0.01	0.02
5	OS-SS-18	0.65	0.13	0.63	0.13	0.01	0.02
6	OS-SS-20	0.70	0.12	0.75	0.13	0.01	0.02
7	OS-SS-21	0.56	0.13	0.53	0.11	0.02	0.02
8	OS-SS-22	0.60	0.14	0.61	0.12	0.02	0.02
9	OS-SS-24	0.55	0.12	0.60	0.13	0.01	0.02
10	OS-SS-25	0.58	0.12	0.61	0.12	0.02	0.02
11	OS-SS-27	0.56	0.12	0.58	0.12	0.01	0.02
12	OS-SS-28	0.52	0.10	0.55	0.11	0.01	0.01
13	OS-SS-29	0.69	0.13	0.73	0.13	0.01	0.02
14	OS-SS-30	0.61	0.12	0.65	0.13	0.01	0.02
15	OS-SS-31	0.59	0.12	0.61	0.13	0.02	0.02
16	OS-SS-32	0.58	0.11	0.74	0.11	0.01	0.02
	PB-SS-01	n/a	n/a	n/a	n/a	n/a	n/a
	Averages[1]	0.61	0.12	0.64	0.12	0.01	0.02

[1] Averages were calculated.

Source: DOE 1995b:12-9 through 12-14

TABLE I.1.2.4–1.—*Summary of 1994 Results of Radionuclides in Soils*

AREA / SAMPLE NO.	URANIUM - 234						URANIUM - 238						PLUTONIUM 239/240						TRITIUM				
	1994 AVG. (pCi/g)		1994 MAXIMUM[10] (pCi/g)		HIST. AVG.[5] (pCi/g)		1994 AVG. (pCi/g)		1994 MAXIMUM[10] (pCi/g)		HIST. AVG.[5] (pCi/g)		1994 AVG. (pCi/g)		1994 MAXIMUM[10] (pCi/g)		HIST. AVG.5 (pCi/g)		1994 AVG. (pCi/g)		1994 MAXIMUM[10] (pCi/g)		HIST. AVG. (pCi/g)
Firing Site 4	1.02[4]	±0.16[4]	3.22	±0.32	4.96[4]	±0.53[4]	6.33[4]	±0.604	20.57	±1.62	35.8[4]	±2.45[4]	0.03[4]	0.03[4]	0.09	±0.07	0.01[4]	±0.02[4]	NS[3]		NS[3]		NS[3]
Firing Site 5	1.21[4]	±0.17[4]	12.84	±1.45	1.97	±0.23	8.06[4]	±0.73[4]	92.52	±8.97	10.95	±0.6[3]	0.03[4]	0.03[4]	0.15	±0.05	0.01	±0.02	NS[3]		NS[3]		NS[3]
Firing Site 10	0.34[4]	±0.08[4]	0.80	±0.14	1.08	±0.15	1.22[4]	±0.16[4]	4.28	±0.44	4.35	±0.25	0.03[4]	0.03[4]	0.17	±0.05	0.02	±0.02	NS[3]		NS[3]		NS[3]
Burning Ground	0.39[4]	±0.08[4]	22.8	±1.71	0.6[7]	±0.13[7]	0.46[4]	±0.08[4]	4.89	±0.42	0.82	±0.14	0.02[4]	0.03[4]	0.12	±0.04	0.02	±0.02	0.14[6]	±0.55[6]	2.63	±1.37	FS[2]
Playa 1	1.09[6]	±0.17[6]	2.75	±0.27	FS[2]		0.60[6]	±0.11[6]	1.32	±0.16	FS[2]		0.02[6]	0.03[6]	0.06	±0.05	FS[2]		NS[3]		NS[3]		NS[3]
Playa 2	0.28[6]	±0.08[6]	0.54	±0.09	FS[2]		0.27[6]	±0.07[6]	0.56	±0.09	FS[2]		0.05[6]	±0.04[6]	0.08	±0.05	FS[2]		NS[3]		NS[3]		NS[3]
Playa 3	0.49[6]	±0.10[6]	1.20	±0.17	FS[2]		0.43[6]	±0.09[6]	1.40	±0.17	FS[2]		0.04[6]	0.04[6]	0.09	±0.05	FS[2]		0.09[6]	±0.60[6]	0.78	±1.37	FS[2]
Offsite	0.25[4]	±0.07[4]	0.84	±0.12	0.61[8]	±0.12[8]	0.21[4]	±0.07[4]	0.69	±0.12	0.64[8]	±0.12[8]	0.02[4]	0.03[4]	0.09	±0.04	0.01[8]	±0.02[8]	NS[3]		NS[3]		NS[3]
Bushland	0.35[4]	±0.08[4]	0.64	±0.10	0.58[9]	±0.11[9]	0.33[4]	±0.08[4]	0.69	±0.12	0.74[9]	±0.11[9]	0.02[4]	0.03[4]	0.07	±0.07	0.01[9]	±0.02[9]	0.1[6]	±1.04[6]	0.94	±1.48	FS[2]

[1](±): Counting error at 95% confidence level.
[2]FS = first year sampled.
[3]NS = no sample collected.
[4]Averages were taken directly from Table 12.9 on page 12-21 of the *1994 Environmental Report for Pantex* unless otherwise indicated (DOE 1995b).
[5]Historial averages for each location were calculated in Table 1 by Tetra Tech using the routine surveillance data from 1988-1993 provided in the *1994 Environmental Report for Pantex Plant* (DOE 1995b).
[6]Averages were not provided in the *1994 Environmental Report for Pantex Plant* (DOE 1995b) but were calculated (See Table I. 1.2.1-3).
[7]This value is based on historical sample locations (BG-SS-01 to -04) because (BG-SS-05 to BG-SS-11) are new sampling locations as of 1994 (See Table I.1.2.1-3).
[8]This value is based on historical sample locations (OS-SS -01,-04,-05,-10,-18,-20,-21,-22,-24,-25,-27 to -32) and was calculated (See Table I.1.2.1-6).
[9]This value is based on historical sample location (OS-SS-32) because (PB-SS-01) is a new sampling location.
[10]Maximum value as reported in the *1994 Environmental Report for Pantex Plant* (DOE 1995b: Tables 12.3, 12.4, 12.5, and 12.6).
Source: DOE 1995b:12-8 through 12-14

TABLE I.1.2.4–2.—*Summary of 1994 Results of Metals in Soils*

AREA	ALUMINUM (mg/kg)	BORON[7] (mg/kg)	CADMIUM (mg/kg)	CHROMIUM[4] (mg/kg)	COBALT (mg/kg)	COPPER (mg/kg)	MAGNESIUM (mg/kg)	MANGANESE (mg/kg)	MOLYBDENUM (mg/kg)	MERCURY (mg/kg)	NICKEL (mg/kg)	SILVER (mg/kg)	ZINC (mg/kg)
"CLEANUP" LEVELS[2]													
Surf Soil (0'-2')	not determined	not determined	1.59	27.8[5]	not determined	19.4	not determined	not determined	not determined	0.2	21.5	51.1	3070
Subsurf Soil (2'-432')	not determined	not determined	4.0	69.0[5]	not determined	48.6	not determined	not determined	not determined	0.2	55.0	51.1	3070
RBCs[3]													
Industrial Levels	1,000,000	180,000	not reported	not reported	120,000	not reported	not determined	10,000	10,000	not reported	not reported	not reported	not reported
Residential Levels	78,000	7,000	not reported	not reported	4,700	not reported	not determined	390	390	not reported	not reported	not reported	not reported
BURNING GROUND													
1994 Mean Avg	15,362 ±3,940	13 ±7	0.7 ±0.1	20 ±7.0	7.5 ±1.0	13 ±2.0	2750 ±519	442 ±52	NC[1]	NC[1]	14 ±2.0	NC[1]	51 ±8.0
1994 Mean Max	17,700 ±2,000	13 ±7	0.7 ±0.1	22 ±5.3	7.9 ±1.6	14 ±1.7	3,200 ±350	520 ±150	NC[1]	NC[1]	15 ±1.6	NC[1]	55 ±8.7
PLAYA 3													
1994 Mean Avg	17,168 ±4,950	NC[1]	0.8 ±0.2	20 ±8.0	8.1 ±2.0	17 ±2.1	2,750 ±620	460 ±215	NC[1]	NC[1]	14 ±2.3	NC[1]	75 ±15.5
1994 Mean Max	19,250 ±4,900	NC[1]	0.8 ±0.2	22 ±6.6	9.6 ±3.0	18 ±1.8	2,800 ±620	640 ±310	NC[1]	NC[1]	16 ±2.4	NC[1]	76 ±18.0
BUSHLAND													
1994 Mean Avg	20,000 ±3,800	NC[1]	NC[1]	26 ±6.7	7.2 ±0.9	16 ±3.7	3,900 ±480	385 ±155	NC[1]	NC[1]	14 ±1.1	NC[1]	56 ±6.8
1994 Mean Max	21,000 ±4,000	NC[1]	NC[1]	26 ±7.2	7.2 ±0.9	16 ±5.9	4,000 ±500	390 ±190	NC[1]	NC[1]	14 ±1.5	NC[1]	58 ±9.2

[1]NC = mean was not calculated if fewer than four observations were above detection limits.
[2]"Cleanup" Levels are based on TNRCC Risk Reduction Standards (DOE 1994).
[3]EPA III - Risk Based Concentrations (RBCs): Soil Ingestion by Residential Standards (EPA 1995).
[4]Assume metal is Chromium III. Note: "Cleanup" levels for Hexavalent Chromium is 10 mg/kg for surface and subsurface soils. RBCs for Chromium IV is 10,000 mg/kg for Industrial levels and 390 mg/kg for Residential levels.
[5]"Cleanup" Levels for Chromium IV are 10 mg/kg for both surface and subsurface soils.
[6]RBC Levels for Chromium IV: Industrial is 10,000 mg/kg and Residential is 390 mg/kg.
[7]Boron, listed in summary table 12.7 in the *1994 Environmental Report for Pantex Plant* (DOE 1995b) as a metal, is not a metal.
Sources: DOE 1995b:12-15 through 12-19; DOE 1994; EPA 1995

TABLE I.1.2.4–3.—*Summary of 1994 Results of Explosives in Soils*

AREA /SAMPLE NO.	HMX[4] (mg/kg)		RDX[5] (mg/kg)	PETN (mg/kg)	TNT (mg/kg)
"CLEANUP" LEVELS[2]					
Surf Soil (0'-2')	not determined		not determined	not determined	5.1
Subsurf Soil (2'-432')	not determined		not determined	not determined	5.1
RBCs[3]					
Industrial Levels	not determined		52	not determined	not reported
Residential Levels	not determined		5.8	not determined	not reported
BURNING GROUND					
1994 Mean Average	1.08	±0.78	NC[1]	NC[1]	NC[1]
1994 Mean Maximum	3.54	±2.47	NC[1]	NC[1]	NC[1]
PLAYA 3					
1994 Mean Average	NC[1]		NC[1]	NC[1]	NC[1]
1994 Mean Maximum	NC[1]		NC[1]	NC[1]	NC[1]
BUSHLAND					
1994 Mean Average	NC[1]		NC[1]	NC[1]	NC[1]
1994 Mean Maximum	NC[1]		NC[1]	NC[1]	NC[1]

[1]NC = mean was not calculated if fewer than four observations were above detection limits.
[2]"Cleanup" Levels are based on TNRCC Risk Reduction Standards (DOE 1994).
[3]EPA III - Risk Based Concentrations (RBCs): Soil Ingestion by Residential Standards (EPA 1995).
[4]HMX (High Melting Explosives) - Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazozine.
[5]RDX (Research Developed Explosives) - Hexahydro-1,3,5-trinitro-1,3,5-triazine.
Sources: DOE 1995b:12-20, 12-21; DOE 1994; EPA 1995

REFERENCES

Argonne 1995 — Argonne National Laboratory and Battelle Memorial Institute, *Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant*, work sponsored by United States Department of Energy, November 1995.

DOE 1994 — DOE Draft Final, *Risk Reduction Rule Guidance for Pantex Plant RCRA Facility Investigations*, prepared by U.S. Army Corps of Engineers, Tulsa District and Mason & Hanger-Silas Mason Co., Inc./Battelle Pantex, Pantex Plant, for the U.S. Department of Energy, Amarillo Area Office Environmental Restoration Program, April 1994.

DOE 1994b — Battelle Pantex and Mason & Hanger-Silas Mason Company, Inc., *1993 Environmental Report for the Pantex Plant*, DOE/AL/65030-9413, prepared under contract DE-AC04-91AL-65030, by Environmental Protection Department, Environment, Safety, and Health Division for U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, Texas, June 1994.

DOE 1995b — Battelle Pantex and Mason & Hanger-Silas Mason Company, Inc., *1994 Environmental Report for the Pantex Plant,* DOE/AL/65030-9506, prepared under Contract DE-AC04-91AL65030, by Environmental Protection Department, Environment, Safety, and Health Division, for U.S. Department of Energy, Albuquerque Operations Office, Amarillo Area Office, Amarillo, TX, June 1995.

EEI 1995 — Ecology and Environment, Inc., Environmental Restoration Program, U.S. Department of Energy, *Draft Final Report for RCRA Facility Investigation at Solid Waste Management Unit 109 Building 12-68, Concrete Sump ADS 1219 (AL-PX-02),* Pantex Plant, Amarillo Texas, under contract to U.S. Army Corps of Engineers Tulsa District, June 1995.

EPA 1995 — EPA, *Risk Based Concentration Table, January to June,* prepared by the U.S. Environmental Protection Agency, Region III, Philadelphia, PA, March 7, 1995.

IT 1995 — IT Corporation, *Draft Final RCRA Facility Investigation Report for the Burning Grounds Assessment ADS 1232 (AL-PX-01),* U.S. Department of Energy Pantex Plant Amarillo, Texas, submitted to U.S. Army Corps of Engineers Tulsa District, Project No. 448109, May 1995.

IT 1995a — IT Corporation, *RCRA Facility Investigation Report for the Miscellaneous Chemical Spills/Releases ADS 1198 (AL-PX-12),* U.S. Department of Energy Pantex Plant Amarillo, Texas, submitted to U.S. Army Corps of Engineers Tulsa District, Project No. 448352, August 1995.

Pantex 1994 — Pantex Plant, Environmental Restoration Program, *Solid Waste Management Unit Reference Guide*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM, September 1994.

Pantex 1996	Pantex Plant, *Environmental Information Document*, prepared for the U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, NM. September 1996.
Radian 1995	Radian Cororation, *Draft RFI Report Pantex RCRA Facility Investigation, AL-PX-8 Ditches and Playas, ADS 1216*, submitted to U.S. Department of Energy Amarillo Area Office, Texas, for U.S. Army Corps of Engineers Tulsa District Tulsa, Oklahoma, September 1995.
SW-846	USEPA, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, SW-846, 3rd Edition, July 1992.

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APPENDIX J

Correspondence with Consulting Agencies

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APPENDIX J
CORRESPONDENCE WITH CONSULTING AGENCIES

This appendix includes correspondence between the U.S. Department of Energy and the agencies listed below. Copies of correspondence are attached.

Environmental Protection Agency, Region 6
Department of Interior, Fish and Wildlife Service (Arlington, TX Office)
Department of Interior, Office of Environmental Policy and Compliance
State of Texas, Office of the Governor, including input from:
- Texas Department of Health
- Texas Natural Resource Conservation Commission
- The University of Texas at Austin, and Texas A&M University
- Texas Parks and Wildlife Department
- Texas Historical Commission

State of Tennessee, Department of Environment and Conservation
State of New Mexico, Environment Department
State of Nevada, Department of Administration
Georgia Department of Natural Resources
Clark County, Department of Comprehensive Planning
All Indian Pueblo Council, Pueblo Office of Environmental Protection

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

JUN 2 8 1996

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Dear Ms. Founds:

In accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality Regulations (CEQ) for Implementing NEPA, the U.S. Environmental Protection Agency (EPA) Region 6 office in Dallas, Texas, has completed its review of the U.S. Department of Energy (DOE) Draft Environmental Impact Statement (DEIS) for continued operation of the Pantex plant and associated nuclear component storage located at the existing Pantex facility near Amarillo, Texas.

EPA classifies your DEIS and proposed action as "EC-2," i.e., EPA has "Environmental Concern" and requests additional information. Although the EPA has no objections to the preferred action alternative, continued operation and storage at the Pantex site; we have identified some environmental concerns and are requesting additional information for clarification purposes. Our classification will be published in the Federal Register according to our responsibility under Section 309 of the Clean Air Act, to inform the public of our views on proposed Federal actions.

Detailed comments identifying our concerns and needed information are provided in an enclosure to assist you in preparation of the Final EIS. Should you have any questions, please contact the appropriate Regional Environmental Review Coordinator, Mike Jansky (EPA Region 6) at (214) 665-7451 or Dave Farrel (EPA Region 9) at (415) 774-1575, for assistance.

We appreciate the opportunity to review the DEIS. We request that you send our office two (2) copies of the Final EIS at the same time that it is sent to the Office of Federal Activities (2251A), EPA, 401 M Street. S.W., Washington, D.C. 20460.

Sincerely yours,

Robert D. Lawrence

Robert D. Lawrence, Chief
Office of Planning and
Coordination

Enclosure

DETAILED COMMENTS
CONTINUED OPERATION OF PANTEX PLANT
DRAFT ENVIRONMENTAL IMPACT STATEMENT

BACKGROUND:

Most nuclear weapons use a nuclear package with two assemblies: a primary assembly is used as the initial energy source while a secondary assembly provides additional explosive energy release. The primary assembly has a central core, called the "pit," surrounded by a layer of high explosives. A "pit" is typically composed of plutonium-239 and other materials. The Department of Energy (DOE) proposes to continue conducting nuclear weapons operations at the Pantex Plant and to increase the on-site interim storage levels of pits from 12,000 to 20,000 pits. The DEIS also evaluates relocation of some or all of the Pantex interim storage activities to 4 alternate sites. The alternative sites include: Savannah River Site near Aiken, South Carolina; the Nevada Test Site near Las Vegas, Nevada; Hanford Site near Richland, Washington; and the Manzano Weapons Area at Kirtland Air Force Base in Albuquerque, New Mexico.

GENERAL COMMENTS:

Pollution Prevention

The EPA would like to commend DOE for Appendix G in Volume II on pollution prevention and waste minimization. We find Appendix G to be comprehensive in scope, informative to the reader, and a model which other DOE NEPA documents may find beneficial.

Interim Storage

The DEIS makes reference to "interim storage"of plutonium pits at three DOE sites (Nevada; South Carolina; Washington State) and a Department of Defense site at Kirtland Air Force Base, New Mexico. However, the DEIS did not define what constitutes "interim storage," either a fixed period of years or decades, or until a permanent storage facility is approved, upgraded or built. If possible, the Pantex FEIS should define the minimum and maximum time limits expected by DOE for "interim storage" (we recognize the difficulty in this because nuclear storage projects often run into problems that delay their proposed timeliness).

Energy Efficiency and Water Conservation

EPA suggests that Appendix G should reference the requirements of Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities (March 8, 1994), particularly for the 6 new construction projects at Pantex listed in Table 3.1.1.1-1 (gas analysis laboratory, materials compatibility assurance facility, etc.) Section 306 of Executive

Order 12902 contains specific requirements regarding the construction of new facilities owned by the United States. Additionally, the Final EIS would be strengthened if it could discuss whether this Executive Order has any implication on the proposed interim storage of plutonium pits in Nevada, South Carolina, New Mexico and Washington State in terms of energy and water conservation.

Plutonium Pit Weight

It would be helpful if the Final EIS could provide the tonnage of the 8,000 to 20,000 pits that would be relocated under the interim pit storage alternative. If allowable under the national security considerations, it is recommended that the FEIS quantify the weight in terms of plutonium, other nuclear material, and other constituents such as Resource Conservation and Recovery Act (RCRA) regulated hazardous waste.

PANTEX ALTERNATIVE
(EPA Region 6)

1. Page 4-57, second paragraph: In this paragraph and at other places in the text it is asserted that the discharge water from the plant meets the surface water quality permit requirements. Because it is acknowledged in the document that leakage from waterways and playas enters the ground, EPA guidelines for ground water quality are of concern here. Under EPA's "Strategy for the 90's" report of the Ground Water Task Force, the Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act (SDWA) are to be used as reference points in evaluating ground water quality. This draft EIS also recognizes the significance of these MCLs when it lists them as "decision criteria" for ground water analyses presented in Volume II. The requirements under the National Pollutant Discharge and Elimination System (NPDES) do not include all of the contaminants for which MCLs have been set for public water supply systems under the Safe Drinking Water Act and in many cases the limits set under NPDES are higher than those under the SDWA. Under these circumstances, we recommend that Pantex consider protecting the ground water by either lining the ditches and playas with impermeable materials or, alternatively, treating the effluent to the level required to maintain, or restore to, SDWA MCLs in the ground water. Discussion on this matter should be included in the Final Statement.

2. Page 4-62, last paragraph: The first bullet describes "unsaturated sands of the Blackwater Draw Formation and upper Ogallala" at the surface, but the diagram on page 4-64 indicates that the Blackwater Draw Formation consists of clay. This inconsistency should be clarified in the Final Statement.

3. Page 4-65, third paragraph: It is stated that the perched aquifer "exhibits radial flow." By way of clarification, the Final EIS should note that the flow is radial from Playa #1,

suggesting that the playa is a major source of recharge locally.

4. Page 4-67: The map illustration depicts a domestic water well to the southeast of the Pantex property, just outside the area of the perched aquifer. The well appears to be in the flow direction of the ground water in the perched aquifer and may be in danger of contamination from ground water in the perched aquifer. The Final EIS should identify the boundaries of the contaminated perched aquifer and establish what risk may exist, if any, for the potential contamination of the Ogallala aquifer.

5. Page 4-71, third paragraph: It is indicated here that the quality of surface water being discharged is described earlier at Section 4.6.1.1. However, there is no description of the discharge water quality at the point cited. It would be helpful if the FEIS could provide a complete description of the discharged water chemistry within the text.

6. Page 4-72, second paragraph: It is difficult to visualize all the information about water quality and contaminant locations described here and would be helpful to have one map to display this information in the Final Statement. It would also be helpful if the FEIS could have a section describing the past and current chemical quality of discharges. Section 4.6.1 makes a general attempt at this goal but is too generalized. The Final Statement should list specific contaminants and major components of water chemistry, and describe any changes through time. A table showing concentration ranges, averages, etc., would be appropriate for this discussion.

7. A number of contaminants have been identified in the soil and ground water (Table 4.5.1.3.3-3) at the existing site. The Final EIS should document what measures have been taken to avoid potential contamination by the sources identified.

NEVADA TEST SITE (NTS) ALTERNATIVE
(EPA Region 9)

<u>Groundwater and Seismicity at Nevada Test Site</u>

BACKGROUND:

Two sites at the Nevada Test Site (NTS) were assessed for the interim storage of plutonium pits, the P-Tunnel area and the Device Assembly Facility area. The Pantex DEIS (Volume I, p. 5-8) indicates that ground water at the two NTS sites is characterized by a "deep water table," although depth to ground water is not specifically quantified in the DEIS.

A prior Department of Energy EIS reviewed by EPA Region 9(FEIS, Tritium Supply & Recycling, October 1995, Volume I, p. 4-114) stated that the depth to ground water at NTS ranges from 500 to 2,400 feet. The Tritium FEIS also indicated that "there are... areas of perched water that lie at considerably shallower depths" at NTS. The DEIS (Volume I, p. 5-16) states that earthquakes pose the greatest natural threat to storage of plutonium pits at NTS. The Cane Springs Fault was identified as the most significant seismic risk. However, the DEIS indicates that four faults in the NTS vicinity (Mine Mountain Fault, Carpetbag Fault, Yucca Flat Fault and Cane Spring Fault) "are capable of generating earthquakes of up to 0.85g," which is an 8.5 quake on the Richter scale.

According to the Tritium FEIS (Volume I, p. 4-117), the maximum credible earthquake on the Cane Spring Fault is expected to produce a peak acceleration of 0.67g, a 6.7 quake on the Richter scale. The Cane Springs Fault is three to five miles from the Device Assembly Facility.

The following comments relate to the proposed interim storage of plutonium pits at NTS in terms of seismic risk and the potential for ground water contamination should the plutonium pits be damaged in a quake:

1. The FEIS should recognize that the P-Tunnel at the NTS is due west of two parallel faults, the Carpetbag Fault approximately five miles away and the Yucca Fault approximately seven to ten miles away. The Tritium FEIS (Volume I, p. 4-117) describes both the Yucca and Carpetbag Faults as "capable faults," as defined by the Nuclear Regulatory Commission regulations 10 CFR Part 100, Appendix A. However, the Tritium FEIS reported that the "possible magni- tude, intensity, and acceleration of earthquakes along the Yucca and Carpetbag faults have not been estimated." The DEIS gives the impression that quakes along any of the four faults in the NTS area could have an 8.5 magnitude on the Richter scale (Volume I, p. 5-16).

EPA believes that the FEIS should provide more documentation as to potential ground water impacts should an earthquake harm the plutonium pit facility or render it inaccessible. In particular, we are concerned that DOE may have concluded that leaving the plutonium pits inside the P-Tunnel (should it collapse) may have less environmental impact than attempting to retrieve the pits from inside a collapsed P-Tunnel (due to wording in the Pantex DEIS that impacts to workers and the public from radionuclide releases would be "negligible" because the plutonium containers would be sealed inside the collapsed tunnel).

Additionally, potential NTS impacts to ground water such a scenario were not discussed in the Pantex DEIS. We recommend that the FEIS provide more information on the depth to ground water in the Device Assembly Facility and P-Tunnel areas and whether keeping plutonium pits in a collapsed tunnel may ultimately cause a migration of radioactivity to ground water.

The Pantex FEIS should discuss whether either of the areas is characterized by "perched water...at considerably shallower depths..." as described in the Tritium FEIS. If so, the Pantex FEIS should provide additional information on the ground water impacts that are reasonably foreseeable should the plutonium pits be damaged in a quake. The Pantex FEIS should also outline DOE's intentions regarding the retrieval of plutonium pits in such a situation, as well as, the feasibility of monitoring the pit storage facility. The DEIS (Volume I, p. 5-17) gives the impression that the plutonium pits would remain entombed.

2. We ask that the FEIS provide further discussion regarding the wording on p. 5-17 of Volume I that "Some mitigation of a tunnel collapse would be needed after a major seismic event. A separate assessment of the risk associated with the mitigation would be necessary..." The Pantex FEIS should better define what is meant by "some mitigation" and a "separate assessment" (would the separate assessment be a NEPA document?). The FEIS should discuss what risks would be analyzed in the separate assessment: radionuclide emissions, worker health and safety, ground water contamination, etc.

3. The Pantex Summary (Table S-2) identifies the environmental impacts associated with the alternative pit storage relocation sites. For NTS, the range of potential accident scenarios are limited to two: puncture of a pit due to a forklift accident and an aircraft crash. Potential seismic hazards at NTS are not recognized in Table S-2, as they were in Volume I. We, therefore, recommend that Table S-2 be modified to recognize NTS seismic hazards. Table S-2 should also reflect seismic conditions that may exist at the proposed interim pit sites in South Carolina, New Mexico and Washington State. Modifications to Table S-2 should be incorporated into the FEIS.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Stadium Centre Building
711 Stadium Drive East, Suite 252
Arlington, Texas 76011

2-12-94-I-030

February 13, 1995

Mr. Jerry S. Johnson
Assistant Area Manager for Projects and Environmental Management
P.O. Box 30030
Amarillo, TX 79120

Dear Mr. Johnson:

Per conversations on January 11 and 23, 1995, with John Sigler of Lamb Associates, Inc. and Denise Baker of my staff, we are providing the enclosed guidelines for preparation of a Biological Assessment as part of the on-going informal section 7 consultation process.

The Fish and Wildlife Service (Service) recommends the Department of Energy (DOE) request an updated list of federally endangered and threatened and candidate species. An updated list is required per 50 CFR §402.12(i) where "The Federal agency ... shall complete the biological assessment within 180 days after initiation (receipt of or concurrence with the species list)...". By letter dated December 8, 1993, the Service provided DOE with information and a list of federally listed endangered, threatened, and candidate species in response to their request dated November 23, 1993, to initiate informal consultation. The 180 day time frame to complete a BA has expired.

The Service also recommends that surveys be completed for the swift fox (*Vulpes velox*) a candidate category 2 species.

If you have any questions, please contact Jeff Reid or Denise Baker at (817) 885-7830.

Sincerely,

Robert M. Short

Robert M. Short
Field Supervisor

Enclosure

cc: DOE, Amarillo, TX (Attn: Vicki Loucks)

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TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF WASTE MANAGEMENT
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATIONS OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Industrial and Hazardous Waste Division/Corrective Action Section:

1. Hazardous Waste Treatment and Processing Facility (HWTPF) - As noted in the EIS, the Hazardous Waste Treatment and Processing Facility is necessary for compliance with the Agreed Order and Site Treatment Plan, which was negotiated in good faith with the TNRCC and issued on October 3, 1995. The No Action alternative in the EIS eliminates the HWTPF at Pantex, which threatens to put Pantex in noncompliance with the Agreed Order. At no time during the negotiations of the Agreed Order did DOE indicate that construction of the HWTPF was contingent upon an alternative selection process such as represented in the EIS. It is the TNRCC's opinion that, since the current activities at Pantex are the same now as they are in the No Action alternative, DOE should modify the No Action alternative to include development and use of the HWTPF. In other words, DOE should consider the fate of the HWTPF independent of any actions associated with the EIS.

2. Ogallala Contamination - The EIS should be revised to reflect that the Ogallala has been impacted by Pantex operations, as evidenced in recent contaminated samples obtained from Mr. Cockrell's private off-site wells.

3. Homestead Wells - The EIS should note that the low vertical permeability of the fine grained zone may be compromised by abandoned homestead wells. These wells could provide contaminant pathways through the fine grained zone to the Ogallala. The potential for this to occur has been demonstrated at the Cockrell farm east of the Pantex Plant.

4. Facility Boundary - The EIS should mention that DOE will take whatever action is practicable to clean contaminated groundwater to the residential drinking water standards beyond the facility boundary (page 4-69).

5. Regulatory Oversight - The TNRCC would be more willing to embrace Pantex's mission within the State of Texas if DOE would promote independent regulatory oversight for radioactive source, special nuclear, or byproduct material. We applaud DOE's willingness to share its information concerning radioactive contaminants; however, it is our opinion the public would be better served and potential waste management errors minimized if the oversight authority was shared with the TNRCC.

6. <u>Risk</u> - The risk from ingestion of hazardous substances should also be included when calculating risk to on-site workers. The EIS only accounts for risk from inhalation.

7. <u>Pantex Plant Playas</u> - The Risk Reduction Rules (RRR) (30 Texas Administrative Code (TAC), §335, Subchapter S), which include references to the Texas State Water Quality Criteria (30 TAC §307), do apply directly to the Pantex Plant Playas, contrary to the statement on page C-2.

8. <u>Surface Water Quality Values</u> - The surface water quality values determined in accordance with the RRR take precedence over the Risk Based Concentration Guidelines from EPA Region 3 (Section C.1.2). The EPA Region 3 Guidelines are not appropriate standards to apply when values are available in the Texas Surface Water Quality Criteria, the Federal Safe Drinking Water Act, or the Texas Regulations for Control of Radiation (TRCR) (30 TAC §336).

9. <u>Tables C.1.2-1 through C.1.2-3</u> - The standards listed in Table C.1.2-1 should cite values based on the RRR, rather than EPA Region 3 Guidance. For instance, the standard for antimony should be 0.006 milligrams per liter (mg/L), based on the RRR, rather than 0.015 mg/L cited for EPA Region 3 Guidance.

   The standard for gross alpha activity, according to the RRR, should be 15 picocuries per liter (pCi/L), rather than N/A. No water quality standard is provided by the Texas Surface Water Quality Criteria; therefore, the RRR specify use of the drinking water standard.

   The proposed drinking water standard of 50 pCi/L (4 millirems per year) should also be cited for beta particle activity.

   The TNRCC requests that DOE revise Table C.1.2-1 to cite the more stringent surface water quality standards for radionuclides that are developed in accordance with the RRR. As such, the standard for plutonium-239/240 would be 2E-8 microcuries per milliliter (μCi/ml), based on the TRCR standards. Radium-226 and Radium-228 would be 6E-8 μCi/ml, based on proposed federal Drinking Water Standards. Tritium would be 1E-3 μCi/ml, based on the TRCR standards. Uranium-234 and Uranium-238 would be either 3E-7 μCi/ml, the TRCR standards, or 20 μg/L, the proposed Drinking Water Standard, which ever is more stringent.

10. <u>Constituents of Concern</u> - The constituents of concern for groundwater should not be limited to those constituents that exceed risk based concentrations (Section C.2.2, page C-4). In addition, the nature and extent of contamination must be based on background values or laboratory Practical Quantitation Limits (PQL), rather than risked based values. These issues were addressed in DOE's revised Sampling and Analysis Plan and the TNRCC's subsequent approval with modification.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Monitoring Operations Division/Ambient Monitoring Section:

1. The footnote on National Ambient Air Quality Standards (NAAQS) in Table 4.7.1.3-1 in Volume 1 is inaccurate. Both ozone and PM10 NAAQS are based on expected exceedances, meaning that non-sampling days must be accounted for when calculating attainment determination. The NAAQS is attained when the expected number of days per calendar year, averaged over a three-year period, with maximum hourly average concentration for ozone and 24-hour average concentration for PM10 above the standard is equal to or less than one. SO2 annual, NO2 annual, and lead quarterly NAAQS are not to be exceeded. CO one-hour and 8-hour and SO2 3-hour and 24-hour standards cannot be exceeded more than once per calendar year.

2. In the discussion of air monitoring results on page 4-93 of Volume 1, it is stated that methylene chloride was found at 213 ppbv on July 6, 1993. There is no mention that this concentration was seven times the effects screening level (ESL). Further review and analysis of the methylene chloride data by Toxicology and Risk Assessment staff concluded that this one time episode would not result in any long- term health effects. Although there is detailed discussion of slightly above ESL concentration of 1,2 dibromoethane, this additional discussion on methylene chloride is left out.

3. TNRCC air monitoring at Pantex has found a number of exceedances of the PM10 NAAQS. Although modeling by TNRCC and the EIS staff did not predict possible PM10 violations, actual exceedances happened mainly due to blowing dust and localized earth moving activities. Precisely this kind of scenarios are anticipated in the Consolidation Alternative if additional construction activity takes place at Pantex. The EIS addresses this issue in section 4.7.6 on page 4-118 by stating that mitigation measures will be undertaken to alleviate temporary dust emissions from construction activities. These are standard TNRCC- approved mitigation measures for particulate emission control.

4. TNRCC Modeling staff reviewed Appendix B, Air Quality Analysis, of the Sitewide EIS and their comments are submitted separately. Additionally, the EIS used the same model, the Industrial Source Complex Model, that the TNRCC used for modeling Pantex emissions. EIS modeling was performed in accordance with the EPA guidance document, "Guidelines for Air Quality Models" (revised) and TNRCC guidance document, "Air Quality Modeling

Guidelines." The modeling approach used by the EIS is different from the one used by TNRCC. However, both models arrived at the same conclusion.

5. TNRCC used a tiered modeling approach that included a blend of screen and refined modeling techniques because of the large number of fugitive emission locations, buildings, and pollutants, whereas the EIS modeling used a refined dispersion model to accommodate the large number of emission sources and pollutants.

6. In the TNRCC approach, the TNRCC modeling results were added to the results of the modeling conducted by Radian Corporation in support of a permit application. Radian modeling addressed predicted impacts of emissions from the burning ground and container storage area. Therefore, TNRCC used an additive modeling approach to account for emissions from some of the buildings to assess plant wide emission impact. Using this approach, TNRCC modeling concluded that no predicted exceedances of the criteria pollutant impact public health. The maximum concentrations of alcohols predicted at the property line was slightly above the ESL, but concentrations of alcohols predicted at the nearest residence was below the ESL.

7. Using a different approach, EIS modeling also concluded that there would be no exceedance of the NAAQS for criteria pollutants and that the only hazardous air pollutant that exceeded its ESL was alcohols. Again, predicted maximum concentrations of alcohols for 11 residences located near Pantex were below ESL.

The nonradiological air quality impacts due to the No Action Alternative and the Consolidation Alternative will be minimal, especially if mitigation measures are taken to control particulate emissions due to increased vehicular traffic and construction activity.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Air Quality Planning Division/Permit Modeling Unit:

Data reviewed were contained in Tables B.3.6-1 through B.3.6-9 and Tables B.4.1-1 through B.4.2-3 of the EIS. Please note that no modeling input and output files were available to assist in our review. Therefore, a comparison was made of the emission rates and results presented in the EIS to the emission rates and results reported in the TNRCC's *Modeling Analysis of the Pantex Plant Amarillo, Texas*, dated June 1995.

Some of the sources modeled by the TNRCC were not listed in Table B.3.6-1 of the EIS, so we assumed they were not modeled. However, in the TNRCC analysis the predicted concentrations for the pollutants emitted from the omitted sources, plus all other applicable sources, were less than the respective National Ambient Air Quality Standard (NAAQS). Following is a list of pollutants and omitted sources:

- CO emissions from EPNs 54, 85, and 160,
- NO_x emissions from EPNs 85, 157 and 160, and
- PM_{10} emissions from EPNs 157 and 160.

All predicted concentrations in the EIS were less than those reported by the TNRCC except for alcohols, hydrogen chloride, methylene chloride, and PM_{10}. Except for alcohols, the concentrations for all pollutants were below the respective Effects Screening Level (ESL) or NAAQS. The predicted concentration for alcohols was only slightly higher than the TNRCC-predicted value and less than twice the ESL.

The EIS Tables B.4.2-1 and B.4.2-2 do not include all the pollutants reviewed by the TNRCC. Therefore, we assumed that the EIS did not include an evaluation for them. However, the TNRCC reported in its analysis that no concentrations for these pollutants were predicted to exceed an ESL or state standard. The omitted pollutants follow:

1,3,5- Trinitrobenzene
1-Butanol
2,4,6- Trinitrotoluene
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Nitronaphthalene
2-Ethoxyethanol
Acetone

Acetylene
Aluminum
Ammonia
Barium
Benz(a) anthracene
Benz(a) pyrene
Bismuth
Butadiene
Butane
Butene
Calcium
Chlorinated Fluorocarbon
Copper
Cyanogen
Cyclohexane
Cyclohexanone
Dimethylformamide
Dioxane
EthaneEthyl Acetate
Ethyl Ether
Ethylene
Formic Acid
Iron
Isobutane
Isobutanol
Ketene
Lithium
Magnesium
Methane
Methane, dichloro
N-Butyl Alcohol
Non-F Solvents
Ortho-dichlorobenzene
Propane
Propene
Pyrene
Pyridine
Silicon
Tetrahydrofuran
Titanium
Total Suspended Particulate
Trichlorofluoromethane
Trichlorotrifluoroethane

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Toxicology & Risk Assessment Section:

1. On Page 4-93, Paragraph 2, 2nd Sentence: "AQCR 211 is designated by EPA as "better than national standards" for total suspended particulates..."

   Comment: To our knowledge there is no national standard for total suspended particulates. EPA replaced the Total Suspended Particulate standard with the particulate matter standard during the late 1980's.

2. On Page 4-95, Paragraph 5, 2nd Sentence, there is a typographical error.

   Comment: "TRNCC" should be changed to "TNRCC".

3. On Page 4-95, Section: Air Quality Modeling and Corresponding Tables:

   Comment: It is not clear in the narrative whether the air dispersion modeling referenced was conducted as part of the Agreement in Principle or as part of the permit application submitted by the DOE.

4. On Page 4-97, Table 4.7.1.3-4:

   Comment: The following ESLs need to be corrected:

Ethene, Trichloro:	135 ug/m3 for the annual ESL 1350 ug/m3 for the 30-minute ESL.

5. On Page 4-98, Table 4.7.1.3-4:

   Comment: The following ESLs need to be corrected:

Methanol:	262 ug/m3 for the annual ESL 2620 ug/m3 for the 30-minute ESL.

6. On Page 4-99, Table 4.7.1.3-4:

   Comment: The format of the ESL should be converted to be consistent with the other ESLs represented in the table (e.g., 135 ug/m3 should be 1.35 x 10E2).

FWS Recommendations for Contents of Biological Assessments

When you prepare a biological assessment (BA), keep in mind that the people who read or review this document may not be familiar with the project area or what you are proposing to do. Your BA should present a clear line of reasoning that explains the proposed project and how you made your decisions regarding the effects of the project on threatened and endangered (T/E) species. Try to avoid technical jargon that is not readily understandable to people outside your agency or area of expertise. Remember, this is a public document. Some things to consider and include (if appropriate) in your BA:

1. Describe the action to be considered.

- This is a key point for a BA. For example describing the operations at Pantex Plant including associated operations with other DOE facilities. Describe alternatives that may be addressed in the Environmental Impact Statement.

- Include sketches if they will help others understand your proposed action and its relationship with the species' habitat.

- How are you planning on carrying out the project? What tools or methods may be used? How will the site be accessed?

2. Describe the project area.

- Always include a map. What does the project area look like now (topography, vegetation, condition/trend, etc.)?

- Describe current operations relevant to the project area. How will your project change the area?

- Supporting documents are very helpful.

3a. Describe the T/E species or critical habitat

- What T/E species may occur in the project area? The FWS provided the DOE a list of T/E species and candidate species by letter dated December 8, 1993. This letter included specific information on the species to assist you with the BA. It is recommended that you request an update on the T/E species and candidates, because the 180 day time frame to complete a BA has expired per 50 CFR §420.12(i) and changes to the species list may occur.

- Use your familiarity with the project area when you develop your species list. Sometimes a species may occur in the larger regional area near your project but the habitat necessary to support the species is not in the project area. If, for example, you know that the endangered Organic Sprout lives in riverine systems, and you also know that this type of habitat does not occur in the project area, it does not need to appear on the species list for the project. However, documentation of your reasoning is helpful and can protect you against lawsuits or appeals, so many biologists and botanists routinely include this information in the BA.

3b. Have you surveyed for species that are known to occur or have potential habitat in the proposed project area? Include a clear description of your survey methods so that the reader can have confidence in your results. Answer questions such as:

- How intensive was the survey? Did you look for suitable habitat or did you look for individuals? Did the survey cover the entire project area or only part of it? Include maps of areas surveyed if appropriate.

- Who did the surveys and when? Was the survey done during the time of year/day when the plant is growing or when the animal can be found (its active period)?

- If you aren't sure how to do a good survey for the species, consider contacting species experts. If you talk with someone about special survey techniques or if you read about them, cite your source(s) in the BA.

4. Provide some background information on the T/E species in the project area.

- Describe the species in terms of overall range and population status. How many populations are known? How many occur on or near the project site? What part of the population will be affected by this project? Will the populations's viability be affected? What is the current habitat condition and population size and status?

- Describe the related items of past management for the species, such as habitat improvements, or loss of habitat or individuals caused by previous projects.

5. Describe how the project will affect the T/E species that occur in the project area?

- If you believe the project will not effect the species, explain why.

- If you think the project may affect the species, explain what the effects might be. The Endangered Species Act requires you to consider all effects when determining if an action funded, permitted, or carried out by a federal agency may affect listed species. Effects you must consider include direct, indirect, and cumulative effects. Effects include those caused by interrelated and interdependent actions, not just the ones that are direct.

- Describe measures taken to avoid, reduce, or eliminate adverse effects or enhance beneficial effects to T/E species. Refer to conversations you had with species experts to achieve these results.

6. What is your decision?

- Will the project have no effect? "No effect" means there are absolutely no effects of the project.

- Or will the project affect listed species? If the project may affect listed species, than you must decide whether or not some or all of the effects are adverse. A decision that the project "is not likely to adversely affect" the species means that all effects are beneficial. For a project that has all adverse effects or mixed adverse and beneficial effects to a T/E species, the legally proper conclusion is that the project "is likely to adversely affect".

List the species experts you contacted when preparing the BA but avoid statements that place the responsibility for the decision of "may affect" or "no effect" on the shoulders of the species experts. For example, avoid the following kind of statement: "I contacted Janice Smith, biologist, and she said the project would have no affect on this endangered species." Remember, this decision will be made by a federal agency, which is accountable for its actions.

Department of Energy
Albuquerque Operations
Amarillo Area Office
P. O. Box 30030
Amarillo, Texas 79120

OCT -2 1995

Robert M. Short
Field Supervisor
U. S. Fish & Wildlife Service
Ecological Services Field Office
711 Stadium Drive East, Suite 252
Arlington, Texas 76011

Dear Mr. Short:

Enclosed is a list of endangered, threatened, and candidate species which have been identified on or have the potential of occurring on the Pantex Plant. The Department of Energy (DOE) is formally requesting a list of endangered, threatened, and candidate species which have the potential to reside on the Pantex Plant. This formal request should begin the 180 day clock for preparing a Biological Assessment for the Pantex Plant. The DOE is also requesting a letter with the start date for the 180 day clock.

The Biological Assessment is currently underway and a draft should be ready for your review by February 28, 1996. If you have any questions or comments, please call Vicki Loucks of my staff at (806) 477-5906.

Sincerely,

ORIGINAL SIGNED BY
JERRY S. JOHNSON
Jerry S. Johnson
Assistant Area Manager for Projects
& Environmental Management

Enclosure

cc w/enclosure:
Ron McClendon
U. S. Fish & Wildlife Service
Albuquerque Field Office
P. O. Box 1306
Albuquerque, NM 87103-1306

bcc w/o enclosure:
Alan Bowman, ES&H
Tim Green, EPD

STATE OF TEXAS
OFFICE OF THE GOVERNOR

GEORGE W. BUSH
GOVERNOR

July 12, 1996

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Dear Ms. Founds:

Enclosed are the comments from the State of Texas regarding the Pantex Site-Wide Environmental Impact Statement. As you know, a request has been made to extend the commenting period since the Final DOE Standard for calculating the probability of an aircraft crash into the Pantex storage areas has not been released.

While we believe it is imperative that an extension for comments should be granted on those issues related to the aircraft crash estimates, comments on the rest of the document are included in this submission.

Once again, the Office of the Governor would like to thank the U.S. Department of Energy for the opportunity to offer comments on the document. As has been stated on numerous occasions, the State of Texas remains committed to ensuring that all current and future missions at Pantex be conducted in a safe and environmentally sound manner.

This office continues to believe that the Site-Wide EIS correctly concludes that a continuation of current dismantlement and disassembly missions at Pantex will have no significant impact on the health of workers nor any significant adverse impacts on the environment in the Amarillo area.

Likewise, this office continues to believe that any future missions at Pantex related to plutonium can be successfully carried out, provided the following three criteria are met:

Post Office Box 12428 Austin, Texas 78711 (512) 463-2000 (Voice)/(512) 475-3165 (TDD)

1. Continued Local Support Is Earned

2. Proven Technology Is Utilized

3. Independent Oversight Is Guaranteed

During the public hearings in Amarillo on April 22 and 23, 1996, a number of issues were raised directly related to the Pantex Site-Wide EIS. A few of those are:

Comment:

In Section 4.14.2.1 (p. 4-219 of the text) and in Figure 4.14.2.1-1 (p. 2-224) a classic error is made in explaining potential latent cancer fatalities. The error is to use risk estimates for exposures to large populations and to assume that applying that risk estimate to a specific group of workers allows for definitive conclusions about that group. In this example, the figure provides the correct explanation. The text is misleading and might cause confusion in the community by indicating that the 330 plant workers would suffer a certain number of cancers.

Question:

Health effects are important to understand. The section on continued operations talks about health effects for workers. A statement is made that workers *would* experience additional cancers.

In the figure, a different explanation is used. The statement in the figure is that an average number of cancers could occur if many groups of workers were exposed. The final statement was that the *most likely outcome is zero cancers*.

What is the correct explanation?

Comment:

Table S-1 in the Summary, under intrasite transportation, presents person-rem information (Summary page-18). The table is supported by Section 4.12 in the main text. An underlying baseline person-rem appears to be incorporated into the estimates for the Proposed Action alternative. Neither the main text nor the table clearly state the assumptions used. The person-rem shown for the Pit Storage Relocation alternative adds the estimated person-rem for pit storage relocation and the person-rem from the 2,000, 1,000, and 500 weapons levels under the Proposed Action alternative. Thus, while implementing the Pit Storage Relocation alternative, plant workers are assumed to receive the person-rem associated with the Proposed Action alternative. The radiation exposures for individual workers for the alternatives are within regulatory guidelines and do not have any public health significance.

Questions:

In Table S-1 for the Proposed Action alternative, 50 workers receive 61 person-rem for 2,000 weapons. Next, 50 workers receive 48 person-rem for 1,000 weapons. Finally, 50 workers receive 41 person-rem for 500 weapons. How does one scale these numbers? The same type of calculations are made for the No Action alternative. Again, the numbers for person-rem do not follow the amount of work.

In the Pit Storage Relocation alternative, the amount of person-rem from the Proposed Action alternative appears to be added to what happens for pit storage relocation. How can one add the person-rem for these two alternatives? Is the same person-rem used two different times?

Comment:

Appendix D, "Human Health," does very little to explain how the impact to human health is derived or calculated. This appendix is more of an explanation of the risk assessment methodology than human health.

Comment:

The U.S. Department of Energy's Office of Emergency Management (NN 60) and the Office of Emergency Response (DP 23) fund the DOE's Atmospheric Release Advisory Capability (ARAC) which is housed at the Lawrence Livermore National Laboratory. ARAC's computer models, which have world-wide acceptance, have been called into service in many real-time responses to both real and potential accidental releases of radioactive material. The Three-Mile Island nuclear power plant accident in 1978, the 1986 Chernobyl disaster in the former Soviet Union, and the U.S. Air Force Titan II missile accident in Damascus, Arkansas are just a few examples. In addition, the ARAC models have been utilized in every nuclear weapons accident exercise since NUWAX 79. Pantex Plant is an "ARAC Site" and is linked to the ARAC center in Livermore via a computer-to-computer connection. ARAC operators are familiar with Pantex operations and can respond in a matter of a few minutes with a computer model graphic output showing the trajectory of the plume of contamination in the event of an accident. When, and if, a real accident occurred at Pantex it would be the ARAC models and the ARAC capability that DOE would call upon to response in real time.

Question:

Since ARAC is funded by Doe Headquarters and is ready to respond to a radiological accident at Pantex, why did DOE choose to use a model like ERAD to assess consequences for this EIS?

Comment:

In Volume I, Section 4.2 "Impact Assessment Methodologies " (p.4-4), under "Biotic Resources," it is stated that "Impacts to wetlands are mostly related to the potential discharge of contaminants to the playas."

Question:

How can impacts to wetlands be related to potential discharges of contaminants? Only actual discharges can have impacts.

Comment:

Table 4.11.1.6-1 presents revenues for the governing bodies within the Pantex ROI (p. 4-165).

Question:

If Pantex is reduced to the 500 weapons activity level, what would be the impact to these revenues?

Again, thank you for allowing us to comment. I look forward to resolving these important issues.

If you have any questions, please call me at 512/463-1866.

Sincerely,

Roger Mulder

ROGER MULDER
Director, Pantex

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Stadium Centre Building
711 Stadium Drive East. Suite 252
Arlington, Texas 76011

2-12-95-I-267

November 1, 1995

Jerry Johnson
Department of Energy
Albuquerque Operations
Amarillo Area Office
P.O. Box 30030
Amarillo, Texas 79120

Dear Mr. Johnson:

This responds to your October 2, 1995, letter requesting a list of federally listed endangered, threatened, or candidate species which are known to occur or have the potential to occur at the Pantex Plant, Carson County, Texas.

Available information indicates the following federally listed endangered (E), threatened (T), category 1 candidate (C1), and category 2 candidate (C2) species are known to occur in Carson County:

Common Name	Status	*Genus species*
whooping crane	E	*Grus americana*
bald eagle	T	*Haliaeetus leucocephalus*
swift fox	C1	*Vulpes velox*
Texas horned lizard	C2	*Phrynosoma cornutum*
white-faced ibis	C2	*Plegadis chihi*
Ferruginous hawk	C2	*Buteo regalis*
western burrowing owl	C2	*Athene cunicularia hypugea*
black tern	C2	*Chlidonias niger*
loggerhead shrike	C2	*Lanius ludovicianus*

The species listed above are known to occur with some regularity or in relatively high concentrations in Carson County. However, other endangered, threatened, or candidate species are likely to migrate through the county, stopping over for brief periods of time, including the birds and bats mentioned in your letter as "Species Potentially Occurring at Pantex Plant." If any of the species that you describe as "Potentially Occurring" or any other endangered, threatened, or candidate species are observed at the Pantex facility with significant frequency, we would appreciate notification so that we can update our files.

The Section 7 informal consultation process provides the action agency 180 days to complete a Biological Assessment once they have received a species list from the Service. Therefore, upon receipt of this letter, your Department has 180 days to complete the Biological Assessment for proposed activities at the Pantex Plant.

Thank you for the opportunity to provide information for the biological assessment. If you have any questions, please contact Don Wilhelm at (817) 885-7830.

Sincerely,

for Robert M. Short
Field Supervisor

Department of Energy
Albuquerque Operations
Amarillo Area Office
P. O. Box 30030
Amarillo, Texas 79120

MAY 9 1996

Mr. Robert Short
Field Supervisor
U. S. Fish and Wildlife Service
Ecological Services Field Office
711 Stadium Drive East, Suite 352
Arlington, Texas 76001

Dear Mr. Short:

Enclosed is one copy of the Biological Assessment (BA) recently completed for the Pantex Plant. This BA is in support of the Pantex Sitewide Environmental Impact Statement (SWEIS). The SWEIS examines the Department of Energy's (DOE) proposed action of "Continued Operation of the Pantex Plant and the Associated Storage of Nuclear Weapons Components." The draft SWEIS has been issued and is now in the review process. The BA has been prepared under the Endangered Species Act Section 7, Informal Consultation Process, and covers species and habitat protected by that Act as well as Category 1 and Category 2 candidate species identified in your letter of November 1, 1995. Due to the near completion of the BA when the Notice of Review on candidate species was published in the February 28, 1996, Federal Register, the Amarillo Area Office decided to retain the original species listing and designations, rather than complete a revision, so as to enable us to meet our delivery date to your agency.

Pantex Plant is developing management plans for incorporation into the Plant "Stewardship Strategy" as required by current DOE regulations and policy statements. Included in this process are management plans for the playas and their floodplains for agricultural areas and the industrial portion of the Plant. All of these plans incorporate best management practices and good stewardship philosophies.

Based on the information presented in the BA and on elements of the Plant's stewardship strategy, it is my determination that the proposed action is not likely to adversely affect any species afforded protection by the Endangered Species Act. If you have any questions regarding this issue or the BA, please contact Vicki Loucks of my staff at (806) 477-5906.

Sincerely,

Jerry S. Johnson
Assistant Area Manager for Projects
and Environmental Management

DE:96:53579\DE:96:53580
Enclosure L-0002-5.4.4\D-0002-5.4.4

cc w/o enclosure:
Steve Pomeroy, EPD, BMI

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TDH

Texas Department of Health

David R. Smith, M.D.
Commissioner

Randy P. Washington
Deputy Commissioner for Health Care Financing

1100 West 49th Street
Austin, Texas 78756-3189
(512) 458-7111

Radiation Control
(512) 834-6688

Carol S. Daniels
Deputy Commissioner for Programs

Roy L. Hogan
Deputy Commissioner for Administration

July 2, 1996

.s. Nanette Founds
U. S. Department of Energy
Albuquerque Operations Office
Post Office Box 5400
Albuquerque, NM 87185-5400

Dear Ms. Founds:

Enclosed are comments on the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage. Enhancement of public safety, protection of public health and the prevention of environmental degradation are crucial factors for assessing Pantex Plant mission accomplishment. Texans must be assured that these issues will receive sufficient attention prior to any decisions regarding plant operations. Thorough and complete assessment of consequence analyses to a satisfactory confidence level is required to support the decisions under consideration.

Efforts now underway and programmed to begin in the near future to update assessments and refine estimates of radiological and other health impacts from plant operations on the workers and on the general public must be maintained on schedule to increase confidence in and acceptance of the continued mission at Pantex Plant. We will continue to follow these important issues to satisfactory conclusion.

We appreciate having been provided the opportunity to participate in this process. If we can be of any further service, please do not hesitate to contact us.

Sincerely,

Joseph A. Martillotti
Pantex Special Project Coordinator
Division of Compliance and Inspection
Bureau of Radiation Control

Enclosure

cc: R. Mulder/Office of the Governor
V. Battley/DOEAAO

TEXAS DEPARTMENT OF HEALTH
Bureau of Radiation Control
Pantex Plant Sitewide Environmental
Impact Statement DRAFT Comments

In the Summary, page S-9, right column, it is stated that 8.1 E-6 Latent Cancer Fatalities (LCF) per year would result from and aircraft crash into a facility with a weapons high explosive detonation. Scenario 3, described in Volume I, page 4-229 conflicts with this statement, indicating that the increased risk is 1.8 E-11 latent fatal cancers per year. Table 3.14.2.1-4 in Volume I page 4-228, Excess Cancer Fatality Risk for Scenario 3 lists 5.1 E-6. These figures need to be verified, reconciled, and, if necessary, corrected.

In the Summary, page S-10, left column, it states that from an aircraft crash into Zone 4 facilities, 1.5 E-6 LCF per/yr for 20,000 pits and 9.8 E-7 LCF per yr for 8,000 pits would result. Table 4.14.2.1-4, Volume I, page 4.228, Scenario 9 lists 6.0 E-8 excess cancer fatality risk. For Zone 4 weapons storage, 6.8 E-7 LCF/yr is given on page S-10. Scenario 3 in Table 4.14.2.1-4 lists 5.1 E-6 excess cancer fatality risk. Page 4-250 lists the increase in fatal cancer risk as approximately 2.2 E-11 increase in fatal cancer risk (compared to a baseline risk of 1.5 E-3 per yr). These figures need to be verified, reconciled, and, if necessary, corrected.

In the Summary, page S-11, right column, the discussion on Stockpile Stewardship and Management Draft PEIS omits the "Downsize Pantex with transfer of HE Operations" option briefed as a preferred alternative at the April 22-23, 1996 meetings. The Stockpile Management Preferred Alternatives Report, pages 17 through 20 discusses fiscal impacts related to the transfer of HE operations for fiscal years 1996 through 2020. If this issue is anticipated to impact on the Texas Panhandle during the tenure of the Pantex SWEIS, the effect of transporting a large number of HE components over the roadways needs to be included.

In the Summary, page S-12, right column, the Light Water Reactor disposition alternative from the Storage and Disposition of Weapons-Usable Fissile Materials PEIS has not been removed, although it was indicated in the April meetings that the LWR was no longer being considered for Pantex. This issue requires clarification.

In the Summary, Table S-1, page S-20 gives a 4 E-12 increase in fatal cancer risk, whereas in the same table, on page S-26 a duplicate entry gives 3 E-12. Volume I, page 4-229, Scenario 3 lists an increased risk of 1.8 E-11 LCF per year. Table 4.14.2.1-4, Scenario 3 gives 5.1 E-6 Excess Cancer Fatality Risk. Volume II page 4-250, right column lists 2.2 E-11 increase in fatal cancer risk (per yr). These figures need to be verified, reconciled, and, if necessary, corrected.

In the Summary, Table S-2, page S-25 right column, sixth line, between "in" and "0.04", insert "0.11 LCF and".

In Volume I, page 4-155, right column, the projected population in the ROI in 2055 ranges between 214,353 and 246,464. Figure 4.14.2.1-1, page 4.223 gives the ROI population of 267,107 for risk estimates. Volume II, page D-28, left column, gives the population in the ROI as 267,107 for fatal cancer estimates. An explanation of the different populations is necessary, or one of the ROI needs to be re-named.

In Volume I, page 4-215, right column, the statement concerning the Pantex Epidemiologic Surveillance 1994 Annual Report should be updated to indicate that the report has been released. (The 1995 Annual Report may also be available by the time the Final Report is issued.)

In Volume I, page 4-223, Figure 4.14.2.1-1, fifth line from bottom incorrectly refers to Table 4.14.2.1-3. The correct reference is Table 4.2.1.1-4. A similar error was noted in Volume II, Appendix E, page E-23, left column at the end of paragraph E.3.1.6.

In Volume I, page 4-264, shipment of chemical high-explosive material does not address shipment of main charges from other DOE sites. The "Downsize Pantex with transfer of HE operations" option", presented as the preferred option in the SS&M PEIS, would necessitate large numbers of shipments of these components. The deletion of relatively few raw HE shipments and subsequent increase in transportation risks from these components needs to be adequately assessed here.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

June 27, 1996

RECEIVED
JUL 02 1996
GOVERNOR'S BUDGET OFFICE

Mr. T.C. Adams
Governor's Office of Budget and Planning
P.O. Box 12428
Austin, Texas 78711

Re: U.S. Department of Energy (DOE)
Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components
TX-R-96-04-03-0001-50-00

Dear Mr. Adams:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the above-referenced Environmental Impact Statement, and our technical review comments are enclosed. The joint comments of the State's natural resource trustees are also enclosed.

The TNRCC is concerned that contamination in the perched aquifers beneath the site indicates that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. The DOE should insure that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

In order to reduce DOE's residual liability for injury to natural resources, the State and Federal trustees encourage DOE to continue to work with the trustees during the remedial process so that appropriate restoration will be incorporated into remedial activities.

We applaud DOE's willingness to share its information concerning radioactive contaminants; however, the TNRCC permit does not include radionuclide parameters. And as we have stated before, the TNRCC recommends that the DOE share regulatory oversight with another federal or state agency to minimize the potential for further injury to natural resources.

Thank you for the opportunity to participate in this review process. I believe these comments will assist the DOE in considering use of the Pantex facility. If you have any questions regarding these comments, please feel free to contact Mr. David Duncan, Director, Intergovernmental Relations Division, at (512) 239-3510.

Sincerely,

Dan Pearson
Executive Director

Enclosures

cc: Commissioners

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

TO: Sidney Wheeler, Intergovernmental Relations DATE: June 14, 1996

FROM: Ginny King, TNRCC Natural Resource Trustee Program

SUBJECT: **Joint Trustee Comments to the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components**

As Lead Administrative Trustee (LAT) on behalf of the State Trustees, Texas General Land Office (TGLO), Texas Parks and Wildlife (TPWD), and Texas Natural Resource Commission (TNRCC), this memo is written to provide the State Trustees' comments on the "Draft Environmental Impact Statement for the Continued Operation of the Pantex Superfund Site and Associated Storage of Nuclear Weapon Components."

General Comments:

The Trustees for the State of Texas strongly support the President of the United States and the Department of Energy (DOE) in the unilateral efforts to reduce the number of armed nuclear warheads worldwide. We further recognize the difficult responsibility of storing and stockpiling the Nation's disassembled nuclear weaponry. However, the DOE is one of the Federal Trustees for natural resources and has the responsibility of protecting those natural resources from injury on behalf of the public. In order to protect those natural resources from further injury, the Trustees recommend that the DOE incorporate more stringent environmentally protective practices at the Pantex Superfund site.

The Trustees do not oppose the DOE plan to construct an expanded Hazardous Waste Treatment and processing Facility (HWTPF). However, contamination in the perched aquifers beneath the site indicate that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. A treatment facility that is constructed and maintained properly will prevent further injury to natural resources. In addition, the increase of industrial discharge volume to 2.9 million liters may exacerbate contamination problems if additional measures are not taken by DOE to protect valuable groundwater resources. DOE should insure that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

Specific Comments:

1. Page 1-12, Section 1.2.2.3 Environmental Restoration: The information communicated in this text does not necessarily constitute restoration of the natural resources that have been injured as a result of the releases of hazardous substances at this site. In order to perform actual environmental restoration, the nature and extent of contamination must be determined to evaluate the potential injuries to natural resources. After such a determination, and in

cooperation with the other Federal and State Trustees, restoration projects should be designed that will appropriately compensate the public for injury to natural resources. Performing remediation as needed to comply with all appropriate regulatory requirements does not necessarily constitute compensatory restoration for injury to natural resources. In order to reduce DOE's residual liability for injury to natural resources, the State and Federal Trustees encourage DOE to continue to work with the Trustees during the remedial process so that appropriate restoration will be incorporated into remedial activities.

2. Page 3-2, Section 3.1.1 Proposed Action: Care should be taken to ensure that the continued operation of Pantex Plant activities including "quality assurance testing of weapon components and the research and production of weapon components" is conducted in a fashion that will not increase DOE's liability for injury to natural resources.

3. Page 3-3 Performing environmental protection and environmental restoration activities: please see specific comment #1.

4. Page 4-2, Affected Environment: The document states that an area of 50 miles surrounding the Pantex site will be considered the region of influence. The Trustees are concerned that this area will not encompass the potential area of natural resources that could be impacted since:

   a) the lateral extent of the perched aquifer has not been determined; and

   b) documented contamination in the Ogallala and its flow direction provide the potential for this contamination to impact various environmental receptors outside this radius.

5. Page 4-3, section 4.2 Impact Assessment Methodologies, geology and soils: Impacts should be assessed on the destruction of any geologic feature not just those specified unique.

6. Page 4-3, Section 4.2 Impact Assessment Methodologies, water resources: The qualitative assessment of water quality impacts from wastewater and stormwater runoff does not adequately address potential impacts to surface water and groundwater resources at the Pantex Plant. Furthermore, it does not consider existing contamination in the sediments, surface water and groundwater and their cumulative impacts. The text should be corrected to reflect what actions would be necessary to thoroughly address the potential impacts to these natural resources.

7. Page 4-4, Biotic Resources: The text states that US Fish and Wildlife Service and appropriate State agencies have been used in the process of determining whether Pantex Plant operations would impact any plant or animal. This is incorrectly stated. The Trustees understand that an ecological screen has not yet been completed for this site and an ecological risk assessment has not been performed. The text should be corrected to reflect what has actually been assessed at this site and which agencies were involved.

8. Page 4-37 Environmental Restoration Process at Pantex Plant: see comment #1

9. Page 4-55 Affected Environments: The text states that there is not evidence that contaminants found in the perched zone have migrated to the Ogallala aquifer. This is inaccurate and should be corrected to reflect that there is documented contamination in the Ogallala aquifer.

10. Page 4-62, Section 4.6.1.2 Groundwater: While the discharges that are permitted by EPA and TNRCC have protective standards which presently do not allow excessive levels of contaminants, existing contamination is already present in the perched aquifer and the playas. Therefore, the continual discharge of wastewater provides a hydraulic head potentially driving those contaminants into the Ogallala. Contamination in the Ogallala has been documented and more stringent actions are required in order to prevent further migration of contamination which could result in greater injury to an extremely valuable groundwater resource.

11. Page 4-69, Section 4.6.1.2 Groundwater, Perched Aquifer portion: see comment #9

12. Page 4-72, Groundwater Quality: The absence of trinitrotoluene in the perched aquifer may not be due to a reduction in the discharge of this contaminant but rather an indication of it breaking down to degradation compounds in the environment. Also, the text states that levels of trichloroethene occurring at the site barely exceed the Risk Reduction Standards (RRS) decision criteria of 5 micrograms per liter. Data used to make this determination may not be representative of actual levels of contamination at the site. To accurately determine what is occurring at this site, properly screened intervals in groundwater monitoring wells to accurately measure "sinking chemicals, metals, radio nuclides and high explosives," as well as the proper suite of analyses, should be employed for all potential contaminants of concern.

13. Page 4-78, Section 4.6.2.1 Impacts of Continued Operations; Weapon-related activities, Surface water: A thorough evaluation and consideration of existing contamination in surface water and sediments of receiving waters at the Pantex site is needed to adequately assess the potential impacts of waste water discharges. Cumulative impacts of preexisting contamination and projected waste loads must be considered.

14. Page 4-79, Section 4.6.2.1 ... Groundwater: Potential impacts to the groundwater quality from wastewater discharge activities are not negligible. See comment #10.

15. Page 4-80, Section 4.6.2.1 Groundwater: The TNRCC permit does not include radionuclide parameters. In order to prevent further injury to natural resources, DOE regulatory oversight should be shared with another appropriate agency. Also, see comment #10 and 15.

cc: Richard Seiler, Manager, TNRCC NRTP
Don Pitts, TPWD
Diane Hyatt, TGLO
Bob Short, USFW Arlington
Steve Spencer, DOI
Ron Gouguet, NOAA CRC Region 6
Geof Meyer, TNRCC RCRA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Stadium Centre Building
711 Stadium Drive East, Suite 252
Arlington, Texas 76011

2-12-96-I-236

May 29, 1996

Jerry Johnson
Department of Energy
Albuquerque Operations
Amarillo Area Office
P.O. Box 30030
Amarillo, Texas 79120

Dear Mr. Johnson:

This responds to your May 9, 1996, letter requesting review and comments on the Biological Assessment (BA) for the Pantex Plant, located in Carson County, Texas. The BA was prepared in support of the Pantex Sitewide Environmental Impact Statement which examines the Department of Energy's proposed action of "Continued Operation of the Pantex Plant and the Associated Storage of Nuclear Weapons Components."

We commend Pantex for developing a comprehensive and complete BA, and concur with your assessment that the proposed action is not likely to adversely affect any federally listed threatened or endangered species.

We also fully support Pantex's proposed plans to manage portions of their property for the benefit of native resident and migratory wildlife species, including the proposed playa basin management plans. As described in the BA, the Pantex Plant and surrounding area currently contains and supports significant wildlife resources, but with proper management, the area has the potential to support an even higher diversity and number of native plant and animal species, to the mutual benefit of both humans and wildlife.

Thank you for your efforts in support of our Nation's fish and wildlife resources and for the opportunity to provide comments on the BA. If you have any questions, please contact Don Wilhelm at (817) 885-7830.

Sincerely,

Robert M. Short

Robert M. Short
Field Supervisor

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Post Office Box 649
Albuquerque, New Mexico 87103

IN REPLY REFER TO:

July 30, 1996

ER 96/0273

Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
Post Office Box 5400
Albuquerque, New Mexico 87185-5400

Dear Ms. Founds:

The U.S. Department of the Interior has reviewed the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components near Amarillo, Texas and has no comment on this document. The Pantex Plant, however, is on the National Priorities List of hazardous waste sites and, in this regard, we look forward to participating with the U.S. Department of Energy in the development of remedial actions with a view toward concurrently implementing appropriate restorative measures to compensate for injuries to our natural resources that may have occurred as the result of hazardous substances on or emanating from this Site. Thank you for the opportunity to provide these comments.

Sincerely,

Glenn B. Sekavec
Regional Environmental Officer

cc: via Facsimile
Pantex Plant EIS Faxline
800-822-5499

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DIVISION OF EMERGENCY MANAGEMENT

TEXAS DEPARTMENT OF PUBLIC SAFETY

GEORGE W. BUSH
Governor

5805 N. Lamar Blvd.
Box 4087
Austin, Texas 78773-0001
Duty Hours 512 424-2138
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Fax 512 424-2444

JAMES R. WILSON
Director

TOM MILLWEE
Coordinator

July 5, 1996

Roger Mulder
Director, Special Projects
Environmental Policy Division
Office of the Governor
1100 San Jacinto, Room 415
Austin, Texas (via Interagency Mail)

Dear Mr. Mulder:

We have reviewed the draft *Pantex Site-Wide Environmental Impact Statement*. Our comments are attached.

My point of contact for this matter is Russ Lecklider. Please contact Mr. Lecklider at 424-2429 if you have any questions regarding our comments.

Sincerely,

Tom Millwee
State Coordinator

STM:RPL:ss

Attachment: DEM Comments on Draft *Pantex Site-Wide Environmental Impact Statement*

RL-1-96/07:sv-e1s

Division of Emergency ManagementComents
on the
Draft *Pantex Site-Wide Environmental Impact Statement*

Section 4.16, Intersite Transportation of Nuclear & Hazardous Materials·

Section 4.16.1 indicates that non-radiological consequences of transportation were not considered in the analysis. Various DOE publications indicate that DOE is considering moving the high explosives fabrication mission from the Pantex Plant to Lawrence Livermore National Laboratory (LLNL) or Los Alamos National Laboratory (LANL) or both. It appears that such a relocation could significantly increase the risk of a hazardous materials transportation accident. Currently, explosives are shipped to Pantex in bulk and fabricated into components; the components are then installed in weapons. This arrangement requires a limited number of bulk shipments of explosives to Pantex and means that fabricated HE components are transported within the Pantex Plant site.

Should the high explosives fabrication mission be moved to LLNL or LANL, bulk shipments would be made to those laboratories and the HE components would be fabricated and packaged for shipment at those sites. The components would then have to be shipped by Safe Secure Tractor-trailer (SST) over public highways for substantial distances to the Pantex Plant for use. Since packaged, fabricated components typically occupy much greater volume than the raw materials used to make them, a substantial number of hazardous materials shipments would be required. Such shipments increase the risk to the public of traffic accidents and the effects of accidents involving explosive cargo, which frequently include fires and explosions.

BUREAU OF ECONOMIC GEOLOGY
THE UNIVERSITY OF TEXAS AT AUSTIN
University Station, Box X · Austin, Texas 78713-8924 · (512) 471-1534 or 471-7721 · FAX 471-0140
10100 Burnet Road, Bldg 130 · Austin, Texas 78758-4497

July 10, 1996

U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Attention: Ms. Nanette Founds

Dear Ms. Founds:

The following are review comments on the "Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components" from staff at the Bureau of Economic Geology of The University of Texas at Austin.

General Comments:

Sections 4.5 and 4.6, which describe water resources and geology and soils, do not provide sufficient information for the reader to determine if environmental impacts could result from continued operations and storage of nuclear weapons at Pantex.

Some of the maps in this document are used without referencing or obtaining permission of the author. Figure 4.5.1.2-1 was published by Gustavson (1981), but attributed to DOE (1981). Figure 4.5.1.2-2 was prepared by Davis, Pennington and Carlson (1989), but attributed to DOE 1995.

Specific Comments:

Page 4-27, Geomorphology, para. 1, ln 13. It is inaccurate to state that playa basins could play a role in the contamination of ground water at Pantex Plant. Playa basins and ditches have been shown to be the sites where contaminated surface water is recharged to the subsurface (Gustavson and others, 1995).

Page 4-27, Stratigraphy, para. 1, ln 4. The Blackwater Draw and Ogallala Formations beneath the Pantex Plant are not lithified and therefore are not rocks. The correct term is sediments. Rephrase sentence to "The stratigraphy of the *sediments and* rocks . . ."

Page 4-27, Stratigraphy, para. 2, ln 6. The upper unit of the surface soil (Pullman clay loam) of the Blackwater Draw Formation is the A horizon and it contains no caliche. The first soil carbonate is found at a depth of about 24 inches in the upper part of the B horizon (US Department of Agriculture, Soil Conservation Service, 1972, Pullman Series: Established Series, 4 p).

Page 4-29, Stratigraphy, para. 1. The variable lithologies of the Ogallala and Blackwater Draw Formations are not described. These descriptions should include a brief discussion of the complex heterogeneity of the Ogallala and Blackwater Draw because the variation in sediment types controls ground water flow in the formation.

Page 4-29. Sentence describing the lower part of the Ogallala implies that the fine-grained zone is the base of the lower Ogallala and generally confuses channel deposits above the fine-grained zone (which actually falls within the middle part of the Ogallala) with predominantly fluvial Ogallala sediments within the lower part of the Ogallala Fm below the fine-grained zone.

Page 4-29, Stratigraphy, para. 1, ln 29. The fine-grained zone is not a sandstone. Limited available core from the fine-grained zone shows interbedded sands, silty sands, and muds. Because of the variability of sediments in this unit, the vertical hydraulic conductivity varies by 3 orders of magnitude. Geophysical logs and core show that at least part of the fine-grained zone consists of fining upward sequences of fine sand, silty to clayey sand, and mud. Furthermore, these sediments are not lithified; thus, they are not sandstones.

Page 4-30, Figure 4.5.1.1-2. Well PXSB-03 is not just coarse sand. There are about 50 feet of sand and gravel near the bottom of the well.

Page 4-31, para. 3, ln 1. Salt dissolution and accompanying subsidence or collapse are rapid processes on a human time scale. More than 2,000,000 tons of salt are dissolved each year along the eastern margin of the High Plains in the Texas panhandle. Furthermore, about 2 years ago a very large sinkhole (250 ft wide and more than 60 ft deep) formed in northeastern Hall County, which like the Pantex Plant lies in the salt dissolution zone shown in figure 4.5.1.2-1. Development of this sinkhole was described in the Amarillo newspaper.

Page 4-31, para. 3, ln 1. No attempt is made to describe the role of salt dissolution and subsidence in the formation of playa basins. High solute loads in streams draining the region indicate that these processes are active regionally. No mention is made of the potential effects, if any, of dissolution-induced subsidence at the plant.

Page 4-31, para. 3, ln 11. While it is true that sinkholes or fractures associated with salt dissolution have not been described in Carson County, several playas on or near the Pantex Plant have been associated with dissolution induced subsidence. Furthermore, sinkholes or fractures have been identified in adjacent Armstrong *and Donley* Counties to the south, *in Potter County to the west,* and in... .

P. 4-32, Figure 4.5.1.2-1. Gustavson (1981) who compiled the information on which this map is based, showed that sinkholes or fractures have been recognized in Oldham, Potter Donley, Briscoe, Motley, and Dickens Counties in addition to the counties shown here.

Page 4-33, para. 2. Davis, Pennington, and Carlson (1989) reviewed in considerable detail the history of earthquakes in the Texas Panhandle. Events are shown using the Richter scale.

Page 4-33, Soil Types, para. 2 or 3. No attempt is made to point out that Randall clay soils are Vertisols and that deep desiccation cracks and root tubules, which are potential pathways for recharge, are characteristic of these soils. Furthermore, these soils have a udic moisture regime, which means that water moves down through the soil at some time in most years. That is, recharge occurs through even these clay soils.

Page 4-33, Soil Types. In the discussion of soil sampling activities, there is no mention of the preliminary soil sampling that took place as a result of the May 1989 tritium release. This is a significant problem resulting from this omission for two reasons. First, there is no mention of this event or the known areas of contamination within this report. Second, there have still not been any characterization efforts completed beyond the initial preliminary assessment, to determine the amount of contamination from this tritium release. This lack of characterization continues despite, at least using one data set, the apparent increasing tritium levels in perched ground water in the area of playa 1.

Page 4-35, Figure 4.5.1.2-2. Pantex is incorrectly located on the map. The correct location is approximately 1/4-inch to the northeast of the center of the black square or immediately adjacent to the system of faults and earthquake locations that mark the buried Amarillo Uplift. The city of Amarillo is not located on the map.

Page 4-50. The statement is made that there is no surface expression of sinkholes or fractures associated with salt dissolution in Carson County. We argue that, based on seismic data at the plant, the playas themselves are a sinkhole-like expressions of salt dissolution.

Page 4-50, Wepons Related Activities, para. 2, ln 2. The statement is made that the "potential impacts due to subsidence (resulting in sinkholes and/or surface rupture) are considered negligible because salt dissolution is a slow process relative to human activities." While the rate of salt dissolution may be slow relative to geologic time, the surface expression of salt dissolution can be catastrophic and result in the loss of life and property. Another inaccurate statement in this same paragraph refers to the absence of sinkholes in Carson County. Paine (1994) demonstrated that many playa basins in the vicinity of the Pantex Plant formed as a result of surface subsidence over areas of salt dissolution. In this context playa basins are similar to sinkholes found elsewhere in the salt dissolution zone. Thus, it is inaccurate to imply that there are no subsidence features in Carson County by simply stating that there are no sinkholes. A better approach would be to explain that sinkholes are the product of catastrophic, rapid collapse into an underground cavern. Playa basins on-the-other-hand formed in part as the result of relatively slower surface subsidence over areas of salt dissolution.

Page 4-55, Affected Environment, para. 2, ln 19. The statement is made that there is no evidence that the contaminants found in the perched aquifer have migrated to the Ogallala aquifer. Only a few (2 or 3) Ogallala aquifer monitor wells are located in areas where there is perched ground water present. There are no Ogallala monitor wells beneath badly contaminated areas such as Zone 12, so there are no data on which to base the conclusion that no contamination has occurred. Furthermore, the unsaturated zone between the Ogallala and perched aquifers has not been sampled so it is not known if these waters and sediments have been contaminated.

Page 4-62, Ground water, para. 1. There is no discussion of sediment heterogeneity, which strongly affects ground water flow rates.

Page 4-63, Figure 4.6.1.2-1. Why are there no monitor wells in the area of playa 4 ? Considering all of the discharge that has occurred from zone 12 south to playa 4, it would seem appropriate to determine the nature of the hydrogeology in this area.

Page 4-65, Perched Aquifer, para. 2, ln 1. Contrary to this confusing statement, there are areas at Pantex where perched ground water is present, but where gravel channels are not present and vice versa. The presence of gravel channels does not control the presence of perched aquifers; it is the presence of a stratigraphic horizon (in this case the fine grained zone) with a vertical hydraulic conductivity lower than the flux of recharge water moving through the unsaturated zone. It is quite obvious that if the gravel channels were underlain by a coarse sand then no perched aquifer would have formed.

Page 4-69, para. 4, ln 6. If the spread of contaminants in the perched aquifer is limited to the confines of the perched aquifer in buried channel deposits, then why are there so many perched aquifer monitor wells in Zone 12 with contaminants, but located outside the gravel channel as mapped on page 4-66? It seems obvious that something other than gravel channels is, at least in part, controlling flow in the perched aquifer and that contaminants are present in perched aquifer water outside the gravel-filled channel.

If you have any questions concerning these comments, please call me at (512) 471-0232.

Sincerely yours,

Thomas C. Gustavson
Senior Research Scientist

TCG:mk

cc: R. Mulder, Governor's Office
T. Grimshaw, BEG
J. Raney, BEG

CENTER FOR RESEARCH IN WATER RESOURCES
THE UNIVERSITY OF TEXAS AT AUSTIN

Mail: CRWR · J.J. Pickle Research Campus · UT Austin · Austin, Texas 78712
Delivery: CRWR · 10100 Burnet Road, Bldg. 119 · Austin, Texas 78758

Telephone: (512) 471-3131
FAX: (512) 471-0072

Date: July 11, 1996

To: Roger Mulder
Office of the Govenor

From: Randall Charbeneau

Subject: Draft EIS for Pantex

- The sections that deal with Geology and Soils, and with Water Resources are generally well done. One issue that is still not adequately covered relates to the perched aquifer. The extent of the fine-grain zone which forms the perching layer is not known. The question of what happens to the perched aquifer is not discussed. Does the fine-grained zone pinch out with the perched aquifer groundwater flowing off the side, down to the Ogallala? Alternatively, will the perched aquifer eventually migrate through the fine-grained zone and down to the Ogallala? All that the Draft EIS acknowledges is "Recharge to the area aquifers is not fully understood."

- Groundwater was not considered as a pathway for exposures potentially impacting human health. An obvious concern of some people in the area is contamination of the Ogallala from Plant activities. In what way were groundwater scenarios considered, and what pathway assumptions were used?

- Table C.2.2-2 Volume II provides data on chemical concentrations measured in the perched aquifer. A great deal of data is here, but I do not believe that it represents all available data. The Draft EIS should explain what data was used and what data was not used, and why.

- The conclusions drawn with respect to potential impacts on Geology and Soils, and Water Resources appear to the well based.

COLLEGE OF ENGINEERING
THE UNIVERSITY OF TEXAS AT AUSTIN
Center for Transportation Research · Suite 200
3208 Red River · Austin, Texas 78705-2650 · (512) 472-8875 · FAX (512) 480-0235

July 12, 1996

Mr. Roger Mulder
Director, Pantex
Office of the Governor
P. O. Box 12428
Austin, TX 78711

Dear Mr. Mulder,

We have reviewed both the Draft Site Wide EIS and the draft working documents used for preparing the Final EIS. We have also met with DOE personnel and contractors preparing the DOE Standard for evaluating probabilities for aircraft accidents. After this review, we present the following written comments and request that they be addressed in the Final EIS.

1. As of this date, July 11, 1996 - the eve of the closing of the comment period for the draft EIS - those personnel from Tetra Tech responsible for preparing the Final EIS have not (1) received the Final DOE standard, (2) have not received the final technical support documentation, and (3) have no idea if the probability of an aircraft crash into a Pantex plutonium storage facility is 1 or 100 in a million. Therefore, at the close of this comment period, we can not verify their results because none is available. What is known is that everything published in the draft EIS will be changed based upon the new DOE standard.

2. The aircraft crash rates are fixed in the DOE standard; however, do not have access to either the Technical Support Documentation nor the data from which the accident crash rates (usually reported as accidents per hundred thousand flying hours) have be calculated into a crash probability for each takeoff, for each landing, or an inflight rate per square mile. This calculation requires many assumptions and several different steps. From interviews, we have determined the draft DOE standard does a credible job in establishing these crash rates. However since DOE contractors have denied access to both the data and the technical support documentation, we request that that the following points of potential errors be addressed by the DOE contractor, reviewed by a competent authority, and be included in the Final EIS:

A. Military Crash Rates - Military aircraft perform touch and go landings for proficiency training only with an instructor on board. Additional landing practice is accomplished as a low approach with the wheels not touching the runway. The civilian tower counts this low approach as two operations (1 takeoff and 1 landing) but no record of a landing is recorded in the military records. We request details of how this discontinuity in the raw data is accounted for in the DOE standard. We request that following data be published in the Final EIS for all military aircraft with significant impact at the Pantex facility: accident and crash rates per hundred thousand flying hours; average hours per sortie; average landings and low approaches per sortie; and number of crashes attributed to landing, takeoff, and inflight categories.

B. General Aviation Inflight Crash Rates - It was pointed out in interviews that there are 422 off-airport crashes per year of general aviation aircraft in the United States which are considered in the calculation of the probability inflight crash rate. This data may be true, but it would be overly conservative to assume the probability of crash into a vacant or farming square mile was equal to the probability of crash into a built up areas such as the Pantex compound. Many general aviation crashes are the result of engine failure, nearly all general aviation aircraft have flight controls that function without power and pilots are trained to attempt forced landings in those emergencies. No pilot given a inflight situation where some flight control remains, would aim at the Pantex compound rather than away from the reinforced structures at the compound. Given the good weather conditions at Amarillo and the relatively open spaces surrounding the Pantex compound, the crash rate cited in the DOE standard should be greatly reduced for the local application of inflight general aviation aircraft.

3. In general we feel the DOE standard is a tremendous improvement in accuracy over the previously used Solomon model for predicting the probability of an aircraft crash into a facility. The Solomon model was far too overly conservative in the estimate of the contribution of high altitude overflight aircraft. Since this new DOE standard corrects the inflight contribution of the Solomon model, we would logically expect that the probability of an aircraft crash into the Pantex plutonium storage facilitates should decrease from previous studies that used the Solomon model. We request that the Final EIS provide some narrative description of the new calculation of hit probability in comparison to the previously conducted studies and a short justification for the differences in the findings.

4. After reviewing the draft EIS and conducting interviews, we recommend that the DOE standard in its application to the Pantex facility be localized for the conditions and aircraft traffic in the following ways:

A. The small military aircraft subcategory which makes up a large portion of the traffic at Amarillo Airport must be studied by specific aircraft types. The T-38 and T-1 aircraft which are the dominate aircraft types in the traffic stream must have separate hit probabilities as well as separate release probabilities.

B. The closure of Reese AFB in Lubbock, Texas by December 1996 will have a significant effect on the forecast T-1 and T-38 traffic at Amarillo Airport and therefore attempts must be made to use the actual forecast numbers rather that past history for these aircraft.

C. The collection of RAMS data at Amarillo Airport has provided the Department with a very good record of the number and types of aircraft and their ground track in comparison to the Pantex facility. This data should be used when necessary to adjust DOE standard crash rates which are based upon a total average of all airports throughout the United States. The takeoff ground tracks for Runway 04 do not follow the typical pattern assumed when the data was collected for the DOE standard.

D. When using the RAMS data, insure that military aircraft that are in formation be counted as multiple aircraft rather than as a single aircraft.

E. The Pantex facility has super stout structures and consideration of the structural capacity and resistance to aircraft penetration should be accurately modeled.

F. The effective aircraft crash skid length should be localized to consider the local conditions at the Pantex facility.

G. The FAA and DOE have agreed to several mitigation measures to reduce the probability of aircraft impact into Pantex and we applaud those efforts. The draft EIS provided an estimate of the effectiveness of these measures using the Solomon model which were significant. Although the application of this new model in the DOE Standard will probably estimate the effectiveness of these measures as insignificant, we believe they are significant and should be estimated separately.

5. We recommend that DOE continue to collect radar data at the Amarillo airport as a mitigation item for the Site Wide EIS We highly recommend that the current method of tracking radar should be improved with DOE funding a state-of-the-art system that is equal to the noise monitoring systems installed at many major airports in the US. This system should be automated and integrated with a geographical information system and be turned over to the airport for their use in airport planning.

Sincerely,

Michael T. McNerney, Ph.D., P.E.
Director
Aviation Research Center

MTM:ls

James C. Rock
Department of Nuclear Engineering
Texas A&M University
College Station TX 77843-3133

11 July 1996

Subject: Aircraft Accidents and the Draft Pantex Site Wide Environmental Impact Statement (SWEIS)

1. First, let me start by observing that the Department of Energy (DOE) has created the best available models for assessing the probability of an aircraft accident at any point in the country. Second, DOE is to be congratulated for using their models in their Environmental Impact Assessments. Third, DOE is continuing to improve their aircraft accident models. Unfortunately, this continuous improvement poses difficulty for those who try to comment on the draft SWEIS for Pantex. A major shift in modeling assumptions occurred between July 1995 and July 1996. The predicted annual risk of an aircraft accident in any square mile has increased as a result of changes in the model, not as a result of changes in the aeronautical environment in the vicinity of the Pantex Plant.

COMMENT: The aircraft accident risk depends as much on the aeronautical environment as it does on the assumptions of the model used for predictive purposes. The final SWEIS must clearly portray both effects. It is important that this issue be addressed in the Executive Summary as well as in the EIS itself.

2. The discussion in the SWEIS points out that an Aircraft Accident can be an initiating event in a scenario that leads to public exposure to radioisotopes. Because this is a very unlikely event, the authors attempt to quantify the probability of the event. The Draft SWEIS used the Draft DOE Guidelines for Aircraft Accident Prediction (July 95, Revised). During the period of public comment, HQ DOE announced its intent to publish final guidelines, now promised for mid-July 1996. Further, DOE wants the final SWEIS to be based on the final guidelines. The new paradigm is that aircraft accident locations are best predicted on the basis of the locations of previous accidents. The location probability density function is a smoothed average over the whole nation for en route accidents. For near airport accidents it is a smoothed function of all accidents as a function of distance and direction from a composite runway. This is a major change from the draft guidelines and prior accident models. These assumed the impact location would be near the point along an established "flyway" where an aircraft encountered difficulty and used probability factors with dimensions of accident probability per mile of flight.

Preliminary calculations show that the new model predicts accident rates 2 to 10 times higher than the older models.

QUESTION: Since the Pantex SWEIS will be the first to use the new DOE Aircraft Accident Guidelines, and since it may be used to compare predicted accident probabilities at Pantex to those at other DOE facilities, how does DOE intend to explain the changed paradigm to members of the public and to senior decision makers?

3. In cooperation with FAA, DOE has initiated several mitigation measures to reduce the probability of an aircraft accident involving Pantex facilities. These include moving the back course localizer 6 degrees west and creating GPS instrument approaches that move takeoff and landing operations more than 2 miles away from Pantex. Plans exist to move the VOR onto the airport from its present location near then Pantex fence line. This will reroute high altitude traffic away from Pantex facilities. Unfortunately, the new accident model, based only on the history of previous aircraft accidents, is unable to demonstrate reduced accident probabilities from mitigation measures. From conversations with Kamiar Jamali, DOE did not intend this model to be used for mitigation design. It is designed to provide a common basis for comparing one DOE location to another. Nevertheless, as existence proof for the benefit of mitigation measures, note that the White House is surrounded by a no-fly zone.

QUESTION: Request that DOE insure that the final SWEIS give appropriate credit for mitigation measures completed and contemplated. See the next comment for a suggestion.

4. To better understand the true flight environment at Amarillo, DOE installed the RAMS system to record the flight tracks of every aircraft operating near the Pantex Plant. This data has been analyzed by Dr. Y.T. Lin of Sandia Labs. In his paper, "Assessment of Aircraft Risk Reduction at Pantex Plant," he uses actual RAMS data to compute the probability density function for aircraft distance from zone 4 for all recorded aircraft. Dr Lin uses this data to make three relevant points:

1. It shows dramatic differences in overflight activity on days when the USAF is flying compared to days when there are no military flights.

2. Only a small fraction of all flights approach within 2 miles of zone 4.

3. The daily total of high altitude en route flights and low altitude en route flights provide no clue as to the location of the VOR or of the FAA route structure. These flights are better modeled as uniformly distributed.

QUESTION: Can Dr Lin's approach to analyzing RAMS data be used to demonstrate efficacy of mitigation measures?

5. The proposed DOE Standard 3014-96, uses a hierarchical accident analysis scheme starting with simple, conservative models and progressing towards complex, accurate models. A screening level of risk < 1E-6 / yr is recommended. If at any point in the progression, the aircraft crash probability falls below this level, no further analysis is required. It is presumed that other initiating events become more important than aircraft accidents at this probability level. There are two problems with this approach. First, it leads some to believe that only when the aircraft accident probability is below 1E-6 / (sq mi* yr) has an adequate margin of safety been provided. Second, the base accident rate for general aviation aircraft is on the order of 500 /yr over 4,000,000 sq mi, or about 1E-4/(sq mi * yr). There are four other categories of aircraft in the DOE guidelines, each with their own accident rate: large military, small military, commercial air carrier and commercial air taxi. Thus, the total aircraft accident probability in the continental United States is above the screening rate, and full analysis is mandated by the DOE standard.

COMMENT: DOE should very clearly explain the meaning of their screening level and of any aircraft accident probabilities computed for the Pantex SWEIS. The Pantex SWEIS will be the first to use the new geographic based guidelines. Other DOE laboratories and locations have analyzed their aircraft accident risk using earlier draft guidelines. Since DOE claims the aircraft accident model is designed to compare relative risk among DOE facilities, the revised prediction for all DOE sites should be included in the Pantex SWEIS. This means that the new guidelines need to be applied to all DOE operating locations so that Pantex can be viewed in proper relationship to the others.

6. Although the geographic modeling approach is an interesting exercise, the SWEIS should also contain complete Amarillo Aircraft accident data from 1970 to 1996. This data should then be explained in the context of the aircraft accident model. That is, based on the accident model, is the real experience an expected outcome?

COMMENT: Suggest using the binomial distribution to estimate the confidence in the predicted accident rate. Use confidence interval principles to determine if the location and frequency of observed accidents are in reasonable agreement with the model.

7. Personnel at HQ DOE understand the difficulty of explaining the aircraft accident probabilities to the public. In a lively discussion at SAIC on 9 Jul 96, hosted by Tim Haley and chaired by Kamiar Jamali, the suggestion was made that EIS analyses not report the aircraft accident probabilities. These probabilities are intermediate results from the model and do not indicate public health risk. An accident is merely a potential initiating event. The suggestion was that the EIS should focus on the release probabilities, instead. This movement from "hit probability" to "release probability" involves many intermediate layers of modeling. First, one must assume the angle of impact for the aircraft. Second, assume an impact velocity and

compute the skid distance during which the aircraft retains sufficient kinetic energy to penetrate a storage magazine or transport trailer and storage container. Third, compute the probability that an aircraft will impact within the dangerous skid distance from the facility heading toward that facility. Fourth compute the probability that a fire or a dense part of the aircraft will penetrate or destroy the facility. Clearly, the probability that all of the above events occur together is many orders of magnitude smaller than the simple probability that an aircraft hits near a critical facility or transporter. It is also clear that values assigned to the coefficient for each step affect the confidence interval about the point estimate of the release probability. The understandable tendency is to assign worst case values to all parameters to create an upper bound on the estimated release probability. For purposes of communicating to the public, it is desired to have an estimate of the central tendency, the median or the mean value of the release probability as well.

COMMENT: Include both the worst case and the mean value of the release probability due to aircraft accidents. The difference between point estimates of the worst case and of the typical case will give public officials an internally consistent estimate of the safety factors built into the prediction algorithm used.

8. Not all structures proposed for storage and handling operations at Pantex are constructed in the manner and with the materials assumed in the DOE structural vulnerability analysis. That analysis seems to assume standard rebar reinforced concrete construction techniques. At Pantex there are some facilities that are more stout and some that are less stout than the analysis in the draft SWEIS seems to assume. Bundling the stout structures into the analysis probably creates a pessimistic estimate of the true risk of release.

COMMENT: Suggest DOE obtain data from a test involving crashing an F-4 into a section of a commercial reactor containment vessel. Use that data as a basis for assessing the likelihood that a small military aircraft crash could be an initiating event for a release incident in a stout structure. Then assess the effect on the overall risk to Pantex operations.

9. The present model seems to assume that an accident that results in internal spalling of a structure will produce a release. This assum- :on seems overly conservative for pits stored in approved storage or shipping containers. a, the data from the F-4 Crash Test may provide valuable clues to the appropriateness of t[illegible] .lytical assumptions in the release models.

COMMENT: Clarify in the EIS the release probability from spalling incidents. This may be one of the factors leading to an overly pessimistic assessment of the consequences of an aircraft accident. Since pits will be stored without chemical explosives, spalling seems an unlikely source for damaging both the storage container and the cladding on the pit.

10. In the aircraft accident consequence analysis, the DOE model assumes that either a direct impact or a skidding impact can lead to a release. The model assumes that the aircraft (or its dense structures acting as kinetic missiles) retains dangerous velocities for the entire skid. In reality, the velocity slows continuously during the skid. The target area is computed from the actual facility dimensions, the aircraft wingspan and the skid distance. The skid distance is the dominant factor in target area.

QUESTION: Why not use a linearly decreasing velocity as a conservative means for estimating remaining kinetic energy during a skid? This would dramatically reduce the area involved in target zones and would refine the point estimate of critical aircraft accident probability.

11. The structural damage modeling assumes all aircraft in a single FAA category pose similar risk to structures. These categories are useful for licensing, air traffic control and taxing purposes, but may not be ideal for accident analysis. For example, both a T-37 and an F-15 are included in the small military category. The T-37 has much less kinetic energy than an F-15, and has much smaller components that could become missiles. The damage potential of a T-37 matches that of many general aviation aircraft better than it does an F-15. Nevertheless, the default portions of the DOE guidelines treats them identically.

QUESTION: Why does DOE use FAA categories rather that a more technical criteria to group aircraft? Suggest a product of wing loading and gross weight as a better metric. Aircraft with high wing loading always approach faster than those with low wing loading. Aircraft with high gross weights always have more stout pieces in their structures and engines than aircraft with low gross weights.

12. Dr Lin's analysis of nearest point of approach for each flight trajectory provides an alternative for site-specific accident modeling. It is not likely that his work can be extended to a full analysis of RAMS data within the promised schedule for the final SWEIS. However, his work does suggest that a careful examination of consequence analysis assumptions may be in order. One is tempted to believe that aircraft flying directly over a facility may pose the greatest risk. However, any aircraft impacting a facility from within a cone above that facility must impact at a very large glide slope angle. At angles greater than 30 degrees, there is virtually no skid distance. Thus the facility floor plan is the target area for impact from above. Because this area is much smaller than that assumed in the DOE guidelines, the probability of this accident is much smaller.

QUESTION: Can the distribution of the points of closest approach be used to determine both the slant range and the line of sight angle to critical facilities? The effective target area for each facility will depend strongly on the impact angle. This effect is not included in the DOE guidelines because they default to a specified point estimate of the impact angle. The basis for this assumption is apparently discussed in the technical support documents for the DOE Standard, but that is not yet published, and may not be published for several more months.

COMMENT: A Monte Carlo analysis is likely the right means for accommodating this important effect.

13. A full risk assessment of aircraft accident potential would include a term for a collision between an aircraft and a transport trailer, either on site during transport between structures or off site during cross country transport. No such term is evident in the draft SWEIS.

COMMENT: Suggest that the probability of an aircraft accident impacting a transporter be computed. Due to the short duration of exposure while in transit, it is expected that this risk will be shown to be negligible compared with other risks associated with fixed storage facilities.

14. The tiered approach to aircraft accident modeling encourages the analyst to perform increasingly complex computations if the screening level has been exceeded in the prior step. The next step for the Pantex modeling effort involves using actual aircraft specific accident rates rather than using average accident rates for each of the identified five aircraft categories. It is also possible to use available accident rates for the most commonly observed aircraft in a category and to use the category specific rates for the remainder.

COMMENT: If accident rates are assigned to specific aircraft (such as the USAF T-1, T-37 and T-38 aircraft), then verify that the appropriate rates are used for the remaining aircraft in that category. These may be derived from aircraft specific accident data or estimated by marginal analysis of the entire category to determine the portion of the accident rate appropriate to the remaining aircraft types.

Copy to:
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TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

May 22, 1996

Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Attention: Nanette D. Founds
SWEIS Project Manager

Dear Ms. Founds:

Texas Parks and Wildlife Department (TPWD) staff has reviewed the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, Summary, Volume I-Main Report, and Volume II-Appendixes. TPWD has the following comments for your consideration.

While we recognize Pantex efforts to discover the amount and extent of the historical contamination and Pantex current contaminant reduction in progress, we are concerned about impacts to wildlife from historic contamination listed in the report. Due to the unknown extent of the historical contamination, TPWD requests Pantex continue to describe the extent of contamination and encourages efforts to clean up or rectify the contaminant impacts. Consider incorporating a time line showing past efforts and future efforts in contaminant identification and clean up. If available, please send Joan Glass of our staff copies of completed reports describing potential wildlife impacts.

TPWD is also concerned about the unidentified minnow species from Pantex Lake. Because there are 6 Federally listed *Notropis* with 2 additional State listed *Notropis* species, the minnow species should be identified by a competent scientist. You may request assistance in identification of the minnow by contacting the TPWD Freshwater Studies Program aquatic biologist, Kevin Mayes at 512/754-6844. Upon contacting Mr. Mayes for identification, a minimum of 5 specimens can be sent to him at 300 C.M. Allen Parkway, Bldg. B, San Marcos, TX 78666.

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components. Please call Dave Buzan at 512/389-4634 or Joan Glass at 817/867-7956 if you have any questions.

Sincerely,

Bob Spain

Robert W. Spain, Chief
Habitat Assessment Branch
Resource Protection Division

RWS:JG:bsl

cc: Joan Glass, Texas Parks & Wildlife Department, Waco Office
Kevin Mayes, Texas Parks & Wildlife Department, San Marcos Office

TEXAS HISTORICAL COMMISSION

The State Agency for Historic Preservation

May 1, 1996

Mr. Bruce G. Twining
Manager
Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Re: Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage.
(DOE, F2)

Dear Mr. Twining:

This letter replaces our letter of April 22 and provides clarification of our comments regarding the Pantex Draft EIS. We have learned that the EIS addresses Section 110 of the National Historic Preservation Act, not Section 106 as we had assumed in our letter of April 22. With the clarification of this issue by DOE at a May 1 meeting, we agree that the EIS addresses Section 110 issues. Moreover, the EIS is a good step toward achieving compliance with Section 110.

Concerning our comment that consultation with Section 106 has not taken place for archeological studies, we have found evidence in our files that DOE has consulted with this office about archeological sites at the Pantex Plant. Extensive consultation has occurred regarding historic buildings with representatives of the National Register Programs Office and Division of Architecture at the Texas Historical Commission. Our primary concern, however, was that the archeological reports listed on page 4-148 of the Draft EIS have not been formally submitted to us for review. This situation was also resolved at the May 1 meeting, with DOE agreeing to have its contractor prepare a timetable for the submission of the reports along with National Register eligibility determinations for archeological sites.

We regret any misunderstanding our initial comments may have caused. In an effort to prevent future miscommunication, DOE and our agency have exchanged letters specifying the appropriate points of contact for issues related to archeology and architecture at Pantex. If we may be of further assistance concerning archeological issues, please contact Mr. Bill Martin of my staff at 512/463-5867.

Sincerely,

James E. Bruseth, Ph.D.
Deputy State Historic Preservation Officer

Sincerely,

Timothy K. Perttula, Ph.D.
Assistant Director for Antiquities Review

JEB/TKP/wam

cc: Ms. Vicki Battley, Pantex Plant
Mr. Roger Mulder, Governor's Office

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PANTEX
PURSUIT OF EXCELLENCE
MEMO

Date: September 15, 1994

From: C. J. Phagan Location: Environmental Prot., 12-100

To: Distribution Location:

Subject: Summary Notification of Native Americans; NEPA/EIS, NHPA Activities. Revision 1

Two sets of compliance-related activities at Pantex Plant involve various public notification, including concerned Native American Tribes: the Site-Wide Environmental Impact Statement (EIS) for Plutonium components storage, done under the National Environmental Policy Act (NEPA), and the development of Programmatic Agreements for the management of archeological sites and other historic properties, done under the National Historic Preservation Act (NHPA) and related legislation. Both activities require the identification of potentially concerned groups, including Native American tribes, providing them with relevant information, soliciting their comments, and addressing those comments in any final project documentation.

In April 1993, preliminary notification of NHPA-related activities at Pantex Plant was provided, via registered mail, to a list of seven Native American Tribes identified by the Texas State Historic Preservation Office (SHPO) as potentially interested parties with traditional interests in the area. Those tribes were: Comanche Tribe of Oklahoma, Kiowa Tribe of Oklahoma, Apache Tribe of Oklahoma, Mescalero Apache Tribe, Jicarilla Apache Tribe, Cheyenne-Arapaho Tribe of Oklahoma, and the Wichita and Affiliated Tribes. No responses were received at that time.

By early 1994, the same NHPA-related activities were continuing at Pantex Plant, and Site-Wide EIS activities under NEPA were started. The Environmental Protection Department (EPD), and others, felt that additional actions by the Plant were needed to demonstrate a good-faith effort to locate and inform potentially concerned Native American Tribes of these Plant activities, and to encourage their participation in the NHPA and NEPA processes. The EPD Cultural Resources Staff contacted both the Texas SHPO and the Anadarko, OK, office of the Bureau of Indian Affairs (BIA) to identify potentially interested tribes with historical/traditional concerns in the Texas Panhandle area. As a result, three additional tribes were added to the above list of potentially interested parties: the Caddo Tribe of Oklahoma, the Delaware Tribe of Western Oklahoma, and the Fort Sill Apache Tribe.

These ten tribes were contacted by telephone during the period May 18-25, 1994. On May 18, 1994, Mr. Leonard Atole, Tribal President of the Jicarilla Apache Tribe, stated that the Jicarilla Apache did not have concerns in the central Texas Panhandle. He thanked us for our call. On May 19, 1994, Mr. Fred Peso, Vice President of the Mescalero Apache Tribe, stated that their traditional interests were further to the south than the Texas Panhandle. However, they were interested in the EIS process, they would like to be placed on the EIS mailing list, and they would contact us if they needed additional information. The remaining eight tribes expressed an interest in knowing more about either the EIS/NEPA activities or the NHPA activities, or both.

On June 14 and 15, 1994, a second telephone contact was made with the eight interested tribes by EPD Cultural Resources Staff to schedule a visit to the tribes to provide detailed information on both EIS/NEPA and NHPA activities, to respond to questions, to explain the EIS scoping and comment process, and to encourage tribal comments. These visits were scheduled for June 22-24, 1994.

A packet of information was prepared for each of the eight tribes that included:

1. EIS/NEPA information

   - A letter from the Pantex Plant EIS Program Manager to the Tribal official

   - maps showing the location and layout of the Pantex Plant

   - multiple copies (5) of four EIS News fact sheets ("Pantex's New Environmental Impact Statement," "What is an EIS?," "What is the Purpose of the EIS for the Pantex Site?," and "Issues to be Addressed in the Pantex Environmental Impact Statement")

   - multiple copies (5) of a "checklist for Scoping Comments"

   - multiple copies (5) of a brochure entitled "Public Involvement Opportunities in the Site-Wide Environmental Impact Statement for the Pantex Plant"

2. NHPA information (separately packaged)

   - a letter from the Department of Energy, Assistant Area Manager for Projects and Environmental Management, to the Tribal official

   - a "Cultural Resources Management Overview" for the Pantex Plant, with detailed information on NHPA compliance program status, and comment opportunities

An example packet is on file in the EPD Cultural Resources Office. In addition to the information packets, an aerial photograph of the Plant site was available to provide a visual image during discussions, and an information video on the Site-Wide EIS was available for those who wished to view it.

C. J. Phagan
Sr. Project Scientist

CJP:sw

cc: R. H. Gray
C. N. Click
P. S. Allison
G. D. Greenly
S. E. Pomeroy
D. Halliday
D. F. Trisbel
C. L. Cizan
W. A. Bowman

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STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
401 Church Street
Nashville, Tennessee 37243

July 12, 1996

Ms. Nanette D. Founds
US Department of Energy
Albuquerque Operations Office
PO Box 5400
Albuquerque, NM 87185-5400

Dear Ms. Founds:

As the Governor's Lead Contact for State of Tennessee National Environmental Policy Act (NEPA) reviews, I am providing comment in response to the *Draft Environmental Impact Statement (DEIS): Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components, DOE/EIS-0225D, March 1996.* The attached comments from our DOE Oversight Office in Oak Ridge, Tennessee represents the official response of the State of Tennessee. Please give these comments your full consideration.

We appreciate the opportunity to comment and will respond to additional opportunities in the future. If you have any questions, please contact our NEPA coordinator at (615) 532-8545.

Sincerely,

Justin P. Wilson by [illegible]

Justin P. Wilson
Commissioner

c: Ken Bunting, Administrator (for WKS)
Earl Leming, DOE-Oversight
Mike Mobley, RH
Dodd Galbreath (NEPA coordination file)
James C. Hall, Manager, DOE ORR
Dr. Amy S. Fitzgerald, Ph.D., ORR LOC

amount of depleted uranium currently stored on the Oak Ridge Reservation (ORR) and the metric ton amount that will be shipped from the Pantex facility. Please provide the historical metric ton amount of depleted uranium at the ORR. Also provide information on the environmental impacts for the interim storage of depleted uranium at the ORR. The Division contends that if the historical levels of depleted uranium stored (interim) at the ORR are exceeded, additional NEPA documentation should be prepared to adequately address the impacts to human health and environment.

The Division requests these comments be given full consideration in the preparation of the Final Environmental Impact Statement for Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components.

The Division looks forward to receiving future project documents and correspondence. If you have any questions regarding this Division's review, please contact Dale Rector at (423) 481-0995 or Steve Nisley at (423) 481-0163.

Sincerely

Earl C. Leming
Director

em340.99

State of New Mexico
ENVIRONMENT DEPARTMENT
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GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

July 3, 1996

Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, N.M. 87185-5400

Dear Ms. Founds:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPON COMPONENTS; U.S. DEPARTMENT OF ENERGY (MARCH 1996)

The following transmits New Mexico Environment Department (NMED) staff comments concerning the above-referenced Draft Environmental Impact Statement (DEIS).

(1) Some of the actions appear to (potentially) be in conflict with NMED laws and regulations.

a) Vol. I, page 6-4, **6.5 Pit Storage Sites**, under the paragraph referring to Kirtland Air Force Base. The U.S. Department of Energy (DOE) must be in compliance with the Federal Facility Compliance (FFC) Order issued by New Mexico under the provisions of the Federal Facility Compliance Act. The FFC Order has jurisdiction over generation and storage of mixed waste and site treatment plans for its disposition. (p.5-60, **5.5.1.10 Waste Management**. "The pit storage operations would generate less than 1 cubic meter (1.3 cubic yards) of mixed, low-level, and hazardous wastes.")

Mention of the New Mexico unilateral FFC Order is not included in Table 6.5-4.

(2) There are some deficiencies in the information provided which prevent an adequate environmental assessment of the project. Specific areas in the DEIS exhibiting information deficiencies include the following:

a) Vol.I, page 5-63, **5.5 KIRTLAND AIR FORCE BASE, 5.5.1.12 Aircraft Accidents**, "An analysis was performed to determine whether expected bomb loads (one to four 909-kilogram [2000-pound] bombs) could damage the Manzano storage magazines in the event of an airplane crash. With the minimum cover of 9 meters of granite and earth the magazines cannot be damaged by any foreseeable aircraft events."

Vol. II. page E-26. **AIRCRAFT ACCIDENT ANALYSIS, E.3.2.4 Structural Calculation.** "A survey of contour maps reveals that the approximate overburden for the Manzano WSA is approximately 3.05 meters."

Based on the aforementioned information . it is unclear which of the above statements is correct. If the second statement is correct, then the minimum overburden is 3 meters. and the analysis of the bomb loads should be further considered as a plausible accident analysis. Although a bomb load may not have impacts below 9 meters of granite. it may impact 3 meters.

b) Vol.1. page 5-65. **5.5.2 Resources Discussed in Detail, 5.5.2.1 *Human Health*. Impacts of Storing 20,000 Pits.** "The combined worker dose from unloading and storage of 20.000 pits at the Manzano WSA would be 283 person-rem distributed over the 30 people directly involved in material movement."

If there is a collective effective dose of 283 person-rem, which is a sum of a population of 30 workers, then the average effective dose per worker is 9.43 rem. The **maximum yearly allowable dose** for radiation workers is 5 rem. according to DOE order 5480.11 "Radiation Protection for Occupational Workers" (1992. DOE). The projected radiation dose for these workers is in excess of the yearly allowable dose. The DEIS statement should be clarified and the calculation (inclusive of the population numbers) on person-rem provided.

The term "person-rem" should be defined in the glossary section.

c) Vol.1. page 5-65. **5.5.2 Resources Discussed in Detail, 5.5.2.1 *Human Health*. Impacts of Storing 20,000 Pits.** and **Impacts of Storing 8000 Pits**. Population doses and risk estimates from accidental releases are based on current populations. Pits are placed in interim storage for 20 years. for instance. and projected population growth is not reflected in the estimated doses (nor is risk) over this time period. Albuquerque has had a high increase in population in the last 20 years.

d) Vol.1, page 5-69. **5.5.2.2 Environmental Justice**. The entire section relies on 1990 census data. The "no impact" decision does not consider projected population growth in this location over the period of time that the pits may be in storage. Albuquerque, for example, has had a substantial increase in population during the last 20 years.

3) A number of topics not covered in the draft document continue to be of concern to state residents; they are recommend for inclusion in the final version of the DEIS. The issues in question include the following:

- Does the close proximity of the pit storage to weapons presently stored in the Manzano WSA pose an increase in potential nuclear accidents? Why would they not pose a problem?

- One alternative considered in the DEIS could have been placing plutonium in a permanent disposal, deleting interim storage (especially at Manzano WSA) as an alternative.

- Transportation of the pits is a very serious task. What assurances exist for safe transportation? For example, are the transporters meeting speed limits, obeying other traffic rules and using defensive driving techniques to reduce transportation risks? If drivers are not complying with safe driving techniques, accident risks are increased. These concerns should be addressed in the DEIS.

We appreciate the opportunity to comment on this document. Please let us know if you have any questions.

Sincerely,

Gedi Cibas, Ph.D.
Environmental Impact Review Coordinator

NMED File No. 982ER

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BOB MILLER
Governor

STATE OF NEVADA

JOHN P. COMEAUX
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July 12, 1996

Ms. Nanette Founds
U.S. Department of Energy
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P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Re: SAI # 96300158: State of Nevada's Comments on the Draft Environmental Impact Statement for the Continued Operations of the Pantex Plant and Associated Storage of Nuclear Weapons Components (DOE/EIS-0225D)

Dear Ms Founds:

Thank you for providing the State of Nevada the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the U.S. Department of Energy's (DOE) Pantex Plant located near Amarillo, Texas. As you may recall, in June of 1994, we provided extensive scoping comments on the Notice of Intent for this DEIS. In those comments, we noted that the Nevada Test Site was being considered as an off-site storage location for up to 8,000 plutonium pits. After reviewing the subject DEIS, we found that Nevada is still under consideration, along with three other off-site locations, for the storage of plutonium pits. To reiterate our comments presented in June 1994, <u>the State of Nevada remains firmly opposed to storing nuclear components such as plutonium pits at the Nevada Test Site</u>.

Proposed Action:

For the reasons discussed below, Nevada officials strongly support the Proposed Action in the DEIS, which stipulates that Pantex would retain storage of the plutonium pits and would provide for future storage of up to 20,000 pits over the next ten years. We support this interim action without regard to pending decisions concerning the long-term storage of strategic reserve pits and/or storage and disposition of surplus pits. As you know, these concurrent decisions are being evaluated in DOE's Stockpile Stewardship and Fissile Materials Programmatic Environmental Impact Statement (PEIS) documents.[1]

In reference to interim storage of plutonium pits at Pantex, Nevada's position on this issue continues to be that DOE should adopt a proposed action for the permanent disposition of surplus plutonium pits before selecting new interim or long-term storage sites for this long-lived material. In addition, to reduce duplication in storage, transportation, and security costs and to address risks associated with the proliferation of weapons-grade plutonium, DOE should consider adopting a program that combines materials disposition (e.g., plutonium vitrification) with long-term plutonium storage.

Implementing the Proposed Action as defined in the DEIS would enhance such a program; it would also help prevent redundant shipping campaigns of plutonium bearing material on public roads and highways. This is important since excessive

[1] Stockpile Stewardship and Management Draft Programmatic Environmental Impact Statement (DOE/EIS-0236), and Storage and Disposition of Weapons-Useable Fissile Materials Draft PEIS (DOE/EIS-0229).

transportation of plutonium on public roads remains controversial and is generally unacceptable to the public. For all of these reasons, officials in Nevada have long stated that "DOE should link long-term materials consolidation and management with options for final materials disposition."[2]

Pit Storage Relocation Alternative:

In reference to the detailed analysis of potential environmental effects at the two sites under consideration for pit storage at the Nevada Test Site (the Device Assembly Facility [DAF] and the P-Tunnel Complex), we concur that pit storage at either of these sites would not have any direct "significant" environmental impacts on existing environmental resources.[3] We note that new construction at the Test Site would occur within existing facilities [inside the DAF or P-Tunnel complex] and/or on adjacent lands that are already disturbed. Because of this, we have purposely forgone a detailed review of the "direct" environmental impacts presented in the DEIS. There are, however, certain "indirect" and largely cumulative impacts that could result from pit storage at the Nevada Test Site. For example, if plutonium pits were placed in the P-Tunnel complex, local and/or regional earthquakes could pose significant seismic risks that might lead to tunnel collapse. In this regard, we concur that, if Nevada is

2 Letter dated October 29, 1993 from Robert R. Loux, State of Nevada, to Mr. Howard Canter, Deputy Assistant Secretary, Office of Weapons Complex Reconfiguration.

3 In this context, environmental resources include: facilities and infrastructure; land resources: geology and soils; water resources; air quality; acoustics; biotic resources; cultural resources; socioeconomic resources; waste management; intrasite transportation; and aircraft accidents.

selected for pit storage, a separate assessment of the risks associated with seismic events would be required.[4]

Also, we were surprised that an analysis of indirect cumulative impacts was not provided in the DEIS for any of the off-site storage locations. This is significant, since a decision authorizing centralized plutonium storage and/or disposition will play a key role in determining the potential cumulative environmental impacts and radiological human health risks at the federal site(s) selected for such an activity. Hence, if DOE selects one of the off-site locations for interim pit storage (i.e., changing the proposed action), then a cumulative impact analysis must be provided for the selected site(s). Such an analysis must also account for impacts associated with interim pit storage in relationship to other department-wide programmatic decisions[5] involving treatment, storage, and disposition of other waste streams at the selected site(s).

In an unrelated issue, we note that the Nevada Test Site is described in the DEIS as a "government owned, contractor-operated facility, currently managed by Bechtel Nevada [and] DOE owns the 864,000 acre site in Nye County, Nevada."[6] This statement is incorrect. DOE does not "own" the Nevada Test Site. The Test Site occupies public lands that have been withdrawn for nuclear testing purposes only. The Final EIS for Pantex must acknowledge that the Public Land Orders[7] for the Test

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4 See DEIS page 5-17, paragraph one.

5 Examples include decisions concerning treatment and disposal of low-level waste, mixed low-level waste, disposition of Greater-Than-Class-C, disposal of Special Case Waste, etc.

6 DEIS, page 5-3 paragraph three

7 Public Land Orders 805, 1662, 2568 and 3579. Bureau of Land Management (BLM), 1984. Continuation of Withdrawals, Department of Energy, Nevada Test Site 4310-84. (This file is located at

Site do, in fact, limit the use of the site to weapons testing and related research and development facilities only. Moreover, when the Nevada Legislature ceded its jurisdiction to the public lands that now comprise the site, it did so on the basis of certain stipulated uses (i.e., nuclear testing) as defined in the Public Land Orders. Thus, while many believe the lands comprising the Nevada Test Site are federal lands, they are in fact public lands that have been withdrawn for a specific national defense purpose, and that purpose does not include long-term storage of fissile materials, nor development of any major disposition technologies such as plutonium immobilization.

Since this is a viable issue that cannot be ignored or dismissed, officials in Nevada have continued to encourage the DOE to propose a path forward to address future federal actions that could alter the stipulated mission of the Test Site. These same concerns were recently repeated by DOE[8] and substantiated in formal comments prepared by the Department of Interior for the Nevada Test Site, Site-Wide Draft EIS (DOE/EIS 0243).[9]

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the BLM State Office in Reno, Nevada.

8 U.S. Department of Energy, February 1996. Storage and Disposition of Weapons-Usable Fissile Materials, Draft Programmatic Environmental Impact Statement, Summary (DOE/EIS-1229-D), Page S-20. (The PEIS states that certain alternatives, such as consolidation of Highly-Enriched Uranium along with an estimated 38 tons of weapons-grade plutonium at the Nevada Test Site (NTS), would be *"inconsistent with the NTS withdrawal."*

9 In formal comments for the Nevada Test Site, Site-Wide EIS, the Dept. of Interior noted that "the Test Site is comprised of public lands withdrawn by the Secretary of the Interior, who has continuing responsibilities at the Test Site, for a specific use. The original orders (PLO No 805) withdrew lands for weapons testing . . . [and] a substantial change in use would require a new withdrawal." Letter to Carol M. Borgstrom DOE from Patricia Sanderson Port, DOE Regional Environmental Officer, April 24, 1996.

Summary:

As previously suggested, State officials in Nevada believe that DOE should link long-term fissile materials consolidation and storage with options for final materials disposition, and we believe the proposed action presented in the Draft EIS for Pantex supports this concept. As such, we continue to advocate a strategy that would bring together long-term pit storage with one or more of the plutonium disposition treatment options being considered in DOE's Storage and Disposition PEIS.

Embracing this strategy will reduce risks and risk perception issues associated with the unnecessary transportation of fissile materials on public roads and highways throughout the country. Clearly, a prolonged shipping campaign of plutonium pits along the nation's highways, especially through large urban areas like Las Vegas, will cause significant adverse socioeconomic and cultural impacts even if no accidents occur. Research has demonstrated that nuclear-related activities such as radioactive material transportation have the potential to result in significant socioeconomic impacts.[10] These impacts originate in intense negative perceptions and avoidance behaviors by the public, and public and media interest in "things nuclear" makes it almost certain that these negative perceptions will adversely affect a community's quality of life and subsequently its commercial, residential, and business investment opportunities. Thus, we contend that DOE should do everything possible to limit the movement of these dangerous materials.

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[10] See State of Nevada, Nuclear Waste Project Office. Publication numbers NWPO-SE 022-89; 056-93; and 063-95.

Again, we appreciate the opportunity to provide comments on the Draft EIS for the Pantex Plant. If you have any questions about these comments, please contact me or Mr. John B. Walker, Nuclear Waste Project Office, at 702-687-3744.

Sincerely,

Julie Butler

Julie Butler, Coordinator
State Clearinghouse, DOA/SPOC

JB\jbw

cc: Governor Bob Miller
Nevada Congressional Delegation
Perry Comeaux, Dept. of Administration
Robert R. Loux, NWPO
Harry Swainston, Deputy Attorney General
Lew Dodgion, Nevada Division of Environmental Protection
Affected State Agencies
Leo Penne, State of Nevada, Washington Office
John Thomasian, NGA
Terry Vaeth, Joseph Fiore, Don Elle, DOE/NV
Carol M. Borgstrom DOEHQ\NEPA
Ann Morgan, State Director, BLM
Members – NTS CAB

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Georgia Department of Natural Resources

Lonice C. Barrett, Commissioner

Historic Preservation Division

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June 19, 1996

Nanette D. Founds
SWEIS Project Manager
Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

RE: Draft EIS--Pantex Plant and Associated Storage of
Nuclear Weapons Components

Dear Ms. Founds:

The Historic Preservation Division (HPD) has received one copy of the document entitled, *Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components*. Thank you for providing our office with an opportunity to review this document.

Based on our review of the Draft EIS, it is our opinion that the proposed activities do not qualify as an "undertaking," as defined in 36 CFR Part 800 of the Advisory Council on Historic Preservation's regulations, and are not subject to our review under Section 106 of the National Historic Preservation Act of 1966, as amended. Therefore, we have no comments concerning this document at this time.

If we may be of further assistance, please contact David R. Bennett, Environmental Review Associate Planner, at (404) 656-2840.

Sincerely,

Jeffrey L. Durbin
Environmental Review Coordinator

JLD:drb

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Clark County

Department of Comprehensive Planning

RICHARD B. HOLMES
DIRECTOR

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July 5, 1996

Ms. Nanette Founds
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Albuquerque, New Mexico 87185-5400

SUBJECT: Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components [The "DEIS"].

Dear Ms. Founds:

With this letter, the staff of the Clark County Department of Comprehensive Planning is submitting its formal comments on the above-referenced *DEIS*. Members of our respective staffs have already identified or discussed many of these matters at a public hearing in Las Vegas on 25 April 1996 and at a teleconference on 5 June 1996 [See letter dated June 17, 1996, Bechtel to Bergman]. We feel that these exchanges were beneficial in that we were able to readily share our views and knowledge regarding the *DEIS* and related issues. Thus, the following comments either reiterate or expand upon our previous discussions.

We recognize that the *DEIS* follows the standard NEPA-mandated DOE format of identifying alternatives and then comparing and contrasting these alternatives by describing potential impacts on a number of environments. This standard format is well-recognized as a reliable and valid process to identify traditional impacts that may result from a major federal activity such as that described in the *DEIS*. However, we feel that the approach falls short of addressing the concerns of those persons and institutions most affected by the proposed project, namely those located in proximity to the site of the proposed activity and those located along related transportation routes.

Residents of Clark County and visitors to the area certainly fall within this definition and we would expect that their perceptions and concerns would be taken into account as the *Pantex EIS* is finalized and the record of decision is reached. Accordingly, we have made comments in two areas, one covering general issues [Section 1.0] and the other addressing procedural issues [Section 2.0]. We appreciate your full consideration of our comments and we would be happy to elaborate on any of the points raised in this letter.

1.0 General Issues

1.1 The EIS must take into account cumulative impacts on Clark County that may result from the selection of the Nevada Test Site [NTS] as a storage or disposal site for a number of DOE activities.

Given the approach taken in the *DEIS* that identifies only impacts from this one activity, it is not possible to reliably estimate the impacts to a geographic area or jurisdiction that may result from a number of initiatives taken by DOE. That is, even though other related NEPA studies are mentioned, there appears to be no analysis of potential interaction among the various DOE activities that are referenced. While any one activity may have negligible impacts on Clark County, significant impacts would result from a scenario where the NTS is selected a major site for storage or disposal of nuclear materials. Based upon the fact that the NTS is mentioned prominently in a number of ongoing DOE EISs, this latter situation is a distinct possibility.

1.2 Clark County questions the intent of DOE to actively pursue the proposed action alternative of storage of pits at the Pantex Plant.

The *DEIS* makes reference to extensive restoration work that is being planned or is in progress at the Pantex and Hanford sites. We question whether it is sound policy to conduct such environmental restoration work at Pantex, a majority which will be completed by 2000, and then store the plutonium pits on site, even for the short term. Given this, it would appear the pit storage relocation alternative may be more attractive than is presently represented in the *DEIS*. And, the NTS may emerge as the most feasible site for such relocation, since it is relatively close to the Pantex Plant, there are minimal environmental restoration plans for the NTS [as compared to other candidate sites] and there are frequent mentions of the NTS as a disposal or storage site in other DOE EISs.

For example, the *Stockpile Stewardship and Management PEIS* includes an alternative which describes the complete closing of the Pantex Plant with its capabilities relocated to NTS, Los Alamos and Lawrence Livermore facilities. The Pantex *EIS* does <u>not</u> address the implications of this alternative. This issue should be addressed in the final *EIS* and the *Record of Decision.*

2.0 Procedures

2.1 The Region of Influence [ROI] for the NTS alternative must be expanded to include the Clark County Urban Area through which all shipments are planned.

As with other DOE EISs, the defined region of influence for the assessment of impacts is 50 miles around a potential site. From Clark County's standpoint, this is a major flaw in the study since the bulk of the impacts would result from the transportation of the plutonium pits and not the storage itself. This is because the storage technology is relatively advanced and the possible NTS storage sites are well isolated and controlled. Use of the ROI around the specific storage site practically guarantees findings of no impact.

However, all highway routes that are under consideration for shipment of the plutonium pits pass through Clark County on the most congested areas of the State of Nevada on roads that are undergoing major construction, and in areas where the number of accidents and accident rates are the highest in the state. Expansion of the ROI to at least 100 miles around the Mercury entrance to the NTS would allow full consideration of any impacts due to use of these routes.

2.1.1 Perceptions of Risk. The interstate route [I-15] historically used for DOE shipments to the NTS and now being considered for the additional Pantex shipments, is within one-half mile of the Las Vegas Strip and downtown areas. This is among the most popular tourist destinations in the country. This means that over 3,000,000 tourists who visit this area annually would be exposed to transportation safety risks and may perceive the area as dangerous and/or one to avoid, even under incident-free operation. Should even a minor incident [e.g., unanticipated stoppage] or accident occur in this area, perceptions of its seriousness may be amplified to a point that fewer people may choose this area as their pleasure or business destinations. Even a minor downturn in the tourist cycle could have a devastating effect on the southern Nevada economy. Although the effects of perceived risk are not easily quantifiable, this variable must be taken into account as routes are screened and evaluated.

2.1.2 Environmental Justice. The population along the Interstate and nearby connectors includes a disproportionate number of minority and low-income individuals [38% minority and low-income, as compared to Clark County's 24%]. In addition, U.S. 95, the connector between the Las Vegas Urban Area and the NTS, serves the fastest-growing area of the country with regard to new residents and highway construction. Designation of a transport route for plutonium pits along this corridor may serve to slow down such growth or, possibly, result in a general lowering of property values. Use of the constricted ROI causes these important issues to be ignored. This is another example where a procedural convention virtually guarantees that potential impacts may not be identified.

2.1.3 Accident Analysis and Emergency Management Measures. Another example of the serious constriction placed on impact assessment by a 50-mile ROI has to do with the analysis of accidents and need for emergency management measures. Because the ROI takes into account only on-site areas, the impacts are so small as to be judged insignificant and transportation and emergency safety issues do not need to addressed. Further, the new storage/transportation container, the AT-400A, now under development, has not had real world experience and its operational characteristics and vulnerability to acts of terrorism are open to question. Again, this becomes insignificant if impacts are not being considered outside the narrowly-defined ROI.

In summary, we feel that all impacts that have been addressed in the *DEIS* must be reconsidered using at least a 100- mile radius from the *Mercury entrance* to the NTS in order to arrive at a realistic appraisal of potential impacts of relocation of the pits to that site. This would lead to a realistic appraisal of potential impacts due to transportation, the most public aspect of siting a storage area for plutonium pits [and other waste] at the NTS.

2.2 Transportation route selection processes should employ techniques that provide for comparisons among routes based on variables agreed upon by DOE, officials of affected local jurisdictions and other stakeholders.

While we accept the findings of the transportation risk analysis that is based on the probability of a occurrence times its consequences, we are not convinced of the validity of this approach for shipments to the NTS. The Clark County Urban Area, with Las Vegas as its hub, contains the major concentration of traffic and congestion in this mainly rural county. When the population, traffic, impedance, distance and other variables for links in the urban area are aggregated with those of all other links on a potential route, inside and outside Nevada, the relative weight and importance of the urban links is diminished. This then leads to a smoothing of the data and the usual result of insignificant risk.

We ask that the DOE take another approach in assessing risk and impact of transportation of nuclear materials - that of comparative risk assessment as endorsed by the U.S. Department of Transportation in its *Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials*, August 1992. This approach places emphasis on comparison of routes on variables that are important in decision-making processes, rather than on probability figures that are almost always insignificant and not interpretable to government decision-makers. For example, comparisons may be made on exposure of special populations, impact on environmentally sensitive areas and even relative risk of negative perceptions. This type of analysis on prospective routes selected for analysis in cooperation with affected jurisdictions would provide understandable results and a higher level of confidence in DOE actions than is now the case. As you know, Clark County is willing to provide up-to-date information for your use in such an approach.

We hope that these comments are helpful to you as you complete the *Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*. We look forward to continuing dialogue with your staff regarding this important project.

Sincerely,

Richard B. Holmes

RICHARD B. HOLMES
DIRECTOR

cc: Clark County Board of County Commissioners
J. Ley, Clark County Manager's Office
D. Bechtel, Nuclear Waste Division

11pantex.eis

ALL INDIAN PUEBLO COUNCIL
Pueblo Office of Environmental Protection
Post Office Box 3256 • Albuquerque, New Mexico 87190 • (505) 884-0480 • FAX (505) 883-7682

May 28, 1996

Nanette D. Founds
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Dear Ms. Founds,

This letter is in response to the Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components. The All Indian Pueblo Council's Pueblo Office of Environmental Protection are glad for the opportunity to comment of this document.

The Pueblo Office of Environmental Protection has the responsibility of protecting the environment of the nineteen Indian Pueblo tribes in the state of New Mexico. We have reviewed the draft EIS with this in mind.

There should be an addition to Table 6.5-4 in the Water Resource row. This table in the draft EIS has only the New Mexico state environmental statutes. Of these 19 Pueblo Indian tribes, six have received EPA approval for water quality standards under the treatment of state designation. These six are Isleta Pueblo, Sandia Pueblo, San Juan Pueblo, Santa Clara Pueblo, Picuris Pueblo and Nambe Pueblo. And of the six, Isleta Pueblo is the closest in proximity and downstream on the Rio Grande river from the Manzano Weapon Storage Area at the Kirtland Air Force base which is one of the alternative sites. Other Pueblo tribes have draft water quality standards that they anticipate approval soon.

It is only proper and respectful to mention the Pueblo water quality standards in table 6.5-4.

Sincerely,

Toney R. Begay, Sr. Environmental Scientist
All Indian Pueblo Council
Pueblo Office of Environmental Protection

CC: Everett Chavez, AIPC/POEP
Blane Sanchez, Isleta Pueblo
File

INDEX

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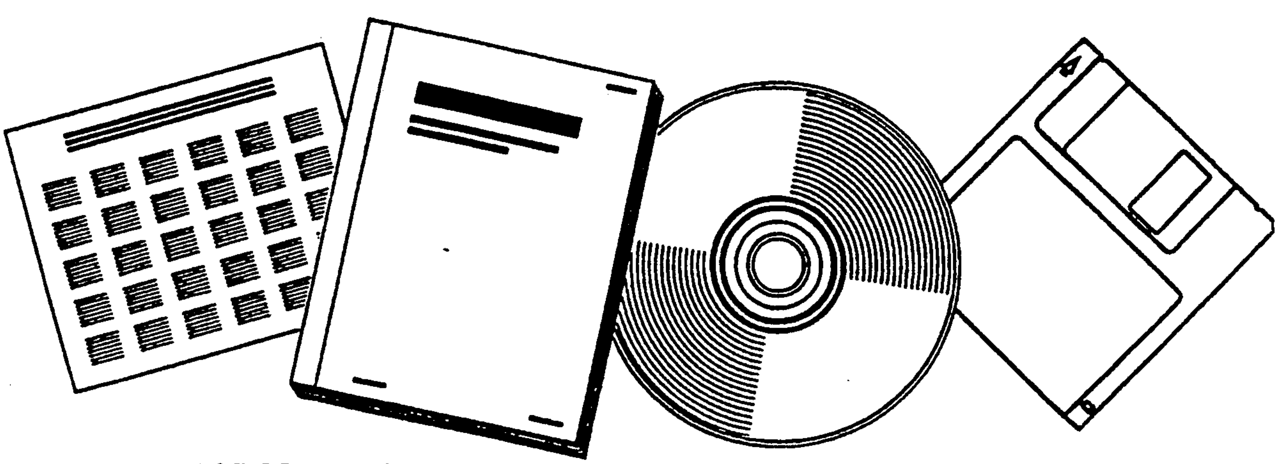
INDEX

DE97003073

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPON COMPONENTS. VOLUME 3 -- COMMENT RESPONSE

DEPARTMENT OF ENERGY
WASHINGTON, DC

NOV 1996



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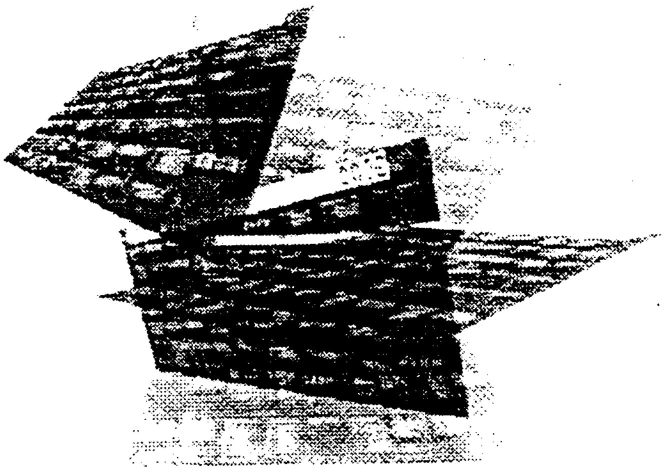

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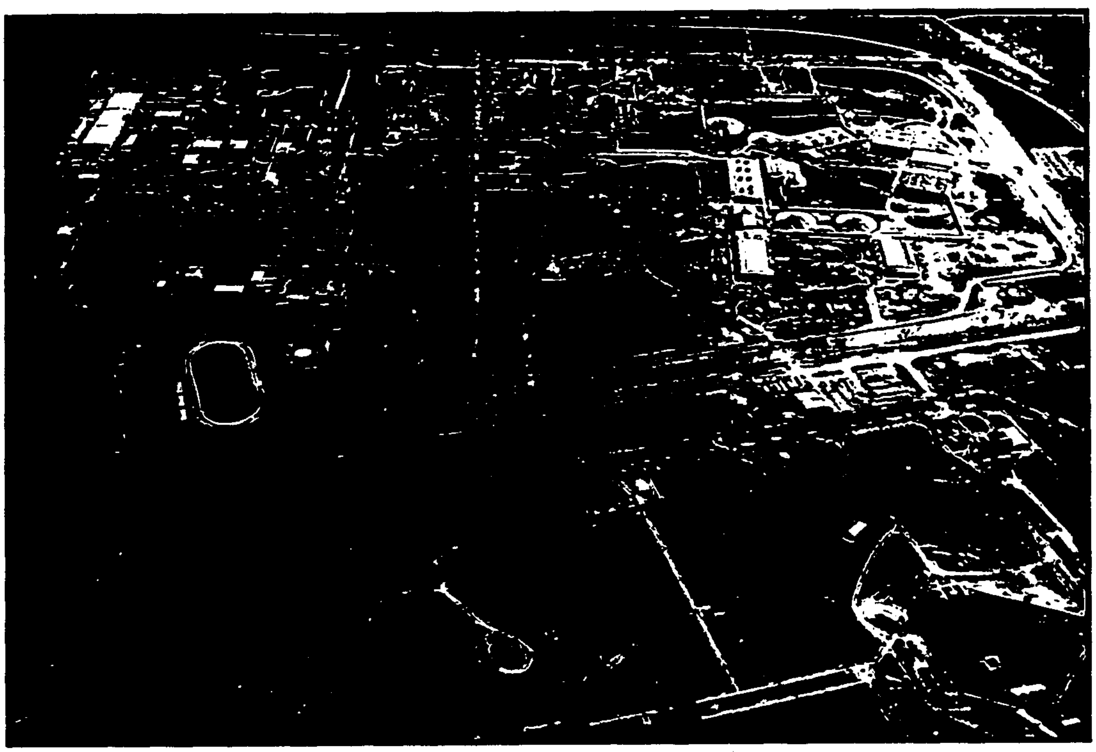
DOE/EIS-0225 - Vol. 3

Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components

Volume III–Comment Response



U.S. Department of Energy
1000 Independence Avenue
Washington, DC 20585

November 1996

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DOE/EIS-0225-Vol.3

Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components

Volume III–Comment Response

MASTER

U.S. Department of Energy
1000 Independence Avenue
Washington, DC 20585

November 1996

HH

DISCLAIMER

DISCLAIMER

CORRECTION SHEET

The Green Pages (pages GP-1 through GP-27) in the front of this volume were inadvertently printed on white, instead of green, paper as intended.

THE GREEN PAGES

THE GREEN PAGES

A Quick Reference Guide to Finding Information in This Document

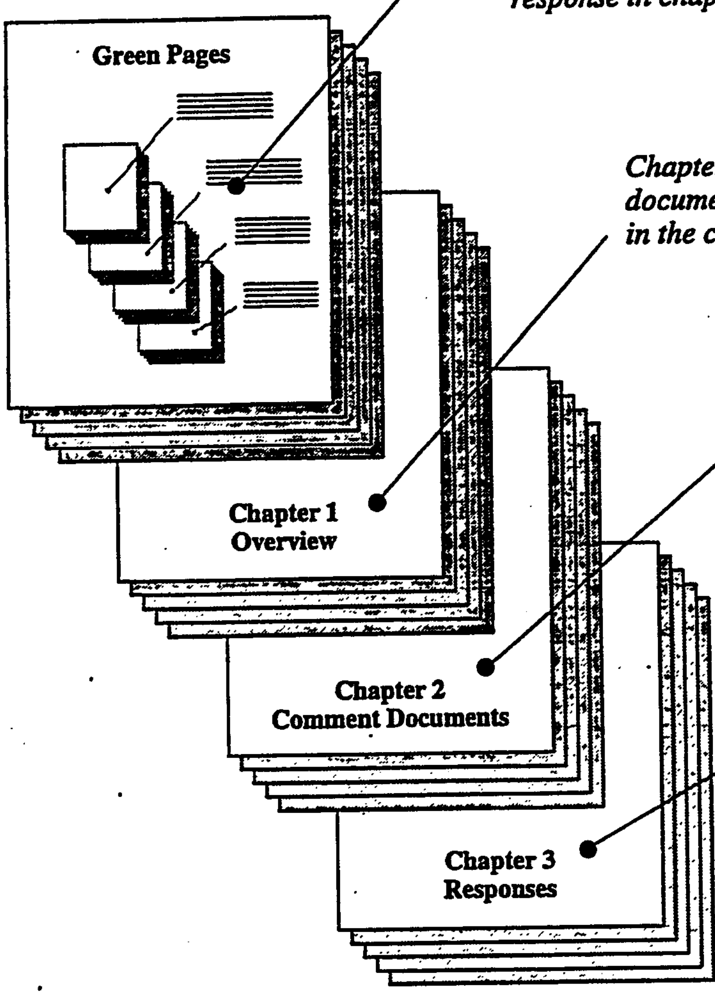
How this Volume Is Structured

Green Pages explain how to find a comment document, how to find the response to a specific agency's or person's comment and how to cross-reference between the source document in chapter 2 and the comment response in chapter 3

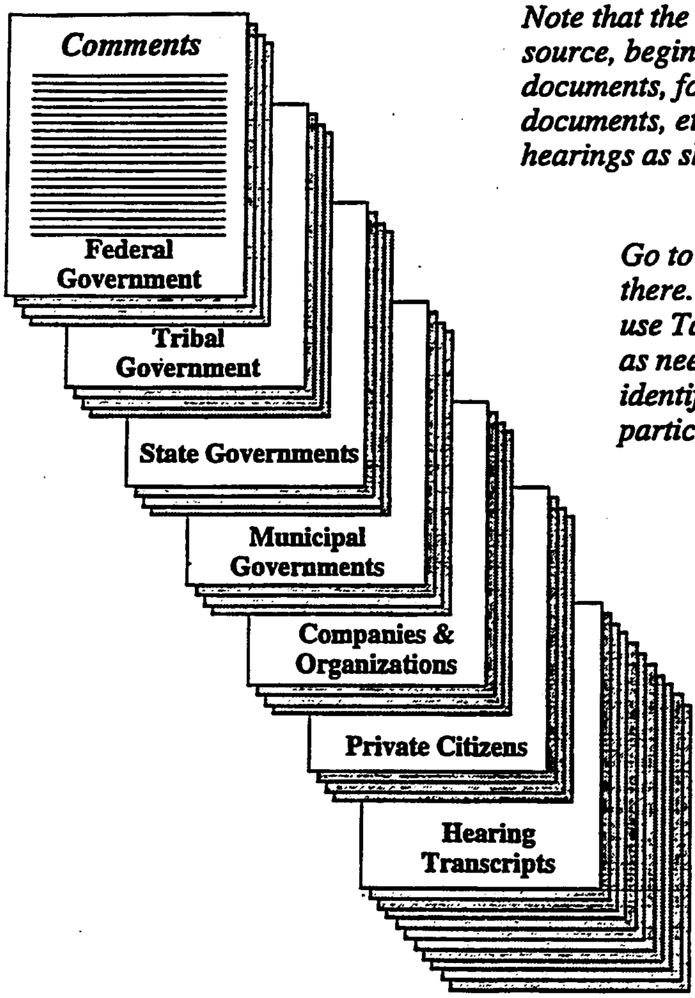
Chapter 1 provides an overview of the document, and discusses the major issues raised in the comment period

Chapter 2 contains facsimiles of comment documents, including letters, postcards, and transcripts

Chapter 3 contains responses to all comments. For convenience to the reader, each comment is printed verbatim, followed by the response



How to Find a Particular Document in Chapter 2



Note that the comment documents are organized by source, beginning with Federal Government documents, followed by Tribal Government documents, etc., down to the transcripts of public hearings as shown in the accompanying illustration.

Go to the next page and follow the instructions there. Those instructions will explain how to use Tables GP–1 and GP–2 of the Green Pages as needed to find the document of interest or to identify the specific comments made in a particular document.

How to Find a Particular Comment Response in Chapter 3

Chapter 3 contains responses to all comments. For convenience to the reader, each comment is printed verbatim, followed by the response.

To find a specific comment response in chapter 3, Turn to page GP-26 of the Green Pages and follow the instructions found there.

How to Find a Comment Document in Chapter 2

The documents appearing in chapter 2 are categorized and organized according to their origin. The sequencing of document categories is as follows:

- Letters from the Federal Government (FG)
- Letters from Tribal Governments, i.e., Indian Tribes or Intertribal Councils (TG)
- Letters from State governments (SG)
- Letters from Municipal governments, including counties (MG)
- Letters from private companies or organizations (CO)
- Letters, cards and other documents from private citizens (PC)
- Transcripts from public hearings, including the Technical Exchange (HT)

The parenthetical code after each of the above categories comprises the first two characters of document numbers for that category. For example, document numbers of letters from State governments begin with "SG" and are sequentially numbered within the category, e.g., SG-001, SG-002, etc.

Table GP–1 following this page lists all documents in each category. The name of each commentor (either an organization or a private citizen) is presented along with the comment number(s) and the document number(s) given by each commentor. If the commentor represented an agency or organization, the organization's name was used and the individual commentor's name(s) was presented in parenthesis. By reviewing this list, the commentor may go directly to a facsimile (in chapter 2) of a particular document or hearing transcript of interest.

For example, to locate the document from the Texas Parks and Wildlife Department, look under the listings for State Governments (SG) until the name of the agency is found. Note the accompanying document number, which in this example is "SG-009". Then turn through the documents of the "SG" section (in chapter 2) until you find the document number "SG-009" (i.e, the ninth document in the "SG" section) at the top of a document. That will be the facsimile copy of the document submitted by the Texas Parks and Wildlife Department. In reviewing that document, note the vertical bars that appear in the margin of the document. These show the portions of text representing the comments that are subsequently addressed in chapter 3. The code "SG-009/1" beside the first vertical bar identifies the first comment within document number SG-009. Also shown is an "RC" code (9.009) for the comment, which is used to later locate the responses to those comments in chapter 3.

Chapter 1 of this volume contains an overview of the comments and responses which are individually listed in chapter 3. Table GP–2 of these green pages provides a listing of the comment numbers for each document submitted. One may identify a document of interest in Table GP–1, and then using the document number for that document, find a listing in Table GP–2 of all comment numbers that appear in that document and the information necessary to locate the responses to those comments. Thus, without reading the source document, one could go directly from Table GP–2 to chapter 3 to see the specific comments and responses applicable to that document.

TABLE GP-1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996*

COMMENTOR INFORMATION	DOCUMENT NUMBER
FEDERAL GOVERNMENT	
U.S. Senators Phil Gramm and Kay Bailey Hutchison: Remarks	FG-001
U.S. Representative Larry Combest (Jimmy Clark): Remarks	HT01-03
U.S. Representative Mac Thornberry: 22.002	FG-002, HT01-02
United States Environmental Protection Agency, Region 6 (Robert D. Lawrence): 01.029, 01.030, 05.026, 05.027, 06.060, 06.061, 06.062, 06.063, 06.064, 06.065, 06.066, 06.067, 13.021, 14.138, 14.139, 22.021	FG-003
TRIBAL GOVERNMENTS	
All Indian Pueblo Council, Pueblo Office of Environmental Protection (Tony Begay): 06.042	TG-001
Cheyenne-Arapaho Tribes (Gordon Yellowman): 10.004, 10.005, 10.006, 10.007, 10.008, 10.009	HT17
STATE GOVERNMENTS	
State of Texas, Governor George W. Bush: Remarks	SG-001
State of Texas, Office of the Governor (Roger Mulder): 01.040, 02.028, 02.029, 05.040, 05.041, 05.042, 05.043, 05.044, 05.045, 05.046, 05.047, 05.048, 05.049, 05.050, 05.051, 05.052, 05.053, 05.054, 05.055, 05.056, 05.057, 05.058, 05.059, 06.095, 06.096, 06.097, 06.098, 06.099, 06.100, 06.101, 06.102, 06.103, 06.104, 06.105, 06.106, 06.107, 06.108, 06.109, 06.110, 06.111, 06.112, 06.113, 06.114, 06.115, 06.116, 06.117, 06.118, 06.119, 06.120, 07.024, 07.025, 07.026, 07.027, 07.028, 07.029, 07.030, 07.031, 07.032, 07.033, 07.034, 07.035, 07.036, 07.037, 07.038, 07.039, 07.040, 07.041, 09.018, 09.019, 12.030, 12.031, 13.030, 14.151, 14.152, 14.153, 14.154, 14.155, 14.156, 14.157, 14.158, 14.159, 14.160, 14.161, 14.162, 14.163, 15.059, 15.060, 15.088, 15.089, 15.090, 15.091, 15.092, 15.093, 15.094, 15.095, 15.096, 15.097, 15.098, 15.099, 15.100, 15.101, 15.102, 15.103, 15.104, 15.105, 15.106, 15.107, 15.108, 15.109, 15.110, 15.111, 15.112, 15.113, 15.114, 22.024, 22.025, 22.026, 22.027	SG-003, HT15
State of Texas, Senator Tom Haywood: Remarks	SG-004
State of Texas, Senator Teel Bivins: 02.004, 23.014	HT01-04
State of Texas, Representative David Swinford: 02.003	HT01-05
State of Texas, House of Representatives, Committee on Environmental Regulation (Warren Chisum): Remarks	SG-005
State of Texas, Office of Attorney General (Dan Morales): Remarks	SG-006

TABLE GP-1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996-Continued*

COMMENTOR INFORMATION	DOCUMENT NUMBER
STATE GOVERNMENTS (CONTINUED)	
State of Texas Department of Health, Radiation Control (Joe Martillotti): 11.039, 14.092, 15.056, 15.057, 15.058, 15.065, 16.029	HT15, HT16, HT17
State of Texas Historical Commission, April 22, 1996 (James E. Bruseth, Timothy K. Pertulla): Remarks	SG-007
State of Texas Historical Commission, May 1, 1996 (James E. Bruseth, Timothy K. Pertulla): Remarks	SG-008
State of Texas Natural Resources Conservation Commission (Dan Pearson): 06.094, 22.022	SG-002
State of Texas Natural Resources Conservation Commission (Joe Panketh): 07.004, 07.005, 07.006, 07.007, 07.008, 07.009, 07.010, 07.012	HT05, HT16
State of Texas Natural Resources Conservation Commission (Geof Meyer): 06.049, 06.050, 06.051, 13.011, 14.093, 14.094, 14.095, 14.096, 14.097, 22.018	HT15, HT16
State of Texas Parks and Wildlife Department (Robert W. Spain): 09.009, 09.010	SG-009
State of Texas Bureau of Economic Geology, University of Texas at Austin (Thomas Gustavson): 06.048	HT16
State of New Mexico Environment Department (Gedi Cibas): 02.026, 13.019, 13.020, 14.134, 14.135, 14.136, 14.137, 15.077, 16.031, 17.013	SG-012
State of Nevada, Department of Administration (Julie Butler): 02.030, 02.031, 04.016, 11.049, 16.059, 21.009	SG-010
State of Tennessee, Department of Environment and Conservation (Earl C. Leming): 16.036	SG-011
MUNICIPAL GOVERNMENTS	
City of Amarillo, Mayor Ken Seliger: 15.087	MG-001, HT01-06
City of Amarillo, City Commissioner Diane Bosch: Remarks	HT01-07
Clark County, Department of Comprehensive Planning (Richard E. Holmes): 01.031, 02.027, 16.032, 16.033, 16.034, 16.035, 17.014, 21.007, 23.050	MG-002
Clark County, Department of Comprehensive Planning, Nuclear Waste Division (Russell Dibartolo): 11.006, 16.013, 16.014, 17.003, 23.007, 23.008, 23.009	HT11
City of Richland, (Pam Brown): Remarks	HT14

TABLE GP–1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996-Continued*

COMMENTOR INFORMATION	DOCUMENT NUMBER
COMPANIES/ORGANIZATIONS	
Letter Campaign 1: Remarks	CO-001
Amarillo Chamber of Commerce (Steve Ahlenius): 14.112, 15.073, 15.074	HT15, HT16
Amarillo Economic Development Corporation (Bob Juba): 04.008, 11.022, 11.023, 11.024, 11.025, 11.028, 11.029, 11.030, 11.031, 11.032, 11.033, 11.034, 11.035, 11.036, 11.037, 11.038, 11.040, 15.062, 15.063, 15.064, 15.076, 17.012, 21.005, 23.042	CO-002, HT08, HT15, HT17
Amarillo Economic Development Corporation (Vance Reed): 11.009, 11.010	HT01-08
Hanford Advisory Board (Walt Blair): 01.005, 02.002, 16.015, 23.010	HT14
Hanford Advisory Board (Merilyn Reeves): 13.009, 14.080, 16.026, 22.013, 23.035	CO-003
ORISE (Robert Menard): Remarks	CO-004
Panhandle Area Neighbors And Landowners (Doris and Philip Smith): 01.043, 04.017, 06.126, 06.127, 11.050, 14.179, 14.180, 14.181, 14.182, 14.183, 14.184, 14.185, 14.186, 14.187, 14.188, 14.189, 14.190, 14.191, 14.192, 17.024, 17.025, 17.026, 23.053	CO-005
Panhandle Area Neighbors And Landowners (Doris Berg Smith): 06.057, 11.041, 11.042, 11.043, 11.044, 13.004, 14.107, 14.108, 14.109, 14.110, 14.111, 14.123, 14.124, 14.125, 14.126, 14.127, 14.164, 14.165, 14.166, 14.167, 14.168, 14.169, 14.170, 14.171, 14.172, 14.173, 14.174, 14.175, 14.176, 14.177, 14.178, 15.070, 15.071, 15.072, 17.020, 17.021, 17.022, 17.023, 23.022, 23.046	HT02-09, HT15, HT16, HT17
Panhandle 2000 (Jerry Johnson, Wales Madden): 02.018, 15.044, 16.028	CO-006
Pantex Plant Citizens Advisory Board (final version): 04.002, 04.013, 05.001, 05.002, 05.003, 05.004, 05.005, 05.006, 05.007, 05.008, 05.009, 05.010, 05.011, 05.012, 05.013, 05.014, 05.015, 05.016, 05.017, 05.018, 05.019, 05.020, 06.008, 06.009, 06.010, 06.011, 06.012, 06.013, 06.014, 06.015, 06.016, 06.017, 06.018, 06.019, 06.020, 06.022, 06.023, 06.024, 06.025, 06.026, 06.027, 06.028, 06.029, 06.030, 06.031, 06.032, 06.033, 06.034, 06.035, 06.036, 06.088, 06.089, 06.090, 06.091, 07.021, 07.022, 07.042, 09.001, 09.002, 09.003, 09.004, 09.005, 09.006, 09.007, 09.008, 10.001, 11.013, 11.014, 11.015, 11.016, 11.017, 11.018, 14.011, 14.012, 14.013, 14.014, 14.015, 14.016, 14.017, 14.018, 14.019, 14.020, 14.021, 14.022, 14.023, 14.024, 14.025, 14.026, 14.027, 14.028, 14.029, 14.030, 14.031, 14.032, 14.033, 14.034, 14.035, 14.036, 15.025, 15.026, 15.027, 15.028, 15.029, 15.030, 15.031, 15.032, 15.033, 15.034, 15.035, 15.036, 15.037, 15.038, 15.039, 15.040, 15.085, 15.086, 16.043, 16.044, 16.045, 16.046, 16.047, 16.048, 16.049, 16.050, 16.051, 16.052, 16.053, 16.054, 16.055, 16.056, 16.057, 16.058, 17.004, 17.005, 17.016, 17.017, 21.008, 21.010	CO-008
Peace Action (Jan Sanders): 01.042, 06.124	CO-007, HT01-01, HT02-11

TABLE GP-1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996-Continued*

COMMENTOR INFORMATION	DOCUMENT NUMBER
COMPANIES/ORGANIZATIONS (CONTINUED)	
Peace Farm (Mavis Belisle): 01.022, 06.054, 23.043	HT02-12, HT16, HT17
Serious Texans Against Nuclear Dumping (Beverly Gattis): 01.026, 02.019, 07.011, 12.019, 12.020, 12.021, 13.012, 13.013, 13.014, 13.015, 14.091, 14.103, 14.104, 14.105, 14.106, 14.120, 14.121, 14.122, 15.066, 15.067, 15.068, 15.069, 21.006, 22.017, 22.025, 23.011, 23.012, 23.013, 23.040, 23.044, 23.045, 24.003	SG-003, HT02-01, HT15, HT16, HT17
Southwest Information and Research Center (Don Hancock): 01.021, 01.027, 01.028, 02.009, 02.020, 03.007, 12.013, 12.014, 12.015, 13.006, 13.018, 14.113, 14.066, 14.068, 23.018, 23.019, 23.021, 23.041, 23.047, 23.048, 24.002	HT02-15, HT06, HT13, HT15, HT16, HT17
Southwestern Public Service Company (William T. Crenshaw): 11.026, 21.004, 22.014, 23.036, 23.037	CO-009
Texas A&M University (Jim Rock): 12.018, 15.045, 15.046, 15.049, 15.050, 15.054, 15.055, 15.061, 15.075, 15.078	HT15, HT16
Tri City Industrial Development Council (Sam Volpentest): 02.013, 16.027, 21.003	CO-010
University of Texas (Mike McNerney): 15.047, 15.048, 15.051, 15.052, 15.053	HT15
PRIVATE CITIZENS	
Letter Campaign 2: 01.032, 07.013, 14.142	PC-031
Post Card Campaign: Remarks	PC-032
Clyde Alley: 06.128, 11.048, 17.018	PC-008
Robert Anderson: 23.039	PC-022
Jonell Archer: Remarks	HT16
Robert L. Bass: Remarks	PC-002
David R. Boyle: Remarks	PC-035
Bradfoot: 13.017	HT16
Vernon Brechin: 01.020, 02.014, 02.015, 02.016, 02.017, 03.004, 03.005, 04.006, 04.007, 06.045, 14.088, 14.089, 14.090, 15.043, 22.015, 22.016	PC-024
Paula Breeding: 16.016	HT02-16
Horace Bright: Remarks	PC-007
Rita Calvert: Remarks	HT02-14

TABLE GP-1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996-Continued*

COMMENTOR INFORMATION	DOCUMENT NUMBER
PRIVATE CITIZENS (CONTINUED)	
Addis Charless, Jr.: 06.040, 06.041, 14.081	PC-011
Dorothy Cluskins: 12.016, 12.017, 14.140, 14.141	HT16
Louise Daniel: 02.032, 05.060, 06.125, 13.031	PC-030, HT02-23
Danny Detten: Remarks	HT02-19
Allen Finegold: 01.023, 02.021, 14.098, 14.099, 14.100, 14.101, 14.102, 22.019	HT15, HT17
Rick Geddes: 01.019, 14.082	PC-006
Ross Gideon: 06.055	HT17
Richard S. Goodoll: Remarks	PC-001
Sam Gore: 04.003	HT12
Anna Marie Harkey: Remarks	HT02-13
Jewett (Gene) Huff: Remarks	HT02-20, HT06
Marcia A. Keevan: 05.022, 05.023, 05.032, 05.033, 05.034, 05.035, 05.036, 05.037, 05.038, 05.039, 06.021, 06.037, 06.123, 07.002, 07.003, 13.005, 23.023	PC-016, HT02-04 HT17
Matt Kennedy: 14.002	PC-009
Dan Kerlinsky: 14.049	HT13
Dennis Larson: 01.037, 06.093	PC-029
Bill (Last Name Illegible): 11.020	PC-013
W. F. Lawless: Remarks	PC-015
Susan Lee: 02.022, 14.114, 14.115, 14.116, 14.117, 14.118	HT16, HT17
Al Lodge: Remarks	HT12
David S. Losey: Remarks	PC-020
Harriet Martin: 07.001	HT02-05
Mason & Hanger Company Employees: 06.043, 06.044, 09.011, 10.003, 11.027, 12.010, 12.011, 12.012, 14.083, 14.084, 14.085, 14.086, 14.087	PC-034
Frances Keller Matthews: 06.092	PC-026

TABLE GP–1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996-Continued*

COMMENTOR INFORMATION	DOCUMENT NUMBER
PRIVATE CITIZENS (CONTINUED)	
W. Penland Mayson, Jr.: Remarks	PC-014
David L. Michaels: Remarks	PC-003
Mohammed: Remarks	HT12
Jim Murphy: Remarks	HT02-06
Trish Neusch: 01.044, 02.023, 04.009, 04.018, 05.061, 08.004, 10.013, 11.051, 13.032, 14.119	PC-033, HT02-10, HT16, HT17
Chris Noah: 04.004	HT12
Bill O'Brien: Remarks	HT02-18
Jeri & Jim Osborne: 02.025, 06.058, 06.059, 08.002, 11.045, 11.046, 14.128, 14.129, 14.130, 14.131, 14.132, 14.133, 16.030, 22.020, 23.049	PC-017
Jeri Osborne: 11.008, 14.007	HT02-02
Jim Osborne: Remarks	HT02-03
Mike Osborne: 15.003, 15.004, 15.005, 15.006, 15.007, 15.008, 15.009, 15.010, 15.011, 15.012, 15.013, 15.014, 15.015, 15.016, 15.017, 15.018, 15.019, 15.020, 15.021, 15.022, 15.023, 15.024	PC-021
Jim Parham: Remarks	HT07
Tom Patterson: Remarks	HT02-17
Dana Porter : 03.006, 06.046, 06.047, 08.001, 23.038	PC-023
Anne Reid: 23.020	HT02-21
Wayne Rodgers: Remarks	HT12
Gordon Rodgers: Remarks	HT14
William Seewald: 01.024, 01.025, 02.001, 04.001, 06.056, 13.016, 23.001, 23.002	HT02-08, HT16 HT17
Mary Shennum: 02.024, 05.024, 05.025, 06.068	HT17
Arthur Smith: Remarks	HT12
Jim Dee Smith: 13.010, 14.001	PC-018, PC-019
Tamara Snodgrass: 23.003	HT02-07

TABLE GP-1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996-Continued*

COMMENTOR INFORMATION	DOCUMENT NUMBER
PRIVATE CITIZENS (CONTINUED)	
Elizabeth Sproul: Remarks	PC-004
Joe Stang: Remarks	HT05
L. B. Thomas: 01.033, 01.034, 01.035, 01.036, 03.008, 03.009, 03.010, 03.011, 03.012, 03.013, 03.014, 04.010, 04.011, 04.012, 05.028, 05.029, 05.030, 05.031, 06.069, 06.070, 06.071, 06.072, 06.073, 06.074, 06.075, 06.076, 06.077, 06.078, 06.079, 06.080, 06.081, 06.082, 06.083, 06.084, 06.085, 06.086, 06.087, 07.014, 07.015, 07.016, 07.017, 07.018, 07.019, 07.020, 08.003, 09.012, 09.013, 09.014, 09.015, 09.016, 09.017, 11.047, 12.022, 12.023, 12.024, 12.025, 12.026, 12.027, 12.028, 12.029, 13.022, 13.023, 13.024, 13.025, 13.026, 13.027, 13.028, 14.143, 14.144, 14.145, 14.146, 14.147, 14.148, 14.149, 14.150, 14.193, 15.079, 15.080, 15.081, 15.082, 15.083, 15.084, 16.037, 16.038, 16.039, 16.040, 16.041, 16.042, 17.015, 22.028, 22.029, 22.030, 22.031, 23.051, 23.052, 24.004, 24.005	PC-025
L. O'Brien Thompson: 24.001	HT02-22
David Tracy: 01.041, 03.015, 04.015, 06.121, 06.122, 09.020, 10.011, 10.012, 15.115, 16.060, 17.019	PC-028
Priscilla Tracy: 01.038, 01.039, 04.014, 07.023, 10.010, 13.029, 22.023	PC-027
Unidentified Commenter: 17.027	PC-010
Unidentified Commenter: 11.021	PC-012
Unidentified Commenters (Amarillo Public Hearings): 01.006, 02.005, 11.001, 11.002, 11.003, 11.004, 11.011, 11.012, 14.008, 14.009, 14.010, 15.001, 15.002, 17.001, 17.002, 21.001, 23.016, 23.015, 23.017	HT03, HT05, HT07 HT08, HT10
Unidentified Commenters (North Las Vegas Public Hearings): 01.001, 01.002, 01.003, 01.004, 06.001, 06.002, 11.005, 13.001, 13.002, 13.003, 14.003, 14.004, 14.005, 14.006, 15.008, 16.001, 16.002, 16.003, 16.004, 16.005, 16.006, 16.007, 16.008, 16.009, 16.010, 16.011, 16.012, 22.001, 23.004, 23.005, 23.006	HT11
Unidentified Commenters (North Augusta Public Hearings): 01.018, 03.003, 04.005, 12.005, 12.006, 12.007, 12.008, 12.009, 13.008, 14.069, 14.070, 14.071, 14.072, 14.073, 14.074, 14.075, 14.076, 14.077, 14.078, 14.079, 15.042, 17.008, 17.009, 17.010, 17.011, 18.001, 22.011, 22.012, 23.028, 23.029, 23.030, 23.031, 23.032, 23.033, 23.034	HT12

TABLE GP-1.—*Documents Received During Public Comment Period, April 5 - July 12, 1996-Continued*

COMMENTOR INFORMATION	DOCUMENT NUMBER
PRIVATE CITIZENS (CONTINUED)	
Unidentified Commenters (Albuquerque Public Hearings): 01.007, 01.008, 01.009, 01.010, 01.011, 01.012, 01.013, 01.014, 01.015, 01.016, 01.017, 02.006, 02.007, 02.008, 02.010, 02.011, 02.012, 03.001, 03.002, 05.021, 06.038, 06.039, 10.002, 11.019, 12.001, 12.002, 12.003, 12.004, 13.007, 14.037, 14.038, 14.039, 14.040, 14.041, 14.042, 14.043, 14.044, 14.045, 14.046, 14.047, 14.048, 14.050, 14.051, 14.052, 14.053, 14.054, 14.055, 14.056, 14.057, 14.058, 14.059, 14.060, 14.061, 14.062, 14.063, 14.064, 14.065, 14.067, 15.041, 16.017, 16.018, 16.019, 16.020, 16.021, 16.022, 16.023, 16.024, 16.025, 17.006, 17.007, 22.003, 22.004, 22.005, 22.006, 22.007, 22.008, 22.009, 22.010, 23.024, 23.025, 23.026, 23.027	HT13
Unidentified Commenters (Richland Public Hearings): 11.007, 21.002	HT14
Larry Whicker: Remarks	HT17
Rodney Wilcox: Remarks	PC-005
C E Williams: 06.003, 06.004, 06.005, 06.006, 06.007, 06.052, 06.053, 23.041	HT05 HT16

TABLE GP-2.—*Comment Document Locator*

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
FG-001	No Comments		
FG-002	No Comments		
FG-003	1	01	029
	2	13	021
	3	01	030
	4	06	060
	5	06	061
	6	06	062
	7	06	063
	8	06	064
	9	06	065
	10	05	026
	11	06	66
	12	05	027
	13	14	138
	14	06	067
	15	22	021
	16	14	139
TG-001	1	06	042
SG-001	No Comments		
SG-002	1	06	094
	2	22	022
SG-003	1	14	151
	2	14	152
	3	12	030
	4	12	031
	5	14	153
	6	14	154
	7	09	018
	8	14	155
	9	14	156
	10	14	157
	11	02	028
	12	02	029
	13	14	158
	14	14	159
	15	14	160
	16	14	161

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
SG-003 (cont'd)	17	14	162
	18	06	095
	19	22	024
	20	22	025
	21	06	096
	22	22	026
	23	01	040
	24	06	097
	25	05	040
	26	06	098
	27	09	019
	28	22	027
	29	06	099
	30	06	100
	31	06	101
	32	06	102
	33	06	103
	34	06	104
	35	06	105
	36	06	106
	37	06	107
	38	13	030
	39	14	163
	40	06	108
	41	06	109
	42	06	110
	43	06	111
	44	07	024
	45	07	025
	46	07	026
	47	07	027
	48	07	028
	49	07	029
	50	07	030
	51	07	031
	52	07	032
	53	07	033
	54	07	034

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
SG-003 (cont'd)	55	07	035
	56	07	036
	57	07	037
	58	07	038
	59	07	039
	60	07	040
	61	07	041
	62	06	112
	63	06	113
	64	06	114
	65	05	041
	66	06	115
	67	05	042
	68	05	043
	69	05	044
	70	05	045
	71	05	046
	72	05	047
	73	05	048
	74	05	049
	75	05	050
	76	05	051
	77	05	052
	78	05	053
	79	05	054
	80	05	055
	81	05	056
	82	05	057
	83	05	058
	84	05	059
	85	06	116
	86	06	117
	87	06	118
	88	06	119
	89	06	120
	90	15	088
	91	15	089
	92	15	090

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
SG-003 (cont'd)	93	15	091
	94	15	092
	95	15	093
	96	15	094
	97	15	095
	98	15	096
	99	15	097
	100	15	098
	101	15	099
	102	15	100
	103	15	101
	104	15	102
	105	15	103
	106	15	104
	107	15	105
	108	15	106
	109	15	107
	110	15	108
	111	15	109
	112	15	110
	113	15	111
	114	15	112
	115	15	113
	116	15	114
SG-004	No Comments		
SG-005	No Comments		
SG-006	No Comments		
SG-007	No Comments		
SG-008	No Comments		
SG-009	1	09	009
	2	09	010
SG-010	1	02	030
	2	21	009
	3	04	016
	4	02	031
	5	16	059
	6	11	049
SG-011	1	16	036

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
SG-012	1	13	019
	2	13	020
	3	15	077
	4	14	134
	5	14	135
	6	14	136
	7	17	013
	8	14	137
	9	02	026
	10	16	031
MG-001	1	15	087
MG-002	1	23	050
	2	21	007
	3	01	031
	4	02	027
	5	16	032
	6	16	033
	7	17	014
	8	16	034
	9	16	035
CO-001	No Comments		
CO-002	1	11	022
	2	11	023
	3	11	024
	4	11	025
	5	17	012
CO-003	1	13	009
	2	22	013
	3	14	080
	4	23	035
	5	16	026
CO-004	No Comments		
CO-005	1	11	050
	2	04	017
	3	23	053
	4	06	126
	5	06	127
	6	14	179
	7	14	180

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
CO-005 (cont'd)	8	14	181
	9	14	182
	10	01	043
	11	14	183
	12	14	184
	13	14	185
	14	14	186
	15	14	187
	16	14	188
	17	14	189
	18	14	190
	19	14	191
	20	14	192
	21	17	024
	22	17	025
	23	17	026
CO-006	1	15	044
	2	02	018
	3	16	028
CO-007	1	06	124
	2	01	042
CO-008	1	15	025
	2	15	026
	3	15	027
	4	15	028
	5	15	029
	6	15	030
	7	15	031
	8	15	032
	9	15	033
	10	15	034
	11	15	035
	12	15	036
	13	15	037
	14	15	038
	15	15	039
	16	15	040
	17	15	085
	18	15	086

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
CO-008 (cont'd)	19	09	001
	20	09	002
	21	09	003
	22	09	004
	23	09	005
	24	09	006
	25	09	007
	26	09	008
	27	10	001
	28	17	004
	29	17	005
	30	17	016
	31	17	017
	32	05	001
	33	05	002
	34	05	003
	35	05	004
	36	04	002
	37	04	013
	38	14	011
	39	14	012
	40	14	013
	41	14	014
	42	14	015
	43	14	016
	44	14	017
	45	14	018
	46	14	019
	47	14	020
	48	14	021
	49	14	022
	50	14	023
	51	14	024
	52	14	025
	53	14	026
	54	14	027
	55	14	028
	56	14	029

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
CO-008 (cont'd)	57	14	030
	58	14	031
	59	14	032
	60	14	033
	61	14	034
	62	06	008
	63	14	035
	64	14	036
	65	11	013
	66	11	014
	67	11	015
	68	11	016
	69	11	017
	70	11	018
	71	05	005
	72	05	006
	73	05	007
	74	05	008
	75	05	009
	76	05	010
	77	05	011
	78	05	012
	79	05	013
	80	05	014
	81	05	015
	82	05	016
	83	05	017
	84	05	018
	85	05	019
	86	05	020
	87	06	009
	88	06	010
	89	06	011
	90	06	012
	91	06	013
	92	06	014
	93	06	015
	94	06	016

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
CO-008 (cont'd)	95	06	017
	96	06	018
	97	06	019
	98	06	020
	99	06	022
	100	06	023
	101	06	024
	102	06	025
	103	06	026
	104	06	027
	105	06	028
	106	06	029
	107	06	030
	108	06	031
	109	06	032
	110	06	033
	111	06	034
	112	06	035
	113	06	036
	114	06	088
	115	06	089
	116	06	090
	117	06	091
	118	16	043
	119	16	044
	120	16	045
	121	16	046
	122	16	047
	123	16	048
	124	16	049
	125	16	050
	126	16	051
	127	16	052
	128	16	053
	129	16	054
	130	16	055
	131	16	056
	132	16	057

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
CO-008 (cont'd)	133	16	058
	134	21	010
	135	21	008
	136	07	042
	137	07	021
	138	07	022
CO-009	1	22	014
	2	21	004
	3	23	036
	4	23	037
	5	11	026
CO-010	1	02	013
	2	16	027
	3	21	003
PC-001	No Comments		
PC-002	No Comments		
PC-003	No Comments		
PC-004	No Comments		
PC-005	No Comments		
PC-006	1	01	019
	2	14	082
PC-007	No Comments		
PC-008	1	11	048
	2	17	018
	3	06	128
PC-009	1	14	002
PC-010	1	17	027
PC-011	1	06	040
	2	14	081
	3	06	041
PC-012	1	11	021
PC-013	1	11	020
PC-014	No Comments		
PC-015	No Comments		
PC-016	1	05	032
	2	05	033
	3	05	034
	4	05	035

TABLE GP–2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
PC-016 (cont'd)	5	05	036
	6	05	037
	7	05	038
	8	05	039
PC-017	1	11	045
	2	23	049
	3	11	046
	4	14	128
	5	14	129
	6	08	002
	7	22	020
	8	14	130
	9	14	131
	10	06	058
	11	06	059
	12	02	025
	13	16	030
	14	14	132
	15	14	133
PC-018	1	14	001
PC-019	1	13	010
PC-020	No Comments		
PC-021	1	15	003
	2	15	004
	3	15	005
	4	15	006
	5	15	007
	6	15	008
	7	15	009
	8	15	010
	9	15	011
	10	15	012
	11	15	013
	12	15	014
	13	15	015
	14	15	016
	15	15	017
PC-021 (cont'd)	16	15	018
	17	15	019
	18	15	020
	19	15	021
	20	15	022
	21	15	023
	22	15	024
PC-022	1	23	039
PC-023	1	23	038
	2	06	046
	3	06	047
	4	08	001
	5	03	006
PC-024	1	22	015
	2	22	016
	3	01	020
	4	14	088
	5	02	014
	6	02	015
	7	02	016
	8	04	006
	9	03	004
	10	03	005
	11	02	017
	12	15	043
	13	14	089
	14	06	045
	15	14	090
	16	04	007
PC-025	1	23	051
	2	23	052
	3	03	008
	4	13	022
	5	22	028
	6	22	029
	7	01	033
	8	01	034

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
PC-025 (cont'd)	9	01	035
	10	16	037
	11	01	036
	12	03	009
	13	03	010
	14	03	011
	15	03	012
	16	03	013
	17	03	014
	18	04	010
	19	04	011
	20	14	193
	21	05	028
	22	05	029
	23	05	030
	24	06	069
	25	06	070
	26	06	071
	27	06	072
	28	06	073
	29	06	074
	30	06	075
	31	06	076
	32	06	077
	33	06	078
	34	06	079
	35	06	080
	36	06	081
	37	06	082
	38	06	083
	39	06	084
	40	06	085
	41	06	086
	42	07	014
	43	07	015
	44	07	016
	45	07	017
	46	07	018

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
PC-025 (cont'd)	47	07	019
	48	08	003
	49	09	012
	50	09	013
	51	09	014
	52	09	015
	53	09	016
	54	11	047
	55	12	022
	56	12	023
	57	12	024
	58	12	025
	59	12	026
	60	12	027
	61	12	028
	62	12	029
	63	13	023
	64	13	024
	65	13	025
	66	22	030
	67	22	031
	68	13	026
	69	13	027
	70	13	028
	71	14	143
	72	14	144
	73	14	145
	74	14	146
	75	14	147
	76	14	148
	77	14	149
	78	15	079
	79	15	080
	80	15	081
	81	15	082
	82	15	083
	83	15	084
	84	16	038

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
PC-025 (cont'd)	85	16	039
	86	16	040
	87	17	015
	88	24	004
	89	24	005
	90	04	012
	91	05	031
	92	06	087
	93	07	020
	94	09	017
	95	14	150
	96	16	041
	97	16	042
PC-026	1	06	092
PC-027	1	01	038
	2	22	023
	3	01	039
	4	13	029
	5	04	014
	6	10	010
	7	07	023
PC-028	1	01	041
	2	06	121
	3	04	015
	4	06	122
	5	10	011
	6	17	019
	7	16	060
	8	09	020
	9	10	012
	10	03	015
	11	15	115
PC-029	1	06	093
	2	01	037
PC-030	1	02	032
	2	13	031
	3	06	125
	4	05	060

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
PC-031	1	01	032
	2	07	013
	3	14	142
PC-032	No Comments		
PC-033	1	13	032
	2	08	004
	3	01	044
	4	05	061
	5	11	051
	6	04	018
	7	10	013
PC-034	1/2	12	010
	3	12	011
	4	12	012
	5	14	083
	6	14	084
	7	14	085
	8	11	027
	9	14	086
	10	14	087
	11	09	011
	12	06	043
	13	06	044
	14	10	003
PC-035	No Comments		
HT01-01	No Comments		
HT01-02	1	22	002
HT01-03	No Comments		
HT01-04	1	23	014
	2	02	004
HT01-05	1	02	003
HT01-06	No Comments		
HT01-07	No Comments		
HT01-08	1	11	010
	2	11	009
HT02-01	1	23	013
	2	23	011
	3	23	012

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT02-02	1	11	008
	2	14	007
HT02-03	No Comments		
HT02-04	1	23	023
	2	06	037
	3	13	005
	4	06	021
	5	07	002
	6	07	003
HT02-05	1	07	001
HT02-06	No Comments		
HT02-07	1	23	003
HT02-08	1	23	001
	2	23	002
	3	04	001
	4	02	001
HT02-09	1	23	022
	2	13	004
HT02-10	No Comments		
HT02-11	No Comments		
HT02-12	No Comments		
HT02-13	No Comments		
HT02-14	No Comments		
HT02-15	1	23	018
	2	23	019
HT02-16	1	16	016
HT02-17	No Comments		
HT02-18	No Comments		
HT02-19	No Comments		
HT02-20	No Comments		
HT02-21	1	23	020
HT02-22	1	24	001
HT02-23	No Comments		
HT03	1	11	001
HT04	No Comments		
HT05	1	06	003
	2	06	004
	3	06	005

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT05 (cont'd)	4	06	006
	5	06	007
	6	15	001
	7	15	002
	8	01	006
	9	23	016
	10	23	017
	11	14	008
	12	14	009
	13	14	010
HT06	1	23	021
HT07	1	02	005
	2	11	011
	3	11	012
	4	23	015
HT08	1	11	004
	2	17	001
	3	17	002
HT09	No Comments		
HT10	1	21	001
	2	11	002
	3	11	003
HT11	1	14	003
	2	14	004
	3	14	005
	4	14	006
	5	16	001
	6	16	002
	7	16	003
	8	16	004
	9	23	004
	10	23	005
	11	23	006
	12	16	005
	13	16	006
	14	16	007
	15	16	008
	16	01	001

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT11 (cont'd)	17	01	002
	18	01	003
	19	11	005
	20	16	009
	21	16	010
	22	13	001
	23	13	002
	24	13	003
	25	22	001
	26	06	001
	27	06	002
	28	01	004
	29	16	011
	30	16	012
	31	16	013
	32	11	006
	33	17	003
	34	23	007
	35	23	008
	36	16	014
	37	23	009
HT12	1	23	028
	2	18	001
	3	04	003
	4	17	008
	5	04	004
	6	14	069
	7	14	070
	8	14	071
	9	17	009
	10	22	011
	11	22	012
	12	23	029
	13	23	030
	14	23	031
	15	12	005
	16	14	072
	17	12.	006
HT12 (cont'd)	18	12	007
	19	12	008
	20	03	003
	21	14	073
	22	14	074
	23	23	032
	24	17	010
	25	14	075
	26	01	018
	27	12	009
	28	23	033
	29	14	076
	30	17	011
	31	15	042
	32	23	034
	33	14	077
	34	14	078
	35	14	079
	36	13	008
	37	04	005
HT13	1/2	01	007
	3	03	001
	4	05	021
	5	03	002
	6	01	008
	7	06	038
	8	06	039
	9	22	003
	10	22	004
	11	22	005
	12	22	006
	13	22	007
	14	23	024
	15	02	006
	16	16	017
	17	11	019
	18	14	067
	19	12	001

TABLE GP–2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT13 (cont'd)	20	12	002
	21	12	003
	22	02	007
	23	01	009
	24	01	010
	25	01	011
	26	01	012
	27	02	008
	28	22	008
	29	02	009
	30	14	068
	31	01	013
	32	17	006
	33	17	007
	34	23	025
	35	22	009
	36	22	010
	37	10	002
	38	23	026
	39	14	037
	40	14	038
	41	16	018
	42	01	014
	43	14	039
	44	14	040
	45	14	041
	46	14	042
	47	14	043
	48	14	044
	49	14	045
	50	16	019.
	51	16	020
	52	16	021
	53	14	046
	54	15	041
	55	14	047
	56	14	048
	57	16	022

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT13 (cont'd)	58	14	049
	59	14	050
	60	14	051
	61	14	052
	62	14	053
	63	14	054
	64	14	055
	65	14	056
	66	14	057
	67	14	058
	68	14	059
	69	16	023
	70	16	024
	71	16	025
	72	14	060
	73	14	061
	74	24	002
	75	14	062
	76	14	063
	77	12	004
	78	14	064
	79	01	015
	80	01	017
	81	02	010
	82	02	011
	83	02	012
	84	13	006
	85	13	007
	86	14	065
	87	01	016
	88	23	027
	89	14	066
HT14	1	01	005
	2	23	010
	3	21	002
	4	16	015
	5	02	002
	6	11	007

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT15	1	15	045
	2	15	046
	3	15	047
	4	15	048
	5	15	049
	6	15	050
	7	15	051
	8	15	052
	9	15	053
	10	15	075
	11	15	054
	12	15	055
	13	15	056
	14	15	057
	15	15	058
	16	15	059
	17	15	060
	18	15	061
	19	15	062
	20	15	063
	21	15	064
	22	15	065
	23	15	066
	24	23	040
	25	14	091
	26	15	067
	27	15	068
	28	15	069
	29	15	070
	30	15	071
	31	15	072
	32	15	073
	33	15	074
	34	14	092
	35	16	029
	36	14	093
	37	14	094
	38	14	095
	39	14	096

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT15 (cont'd)	40	14	097
	41	14	098
	42	14	099
	43	14	100
	44	14	101
	45	14	102
	46	12	013
	47	12	014
	48	12	015
	49	14	103
	50	14	104
	51	14	105
	52	14	106
HT16	1	14	107
	2	14	108
	3	14	109
	4	14	110
	5	14	111
	6	14	112
	7	02	019
	8	14	113
	9	02	020
	10	12	016
	11	14	140
	12	14	141
	13	12	017
	14	12	018
	15	15	078
	16	06	048
	17a	07	004
	17b	07	005
	18	07	006
	19	07	007
	20	07	008
	21	07	009
	22	07	010
	23	06	049
	24	06	050
	25	06	051

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT16 (cont'd)	26	06	052
	27	06	053
	28	06	054
	29	07	011
	30	07	012
	31	22	017
	32	13	011
	33	22	018
	34	13	012
	35	13	013
	36	13	014
	37	13	015
	38	13	016
	39	23	041
	40	01	021
	41	13	017
	42	12	019
	43	12	020
	44	12	021
HT17	1	11	028
	2	11	029
	3	11	030
	4	11	031
	5	11	032
	6	11	033
	7	11	034
	8	11	035
	9	11	036
	10	11	037
	11	11	038
	12	21	005
	13	11	039
	14	11	040
	15	23	042
	16	11	041
	17	11	042
	18	11	043
	19	06	055
	20	23	043

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
HT17 (cont'd)	21	01	022
	22	01	023
	23	22	019
	24	02	021
	25	05	022
	26	05	023
	27	02	022
	28	14	114
	29	14	115
	30	14	116
	31	14	117
	32	14	118
	33	10	004
	34	10	005
	35	10	006
	36	10	007
	37	10	008
	38	10	009
	39	01	024
	40	06	056
	41	01	025
	42	04	008
	43	15	076
	44	14	119
	45	04	009
	46	02	023
	47	21	006
	48	24	003
	49	14	120
	50	14	121
	51	14	122
	52	23	044
	53	01	026
	54	23	045
	55	11	044
	56	06	057
	57	14	123
	58	23	046
	59	14	124

TABLE GP-2.—*Comment Document Locator*-Continued

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY		COMMENT NUMBER
HT17 (cont'd)	60	14		125
	61	14		126
	62	14		127
	63	01		027
	64	03		007
	65	23		047
	66	23		048
	67	01		028
	68	13		018
	69	06		068
	70	05		024
	71	05		025
	72	02		024
	73	06		123
	74	14		164
	75	14		165
	76	14		166
	77	14		167
	78	14		168
	79	14		169
	80	14		170
	81	14		171
	82	14		172
	83	14		173
	84	14		174
	85	14		175
	86	14		176
	87	14		177
	88	14		178
	89	17		020
	90	17		021
	91	17		022
	92	17		023

How to Find a Comment Response in Chapter 3

The comment responses appearing in chapter 3 are categorized and organized according to their topic, or resource category. The sequencing of resource categories is as follows:

- Alternatives (01)
- Relationship to Other EISs (02)
- Infrastructure (03)
- Land Use (04)
- Geology and Soils (05)
- Water Resources (06)
- Air Quality (07)
- Acoustics (08)
- Biotic Resources (09)
- Cultural Resources (10)
- Socioeconomic Resources (11)
- Intrasite Transportation (12)
- Waste Management (13)
- Human Health (14)
- Aircraft Accident (15)
- Intersite Transportation (16)
- Environmental Justice (17)
- Irreversible and Irretrievable Commitment of Resources (18)
- Unavoidable Adverse Environmental Impacts (19)
- Relationship Between Short and Long Term Effects (20)
- Cumulative Impacts (21)
- DOE Policy (22)
- NEPA Process and Procedures (23)
- Miscellaneous (24).

The parenthetical number next to each of the above categories is the resource category identifier for that topic. For example, the resource category identifier for all comments in volume III relating to water resources is "06".

Table GP–1 lists all of the resource code identifier numbers and all of the document numbers associated with each commentor. A commentor may go directly from the list of comment numbers to the Department's response to any of those comments. Comments and responses in chapter 3 are grouped by resource category and then by sequential comment number within the category. The combination of resource category and comment number is termed a "Resource Category" (RC) identifier. For example, the first comment in resource category "06" would be labeled "RC: 06.001". To facilitate ease of location, each comment (and its response) in chapter 3 is marked with its unique "RC" identifier in the left hand margin.

Table GP–2 lists all comment numbers that appear in each comment document. To illustrate the use of Table GP–2, suppose one had used Table GP–1 to locate the letter written by Dana Porter. The Document Number shown in Table GP–1 for Dana's letter is "PC-023". Turning to Table GP–2, one would then look for the entry "PC-023" under the left-hand column labeled "Document Number". That entry appears in the "Document Number" column on page GP–17. For illustration, that portion of Table GP–2 is shown below:

DOCUMENT NUMBER	SEQUENCE NUMBER	RESOURCE CATEGORY	COMMENT NUMBER
PC-023	1	23	038
	2	06	046
	3	06	047
	4	08	001
	5	03	006

To the right of the document number entry are three more columns. The column labeled "Sequence Number" shows that in Dana Porter's letter (PC-023) there are five comments (sequentially numbered 1 through 5). The column headed "Resource Category" shows that the first comment of Dana Porter's letter is about resource category 23 (NEPA process and procedures), the second and third comments in that letter are about resource category 06 (water resources), the fourth comment is about resource category 08 (acoustics), and the fifth is about resource category 03 (infrastructure). The final column, labeled "Comment Number" tells the reader that Dana's five comments are the 38th comment in resource category 23, the 46th and 47th comments in resource category 06, the first comment in resource category 08, and the sixth comment in resource category 03.

Continuing the example, suppose one wanted to see the responses to Dana's two comments on water resources. One would note the resource category (06) and the comment numbers (046 and 047). Dana's two comments on water resources would thus be marked as "RC: 06.046" and "RC: 06.047" in chapter 3.

To find these two comments and their responses, one would turn to the sixth section of chapter 3 (i.e., section 3.6) and scan through the Resource Categories in the left hand margin until finding "RC: 06.046", Dana's first comment regarding water resources. At this point the reader will see Dana's verbatim comment, along with the response to that comment. Immediately following that comment and its response is the entry for "RC: 06.047", which is Dana's second comment about water resources.

Having found the entry "RC: 06.046", one will also find immediately under it an accompanying cross reference to the document number in which the comment originated. The marginal notations look like this:

RC: 06.046
Doc: PC-023/2

The marginal code labeled "Doc:" shows the document number and sequence number of this particular comment among all other comments that appear in that same document. In this example, the code "Doc: PC-023/2" means that this particular comment ("RC: 06.046") was the second comment in Document Number "PC-023". With this information, the reader may, if desiring to do so, go back to chapter 2 to view the source document and consider the context within which the comment was made.

When a person did not identify himself or herself, during the public meetings, an anonymous identification (such as unidentified speaker) was entered into the transcript. In addition, some of the postcards submitted had illegible signatures. Thus, for these two reasons, there are numerous comments attributed to an unidentified commentor.

In using this volume, note that resource category identifiers 03 through 21 also correspond to the sequence that those resource categories are analyzed within the affected environment and impacts analyses for Pantex Plant (in chapter 4 of volume I). In other words, a reader could know that since water resources has a resource category identifier of "06" and is located in the sixth section of chapter 3 (i.e, section 3.6) of volume III, that the main discussion of the Pantex Plant affected environment and impacts related to water resources can be found in the sixth section of chapter 4 in volume I (i.e, section 4.6). This correlation is intended to make it relatively easy for readers to use volumes I and III together in reviewing both the Final EIS text and the comments related to that text.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

AAO	Amarillo Area Office
ADROIT	Analysis of Dispersal Risk Occurring in Transportation
AEDC	Amarillo Economic Development Corporation
AFB	Air Force Base
AGV	Automated Guided Vehicle
AL	Albuquerque Operations Office
ALARA	As Low as Reasonably Achievable
AOC	Area of Concern
AQCR	Air Quality Control Region
ASER	Annual Site Environmental Report
BA	Biological Assessment
BACT	Best Available Control Technology
BG	Burning Ground
BGU	Burning Ground Upgrade
BNA	Block Numbering Area
BNSF RR	Burlington Northern and Santa Fe Railroad
BRAC	Base Realignment and Closure
BRL	Ballistic Research Laboratory
CAA	Clean Air Act
CAMS	Continuous Air Monitoring Systems
CDP	Census Designated Place
CDR	Conceptual Design Report
CEDE	Committed Effective Dose Equivalent
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant(s) of Concern
COD	Chemical Oxygen Demand
COE	U.S. Army Corps of Engineers
CONUS	Continental U.S.
COPC	Contaminant(s) of Potential Concern
CRM	Cultural Resource Management
CRMP	Cultural Resource Management Plan
CRP	Conservation Reserve Program
CSA	Canned Subassembly

CWA	Clean Water Act
CY	Calendar Year
DAF	Device Assembly Facility
DCG	Derived Concentration Guidelines
D&D	Decontamination and Decommissioning
DEIS	Draft Environmental Impact Statement
DNA	Defense Nuclear Agency
DNL	Day-Night Average Sound Level
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
DOT	Department of Transportation
DPTRA	Defense Programs Transportation Risk Analysis
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ER	Environmental Restoration
ERAD	Explosive Release Atmospheric Dispersion
ERPG	Emergency Response Planning Guidelines
ES&H	Environment, Safety, and Health
ESL	Effects Screening Level
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS	Final Environmental Impact Statement
FFA	Federal Facility Agreement
FFCA	Federal Facility Compliance Act
FFTF	Fast Flux Test Facility
FICA	Federal Insurance Contributions Act
FM	Farm-to-Market Road
FMEF	Fuels and Materials Examination Facility
FPPA	Farmland Protection Policy Act
FWS	Fish and Wildlife Service
FY	Fiscal Year
GAd	Gross Alpha—dissolved
GAs	Gross Alpha—suspended

GBd	Gross Beta—dissolved
GBs	Gross Beta—suspended
GPS	Global Positioning System
HAP	Hazardous Air Pollutant
HE	High Explosive(s)
HEPA	High Efficiency Particulate Air
H-Gear	Weapons-Specific Handling Gear
HHS	Health and Human Services
HVAC	Heating, ventilation, and air conditioning
HLW	High-Level Waste
HPCAF	Health Physics Calibration and Acceptance Facility
HW	Hazardous Waste
HWTPF	Hazardous Waste Treatment and Processing Facility
ICM	Interim Corrective Measure
ICRP	International Commission on Radiological Protection
IHE	Insensitive High Explosive
ILS	Instrument Landing System
IO	Isolated Occurrence
ISC	Industrial Source Complex
ISCLT2	Industrial Source Complex Long Term, Version 2
ISCST2	Industrial Source Complex Short Term, Version 2
IST	In-Service Training
JCO	Justification for Continued Operation
JTA	Joint Test Assembly
KAFB	Kirtland Air Force Base
LANL	Los Alamos National Laboratory
LCF	Latent Cancer Fatality
LDR	Land Disposal Restrictions
L_{eq}	Equivalent Sound Level
LLNL	Lawrence Livermore National Laboratory
LLMW	Low-Level Mixed Waste
LLW	Low-Level Radioactive Waste
LWR	Light Water Reactor
MACCS	Melcor Accident Consequence Code System
MACT	Maximum Achievable Control Technology
MCAF	Materials Compatibility Assurance Facility
MCL	Maximum Contaminant Level

MDL	Method Detection Limit
MELTER	Model of the Thermal Response of Cargos Transported in the Safe-Secure Trailer Subject to Fire Environments for Risk Assessment Applications
MEOI	Maximally Exposed Offsite Individual
MOBILE 5a	Mobile Source Emission Factor Model, Version 5a
MOU	Memorandum of Understanding
MR	Modified Richmond
MSA	Metropolitan Statistical Area
MTU	Mobile Treatment Unit
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
ND	No Damage
NDEF	Nondestructive Evaluation Facility
NDRC	National Defense Research Committee
NE	Northeast
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFA	No Further Action
NHPA	National Historic Preservation Act
NHW	Nonhazardous Waste
NIOSH	National Institute for Occupational Safety and Health
NLR	Noise Level Reduction
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NTS	Nevada Test Site
OB/OD	Open Burning/Open Detonation
O&I	Operations & Inspection
OMB	Office of Management and Budget
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
OSTP	Old Sewage Treatment Plant
OU	Operable Unit
PA	Programmatic Agreement

PBX	Plastic Bonded Explosives
PEIS	Progammatic Environmental Impact Statement
PIDAS	Perimeter Intrusion Detection and Alarm System
PL	Public Law
PPOA	Pollution Prevention Opportunity Assessment
PP/WM	Pollution Prevention/Waste Minimization
PRG	Preliminary Remediation Goal
PRA	Probabilistic Risk Assessment
PSD	Prevention of Significant Deterioration
QA/QC	Quality Assurance/Quality Control
RAMS	Radar Airspace Monitoring System
R&D	Research and Development
RBC	Risk Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RHWSF	RCRA Hazardous Waste Staging Facility
RIMS II	Regional Input-Output Modeling System
RMMA	Radioactive Materials Management Areas
ROD	Record of Decision
ROI	Region of Influence
RRS	Risk Reduction Standard
RTG	Radioisotopic Thermoelectric Generator
S&D	Storage and Disposition
SAC	Steel Arch Construction
SAR	Safety Analysis Report
SARA	Superfund Amendments and Reauthorization Act
SARP	Safety Analysis Report for Packaging
SCDHEC	South Carolina Department of Health and Environmental Control
SDWA	Safe Drinking Water Act
SF	Slope Factor
SHPO	State Historic Preservation Office
SNL	Sandia National Laboratories
SNM	Special Nuclear Material
SPF	Standard Project Flood
SRS	Savannah River Site
SSM	Stockpile Stewardship and Management
SST	Safe Secure Tractor Trailer

STAR	Stability Array
START II	Strategic Arms Reduction Treaty
STP	Site Treatment Plan
SVOC	Semivolatile Organic Compound
SWDA	Solid Waste Disposal Act
SWEIS	Site Wide Environmental Impact Statement
SWMU	Solid Waste Management Unit
T&E	Threatened and Endangered
TAC	Texas Administrative Code
TACB	Texas Air Control Board
TBEG	Texas Bureau of Economic Geology
TCP	Traditional Cultural Property
TDCJ	Texas Department of Criminal Justice
TDH	Texas Department of Health
TDS	Total Dissolved Solids
TNRCC	Texas Natural Resources Conservation Commission
TOX	Total Organic Halogen
TPWD	Texas Parks and Wildlife Department
TRU	Transuranic
TSCA	Toxic Substances Control Act
TSD	Transportation Safeguards Division
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TTU	Texas Tech University
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank
U.S.	United States
U.S.C.	United States Code
UTL	Upper Tolerance Limit
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
VOR	Very High Frequency Omni-Directional Radio Range
VORTAC	Very High Frequency Omni-Directional Radio Range with Tactical Air Navigation
VSI	Visual Site Inspection
WAC	Waste Acceptance Criteria
WM PEIS	Waste Management Programmatic Environmental Impact Statement
WSA	Weapons Storage Area

WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant
XTX	Extrudable Explosive

CHEMICALS AND UNITS OF MEASURE

Be	beryllium
BGY	billion gallons per year
BOD	Biological Oxygen Demand
°C	degrees Celsius
Ca	calcium
Ci	Curie
CCl_4	carbon tetrachloride
CO	carbon monoxide
CFC	chlorofluorocarbons
CFC-12	dichlorodifluoromethane
CFC-113	trichlorotrifluoroethane
cm	centimeter
Cs	cesium
D	deuterium
d	day
dB	decibel
dBA	decibel A-weighted scale
dBC	decibel C-weighted scale
DCE	1, 2-dichloroethylene
DDT	dichlorodiphenyltrichloroethane
DU	depleted uranium
°F	degrees Fahrenheit
ft	feet
ft^2	square feet
ft^3	cubic feet
ft^3/s	cubic feet per second
g	gram
gal	gallon
gpd	gallons per day
g/sec	gram per second
H	hydrogen
H^3	tritium
ha	hectare

HCFC-22	chlorodifluoromethane
HCl	hydrochloric acid
HEU	highly enriched uranium
HF	hydrogen fluoride
HMX	high melt explosive
hr	hour
Hz	Hertz
in	inch
K	kelvin
kg	kilogram
km	kilometer
km^2	square kilometers
km/hr	kilometers per hour
kV	kilovolt
kVA	kilovoltampere
kW	kilowatt
kWh	kilowatt hour
lb	pound
lb/hr	pounds per hour
lb/yr	pounds per year
L	Liter
Li	lithium
LX	press-moldable HMX
M	million
m	meter
m^2	square meters
m^3	cubic meters
mCi	millicurie (one-thousandth of a Curie)
mCi/g	millicurie per gram
mCi/ml	millicurie per milliliter
mg	milligram (one-thousandth of a gram)
mg/L	milligram per liter
MGD	million gallons per day
MGY	million gallons per year
mi	miles
ml	milliliter
MOX	mixed oxide

mph	miles per hour
mrem	millirem (one-thousandth of a rem)
mrem/yr	millirem per year
m/sec	meters per second
MVA	megavolt-ampere
MW	megawatt
MWe	megawatt electric
MWh	megawatthour
MWt	megawatt thermal
N	nitrogen
nCi	nanocurie (one-billionth of a Curie)
nCi/g	nanocuries per gram
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
O_3	ozone
P	phosphorous
Pa	pascal
Pb	lead
PBX	plastic-bonded explosives
PCB	polychlorinated biphenyl
pCi	picocurie (one-trillionth of a Curie)
pCi/g	picocuries per gram
pCi/L	picocuries per liter
PETN	pentaerythritoltetranitrate
pH	hydrogen-ion concentration
PM_{10}	particulate matter of aerodynamic diameter less than 10 micrometers
ppb	parts per billion
ppbv	parts per billion by volume
ppm	parts per million
psi	pounds per square inch
Pu	plutonium
qt	quart
qtr	quarter
RBC	risk based concentrations
RDX	research development explosive
rem	roentgen equivalent man
sec	second

SO_2	sulfur dioxide
SO_x	sulfur oxides
sq	square
Sr	strontium
T	tritium
TATB	triaminotrinitrobenzene
TCA	1, 1, 1-trichloroethane
TCE	trichloroethene
Th	thorium
TNB	trinitrobenzene
TNT	trinitrotoluene
TOC	total organic compounds
TOX	total organic halogen
U	uranium
UL	Underwriter's Laboratory
yd	yard
yd^3	cubic yards
yr	year
µCi	microcurie (one-millionth of a Curie)
µCi/g	microcuries per gram
µg	microgram (one-millionth of a gram)
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
µm	micron or micrometer (one-millionth of a meter)
µohms/cm	micromhos per centimeter

CHAPTER 1

Overview

CHAPTER 1
OVERVIEW

1.1 INTRODUCTION

In March 1996, the Department of Energy (Department or DOE) published the *Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*. This draft environmental impact statement (EIS) examined the potential environmental impacts for three alternatives as described in chapter 3 of volume I. A Notice of Availability of the Draft EIS was published in the *Federal Register* (61 FR 15232) on April 5, 1996. The public comment period for the Draft EIS began on April 5, 1996, and was originally to end on July 5, 1996. However, at the request of stakeholders in the Amarillo area, the ending date was extended to July 12, 1996. The formal comment period thus ran for 98 days. DOE stated that any comments received after the end of the comment period would be incorporated to the extent practicable. Comments were accepted as late as July 29, 1996.

During the comment period, public hearings were held in Amarillo, Texas; North Las Vegas, Nevada; North Augusta, South Carolina; Albuquerque, New Mexico; and Richland, Washington. Each of these hearings was conducted in workshop format beginning with a presentation that provided an overview of the Draft EIS followed by opportunities for stakeholders to make comments or ask questions. In addition, a separate Technical Exchange Meeting was held in Amarillo with representatives of the State of Texas, City of Amarillo, Panhandle Water Conservation District No. 3, the University Consortium, the Amarillo Economic Development Corporation, and the Pantex Plant Citizens Advisory Board.

The workshop format of the meeting also allowed questions and comments from members of the public as well as the participants listed above. Verbatim comments were recorded at all meetings. In addition, the public was invited to submit comments via mail, toll-free facsimile, electronic mail (Internet), and toll-free telephone. If a comment was answered in the public hearing and needed no elaboration, it is not identified for a response in this EIS.

Attendance figures and transcript codes for each meeting are presented in Table 1.1–1. Attendance is only reported for those people who completed and returned registration forms

TABLE 1.1–1.—*Number of Attendees at Public Hearings/Meetings*

PUBLIC HEARING/MEETING	NUMBER OF ATTENDEES	TRANSCRIPT CODES
Amarillo (4/22/96)	161	HT01, HT02, HT03, HT04, HT05, HT06
Amarillo (4/23/96)	54	HT07, HT08, HT09, HT10
Las Vegas (4/25/96)	12	HT11
Augusta (4/30/96)	93	HT12
Albuquerque (5/7/96)	18	HT13
Richland (5/23/96)	16	HT14
Amarillo Technical Exchange (6/25/96)	122	HT15, HT16, HT17
Total	476	

and therefore may not include all those present at each meeting. The transcript codes correspond to the individual transcripts taken at each meeting. Those portions of the transcripts containing comments are presented in chapter 2 of this volume. Transcripts HT01 and HT02 contained continuous dialogues by individually identified commentors. Therefore, these two transcripts are sectioned by the associated individuals. The workshop format of the meetings made this too difficult to do with the other transcripts.

The *National Environmental Policy Act* (NEPA) requires Federal agencies to solicit comments on a Draft EIS from both government entities and the public, and to consider those comments in preparing the final version of the EIS. The purpose of this comment period is not to conduct a referendum on the eventual decision to be made by the Department, but to obtain input on the content of the EIS itself. As stated in the Council on Environmental Quality (CEQ) regulations for implementing NEPA, comments are to be as specific as possible and may address either the adequacy of the Draft EIS or the merits of the alternatives discussed or both (40 CFR 1503.3).

Frequently, during public comment periods, agencies receive statements of political viewpoints or personal feelings rather than comments specifically addressing the subjects of the EIS (i.e., descriptions of alternatives and the environmental analyses of the alternatives). While any citizen has the right to express his or her viewpoint, those expressions are useful in the NEPA process only to the extent that they focus on points that need to be clarified or revised in the final descriptions of alternatives or environmental impacts.

For clarity within the discussions that follow, statements collected during the comment period were identified as "comments" when they specifically relate to the discussions of the alternatives and environmental analyses within the EIS. The Department's responses to these comments are provided in this volume of the EIS. Conversely, general expressions of convictions, personal opinions, or support for or opposition to the continued operation of Pantex Plant are termed "remarks" and are acknowledged, but are not provided with individual responses in the EIS.

Transcripts were made at each public meeting. In addition, comments and remarks were received via mail, electronic mail (i.e., Internet), facsimile, and orally. All of these comments and remarks were recorded on paper and are hereafter referred to as comment documents, regardless of whether the content was in the form of comments or remarks. Each of the comment documents was date stamped and assigned a document number according to its origin (e.g., Federal Government; State Government; transcripts of public meetings; letters and cards from organizations or private citizens, etc.).

Each comment document was then reviewed and each individual comment was categorized into one of 24 comment categories (see Table 1.1–2). Each comment was assigned a sequential comment number and entered verbatim into the computerized Comment Management System.

Two letter campaigns and a postcard campaign occurred during the comment period. A campaign is characterized by multiple submissions from private citizens or organizations of identically or nearly identically worded comments or remarks. Comment documents CO-001, PC-031, and PC-032, in chapter 2 of this volume, are examples of these campaigns. See Table 1.1–3 for a listing of members of the public and organizations that participated in these campaigns. The statements within an example document for each campaign were analyzed, identified, and categorized in the same manner as those within the other comment documents.

TABLE 1.1–2.—*Resource/Issue Categories and Number of Comments Received*

RESOURCE/ISSUE CATEGORY CODE	RESOURCE/ISSUE CATEGORY DESCRIPTION	NUMBER OF COMMENTS
01	Alternatives (including new projects)	44
02	Relationship to Other EISs	32
03	Infrastructure	18
04	Land Use	18
05	Geology and Soils	61
06	Water Resources	128
07	Air Quality	42
08	Acoustics (Noise)	4
09	Biotic Resources	20
10	Cultural Resources	13
11	Socioeconomic Resources	51
12	Intrasite Transportation	31
13	Waste Management	32
14	Human Health	193
15	Aircraft Accident	115
16	Intersite Transportation of Nuclear/Hazardous Materials	60
17	Environmental Justice	27
18	Irreversible and Irretrievable Commitments of Resources	1
19	Unavoidable Adverse Environmental Impacts	0
20	Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity	0
21	Cumulative Impacts	10
22	DOE Policy	31
23	NEPA Process/Procedures	53
24	Miscellaneous	5
Subtotal		989
	Duplicate Comments or remarks in Letter and Postcard Campaigns	2,764
Total		3,753

TABLE 1.1–3.—*Pantex EIS Postcard and Letter Campaigns*

LETTER CAMPAIGN 1 (EXAMPLE, CO-001)		
A to Z Tire, Leonard Nussbaum	Budweiser Distributing Company, Dean Morrison	Page & Associates Contractors, Inc., Phillip Waddell
Acoma Pine Animal & Bird Clinic, Tom Gerald III, DVM, PC	Canyon Drive Lumber Company, Royce Barnett	Panhandle Plastic Surgery, P.A., John Kelleher, Jr., M.D.
Amarillo National Bank, Gary Molberg	Coldwell Banker, Robert Garrett	Potter County Commissioner, Manny Perez Villasenor
Amarillo National Bank, W Wade Porter	Coldwell Banker, Randall Jeffers	Sell & Griffin, Frederick Griffin
Amarillo Tri-State Fair, Cheri Christensen	Coldwell Banker, Tom Roller	Sell & Griffin, Garland Sell
Bill Wolfe Custom Homes, Bill Wolfe	Greg Lair, Inc., Greg Lair	Southwestern Bell Telephone, Gary Stevens
Boatmen's First National Bank of Amarillo, Don Powell	Harrington Regional Medical Center, Stephen Gens	Sprouse, Mozola, Smith & Rowley, P.C, R. Wayne Moore
Boatmen's First National Bank of Amarillo, Joe Stange	Page & Associates Contractors, Inc., Stanley Cotgreave	
LETTER CAMPAIGN 2 (EXAMPLE, PC-031)		
Jerry Arnold	Kay Drought	Madonna Newburg
Virginia, Sarah, Jared, Edward, and Matthew Artho	Mike Dudenhoeffer	Genneil Parker
Gary Barclay	Janet Gattis Duke	David & Jennifer Pluhar
Floyd Beenders	Chip Formby	Billie Poteet
Mavis Belisle	Janetta Fowle	Ben Raizen
Janet Bellwether	Mark Frey	Sheila Mills Rekdal
Silvia Brackman	Don Garner	Richard Scott
Susan Bradshaw	Kathryn Graves	William H. Seewald
Abigail Brown	William Gray	Mary Shennum
R. V. Buck	Joyce Hall	Marshall Smith
Stephanie Canfield	Anna Marie Harkey	Phillip & Doris Smith
Addis Charless, Jr.	Eleanor Hudspeth	Ruth Ann Smith
Gary Cooly	Dana Koetting	Richard Thayer
Peggy Cooney	Janet Kroeger	Joanna Vaughn
Margaret Cooper	D. P. LaBorde	Paul & Lois Way
Robert Cooper	Jeffrey Levin	Duane & Jeannine Wendel
Inez Crawford	Carl Looten	Jack & Betty White
Richard & Mary DeLong	Michael Miles	Clarence Wink
Danny and Bernice Detten	Genevieve Miller	Fred Winner
	Fred & Ann Molesworth	Terri Younger

TABLE 1.1–3.—*Pantex EIS Postcard and Letter Campaigns*-Continued

POSTCARD CAMPAIGN (EXAMPLE, PC-032)		
1 Postcard With Illegible Name	T. Beveres	Addis Charless, Jr
Jane Abell	Allena Bieri	Jeremy Chavez
Aguadas Fuels Consultant	Betty Biggs	Carol Clark
Bill Akin	D. D. Binkley	Deanna Clark
Roger Albrocht	Herman Birkenfield	Polly Clark
Robert Aldridge	Marilyn Birkenfield	Virginia Clark
Dempsey Alexander	Chris Black	Marilyn Clement
Thelma Alexander	Lisa Blakely	W. T. Clements
Ann Allen	Jolene Bledsoe	Douglas Coffee
Susan Allen	Patrick Bonner	Audrey Collard
J R Allison	J. Boon	James Collard
Ruth Allison	Hood & Alma Bonnett	Jim Conkwright
Anna Anderson	Blase Boufave	Danna Contey
Mary Andrada	Susan Bradshaw	Jeanne Cook
Sandi Anson	Beatrice Braikford	Peggy Cooney
John Arhen	Myrna Braman	Gary Cooper
Lee Armsty	Deana Brickman	Margaret Cooper
Jerry Arnold	Rita Bronniman	James Cope
Edward Artho	Harvey Brown	Clifton Corcoran
Joe Artho	Noble Brown	Karl Cote
Edward Asulr	Porter Brown	George Coulten
Patty Atchley	Mike Brucly	Donald Cox
J. B. Atkerson	Richard Bruiltdy	Gladys Cox
George Aueherman	R. C. Brumhardt	Jean Cox
Mary Auiclarn	Caleb Brumley	David Craighead
Nora Bair	Joanna Brumley	Inez Crawford
Sue Baird	R. V. Buck	Rosemary Crossett
Ysleta Ball	Erline Bunten	Tony Crotuyant
Arnold Banks	Robert Bunten	Irene Cummins
Mark Banner	Tom Burtis	Bob Daemmrich
Joy Barham	Addie Caldwell	Louise Daniel
Ulpedne Barn	Joan Caminis	G. Darron
E. J. Battles	G. G. Campbell	Carol Annah Darwin
Margaret Battles	Stephanie Canfield	R. J. Daves
Richard Baur	Betty Jo Carlson	Don Davidson
Binton Beender	Norma Carlson	Beverly Davis
Dana Bellwether	Neil J. Carman, Ph.D.	Raymond Davis
Dick Belsey	Jared Carr	Raymond Davis
Dorothy Berend	Brent Carvies	R. B. Dawson
William Berney	Sophie Cary	O. O. Debry
Mary Berwick	Kay Lynn Caviness	Dal Deeter

TABLE 1.1–3.—*Pantex EIS Postcard and Letter Campaigns*-Continued

POSTCARD CAMPAIGN (EXAMPLE, PC-032)–CONTINUED		
Richard DeLong	Joel Gilbert, Jr	Kathy Haus
Floyd Detten	Larry Hendershot	Richard Heldaharen
E. W. Dettmann	Robert Henschen	Robert Holmes
Robert Diller	Joe Henson	Dave Hoppe
Theresa Diller	Maicelle Hidieiey	Eloise Hougal
Gerry Doyle	Nedra Higginbotham	Billye R. Huchton
Gene Drew	Raymond Higginbotham	Eleanor Hudspeth
Geraldine Duan	A. B. Higgins	Sam Hulsey
Paul Dudenhoffor	Alberta Higgins	Mary Hussman
R. J. Duncan	Hilton Higgins	Ralph Hutchison
Alfred Dziuk	Peggy Higgins	Steve Hyrsey
Jim E.	James Hinde	Becky Hysenger
Lewis Earl	R. Hinsol	Inbllt
Mary Eastman	Richard Hoelscher	D. J.
Elihu Edelson	Jean Hollingsworth	Mike Jack
M. J. Elinch	Gene Glazener	Bill Jackson
Thomas Ellis	Ashlee Glencock	Bob Jackson
Newton Ellison	A. W. Gober	Leslie Jasmon
Pat Enfra	Webb GoberBert Golding	John Jenks
B. A. Erpen	Joan Golding	Mildred Jicks
Deborah Faxhoven	Irene Goss Wiemer	Joan Jite
Shelli Fernandez	Gertrude Gotegut	Leroy Johnson
Edith Filler	Terre Gows	Cyrilla Jones
H Mark Finduum	James Graves	M. Laure Jones
Chip Formby	June Graves	Edward Jorgott
Boyd Foster	Kathryn Graves	Herbert Jue
Dolores Foster	Bill Gray	Richard Justice
Janetta Fowle	Michael Gray	Keith Kalka
Mary Jo Foxgron	Scott Gray	Roger Kallerberg
Francine Freeds	Jackie Griggs	Jerome Kaplanwald
Suzanne Freeman	Doris Clark Gunn	Andrew Keishern
Patty Frerich	Jatt Gyer	Mary Kennedy
Mark Frey	Mami Hack	H. H. King
Cecilia Fuller	Doris Haires	Carl Kleushens
Don Gabel	Lesley Hall	Agnes Klinke
Jean Gallagher	William Hall	Heather Klouskens
Ed Gar	Ray Hampten	Judy Kregrhouse
Danna Garcia	Michael Hannou	Dana Kretting
Deliah Gavin	Ruth Ann Hansen	Reinard Kunutsen
Mona Gee	Betty Harris	Marilyn Kyr
Ron Gideon	Bobby Hatfield	Leo LaBorde

TABLE 1.1–3.—*Pantex EIS Postcard and Letter Campaigns*-Continued

POSTCARD CAMPAIGN (EXAMPLE, PC-032)–CONTINUED		
Vernon Labure	Erin McMartry	Robert Pope
Thelma Lamm	Allan McMurtrey	Mary Porter
Earl Langys	Donald Meyer	Billie Poteet
Della LeGate	J. Paul Mijilden	Richard Privsr
Nolen LeGate	Michael Miles	Ben Raizen
Noles LeGate	Merilyn Miller	Rebecca Rankin
M. J. Lehennacher	Glen Milner	Carolyn Rapstine
Donald Lemmy	Linda Minchew	Helen Raschke
Jeffrey Levin	Richard Don Minchew	Xila Rekdal
Otto Lippmann	Nick & Nancy Mohr	Cathy Revell
Gladys Loaten	Ann Molesworth	George Ricker
Lee Loe	S. Moneseseth	Lyle Robinson
Carl Looten	Mary Moore	Kenneth Robison
K. Liza Loube	Henry Morris	Arline Rokoback
Theresa Luby	Don Morrison	Louis Romero
Katie Lupton	Elizabeth Morrissett	David Root
Richard Lyston	Jeanette Moser	John Rosely
Frank Mabee	Robert Myers	Claudia Roundtree
Genivieve Maller	Madonna Newburg	Don Rouse
Evans Mank	Roserita Niber	Lawrence Ruther
Edna Marnell	Mary Nicholson	Albert Salbeck
D. Marshall	Melanie Nicholson	Henry Salomon
Luise Martindale	Helen Norwood	Hugh Sanborn
Phyllis Mattek	Bill O'Brien	G. J. Sans
Craig Matthews	Kathy O'Rourke	Johnes Saunders
Doris Matthews	Robert Ocooper	Liara Schilling
Frances Keller Matthews	Robert Ogden	Charles Schlabs
Marta Matthews	Cecil Oglesby	Laure Schlabs
Mary Matthews	Ella Oglesby	Richard Schlabs
Leroy Matthuesen	Gary Oliver	Herbert Schlegel
Beverly Maxin	Betty Olson	Margaret Schultz
J. R. McClellan	George Olson	Stephen Schultz
Sandra McClellan	Bobbie Oppermann	Ida Schurmacher
Stan McDonald	Jeri Osborne	Joe Schwerner
Eloise McDougal	Jim Osborne	Elizabet Scott
Teresa McFarel	Karley Parly	Richard Scott
Robert McGee	Roy Parten	J. Scurlock
Lucy McGowan	Pat Patton	Katherine Seewald
V. L. McKennsey	Robert Patton, Jr	William H. Seewald
Phyllis McKenzie	Piolelestineo	Mary Shennum

TABLE 1.1–3.—*Pantex EIS Postcard and Letter Campaigns*-Continued

POSTCARD CAMPAIGN (EXAMPLE, PC-032)–CONTINUED		
Shirley Sider	Joan Strafuss	Dorcas Weather
M. T. Siggi	Cynthia Streun	Helen Welter
Harold Siler	Jo Submon	Jeannine Wendel
Betsy Simpleton	Joe Swann	Jack White
Donna Singleton	Don Sweefetou	George Wilhelm
Franciscan Sisters	Joe Taff	Leo Wilkowski
George Smith	Joyce Taff	Dale Winders
Marshall Smith	Richard Thayer	Anna Marie Wink
Tamara Snodgrass	James Thomas	H. Harbour Winn, III
Karen & Haley Son	T. Thompson	M. T. Winter
Sara Sorelle	Parrs Tim	Benny Womble
Ellen Spear	T. Tusperl	Joan Womble
Mary Springer-Froese	Karen Tusts	Debra Wood
Jim Steiert	Buddy Vance	Jacob Wood
Kerrie Steiert	Joanna Vaughn	P. P. Wood
Pete Steiert	Joanna Vauplin	Marian Yosten
Jerry Stein	Lydia Villanueva	M. V. Z.
Janie Steins	Thein Wah	Leo Zimmeser
Charlie Stengel	B. A. Ward	Louise Wilkowski
R C Stengel	Jake Ward	Jim Williams
Brent Steurker	Patsy Ward	Shirley Wilson
Porter Storey	Dolly Warden	Dori Wimberley
Arthur Story	Atuh Watawlee	Bill Wimberly
Inelda Stousbusy	W. C. Wauln	
Carl Strafuss	Lois Way	

Some of the campaign documents had one or more additional remarks besides those in the example documents or were altered in other ways. Each of these documents was reviewed via the process described above. In each of the campaign documents, the comments or remarks that were the same as those in the example document (of that campaign) were assigned the identical comment numbers as those in the example document. However, any unique comment received its own comment number. By this procedure, repetitive comments were addressed only once within this volume of the EIS. The major themes of the campaigns are summarized in the following paragraphs.

One of the letter campaigns involving 26 participants (see CO-001 for example) discussed issues or made statements mostly applicable to other NEPA documents, particularly the SSM PEIS and the S&D PEIS. Statements that pertained to this Pantex Plant EIS included perceived benefits resulting from current and proposed expansion of Pantex Plant operations, including the benefits to the Amarillo economy. This campaign emphasized that regardless of the levels of activity at Pantex Plant, DOE must continue to manage its facilities in a "safe and environmentally sound manner" in order to protect the public and the environment. The campaign stated that Pantex Plant had a historical record of safely managing hazardous materials, including "safehousing"

8,500 pits, and, therefore, urged DOE to consider Pantex Plant favorably in making decisions related to the two PEISs and the Pantex Plant EIS. The campaign also advocated Pantex Plant as a cost efficient alternative for current and future work. A listing of individuals who sent in this campaign letter is provided in Table 1.1-3.

Another letter campaign involving 59 participants (see PC-031 for example) listed five perceived inadequacies of the Draft EIS. These included perceived shortcomings in the amount of information provided in cumulative impacts analysis and insufficient discussion of water usage impacts, challenges to assumptions used in the aircraft overflight analysis, a desire for building-specific detail in the analysis of site-wide impacts, and an assertion that it was unreasonable to consider placing "hazardous nuclear materials and the processing or storage of nuclear waste" above the Ogallala aquifer. This campaign included some statements or questions identified as individual comments. The names of the individuals who submitted one of these campaign letters are provided in Table 1.1–3.

In the postcard campaign involving 441 participants (see PC-032 for example), commentors expressed opposition to facilities "that handle nuclear waste or to processes that generate it" including "plutonium processing." Additionally, they voiced opposition to "bringing plutonium to Pantex from other sites" and to the possibility of "long-term storage of plutonium over the Ogallala Aquifer." This campaign concluded with a statement of preference for the type of jobs and development within the region that would not endanger workers, families, natural resources, and the reputation of the region's agricultural products. A listing of the individuals who sent in a postcard is provided in Table 1.1–3.

In addition, many of the letter and postcard campaign documents were altered or contained one or more statements added by the individual who signed the document. Those statements were considered, but mostly comprised remarks rather than comments on the EIS content. The statements included expressions of support for or opposition to Pantex Plant in general or specific aspects of plant operations, concern for any impacts to specific environmental resources, or criticism of alternatives being examined in this EIS and the PEISs.

DOE recognizes its responsibility to manage facilities and hazardous materials, including plutonium, with operational and environmental controls appropriate for protecting workers, the public, and the environment. DOE continues to work with the U.S. Environmental Protection Agency (EPA), State regulatory agencies, employees, unions, neighbors, and the general public in developing programs and commitments to further improve management of facilities and all hazardous materials, including wastes.

All of these plans and commitments at Pantex Plant have also been considered in the analysis of the alternative sites to determine if there are any conflicts or restrictions that would inhibit these sites from serving as suitable locations for interim pit storage. Impacts of present and future waste management and human health are discussed and analyzed in volume I, sections 4.13 and 4.14, respectively. As discussed in volume I, section 1.3.9 and 1.3.10 of this volume, and the previously mentioned sections of volume I, nothing was found that would inhibit Pantex Plant or the alternative sites from performing the required missions.

DOE understands the importance of the Ogallala aquifer as the principal source of water in the Texas Panhandle. DOE has monitored groundwater quality in the perched and Ogallala aquifers at Pantex Plant for the past 20 years. Impacts of present and future water consumption and quality are discussed and analyzed in volume I, section 4.6. As discussed in section 1.3.5 of this volume and volume I, section 4.6, nothing was found that would result in a significant impact to the Ogallala aquifer.

DOE believes the EIS adequately and reasonably addresses both the affected environment and any potential impacts to all environmental resources. As for the assumptions and accuracy of the aircraft overflight analysis, DOE has conservatively analyzed the various uncertainties that affect the overall level of risk that an aircraft crash could result in a release of radioactive materials. These issues are presented in volume II, appendix E, Aircraft Accident Analysis. The data, assumptions, and calculations represent the best available and most accurate representation of conditions at Pantex Plant.

The level of local support for the siting of facilities for interim pit storage, long-term storage of surplus and non-surplus fissile materials, disposition of surplus plutonium, and long-term continuation of stockpile stewardship and management activities is not part of the analysis of environmental impacts in accordance with NEPA and, thus, is not addressed in this Final EIS. However, the degree of community support, along with environmental impacts, mission requirements, cost, and technical factors, is considered in the Record of Decision.

1.2 Organization of This Volume

At the beginning of this volume is a section printed on green paper. These "green pages" are a guide to assist readers in quickly locating documents and comments of particular interest. With this guide, the reader can go directly to particular documents or comments without having to read the narratives of any chapter in this volume.

This Comment Response Document is organized into three chapters. Chapter 1 (this chapter) provides an overview of the entire document, including a brief discussion of the major issues that were raised during the comment period and a summary of the changes to the Draft EIS. Chapter 2 is a compendium of the comment documents received, annotated to show the comments that were identified for a response. Chapter 3 provides DOE's responses to the comments. The comments are grouped by resource/issue category so each commentor can easily see, in one section, his or her own comment along with all the comments that other people made about the same subject. Each comment is reproduced verbatim just before the response is provided, so the reader does not have to flip back and forth between the documents in chapter 2 and the responses in chapter 3.

1.3 Discussion of Major Issues and Changes to the Draft EIS

There were 24 categories of comments and a total of 3,753 comments/remarks received. Nearly three-fourths of them were duplicate submissions as a result of the two letter and one postcard mail-in campaigns with a total of 526 participants. Every comment received was considered in the analysis. Each comment was individually reviewed and a response to each is provided in chapter 3 of this volume. There were several categories of comments that were of broad interest or concern. These topics, categorized as "major issues," are listed below in the order in which the topics appear in the EIS:

- Alternatives.
- Relationship to Other EISs.
- Land Use.
- Geology and Soils.
- Water Resources.
- Air Quality.
- Socioeconomic Resources.
- Intrasite Transportation.
- Waste Management.

- Human Health.
- Aircraft Crash.
- Intersite Transportation.
- Environmental Justice.
- DOE Policy.
- NEPA Process and Procedures.
- Out of Scope.

The subsections that follow provide summary discussions of those major issues, organized by topic.

1.3.1 Alternatives

Many comments questioned the adequacy of the process used to select site alternatives, as well as the impact analyses of those alternatives. Additional commentors questioned DOE's rationale and objectiveness in assessing Department of Defense (DOD) relocation alternatives since the Long-Term Storage and Disposition of Weapons-Usable Fissile Materials (S&D) PEIS considered DOD facilities to be infeasible.

Many comments questioned the legitimacy of the 20,000 pit storage limit because, reportedly, the U.S. stockpile was greater than 25,000 weapons. Other comments questioned the 20,000 number because the START II treaty commits to a ceiling of 3,500 deliverable weapons. Concern was expressed that the START II commitments could result in interim pit storage exceeding the 20,000-pit limit. In addition, commentors felt the storage limit was inaccurate because 2,000 weapon disassemblies per year for 10 years (plus the current inventory) could result in interim storage of more than 28,000 pits.

Site Selection Process

The scope of the Pantex Plant EIS included evaluation of potential DOE and DOD sites serving as alternative pit storage sites. A DOE Site Screening Committee systematically assessed a large number of candidate sites to determine the range of reasonable alternative sites. To screen candidate sites, DOE applied exclusionary (e.g., under DOE control through at least 2007) and favorability criteria (e.g., degree of construction required to adapt existing facilities for the pit storage mission). As a result, DOE identified the Device Assembly Facility and P-Tunnel at the Nevada Test Site (NTS), the Fuels and Materials Examination Facility at Hanford Site, and P-Reactor at Savannah River Site (SRS) as reasonable DOE alternatives for interim pit storage.

In parallel, 60 DOD installations were screened by the Nuclear Weapons Council staff. The Council staff determined that only the Manzano Weapons Storage Area (WSA), located on Kirtland Air Force Base (KAFB) (at Albuquerque, New Mexico), and Seneca Army Depot (at Romulus, New York) were feasible.

Subsequently, the Air Force agreed to become a Cooperating Agency in the preparation of this EIS regarding the Manzano WSA. However, because Seneca Army Depot was approved for closure in September 1995, in accordance with the *Defense Base Closure and Realignment Act of 1990 (Public Law 101-510)*, this facility was not available as a candidate site.

After a site visit to validate suitability, the Manzano WSA was determined to be a reasonable alternative site for interim storage of plutonium in pit form. DOE believes the interim storage alternatives evaluated in this EIS, including the Manzano WSA, represent a reasonable management course for interim storage of plutonium in pit form.

Basis for the 20,000 pit storage limit

\s originally discussed in the January 1994 *Environmental Assessment for Interim Storage of Plutonium Components at Pantex* (DOE/EA-0812), the Nuclear Weapons Stockpile Memoranda and corresponding planning and production documents direct the retirement rates for weapons held in DOD custody. In response, DOE has determined the need for interim storage of up to 20,000 plutonium pits.

Chapter 2 of the SSM PEIS discusses in detail the national security policies, responsibilities, strategies, and directives placed upon DOE. For the reasonably foreseeable future, eight principal drivers were used for defining the direction and scope of the U.S. nuclear weapons stockpile. Of the eight, the Strategic Arms Reduction Treaty (START) II protocol is the most useful in helping define a specific time period to bound the reasonably foreseeable future.

The START I treaty and the START II protocol only control the number of strategic nuclear weapons that can be loaded on treaty-specified and verified strategic missiles and bombers. These deliverable nuclear weapons are limited to 6,000 by the START I treaty and 3,500 by the START II protocol. The treaties do not control the total stockpile or the composition of strategic and nonstrategic nuclear weapons. The U.S. stockpile will be larger than 6,000 under START I and 3,500 under START II because the stockpile includes retaining weapons for nonstrategic nuclear forces, DOD operational spares, and spares to replace weapons attrited by DOE surveillance testing. Additional language has been added to volume I, chapters 1 and 3 to clarify this issue.

However, should treaty commitments, Presidential directives, or congressional legislation further reduce the weapons stockpile and increase the need for additional storage above the 20,000 number, DOE would address the environmental impacts in future NEPA documentation.

1.3.2 Relationship to Other EISs

The majority of comments illustrated a need for clarifying the relationship of this Pantex Plant EIS with respect to DOE's other major PEISs (i.e., Waste Management [WM] PEIS, SSM PEIS, S&D PEIS) and two Site-Wide EISs (i.e., NTS EIS and Los Alamos National Laboratory (LANL) EIS). Commentors also asked for more simplified documents and help in improved public understanding of the relationships between DOE's major PEISs and EISs. A commentor questioned the reason the SSM PEIS evaluated complete closure of the Pantex Plant, when this Pantex Plant EIS did not.

Other commentors expressed a wide range of reasons for selecting (preferred alternatives) or eliminating sites under consideration in each of the DOE PEISs and Site-Wide EISs mentioned above.

Relationship of Pantex Plant EIS to Other NEPA Documents

The WM PEIS, the SSM PEIS, the S&D PEIS, the NTS EIS, the LANL EIS, and the Pantex ant EIS relationships are described in chapter 1 of each document. Their respective summaries provide simplified, descriptive information relevant to the decisions impacting each of the six EISs. However, all six documents address issues that are extremely complex and there is a limit to the degree that these issues can be simplified without losing scientific and programmatic validity. At the same time, DOE has attempted to better clarify the relationships through the addition of text to volume I, sections 1.7.1 through 1.7.5.

Continued operation of Pantex Plant and associated storage of nuclear weapon components, including interim storage of plutonium pits, are within the scope of this EIS. The Pantex Plant EIS does not include operations for processing or reprocessing of plutonium. Long-term storage of surplus and non-surplus fissile materials, including plutonium pits currently in interim storage at Pantex Plant are within the scope of the S&D PEIS.

The S&D PEIS evaluates alternatives for the long-term storage of weapons-usable fissile materials and for the disposition of weapons-usable plutonium declared surplus to national defense needs by the President. Long-term continuation of stockpile stewardship and management missions, including Pantex Plant assembly, disassembly, and high explosive (HE) operations, are within the scope of the SSM PEIS. The SSM PEIS evaluates environmental impacts of alternatives including downsizing of sites, relocation of missions, complete closure of sites (e.g., Pantex Plant, Kansas City Plant, Oak Ridge Reservation) and the capability to fabricate new pits and process and reprocess (e.g., reuse) existing pits.

Detailed discussions of DOE's purpose and need for action, range of alternatives, and other EIS relationships are provided in each PEIS. Detailed discussions defining differences in interim storage criteria and long-term storage criteria; "surplus pits" versus "strategic pits"; and disposition alternatives are also presented.

1.3.3 Land Use

Numerous concerns were expressed regarding the potential harm to croplands, livestock, and agribusiness from the potential contamination of the soil and water surrounding Pantex Plant. Concern was also expressed over the brevity of text devoted to discussion of agriculture and agribusiness within the Texas Panhandle.

The Pantex Plant EIS describes land use within an 80-kilometer (50-mile) radius of Pantex Plant. Rural, urban, agricultural, commercial, residential, industrial, institutional, and recreational land uses are discussed.

Land use in the 80-kilometer Region Of Influence (ROI) is predominately agricultural. The majority of this area is rangeland located along the Canadian River drainage to the north and along a tributary of the Red River to the south of the plant. Cropland is the second largest category of land use, with areas containing both dryland crops and irrigated land. Commercial, residential, industrial, and institutional areas are centered around the population centers, and represent a small part of the total land use within the ROI. Livestock operations in this area are represented by dairy operations and beef cattle in feedlots, as well as open range grazing. Four dairies and one creamery are located within the area. Carson County, located within the ROI, is among the top counties in Texas for production of wheat, grain and sorghum, and is a substantial contributor of corn crops. The counties of Castro, Deaf Smith, Hansford, and Swisher are the areas that contain the greatest number of cow-calf units within the ROI.

The major employers in the area are service industries, retail trade, manufacturing, public utilities, construction, wholesale trade, finance and realty, public administration, and agriculture. While agriculture is not the major employer in the ROI, it is an important industry. The concerns of the farmers and livestock growers in the vicinity of Pantex Plant are important to DOE. The future plans for the plant are regulated by various environmental protection measures to monitor the use of the Ogallala aquifer and the possibility of contaminants migrating into the rich soil of the Panhandle area. The continued operations at Pantex Plant are not expected to alter the environment of the surrounding area. Likewise, the construction or modification of the six proposed facilities will not significantly change the existing environment. The interim storage of 12,000 to 20,000 pits at the plant would not increase the potential for contamination at the site, or in the surrounding ROI. However, the commentors concerns are appreciated, and several sections of the Final EIS, including volume I, section 4.4, Land Resources, have been augmented with additional information and analysis concerning the agricultural practices within the ROI.

1.3.4 Geology and Soils

One significant issue is whether there are geologic faults in the Pantex Plant region that are, or may be, "capable" under the definition of 10 CFR 100 Appendix A and, therefore, Pantex Plant may be an unsuitable location for nuclear facilities.

Another issue raised was the possibility of salt dissolution resulting in sinkholes and fractures in the immediate vicinity of the Pantex Plant.

Other commentors requested more information about soil contamination and what will be done to clean these areas of contamination.

Geology

A description of regional geology, including the location of geologic faults, has been added to volume I, section 4.5.1. A geological cross-section of the region has also been included. This cross-section shows the fault in the Permian rocks deep beneath Pantex Plant.

10 CFR 100 appendix A contains guidance on the siting and design of nuclear reactors. Since there is no reactor at Pantex Plant, and this EIS does not consider any proposal to locate a reactor at the plant, this guidance can only be applied in a general way to the facilities at Pantex Plant. The guidance includes criteria to determine the area in which faults should be investigated, how the faults should be evaluated, and how those evaluations should be taken into consideration in the design of the facility. 10 CFR 100 appendix A does not forbid the siting of facilities near faults, even faults that are determined to be "capable" in accordance with the guidance. It does, however, require that the facility be designed to be able to withstand the effects of earthquakes from the faults.

There have not been any comprehensive studies performed in accordance with the criteria of 10 CFR 100 appendix A to determine the capability of each of the faults in the region. Pantex Plant does, in fact, lie on a deep subsurface fault. However, there is no evidence that this fault extends into the more recent rocks and sediments; therefore, the cross-cutting principle can be used to determine that this fault has not been active since the Permian era, about 286 million years ago. In the absence of these studies, the procedure used for evaluating the risk from earthquakes to Pantex Plant assumes that the largest earthquake expected in the region can happen anywhere in the region (DOE 1994aa).

Risk analyses of existing facilities take into consideration the robustness of the facility and the frequency of the earthquakes. The risk of a release of radioactive material resulting from earthquakes has been assessed for Pantex Plant. volume I, section 4.14 presents the accident scenarios that resulted from a screening of potential accidents at Pantex Plant. A suite of 11 accident scenarios were identified as risk significant. These accidents included both high-frequency low-consequence events, such as those that occur during normal operations, and low-frequency high-consequence events, such as aircraft crashes and seismic events.

Four scenarios discuss the risks associated with the release of radioactive material due to seismic events. There is no plausible scenario in which criticality could occur at Pantex Plant due to actinides present in soils interacting with surface groundwater. Section 4.5.1 in volume I contains a description of regional seismicity. The Pantex Plant *Environmental Information Document* (Pantex 1996f) contains a more detailed description. Additional details on the assessment of risk in this EIS can be found in volume II, appendix D.

Salt Dissolution

Salt dissolution is a process that has resulted in major post-Permian structures. In Carson County, a large depression is filled with sediment of the Ogallala Formation. Presence of the Ogallala deposits in the depression indicates that the basin existed prior to Ogallala time and that the local dissolution was underway prior to or during the deposition of the Ogallala Formation (Pantex 1996). Recent work (TBEG 1994a) using shallow seismic data has determined that the structure beneath the playas at Pantex Plant shows subsidence of Ogallala strata attributed to dissolution of underlying salt beds.

Considerable attention has been given to the possible origin of playas. A summary of playa development is provided as follows: "These landforms are the result of a series of intermittently active processes, including wind, fluvial erosion and lacustrine deposition, pedogenesis, dissolution of soil carbonate, salt dissolution and subsidence, and animal activities, that collectively produced the typically shallow and roughly circular playa basins on the High Plains. We infer that playa basins are stable landforms that, once initiated, remain as part of the landscape" (Gustavson, 1994).

Playas are not sinks or sinkholes. For a sinkhole, the actual hole in the ground results from an abrupt collapse of the underground cavity that resulted from the dissolution of salt. While the formation of the sinkhole can happen within days, the cavity that is the cause of the sinkhole is the result of dissolution taking place over geologic time. An example of a sink, involving 2.0×10^6 tons of material, occurred in Hall County in 1994. There is no evidence for, nor expectation of, the formation of sinkholes at Pantex Plant. There is no plausible scenario for the release of hazardous materials even if a sinkhole of similar size occurred at Pantex Plant beneath a magazine containing pits. Since recorded history in the Texas Panhandle, there are no accounts of industrial complexes, buildings, etc., incurring damage as the direct result of sink holes. None of the playas at or near Pantex Plant are the direct result of sinkholes. Playa formation is hypothesized to be the collective result of numerous processes, both physical and chemical.

Soil Contamination

The scope and mission of the Pantex Plant environmental restoration (ER) program is to: assess all inactive sites, which includes solid waste management units; determine the nature and extent of contamination; and perform remediation to eliminate any substantial present or future threat to human health and the environment. Additionally, Pantex Plant currently plans to perform advanced remedial actions (i.e., interim and voluntary actions) where feasible. Remediation activities are currently underway on ditches and playas while a groundwater treatability study is being conducted to determine the most effective method(s) to clean up contaminants (e.g., RDX) detected in the perched groundwater. The treatability system began operating just eight months after the initial boundary contamination was discovered. The treated water now meets drinking water standards as confirmed by co-sampling conducted by the Texas Natural Resources Conservation Commission (TNRCC) (Pantex, 1996; Pantex 1996c).

The ER program is currently being conducted under the *Resource Conservation and Recovery Act* (RCRA) in accordance with the Hazardous Waste Permit and EPA and State of Texas regulations, with a goal of gaining full public, trustee, and regulatory agency acceptance. All decisions and determinations associated with the ER program are made in negotiation with the regulators. The *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) (Superfund) also applies to Pantex Plant because EPA placed Pantex Plant on the National Priorities List on May 31, 1994. Negotiations are currently underway with EPA and the State of Texas to integrate the CERCLA and RCRA processes. The current plan is to complete the remediation process in such a way as to satisfy both RCRA and CERCLA requirements. The Pantex Plant ER program is detailed in the Pantex Plant ER Program Facility Action Plan (DOE 1995e). This plan establishes an aggressive remediation schedule with a goal of initiating remediation at all sites by the year 2000, thereby meeting the State of Texas "Clean Texas 2000 Initiative."

The latest data on soil contamination has been incorporated into this Final EIS. Volume I, section 4.5.1 provides additional details about specific ER projects.

1.3.5 Water Resources

The primary issues and concerns related to water resources included:

- *The status and conditions of wastewater discharge permits;*
- *Surface water quality decision criteria used in the Pantex Plant EIS;*
- *Wastewater discharge into ditches and playas;*
- *The nature and extent of groundwater contamination in the perched and Ogallala aquifers;*
- *The importance of the Ogallala aquifer as a valuable regional groundwater resource; and*
- *The status of environmental restoration programs, such as groundwater contamination prevention, corrective actions, and cleanup.*

Status and Conditions of Wastewater Discharge Permits

Discussion of the status and conditions of wastewater discharge permits for the Pantex Plant has been updated in volume I, section 4.6.1.1 and volume II, appendix C. Because the State of Texas applies regulations through concentration limits specified in permits, the decision criteria for surface water compliance is based on the permit limits established in the National Pollutant Discharge Elimination System (NPDES) Permit and Wastewater Discharge Permit for Pantex Plant. Pantex Plant has worked very closely with EPA Region 6 and TNRCC to produce wastewater discharge permits (EPA NPDES Permit No. TX-0107107 and TNRCC Wastewater Discharge Permit No. 02296) that provide stringent wastewater discharge requirements and are protective of human health and the environment. The Pantex Plant wastewater discharge permit limits meet or exceed applicable requirements for surface water.

TNRCC calculated effluent limitations that are based on the Texas State Water Quality Standards (30 TAC 307). The actual effluent limitations, cited in the permits, are more stringent than those calculated by the TNRCC and reported in its Fact Sheet. As stated in the NPDES Permit, EPA accepted the statistical calculations provided by Pantex Plant and has established metals limitations on a case-by-case basis through best professional judgment under Section 402 (a) of the *Clean Water Act* for best available technology economically available. In addition to the constituents that are regulated in the permits, the Pantex Plant Environmental Protection Department also monitors for other chemical constituents to provide additional assurance that any changes in water quality are protective of human health and the environment.

Surface Water Quality Decision Criteria

Suspected contaminants of concern were determined by comparing tabulated annual average values to the following defined surface water quality decision criteria:

- Texas State Water Quality Criteria for fresh water acute aquatic life protection and human health protection for water and fish.
- EPA Region 6 NPDES Permit (No. TX-0107107) and TNRCC Wastewater Discharge Permit (No. 02296).
- DOE Derived Concentration Guides (DOE Order 5400.5) for radionuclide health standards.

The Texas State Water Quality Criteria for Aquatic Life and Texas State Water Quality Criteria for Human Protection are used as decision criteria for comparative purposes. EPA Region 3 Risk Based Concentrations (RBC) guidelines were used in the Draft Pantex Plant EIS as surface water quality decision criteria only for those constituents that did not have established surface water quality standards, Pantex Plant wastewater discharge permit limits, or DOE Derived Concentration Guides (DOE Order 5400.5) for radionuclide.

However, because the EPA NPDES and TNRCC Wastewater Discharge permits have been finalized, the NPDES and Wastewater Discharge permit requirements have replaced the RBC Guidelines as decision criteria in volume I, section 4.6.1.1 and volume II, appendix C. EPA and TNRCC determined which constituents would have recording requirements and/or permit limits specified in the NPDES and Wastewater Discharge permit, based on a review of the most recent surface water quality data available for the main outfalls and internal outfalls at Pantex Plant.

TNRCC Permit Fact Sheet (TNRCC 1995a) states that the known uses of the receiving waters are high quality aquatic life use and contact recreation. The uses for the unclassified waters are intermittent playa lakes with no significant aquatic life uses. Acute aquatic life criteria apply. There is no reference to drinking water standards or Risk Reduction Rules being applicable criteria for Pantex Plant surface water in either the TNRCC or EPA permits or their respective Fact Sheets.

The decision criteria for radionuclide constraints are the DOE Derived Concentration Guides (DOE Order 5400.5) under the *Atomic Energy Act of 1954* (as amended) (42 U.S.C. 2011). DOE is authorized to protect public health and safety and the environment in conducting programs, such as Pantex Plant operations. The purpose of DOE Order 5400.5 is "To establish standards and requirements for operations of the DOE and DOE contractors with respect to protection of members of the public and the environment against undue risk from radiation."

It is DOE's objective to operate its facilities and conduct its activities so that radiation exposures to members of the public are maintained within the limits established in this Order and to control radioactive contamination through the management of real and personal property. It is also a DOE objective that potential exposures to members of the public are as far below the limits as is reasonably achievable and that DOE facilities have the capabilities, consistent with the types of operations conducted, to monitor routine and non-routine releases and to assess doses to members of the public. In addition to providing protection to members of the public, it is DOE's objective to protect the environment from radioactive contamination to the extent practical.

Wastewater Discharge into Ditches and Playas

TNRCC Wastewater Discharge Permit No. 02296 (as amended) requires that within one year of the effective date (June 14, 1996) of the permit, Pantex Plant must conduct a study to determine the feasibility of eliminating or minimizing discharges to playa lakes and open ditches or improving the quality of discharge. A thorough evaluation of existing contamination in all drainage ditches and playa basins is currently ongoing. Methodologies and plans for implementation are discussed in the Ditches and Playas Interim Corrective Action Work Plan (Stroller 1996). Information regarding this work plan has been summarized in volume I, section 4.6.1.1. The results of those investigations, as well as the effect of continued discharge are pending review (Alternative to Discharge at Playa 1). Pantex Plant's Environmental Protection Department conducts environmental monitoring on a routine basis to ensure that permit limits are not exceeded. The results of environmental monitoring activities are summarized and presented in annual environmental reports that are available to the public.

Nature and Extent of Groundwater Contamination in the Perched and Ogallala Aquifers

An expedited site characterization was conducted in 1994 and 1995 to determine the extent of the perched aquifer, nature of recharge, and direction of groundwater flow. Data collected during the Pantex Plant expedited site characterization was used to predict contaminant movement and evaluate cleanup options for perched groundwater. The perched aquifer occurs as a result of localized groundwater mounds that form beneath the playas from focused surface water recharge. The existence of the perched aquifer is also dependent on the occurrence of a fine-grained zone, reported to be approximately 9.1 to 33 meters (30 to 110 feet) thick. This fine grained zone impedes the downward movement of infiltrating groundwater. The fine-grained zone has an irregular surface, and generally occurs 90 meters (300 feet) below land surface.

Where the fine-grained zone is present, perched groundwater collects in sand and gravel deposits that form subsurface channel features. The perched aquifer is thickest beneath Playa 1, which is considered to be a source of focused recharge to the perched aquifer. Groundwater in the perched aquifer is considered to flow radially away from Playa 1. Recharge varies laterally between playa, interplaya, and drainage ditch environments. It is important to note that the perched aquifer is stratigraphically higher (closer to the surface) and not directly hydraulically connected with the underlying Ogallala aquifer. The depth to groundwater ranges from 64 to 88 meters (210 to 290 feet) below land surface in the perched aquifer and from 104 to 140 meters (340 to 460 feet) in the underlying Ogallala aquifer.

Additional investigations have been conducted on private property south and southeast of Pantex Plant. DOE has completed a Groundwater Protection Project that investigated the potential for contaminant migration in homestead wells that are located at Pantex Plant and southeast of the plant boundary. Although low levels of HE contamination were detected by TNRCC in a domestic Ogallala well located on private property southeast of Pantex Plant proper, efforts to mitigate further contamination have been completed. The well in question has been properly plugged and sealed under the supervision of the TNRCC. A replacement Ogallala well has been drilled and completed to prevent further potential cross-contamination of the Ogallala aquifer. Information regarding Pantex Plant's Groundwater Protection Project is presented in volume I, section 4.6.1.2.

Importance of the Ogallala Aquifer as a Valuable Regional Groundwater Resource Supply

The Ogallala aquifer is the principal aquifer and major source of water for the Texas Panhandle and the South Plains, as well as parts of New Mexico, Oklahoma, Colorado, Kansas, Nebraska, Wyoming, and South Dakota. Water use at Pantex Plant accounted for only 0.7 percent of the total estimated water use in Carson County for 1995. In 1995, Carson County irrigated 25,751 hectares (63,629 acres), using 101 billion liters (26.6 billion gallons) per year, or an average annual withdrawal of 1.6 million liters (0.42 million gallons) per acre.

Pantex Plant is located on approximately 3,700 hectares (9,100 acres) of DOE land. If Pantex Plant property were used for agricultural, rather than industrial uses, then approximately 3,600 hectares (8,900 acres) could require irrigating, assuming that the approximate area of the three onsite playas [79.7 hectares (197 acres)] were excluded. Under such circumstances, approximately 14 billion liters (3.7 billion gallons) per year of groundwater might be withdrawn for irrigation. The plant pumped 618 million liters (163 million gallons) for industrial or domestic uses in 1995. As a result, agricultural activities at Pantex Plant could require up to 23 times as much water if used for typical Carson County agricultural activities.

Under the upper bounding conditions of the 2,000 weapons level, annual groundwater use projections are 1,011 million liters (267 million gallons) per year. This represents an increase of approximately 64 percent over the plant's industrial and domestic water uses of 618 million liters (163 million gallons) in 1995. In Fiscal Year (FY) 1995, Pantex Plant's actual water usage was approximately 33 percent of the plant's total groundwater production capacity. For the 2,000 weapons scenario, the projected water usage is 53 percent of the plant's total capacity of 1,890 million liters (500 million gallons). Furthermore, for the 2,000 weapons per year scenario, Pantex Plant groundwater withdrawals would only account for 0.8 percent of the total estimated annual groundwater withdrawals in Carson County.

Status of Environmental Restoration Programs for Water Resources

Pantex Plant maintains an Environmental Protection Department and an ER program to monitor soil and water quality so that any present or potential threat to human health and the environment is identified and can be corrected. Groundwater contamination has occurred in the perched aquifer as a result of past site-related activities. For the last seven years, the Pantex Plant ER program has assessed inactive sites, conducted investigations to determine the nature and extent of contamination, and implemented remediation strategies to eliminate any present or future threat to human health and the environment. DOE implemented a Groundwater Protection Project to clean up the groundwater to residential drinking water standards beyond the facility boundary. The purpose and objectives of the project are discussed in volume I, section 4.6.1.2.

Remediation activities that are currently underway at Pantex Plant include contaminated soil removal in the vicinity of on-site ditches and playas and a groundwater treatability study to determine the most effective method(s) to clean up perched groundwater. The treatability system began operating just eight months after the initial boundary contamination was discovered. The treated water now meets drinking water standards, as confirmed by co-sampling conducted by the TNRCC (Pantex, 1996; Pantex 1996c). Evidence of natural attenuation and degradation of high explosive compounds, including trinitrotoluene (TNT), have been documented during the treatability studies (PC 1996n).

Summary of Changes to the Draft EIS

Volume I, section 4.6.1.1 has been updated to discuss new EPA NPDES and TNRCC Wastewater Discharge permit requirements, revised surface water quality decision criteria, and corrective measures for wastewater discharge into ditches and playas. Volume I, section 4.6.1.2 has been updated with new information regarding the nature and extent of groundwater contamination in the perched and Ogallala aquifers and the status of ER projects, such as groundwater contamination prevention, corrective actions, and cleanup.

1.3.6 Air Quality

One of the principal air quality issues centered on the comparison of the results of the TNRCC air modeling and the modeling performed for this EIS. A related concern was that a significant number of air pollutants were perceived as left out of the EIS modeling. TNRCC, in reviewing the emissions sources and pollutants reported in the Draft EIS, did not find 8 emissions sources and 51 hazardous air pollutants that were on the TNRCC list. Another issue was the variance between the modeling results, which showed no exceedances for particulate matter (PM_{10}), and the air sampling data collected by TNRCC, which showed a few exceedances of the National Ambient Air Quality Standard (NAAQS).

One of the most frequently mentioned concerns was the fact that there was no discussion of any continuing efforts to develop an alternative to the Burning Ground.

Another issue was the placement of monitoring stations at Pantex Plant and the location and adequacy of the modeling performed for the residences surrounding the plant.

Air Modeling

The air modeling for the EIS indicates that alcohols exceeded the TNRCC Effects Screening Level (ESL) at the plant boundary and at one of the nearby residences. The TNRCC air modeling indicated that alcohols would exceed the ESL at the plant boundary, but not at the nearby residences. The TNRCC modeling was based on a screening process whereby all pollutants were assumed to be located at one point and calculations were made to determine resulting concentrations at the fence line.

The EIS air modeling used the actual locations of each source emission and modeled the resulting concentrations at the fence line produced by simultaneous emissions of all pollutants from their respective sources. The results were very comparable to the TNRCC study, with both modeling exercises indicating that only alcohols exceeded the ESL at the fence line. This outcome was affected by the fact that, at the time, the specific emission rates of each type of alcohol at each source were not available. Therefore, in the EIS modeling, all of the alcohols for which individual emission rate information was not available were modeled together as a group and compared to the ESL for the individual alcohol that had the lowest ESL. Because the 1-hour ESLs for the specific alcohols used by the plant vary from 101 to 18,800 $\mu g/m^3$ (micrograms per cubic meter), this was a very conservative assumption.

Since the Draft EIS was published, the quantity of each type of alcohol in the group present at the plant has been determined. In actuality, of the 19 types of alcohols used by the plant, only one (1-octanol) had an ESL less than 600 $\mu g/m^3$. The quantity of 1-octanol present at the plant is only one gallon, which represents less than 0.05 percent of the total quantity of alcohols at the plant. Conversely, the two types of alcohols stored in greatest quantities at the plant are 2-propanol (isopropyl alcohol) and methanol (methyl alcohol), which comprised 1,105.1 gallons (63.2 percent) and 456 gallons (26.1 percent), respectively, of the plant inventory. The 1-hour ESLs for isopropyl alcohol and methanol are 7,856 and 2,620 $\mu g/m^3$, respectively. The third most common form of alcohol at the plant is ethyl alcohol, which had an inventory of 107.3 gallons (6.11 percent of the plant inventory) and has a 1-hour ESL of 18,800 $\mu g/m^3$.

To divide the previously modeled concentration for the group of alcohols into the specific types and quantities of alcohols that could be emitted, the total concentration of all alcohols was then prorated by the percentage of each type of alcohol that is present at the plant. The concentrations thereby derived for each alcohol were then compared to the ESLs for the specific alcohols involved. The result is that no alcohols exceed their respective ESLs at any point on the fence line or at any offsite residence modeled. Volume I, section 4.7.1 and volume I, Table B.4.1-2 have been revised to reflect these changes.

Following receipt of a list of those sources and emissions included in the TNRCC modeling, checks were made against the EIS modeling database. All eight of the sources at issue were formerly used facilities that were inactive by the time the EIS modeling was performed. All but three of the pollutants modeled by TNRCC were also modeled during the preparation of the EIS. The maximum fence line concentrations of the pollutants, both those listed in the *Clean Air Act (42 U.S.C. 2011)* and those listed by TNRCC, were compared to the appropriate TNRCC ESLs. However, only the results for those chemicals that are listed under the *Clean Air Act,* as amended (Nov. 1990), and those that exceeded their ESLs were reported in the Draft EIS.

In addition, the results for criteria air pollutants were also reported. All of the maximum fence line concentrations for all of the chemicals TNRCC used in its modeling have been included in volume I, section 4.7 and volume II, appendix B of the Final EIS to provide a complete picture of all pollutants. There were three pollutants that had not been included in the modeling: dimethylformamide, ketene, and total suspended particulates (TSP). The first two have been added to the modeling results in the Final EIS. The third pollutant was included in the PM_{10} modeling, as there is no longer a standard for TSP. Changes have been made in the Final EIS to reflect this information.

The variances between PM_{10} monitoring data and modeling results are explained by several factors:

- The dust particles causing the monitoring exceedances could well have occurred as a result of offsite agricultural operations (or relatively short-duration construction activities onsite) and simply blown across the air sampling stations along with the plant emissions. It is not possible for the model to account for offsite generated particulates that combine with onsite emissions.
- The air sampling stations are located well inside the fence line of the plant, whereas the modeling results were

reported at the fence line, further from Pantex Plant sources. With the greater distance from sources, concentrations at the fence line would be expected to be lower than onsite.

- The meteorology for modeling was that for 1988, as standardized by TNRCC. The air samples showing exceedances, however, were taken in the 1992-1995 period.

Burning Ground Alternative

The Burning Ground is used to sanitize explosives components/materials and treat explosives waste and materials contaminated with explosives. It is operated under RCRA regulations for HE waste treatment. Air emissions from the ongoing Burning Ground activities are subject to general air quality conditions established in the Hazardous Waste Permit. The permit states that this facility shall be operated in accordance with and subject to the applicable provisions of the Texas Solid Waste Disposal Act and the Texas Clean Air Act as amended, Chapter 382 of the Texas Health and Safety Code, and all applicable rules, regulations, and orders of the TNRCC. The resulting ash shall be managed so as to not cause or contribute to a condition of "air pollution" as defined in subchapter 382.003 of the Texas Health and Safety Code.

As stated in the Draft EIS, the plant conducted a study in 1994 that determined that the Burning Ground is the Best Available Control Technology. However, after discussions with stakeholders, the plant initiated another study to further examine base hydrolysis as a future technology to sanitize and demilitarize HE components as well as to treat HE residues. This clarification has been added to the Final EIS. Alternative HE disposal methods are discussed and analyzed in volume II, appendix G.

Air Monitoring and Concentrations at Residences

Under an Agreement in Principle between DOE and the State of Texas (November 1991), TNRCC implemented a non-regulatory air monitoring program at Pantex Plant and determined placement of monitors. The results of the monitoring program are discussed in volume I, section 4.7.

To supplement this monitoring program, air quality modeling was performed for the EIS. The air quality modeling analyzed the concentrations at the residences surrounding the Pantex Plant, including several residences on the south side of the plant. The location of the residences used in the modelling was correct. The incorrect map has been replaced with a new map showing locations of all the residences modeled (see volume I, section 4.7.1.3).

1.3.7 Socioeconomic Resources

Commentors questioned the use of different employment multipliers in the Pantex Plant EIS, SSM PEIS, and S&D PEIS.

Commentors expressed concern about cumulative impacts to the economy because of past and future closures of Federal facilities or operations. For example, the future closure of the U.S. Department of Interior's Bureau of Mines Helium Plant, the Amarillo Air Force Base closure in 1968, the Bell helicopter plant closure in 1990, and the cancellation in 1988 of the DOE program for a mine geologic repository for spent nuclear fuel and high-level radioactive waste in Deaf Smith County.

Commentors stated that agriculture forms the basis for the long-term economy of the Texas Panhandle. Related concerns were about potential impacts to the agricultural economy and tax revenues. Other concerns were about damage to the reputation of agricultural products from Pantex Plant activities or related accidents. Commentors asked for more emphasis on these issues in the Final EIS.

When looking at the 500-weapons employment level, some commentors were concerned about the impact on future revenues for governing bodies compared with current revenues. Commentors asked that additional analyses on tax revenues be added to the Final EIS. There was also concern over the loss of jobs if Pantex Plant is downsized, creating economic impacts and outmigration.

Economic Modeling

The SSM PEIS, S&D PEIS, and Pantex Plant EIS all use the U.S. Bureau of Economic Analysis' regional economic model known as Regional Input-Output Modeling System (RIMS II) as the basis for employment and income impact analysis. This nationally recognized model is used by government agencies, university researchers, and private economists throughout the country to measure regional economic impacts. It is designed to be sensitive to differences in the economy from one region to another.

The differences in the employment multipliers presented in the three documents are not because of the models used but because of the differences in the inputs provided to the models by the authors of those documents. These inputs relate to a number of factors, including the size of the ROI, the type and mix of activities involved in the projects being considered; the number of direct employees needed; the average income per employee or total payroll; the money spent on local purchases of goods and services to support Pantex Plant operations or construction and operation of new facilities; the money spent by Pantex Plant workers in the local economy; and the average wage rate applied to direct and indirect workers.

Differences in these inputs at different points in time can generate different indirect employment multipliers. The type and mix of activities involved in the programs described in the three referenced documents are different and each requires significantly different inputs which may or may not be locally available within the ROI. This also contributes significantly to different multiplier values in the three documents.

One commentor expressed concern about the employment multiplier of 2.65 used in the Pantex Plant EIS, which is different from the

3.87 multiplier used in a study conducted for the Amarillo Economic Development Corporation.

As stated before, DOE chose to use the RIMS II model as the basis for employment and income impact analysis. Pantex Plant is a major contributor to the employment in the region. However, the employment multiplier is a derived value and would differ even when the same researcher is looking at different industrial activities. We believe that a multiplier of 1.65 indirect jobs for each direct Pantex Plant job, which translates to a total job multiplier of 2.65, is more realistic when considering the proposed and alternative actions being analyzed in the Pantex Plant EIS.

Cumulative impacts include the incremental impacts of the actions when added to other past, present, and reasonably foreseeable future actions. A discussion of the past activities affecting the ROI, such as the closure of the Amarillo Air Force Base in 1968, the cancellation of the DOE geological repository rogram in Deaf Smith County in 1988, and the closure of the Bell Helicopter Plant in 1990, has been added in volume I, section 4.11.1.5 of this EIS. These impacts are reflected in the baseline employment and population estimates that form the basis for evaluation of impacts from the proposed action and alternatives. Thus, impacts resulting from the cancellation of the repository program in Deaf Smith County on the Pantex Plant ROI, for example, have been addressed in the description of the affected environment and are reflected in population projections for the No Action Alternative. Cumulative economic impacts of planned or reasonably foreseeable DOE actions have been discussed in volume I, section 4.11.5.

As mentioned under Cumulative Impacts in volume I, section 4.2, information on other Federal (non-DOE), State or local projects including private developments was sought through contacts with Federal and State regulatory agencies, the Amarillo Economic Development Corporation, the Panhandle Municipal Water Authority, and the City of Amarillo. This effort yielded only one project (future closure of the Helium Plant) that would contribute to the cumulative impacts in the Pantex Plant ROI.

Agricultural Economy

Risk assessments conducted in the Pantex Plant EIS have shown that plant activities do not adversely impact agricultural operations in the ROI. This is clearly indicated by the growth of the agricultural economy in the ROI over the past several decades since Pantex Plant has been in operation.

The contribution of agriculture to the regional economy of the Texas Panhandle is described in volume I, section 4.11.1.5 of the EIS. It evaluates and summarizes available data for both farm and non-farm workers. Volume I, Table 4.11.1.5–2 presents data on growth of the agricultural industry in the region from 1950 to 1992. In summary, the value of crops grown and sold in the ROI has increased by 151 percent, relative to the 142 percent increase in the Producer Price Index for Crude Foodstuffs and Feedstuffs. Additional information on economic impacts to agriculture has been provided in volume I, section 4.11.

Tax Revenues and Jobs

At the 500 weapons activity level, the Pantex Plant workforce would be reduced by 1,400 workers, Additionally, another 2,351 indirect workers could lose their jobs in the Pantex Plant ROI. For analysis purposes, it was assumed that all direct workers and 50 percent of the indirect workers would leave the Pantex Plant ROI as a result of this action. With a household size of 2.85, this would mean an outmigration of 5,796 persons. It was further assumed, for simplicity in calculation, that all workers live in the City of Amarillo. Based on the current per capita revenue of $457, the revenue loss in the City of Amarillo would be approximately $2.8 million or approximately 3.6 percent of the total revenues of the City in 1994.

In reality, this number would be lower since some of these workers do not live in Amarillo and the per capita revenue generated in the ROI counties is generally lower than in the City of Amarillo. Also, not all unemployed workers, particularly the indirect workers, are likely to leave the Pantex Plant ROI immediately or even over a longer period. Additional information on impacts to overall tax revenues has been provided in volume I, section 4.11.2.1.

The Record of Decision for the SSM PEIS will identify whether Pantex Plant would be downsized or not. If downsizing does occur, the affected communities can request DOE to provide financial assistance for community assistance and planning.

DOE will, in any event, keep the public informed of its actions on a regular basis and soon after any decision is made. Any decision that would result in downsizing would require a formal workforce restructuring plan and additional public participation opportunities in accordance with *National Defense Authorization Act of 1993* (Public Law 102-484). The DOE Office of Community and Worker Transition has the capability to help the facility and community transition in the case of downsizing. The office oversees DOE policies to facilitate worker transition, including worker retraining, education, and relocation assistance.

A reduction to the 500 weapons activity level could contribute to a combined loss of 3,715 jobs (1,400 direct plus 2,315 indirect jobs). This would increase the unemployment rate in the ROI from approximately 4.1 percent to 6.2 percent and could trigger outmigration. Compared to the total employment of 107,000 in Amarillo (ACC 1996), this reduction would represent approximately 3.5 percent of the Amarillo area employment and 3.7 percent of its total personal income of $3.65 billion in 1994.

It should be noted that reduced workforce at Pantex Plant, or even the closure of the plant, would not necessarily result in instant outmigration of population. Even after the closure of the plant, workers would continue to be employed at the site for decontamination and decommissioning of plant facilitates over a number of years.

1.3.8 Intrasite Transportation

The majority of the comments regarding Intrasite Transportation were requests for additional site-specific information or clarification of various topics. Several comments requested information regarding onsite vehicle accidents at KAFB.

A number of comments were received relating to the pyrophoric nature of plutonium and whether this is an issue of concern for pit storage. Additionally, many comments requested further information on pit and pit container surveillance.

A number of commentors requested additional clarification on the scope of dosimetry estimates provided in volume I, section 4.12.

KAFB Accident Experience

Vehicular accident statistics for KAFB are maintained by the U.S. Air Force. For 1995, there were a total of 271 vehicle accidents within KAFB; 241 were minor and 30 were major. A major accident involves a loss of life or damage in excess of $10,000. For 1994, there were a total of 283 vehicle accidents within KAFB; 233 were minor and 50 were major. The potential for vehicle accidents involving pit shipments was considered in the EIS analysis. It vas concluded that it is not reasonably foreseeable that a vehicular accident on KAFB would occur with the severity necessary to result in a release of plutonium from an AT–400A container within a Safe Secure Tractor Trailer (SST). As discussed in volume I, section 5.5.1, the controlled transportation route on KAFB does not contain threats that could create the severe environment required to lead to a dispersal of plutonium. In addition, base personnel traffic would be controlled as SST convoys pass through the base roads. Thus, other vehicles would not pose a threat to the SSTs while on KAFB.

Pit Pyrophoricity

Pyrophoricity is not a realistic concern during pit storage. Plutonium metal in large pieces (such as is present inside pits) does not burn upon exposure to air. Plutonium metal can be handled in air and is often processed and stored ı normal air glove boxes. Spontaneous ignition only occurs when plutonium is present as particles less than 0.2 millimeter thick and then only on exposure to temperatures in excess of 150°C. Larger samples must be exposed to temperatures in excess of 500°C before ignition. Formation of such small particles is difficult.

Analysis of plutonium pits subjected to mechanical deformation or stress shows plutonium does not burn or spread as a result of chemical reaction with air. Plutonium oxide forms when plutonium metal or a compound of plutonium reacts with oxygen. The oxide forms an adherent layer on the metal surface and acts as a barrier that slows the rate at which additional oxygen can react. The oxide is the most stable compound of plutonium in an oxygen-containing environment.

Pits have been under careful scrutiny for many vears through various DOE programs, ırticularly the Weapons Quality Assurance Testing Program, that includes the Pit Surveillance Program and an accelerated aging program, to ensure that aging-related defects do not develop in pits. A routine stockpile surveillance has been performed on the pits for 20 to 30 years in more hostile environments than Zone 4. Information from that surveillance indicates that containers will not be expected to degrade over the interim storage period.

The AT–400A container is designed for a 50-year life. A pit and pit container surveillance program will continue for the AT–400A container. This surveillance program will minimize the likelihood of undetected failure in the pits and/or containers.

Dosimetry Data

The DOE Transportation and Staging Department is responsible for pit storage activities as well as interzone transfers of nuclear material. Historical dosimetry data and a description of responsibilities for this department is provided in volume I, section 4.12.1. This historical dosimetry data was correlated with historical material transfers to estimate impacts from operations. The Transportation and Staging Department has a cumulative dose of 3.642 person-rem for 1995. This information is provided in volume I, section 4.12.1.3.

The dose estimate presented includes not only the expected doses from weapons transfers but also the expected doses from the interzone transfers of 20,000 pits as part of the pit repackaging project. The No Action Alternative dose numbers presented include not only the expected doses from weapons operations but also the expected doses from the interzone transfers of only 12,000 pits as part of the pit repackaging project.

The Proposed Action includes continued weapons operations and pit transfers for pit repackaging. For the pit storage relocation alternatives, both of these activities will be performed in addition to the activities associated with offsite pit shipments.

The offsite shipment of pits from Pantex Plant would require the removal of pits from the Zone 4 magazines and the loading and restraining of pits within an SST vehicle. The performance of these activities will increase the worker exposure total, as discussed in volume I, section 4.12.

1.3.9 Waste Management

Many comments questioned DOE's material management capabilities based on the Department's past history of managing hazardous materials like plutonium and wastes. Commentors questioned where all the waste would go, the lack of licensed facilities to manage DOE wastes, and management mistakes.

Several commentors asked what types of wastes and volumes of waste are generated during dismantlement operations and pit storage activities. Other commentors were concerned that relocation of pit storage activities would adversely impact candidate sites' waste operations and environmental restoration activities.

Commentors questioned which activities were subject to RCRA regulation, permits, CERCLA regulation, and related impacts.

Waste Management (Including Hazardous Materials)

DOE recognizes that all its facilities and all its hazardous materials, including plutonium, require varying levels of operational and environmental controls to protect the workers, the public, and the environment. DOE is considering programmatic waste management strategies and solutions for the next 20 years under the WM PEIS to resolve vital waste management issues. Depending on the site, type of waste, and site management strategies, most waste disposal practices do not require licenses. Where DOE is required to obtain and maintain a license or permits (including Federal Facility Agreements and Agreed Orders), DOE continues to work with EPA, States, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and all hazardous materials, including wastes. All of these plans and commitments have been considered for the proposed sites to determine if there are any conflicts or restrictions that would inhibit these sites from serving as good locations for the facilities proposed in the EIS. Nothing was found that would inhibit Pantex Plant or the alternative sites from performing the required missions.

DOE understands the importance of the Ogallala aquifer as the principal aquifer and major source of water in the vicinity of Pantex Plant. Under the existing DOE environmental monitoring program, groundwater monitoring of the perched and Ogallala aquifer has been conducted at Pantex Plant for the past 20 years. Impacts of present and future water quality are discussed and analyzed in volume I, section 4.6. As discussed in volume I, section 1.3.5 and section 4.6, nothing was found that would result in a significant impact to the Ogallala aquifer.

Waste Types and Volumes

Pantex Plant generates primarily four categories of waste (low-level radioactive waste [LLW], low-level mixed waste [LLMW], hazardous waste [HW], and nonhazardous nonradioactive waste [NHW]) during the assembly and disassembly of nuclear weapons, certain maintenance and modification activities regarding the nuclear weapons stockpile, monitoring of nuclear weapons, and quality assurance testing of weapon components. Waste volume projections are provided in volume I, Table 4.13.1.2–3 and volume I, section 4.13.1.2, Waste Categories and Operations. Pit storage activities generate less than 1 cubic meter (1.3 cubic yards) annually of LLW, LLMW, HW, and NHW each. This small amount of waste would not impact current waste management and environmental restoration activities at candidate sites.

RCRA, CERCLA, Permits

DOE and regulatory organizations monitor the current hazardous material storage and surrounding environment. Pantex Plant operates under several permits, including operations at the Burning Ground. LLMW is managed in accordance with the Agreed Order and Site Treatment Plan-Compliance Plan, 30 TAC 335, the RCRA Part B Permit, and 40 CFR 260-280. LLW is managed in accordance with DOE requirements including the NTS Defense Waste Acceptance Criteria Certification and Transfer Requirement Program (NVO–325).

In regard to past environmental management practices at Pantex Plant, in 1989 the EPA conducted a RCRA Facility Assessment resulting in a Consent Order to investigate and correct 144 solid waste management units. In 1991 the RCRA Facility Investigation was incorporated into the Pantex Plant RCRA Part B hazardous waste permit. Pantex Plant was placed on the Superfund National Priorities List in 1994. As restoration work continues, a tri-party Federal Facility Agreement is currently being negotiated to outline the reporting requirements, schedules, and funding for the ER program. According to the best available information, the majority of the ER activities are expected to be completed by the year 2000.

Pantex Plant continues to implement a Pollution Prevention/Waste Minimization (PP/WM) program to reduce environmental impacts through waste avoidance and waste minimization. This program was recently awarded the President's "Closing the Circle" award. Pantex Plant is one of only 22 Federal facilities to have won this award. Pantex Plant is also active in the Clean Texas 2000 pollution prevention program. Volume II, appendix G contains detailed information of the PP/WM.

The environmental impacts of waste management at Pantex Plant and the pit relocation alternative candidate sites, including the regulatory framework for LLW and LLMW, are discussed and analyzed in volume I, section 4.13, chapter 5, and chapter 6, as appropriate. KAFB is the only alternative storage site candidate that has a RCRA Part B permit issued to a non-DOE agency. If responsibilities for land and operations (all or in part) of the KAFB Manzano WSA changes from the Air Force to DOE, RCRA permit modifications would be required (see 40 CFR 270 criteria). These kinds of modifications are considered administrative in nature and require only regulatory agency approval.

NTS, SRS, and Hanford Site hazardous waste generation and mixed waste generation are covered under existing RCRA Part B permits or interim status permits. Clarifying language has been added to volume I, sections 5.5.1 and 6.5 regarding permitting issues, including mixed waste, as appropriate.

For DOE to continue to fulfill its responsibilities as mandated by statute, Presidential direction, and Congressional authorization and appropriation, the generation of solid waste including "nuclear waste" is an unavoidable result. Recently, in response to numerous public requests for independent regulatory oversight of radioactive source, special material, and by-product material, the Secretary has created an independent Working Group on External Regulation. This working group is presently reviewing various alternatives for external oversight of activities at DOE's nuclear facilities and is expected to submit a report by the end of 1996.

1.3.10 Human Health

Numerous commentors expressed their concern that all current and future operations at Pantex Plant be conducted in a safe and environmentally sound manner. This is the main thrust of essentially all the comments received on this topic. Many other comments questioned the origin of risk factors used to calculate health effects from radiological exposures. One commentor questioned why specific epidemiological studies were not discussed in the EIS. Several commentors questioned the adequacy of conclusions drawn from past epidemiological studies and expressed their desire for future studies.

Comments also were received regarding synergism between radiological and chemical exposure. Others requested further clarification of the risks from radiological exposure.

Health Effects

The primary purpose of the EIS is to provide the basis for DOE decision makers to make proper decisions regarding potential environmental impacts of current and future operations at Pantex Plant and alternative sites, taking into consideration all public concerns. DOE is committed to the safe operation of Pantex Plant, as well as the protection of the public, the environment, and the facility employees. Information regarding current and future operations at Pantex Plant are presented in various sections of the EIS as well as the Pantex Plant Environmental, Safety, and Programmatic Information Documents (Pantex 1996, 1996z, 1996a).

DOE uses risk factors that are recommended by both national and international radiological protection organizations. The public and occupational health risk for normal radiological operations analyzed in this EIS use the two dose-to-risk conversion factors for the public and workers established in the National Research Council's Committee on the Biological Effects of Ionizing Radiation BEIR V Report (NAP 1990). These risk factors have also been endorsed by the International Commission on Radiological Protection (IRCP), the National Committee on Radiation Protection and Measurements, the EPA, and the Nuclear Regulatory Commission. These risk factors are 0.0005 deaths per person-rem to the general public and 0.0004 deaths per person-rem for workers (the lower number for workers accounts for the absence of children in the workforce). This approach is consistent with other EISs prepared by DOE.

Both the BEIR committee and ICRP are independent organizations. As part of the development of risk factors, these organizations review appropriate epidemiological studies. Details on the epidemiological studies reviewed to develop the latest risk factors are available in the following document: BEIR V National Research Council, "Health Effects of Exposure to Low Levels of Radiation," National Academy Press, Washington, DC, 1990 (NAP 1990).

Past, present, and future health studies of Pantex Plant workers and the surrounding communities are described in volume I, section 4.14.1. To date, these studies indicate that there have been no significant excess cancer mortality incidences in the Pantex Plant area related to plant operations. There have been no verifiable indicators as to any short- or long-term health impacts at Pantex Plant. Public exposure to radiological effluents has conventionally been of extremely small dose due to DOE safeguards and the nature of the missions conducted at the facility.

DOE Headquarters Office of Epidemiological Studies initiated an epidemiological surveillance program at Pantex Plant in 1993 to address the current health status of the workforce. The program tracks and analyzes the occurrence of illness and injury on a continuing basis. Monthly data collection began on January 1, 1994; data and reports are issued on a semiannual basis. These reports provide an ongoing assessment of any health problems that may be associated with Pantex Plant operations. The Pantex Plant 1994 annual report is currently available.

One commentor referenced critiques of the 1985 Pantex Plant workforce mortality study (Geiger 1992). This document criticizes DOE epidemiological studies that compare health outcomes of DOE workers with those from the community at large.

Because workers tend to be healthier than the general public, potential adverse health outcomes from workplace radiological exposures may be missed in the comparison of DOE workers with the community at large (Healthy Worker Effect). The authors of the referenced Geiger report reanalyzed data from the 1985 Pantex Plant workforce mortality study with a proposed approach to account for the healthy worker effect. By using this approach, the authors suggested that numerous DOE epidemiological studies overlooked potential adverse health impacts. However, the approach suggested by the authors supports the conclusions of the 1985 mortality study (Aquavella 1985).

A follow-up of this 1985 mortality study is planned. The update will be conducted by National Institute of Occupational Safety and Health (NIOSH) as part of a research program funded by DOE under a Memorandum of Understanding with the Department of Health and Human Services. The follow-up study by NIOSH is scheduled to commence either in late 1996 or early 1997. The study will provide additional years of data on the mortality experience of Pantex Plant workers.

Chemical and Radiological Synergism

There is insufficient scientific evidence to quantify synergistic effects between radiation and chemical exposures, if any. Effects of these exposures are modeled individually using accepted scientific standards and models. The calculated effects from these exposures are shown individually to be extremely low.

Clarification of Radiological Risks

Volume I, section 4.14 provides an analysis of the potential health effects of the ongoing work at Pantex Plant and each of the alternatives. The health effects are expressed as excess cancer fatalities as a result of radiological exposures to workers and the public from normal operations and from accidents. The radiological exposures to the workers and the public can be estimated by models or by historical information. These exposures can be converted to excess cancer fatalities by using dose conversion factors.

Based on DOE's recommended risk factors of 0.0004 deaths per person-rem, an exposure of 330 person-rem will result in 0.13 excess cancer fatalities. A description of this calculation is provided in volume I, section 4.14. Another interpretation of this impact is the average number of excess cancer fatalities that would occur if numerous groups were exposed at this level. Because the value is small, the most likely impact from this exposure for an individual group is zero excess cancer fatalities. This description is provided in volume I, Figure 4.14.2.1–2, Evaluation of Risk. These two descriptions are entirely consistent. They differ only in the level of explanation.

1.3.11 Aircraft Crash

Many comments expressed concern regarding application of the Draft DOE Standard on Aircraft Crash Analysis, and why the values for hit probability changed from those presented in the 1993 Zone 4 Safety Analysis Report (SAR) and a 1994 Environmental Assessment (EA) (DOE 1994w).

Another frequent comment involved the consideration of the recent ValuJet crash in the analysis, including the consideration of this aircraft's high angle of impact (75 degrees).

Many citizen concerns involved the location of the Amarillo International Airport in relation to the plant. People also expressed concern about the number of flights taking-off and landing in connection with the modification and maintenance facility at the Amarillo International Airport.

Hit Probability

The 1993 Zone 4 SAR and 1994 EA results were found to be in error. The value of 1.85×10^{-6} for hit probability was obtained through an incorrect application of the Solomon Model, and was later withdrawn from the safety basis for Pantex Plant. When this analysis was recalculated, the resulting value for hit probability was 1.95×10^{-5}. This low to mid 10^{-5} range value agrees with the results obtained from two previous independent analyses conducted for Pantex Plant and also agrees with the results obtained for this EIS. Table 4.15.1.3-1 in volume I provides a comparison of results from these analyses.

Angle of Impact

Based on the recent tragedy of the ValuJet crash, commentors suggested that the analysis be redone with an impact angle of 75°, the estimated impact angle of this particular crash. The 15° impact angle used in the Draft EIS was chosen based on guidance provided in the July 1995 Draft DOE Standard (DOE 1995z). This value has been shown to be conservative. A sensitivity study was conducted using angles of impact ranging from 0° up to 90°. The results of this study indicated that the risks associated with high impact angles are approximately 10 times lower than those modeled for the Draft EIS because high impact angles result in zero skid distances. The results of the EIS analysis indicate that greater than 90 percent of the risk involves skidding aircraft.

Amarillo International Airport Operations

Pantex Plant's is located near Amarillo International Airport. DOE, in association with the Federal Aviation Administration (FAA), is currently engaging in measures to reduce the number of overflights of Pantex Plant. These measures involve shifting the approach paths away from the plant, and include relocating the Very High Frequency Omni-Directional Radio Range with Tactical Air Navigation (VORTAC) and installation of a Global Positioning System (GPS). Currently, the Draft DOE Standard does not allow for consideration of these measures. It has been estimated that, when taken into account, the proposed overflight reduction measures could result in an 82 percent total relative risk reduction.

All of the post-maintenance flights referred to by the commentors must file with the FAA before an aircraft can embark. These aircraft must meet all of the same FAA requirements applicable to other aircraft. An experienced, certified crew will check the aircraft prior to the flight. These flights are included in the Radar Airspace Monitoring System (RAMS) data and FAA take-off and landing operations data for the Amarillo International Airport. These aircraft will be taking-off into the wind just like all other aircraft. The percentage of take-off operations on Runway 04, the main runway, (35.9 percent) was obtained from the windrose.

1.3.12 Intersite Transportation

Many commentors requested more information regarding the routes used by DOE's Transportation Safeguards Division (TSD) for hazardous material shipments. Additionally, many comments requested further information regarding the interaction between TSD and State and local agencies.

Several other commentors requested more information about the AT-400A transportation container.

TSD Operations

TSD operations comply with the requirements of 49 CFR 177 for selecting, notifying drivers thereof, and adhering to preferred routes. The majority (90 percent) of TSD travel is over interstate highways. The remaining 10 percent is over routes that meet specified conditions for deviating from the preferred route. Regulations permit deviation from the preferred route when necessary for safety or security. TSD personnel are briefed on construction, congestion and severe weather along the route prior to travel. TSD crews make every effort to alter a route or change travel time to avoid potential traffic hazards.

Federal regulations permit TSD deviation from the requirements regarding notification of the routes used. Routes used are classified, compartmented information that may not be disseminated except to persons with appropriate security clearance and a need to know.

TSD directs and manages an emergency management drill and exercise program that involves facility personnel, resources, and offsite elements. To stay proficient in all aspects of TSD convoy operations, TSD annually plans, implements, monitors, and performs follow-up analysis for couriers called in-service training (IST). For each iteration of IST, TSD invites participation from State police agencies. These police agencies train with TSD in all aspects of the program, but TSD's primary interest is in their participation in convoy tactical training with emphasis on law enforcement link-up in the case of an emergency. The present (FY 96) IST program has both Arkansas and Missouri State Police participation. In FY 95, the Arizona State Police and the Oklahoma State Police participated, and in 1994 the Texas Department of Public Safety participated.

TSD has a liaison program through which it communicates with law enforcement and public safety agencies throughout the country, making them aware of TSD operations. The liaison program provides law enforcement officers information to assist them in recognizing TSD vehicles should they be involved in an accident, and what actions to take in conjunction with the actions of the couriers in the rig and escort vehicles.

AT-400A Containers

The design of the AT-400A container is currently being finalized. There are only a few prototype containers in existence. The AT-400A container is currently undergoing certification testing at Sandia National Laboratories (SNL). The performance criteria that the package designer must use to assess Type B packaging against empirically established hypothetical accident test conditions of the transport are prescribed in Nuclear Regulatory Commission regulations (10 CFR 71.73) and are discussed in appendix F of volume II.

Following certification testing by SNL, DOE will develop a Safety Analysis Report for Packaging (SARP) for the AT-400A. The

SARP provides DOE with a detailed safety analysis and risk assessment of the container's performance for its intended mission and expected useful lifetime. Following acceptance of the final SARP, DOE will issue a certification for the AT–400A. The schedule for preparation of the SARP is not yet available.

To gain certification as a Type B package, the AT–400A must pass the testing requirements developed by the Nuclear Regulatory Commission to ensure satisfactory performance under accident conditions. DOE has developed and will implement a pit and container surveillance program for the AT–400A container. This program will evaluate the long-term performance of the container and the integrity of the pit.

Volume I, section 4.12 has been revised to include more information about the above topics.

1.3.13 Environmental Justice

Executive Order 12898 requires the analysis of environmental effects on low income and minority populations to include human health, social, and environmental effects. Commentors felt that the environmental justice analysis was limited to human health effects of the Proposed Action and did not include the social and economic effects as required by Executive Order 12898.

Commentors expressed concern regarding adequacy of training programs and safety information to workers and the community, especially regarding different literacy rates and/or primary language difficulties that might exist among disadvantaged populations.

There was also concern regarding the radiation exposure to workers and the minority community.

Environmental Justice Analysis

Social and economic (socioeconomic) impacts of the continued operations at Pantex Plant have been considered in volume I, section 4.11, Socioeconomic Resources. In volume I, section 4.17, Environmental Justice, the location of minority or low-income populations, identified on Figures 4.17.1–1 and 4.17.1–2 of the Draft EIS, leads to the conclusion that no disproportionately high social and economic impacts occur on minority or low-income populations from Pantex Plant operations. The text in the Final EIS has been revised to state this conclusion. Section 4.17.2 provides discussion of beneficial economic impacts to both majority and minority populations.

Human health impacts resulting from Pantex Plant operations are strongly tied to the geographic location of minority and low-income populations. If minority or low-income populations were concentrated in the immediate vicinity of the plant, there would be a possibility that such a population could be disproportionately impacted. The Pantex Plant EIS has analyzed the potential for offsite release in both routine and accident conditions and has not identified a release scenario that would cause a disproportionate effect on minority or low-income populations.

Concerns of all individuals, whether belonging to majority or a minority and whether living in urban or rural areas are taken into consideration within the overall context of the assessment of potential impacts on population in the ROI.

Training, Safety Information and Radiation Exposure

Health and safety issues are an important part of Pantex Plant operations and have been taken into consideration in this EIS. Occupational

Safety and Health Administration and implementing DOE Orders address safety and health issues for all workers at Pantex Plant regardless of minority or income status, including radiation exposure. Operations at the plant expose workers to occupational hazards during the normal conduct of their work activities. Occupational safety and health training that includes specialized job safety and health training appropriate to the work performed is provided for all plant employees.

DOE and Pantex Plant have initiated a broad program of improving communication with the public by providing fact sheets, speakers, exhibits, information fairs, open houses, and presentations with material geared to elementary school students. In addition, specific inquiries can be made to the Pantex Plant information office to obtain further information on training programs and plant safety. Additional information on worker safety is provided in volume I, section 4.14.1.5.

1.3.14 DOE Policy

Numerous comments were received opposing the storage and reprocessing of plutonium at Pantex Plant. These individuals were concerned about the possibility that plutonium could contaminate the environment. They would like to see all operations in this area halted.

Concern was also voiced for additional independent regulatory oversight at the plant. TNRCC feels that the public would be better served, and that there would be less potential for errors in waste management, if oversight responsibilities at the plant were shared. There were suggestions that State and Federal Trustees should be consulted during the remedial process so that appropriate restoration activities could be incorporated into remedial actions at the plant.

Several commentors were concerned with the lack of specific information in the EIS regarding international controls and inspections of the pits at Pantex Plant and the alternate site locations.

Storage and Reprocessing

DOE is committed to the continuance of, and the continued development of, programs and directives to better manage its facilities throughout the Nation. DOE operation of Pantex Plant is conducted through varying levels of operational and environmental controls to protect the workers, the public and the environment. The probability of contamination from interim pit storage was determined to be unlikely based on the analysis performed in this EIS. The existence of the pits is a reality. Handling them with the utmost care and security until a long-term solution is available is the focus of this document. The Department is working to address present and future issues in the nuclear industry in a manner that benefits everyone.

Regulatory Oversight

There are numerous measures in place at the plant to monitor and update compliance standards for all phases of work performed. DOE has an ongoing commitment to work with EPA, TNRCC, stakeholders, and the general public to further the development of the Pantex Plant ER Program. The areas of personal safety to workers and the surrounding population, as well as numerous environmental regulations, are in effect to address these issues before they become concerns. To address this concern, the Secretary created a Working Group on External Regulation to review the alternatives for all activities conducted at DOE's nuclear facilities. A report from this working group is expected to be released in late 1996.

International Inspection

DOE has not yet established its procedures for international surveillance or inspections of pits. Details concerning the frequency of the inspections and the manner of inspections has yet to be established. Accessibility to the pit storage locations at pit storage sites will be addressed in future DOE policy. This issue was not considered to be a significant factor in the selection of Pantex Plant or any of the other four alternate sites.

1.3.15 NEPA Process and Procedures

Many commentors questioned whether they could trust the Pantex Plant EIS. Commentors expressed concern that too little information was presented, analysis was limited, and the document was too narrow in scope to adequately address the issues at Pantex Plant.

Numerous concerns were voiced regarding the effectiveness of the notification for the public hearings. Individuals felt that there was not enough advance notice of the meetings, that the scheduling was difficult for working people to attend, and that the announcement was not reaching a racially diverse representation of the concerned public.

Several comments were made regarding the lack of cost information relative to Pantex Plant and alternate sites. There was also concern that the significance of impacts was not uniformly discussed as required by the CEQ guidelines.

Other commentors noted that it was difficult to review two PEISs and the Pantex Plant EIS at the same time, due to the short review period and the size of the documents. It was also stated that the document is too complicated for individuals of limited education in the affected areas to read, and a request was made to find an alternate means of informing the public of the contents of the document.

Amount of Information Presented

The Pantex Plant EIS was prepared in accordance with the CEQ *Regulations for Implementing the Procedural Provisions of the National Environment Policy Act* (40 CFR 1500-1508) and DOE NEPA Regulations (10 CFR 1021). These regulations describe how to comply with the "action forcing" procedures of NEPA.

NEPA requires that the government assess any major Federal action that may significantly affect the quality of human environment. It requires the government to seriously consider these impacts and make that information available to public officials and citizens before decisions are made and actions are taken. The decision maker may, however, take into consideration not only environmental, but also economic, technical, and other factors, such as national security, before a final decision on project implementation is made. This decision is published in a ROD.

DOE has presented a "full and fair discussion of significant environmental impacts" and has "informed the decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." As directed, DOE has focused on significant environmental issues and alternatives, while reducing an accumulation of extraneous background data in the EIS. Sources of additional information are referenced throughout the EIS.

Public Notification

'ublic scoping and commenting requirements are addressed in 40 CFR 1501.7 and 1503, respectively. The Pantex Plant EIS followed this direction in its attempts to reach the broadest area of citizenry possible. Comments were requested from Federal, State, and local agencies, concerned citizen groups, and individuals who had expressed an interest during the scoping process or while the document was being prepared. Notices were publicized in the *Federal Register*, as well as in local newspapers and radio spots. Public hearings and meetings were held, fact sheets were distributed, and e-mail and telephone contacts were provided, as well as addresses of DOE personnel to whom citizens could mail comments and information requests.

In an effort to accommodate citizens' work schedules, public hearings in Texas were held throughout the day, as well as late into the evening. Except for Nevada, all hearings were ɜld with afternoon and evening sessions to encourage public attendance. DOE realizes that this is not a perfect system. There are some individuals that will not receive notification and that will not be able to attend the public hearings. Although the law does not require additional notification, DOE will take these concerns into consideration for future EISs.

Although the Notice of Availability for the Draft EIS was issued less than a month before the first public hearing was conducted, the comment period was extended to July 12, 1996, during which time the public could submit comments in writing, by telephone, at a technical information exchange meeting, or via electronic mail. CEQ regulations require a minimum comment period of 45 days. For this EIS, the Department extended the comment period to 98 days. Comments were accepted as late as July 29, 1996.

ach of the documents (SSM PEIS, S&D PEIS, and Pantex Plant EIS) had a public comment period, inclusive of public hearings/meetings as required by NEPA. During this time, the public was encouraged to comment orally at the hearings, in writing, by telephone, or by e-mail. The comment periods for these documents overlapped. It was felt that the public would be better served to have one meeting whenever possible to discuss as many of the documents as appropriate, depending on the geographical location of the meeting. This format also addressed prior stakeholder requests to reduce the number of meetings the public had to attend. The effort was intended to provide the public with as much information as possible and to allow for as long a comment period as could be scheduled.

The workshop format used for the public hearings was also a response to stakeholder requests for this type of format. The entire hearing structure, including the joint presentation of the three EISs, the workshop format, the time periods for formal testimony, the provision of space for displays by citizen groups, and the times for sessions, were planned in consultation with the Pantex Plant Citizens Advisory Board.

Cost and Other Information

The NEPA process is not a cost-benefit analysis process. Rather, the law requires that a NEPA document be prepared to ensure that environmental impacts are documented before any decision is made on a major Federal action. Costs are not required in order to assess environmental impacts. volume I, chapter 4 describes the affected environment and the potential environmental impacts expected from the continued operations of Pantex Plant, as well as the associated interim storage of nuclear weapon components. Non-environmental issues such as cost differences among the alternatives have not been developed for this EIS. The technical aspects of dismantling pits are information that is not available in public documents for security reasons. Plutonium processing is not an alternative covered in this

EIS. Long-term management of the nuclear stockpile is within the scope of the SSM PEIS, while long-term storage and the final disposition of plutonium is addressed in the S&D PEIS.

The CEQ regulations require each Federal agency to interpret and administer the policies, regulations, and public laws in accordance with NEPA and the CEQ Regulations, and to implement procedures to make the NEPA process more useful to the decision maker and the public (40 CFR 1500.2). CEQ Regulations further state that "significantly" as used in NEPA requires considerations of both "context" and "intensity" (40 CFR 1508.27). Context means that significance of an action must be analyzed in several contexts, such as the society as a whole, the affected region, the affected interests, and the locality. Intensity refers to the severity of impacts and is examined using 10 criteria that are discussed in 40 CFR 1508.27. In other words, significance is a judgement rather than a defined outcome.

In consideration of the guidance contained in the CEQ regulations, DOE pursues a policy of presenting the facts regarding the potential environmental impacts of each resource area without drawing conclusions as to the significance of those impacts in the EIS itself. The reader is allowed to draw his/her own conclusions about the significance based upon the facts presented. Likewise, the decision maker considers the facts presented in each resource area, as well as the cumulative impacts in terms of both context and intensity. The judgement of the decision maker as to the significance of these impacts is then considered along with other factors such as national policy, Departmental mission, and technical considerations in making the decision on a course of action.

Several of the commentors have suggested a need for the government to develop a means of reaching individuals of limited education. DOE will continue its efforts to reach the broadest possible segments of affected populations when discussing its proposed activities.

1.3.16 Out of Scope

Many comments were received in support of continuation or expansion of the existing mission at the Pantex Plant. Other comments expressed a general opposition to plutonium processing or nuclear storage at the Pantex Plant.

Many comments were received that were outside the scope of this particular EIS. For example, comments about the underground testing of nuclear weapons at NTS are outside the scope of the Pantex Plant EIS. Out of scope comments were noted but not responded to in this EIS.

In addition, many remarks were not identified as individual comments. For clarity, statements collected during the comment period were identified as "comments" when they specifically relate to the discussions of the alternatives and environmental analyses in the EIS. The Department's responses to these comments are provided in this volume of the EIS. Conversely, general expressions of convictions, personal opinions, or support for or opposition to the continued operation of Pantex Plant are termed "remarks" and are acknowledged, but not provided responses in the EIS.

CHAPTER 2

Comment Documents

CHAPTER 2
COMMENT DOCUMENTS

2.1 INTRODUCTION

Chapter 2 is a compendium of the comment documents received during the public comment period, annotated to show their comments.

The "green pages" at the very front of this volume provide a set of instructions for locating documents and comments that are of particular interest.

2.2 INDEX OF COMMENT DOCUMENTS

The documents appearing in this chapter are categorized and organized according to their origin. The sequencing of document categories is as follows:

- Letters from the Federal Government (FG).
- Letters from Tribal Governments, i.e., Indian Tribes or Intertribal Councils (TG).
- Letters from State governments (SG).
- Letters from Municipal governments, including counties (MG).
- Letters from private companies or organizations (CO).
- Letters, cards, and other documents from private citizens (PC).
- Transcripts from public hearings, including the Technical Exchange (HT).

The parenthetical code after each of the above categories comprises the first two characters of document numbers for that category. For example, document numbers of letters from State governments begin with "SG".

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PHIL GRAMM
TEXAS

United States Senate
WASHINGTON, D.C. 20510-4302

May 5, 1996

The Honorable Hazel O'Leary
Secretary
U.S. Department of Energy
Forrestal Building
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Secretary O'Leary:

Thank you for the opportunity to comment on the U.S. Department of Energy's (DOE) Programmatic Environmental Impact Statements (PEISs) on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials. Please also consider this our comment on the Pantex Site-Wide Environmental Impact Statement, since most of the issues addressed in these documents are identical.

First and foremost, we are adamant that any current and future functions at Pantex be conducted in a safe and environmentally sound manner. Our first priority is to ensure that any expansion at Pantex be implemented in a way that does not impair the health or safety of area residents or have an adverse effect on the environment. These goals serve as a prerequisite to any current and future activities at Pantex, including expansion.

We are pleased that DOE selected Pantex as the preferred alternative for assembly/disassembly, thereby abandoning earlier plans to transfer those functions to the Nevada Test Site (NTS). However, by failing to recognize Pantex as the preferred candidate site for new and/or consolidated stockpile management facilities, the DOE overlooked the best site for maintaining the integrity of the U.S. nuclear stockpile and attaining maximum efficiencies and cost savings.

Pantex is perhaps the most cost-effective alternative for any new construction of SSM facilities. First, labor costs, utility rates, and water and land availability at Pantex, as well as public support, are more amenable than those at any other Complex site. It is appropriate to consider Pantex as an alternative site for all future defense-related facilities to complement activities at the national labs (such as the planned Atlas Facility and plutonium pit fabrication site at Los Alamos National Laboratory [LANL]). DOE makes no mention of a strategic plutonium reserve that we believe is important to our future national security needs, even though the PEIS mentions that strategic storage should be co-located with disassembly. We believe Pantex should be the preferred site for such a mission in coordination with its management functions. The location of additional defense-related activities at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost to the American people. In its deliberations, DOE should insist that budgetary comparisons between Pantex and other sites are accurate, and include capital, transportation, training, remediation, and other costs.

Consistent with the strengths identified above for increased stewardship and management duties, the high explosives (HE) functions should also remain at Pantex. Because the production assembly/disassembly functions remain at Pantex, the HE fabrication duties should be present at the corresponding site. After all, the SSM draft admits that Pantex must retain HE capabilities to process the inventories already on site from dismantling. Therefore, the least expensive alternative is to maintain HE functions at Pantex. We adamantly disagree with the statement in the PEIS that there are no advantages to siting high explosives at Pantex rather than the national labs. The capitol outlay alone necessary for transfer is cost prohibitive. In addition, should future need arise for new weapons production, it will be critical to have the HE facilities at the weapons production/assembly site.

As the sole DOE-authorized facility for assembly and disassembly of nuclear weapons, Pantex has historically handled these functions in a safe and efficient manner for more than 40 years. One of the challenges faced after dismantling a significant portion of the nuclear stockpile is the processing or disposal of the materials that remain. In meeting this challenge, Pantex could continue to store plutonium which is already at the site and upgrade facilities for any and all storage options being considered by DOE with minimal cost and difficulty. Pantex currently safehouses more than 8,000 surplus pits, and plans are being made to ship additional pits from Rocky Flats to Pantex. It makes little sense to re-create storage facilities at another site and then unnecessarily transport large amounts of plutonium across the county from Pantex.

We also believe Pantex should be designated the preferred site for any disposition options and related functions. It makes budgetary and policy sense to site disposition where storage already exists. Furthermore, it makes no sense from any perspective, budget or otherwise, to site strategic storage at one site and surplus at another. Pantex should be selected for both storage functions. Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role with minimal costs and it is the production site closest to Los Alamos, the planned pit fabrication site.

Based upon these reasons, we respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions as well as consolidation of all plutonium storage and disposition and any related functions. Thank you again for the opportunity to comment on these documents.

Yours respectfully,

PHIL GRAMM
United States Senator

KAY BAILEY HUTCHISON
Untied States Senator

MAC THORNBERRY

Congress of the United States
House of Representatives

COMMITTEE ON NATIONAL SECURITY
COMMITTEE ON RESOURCES
JOINT ECONOMIC COMMITTEE

~~April 3~~, 1996
May 7,

The Honorable Hazel R. O'Leary
Secretary of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Re: Comment on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statements (PEISs), and the Pantex Site-Wide Draft Environmental Impact Statement.

Dear Secretary O'Leary:

I made oral comments at the April 22 hearing in Amarillo on the pending PEISs affecting Pantex and the nuclear weapons complex. I am writing to re-emphasize some of my remarks and provide additional comment on other issues.

I believe the analysis in the Draft PEIS for Stockpile Stewardship and Management is deficient for a number of reasons, as described below:

The SSM PEIS does not deal adequately with the need to maintain adequate production capacity over the next ten or more years During this period it will be the Stockpile Management program at the four production plants which will replace weapons components, rebuild weapons, and maintain the capability and expertise to reconstitute the nuclear weapons stockpile should world events require it However, the draft PEIS focuses almost exclusively on preserving the capabilities and core competencies of the national nuclear weapons laboratories. I recognize that preserving the weapons capabilities of these laboratories reflects essential national requirements. But too little attention has been paid to preserving the critical capacity and unique assets that exist at the department's productions plants. I am concerned that the planned reductions at Pantex and the other production plants, as portrayed in the PEIS, are so severe that they will seriously impact the plants' ability to properly support the near-term and long-term safety and reliability of the nation's nuclear weapons stockpile.

The entire SSM analysis regarding the size of the stockpile and associated manufacturing capacity is based on optimistic, rather than conservative, assumptions about future arms control agreements. The SSM PEIS relies too heavily on a workload assumption of 1,000 warheads in the future stockpile, a number far lower than even the 3,500 set in the unratified START II treaty. The administration's budget request also reflects this unjustified optimism. We must not cede the victory we gained in the Cold War through the planned obsolescence of our production capability, which can only be regained at greater cost in later years.

The SSM PEIS analysis and preferred alternatives are based on incomplete national security policy considerations. The most dramatic deficiency is the failure to include current Congressional legislation (e.g. the National Defense Authorization Act for Fiscal Year 1996) and associated national security policy guidance in the PEIS assumptions, analyses, and conclusions. This PEIS needs to be redone based on the full range of national security policies, both Presidential and Congressional. The conclusions of the just completed House and Senate markups for Fiscal Year 1997 should also be taken into consideration in the final PEIS.

Regarding where the high explosives production mission should be sited, I have been to Los Alamos and Pantex and talked to officials at both sites. However, I have yet to hear a credible explanation as to why that mission should not remain at Pantex. The public hearings only served to strengthen my conviction that Pantex is the best and most economical site. At the hearing, an official from the Albuquerque Operations Office admitted that Pantex presently has all of the needed capability and that it would be more expensive to move high explosives functions to the labs. I urge you to select as the preferred alternative the best and most cost-effective site -- Pantex.

FG-002/1
15.116

Regarding the Pantex Site-Wide Draft Environmental Impact Statement, I believe the analysis of the "airplane crash" scenario is deficient. How can it be that the probability of a crash causing a release has increased since your 1994 Finding of No Significant Impact, particularly after Pantex and the Amarillo Airport have worked together to reduce overflights of the plant and taken other preventative measures? I urge the DoE to correct the analytical errors and act to avoid wrongfully depriving Pantex of future functions for which it may be selected

As a final note, I am very concerned about the Albuquerque Operations Office criticizing DoE and contractor officials for having contractor employees comment at the hearings. In effect, Albuquerque is censoring those individuals on issues, such as cost, on which they are the best source of information. I find it remarkable that the exercise of First Amendment rights at a hearing of this importance, which has the stated purpose of eliciting information and public comment, would cause officials at Albuquerque to call on the Amarillo Area Office to "control their people." That this occurred in the aftermath of the "gag order" incident is even more egregious.

I look forward to our continued work together on these issues. I would appreciate a response from you on these matters.

Sincerely,

Mac Thornberry
Member of Congress

cc:

U.S. Department of Energy
Office of Reconfiguration
P.O. Box 3417
Alexandria, VA 22302

U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington DC 20026

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

JUL 2 8 1996

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Dear Ms. Founds:

In accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act (NEPA), and the Council on Environmental Quality Regulations (CEQ) for Implementing NEPA, the U.S. Environmental Protection Agency (EPA) Region 6 office in Dallas, Texas, has completed its review of the U.S. Department of Energy (DOE) Draft Environmental Impact Statement (DEIS) for continued operation of the Pantex plant and associated nuclear component storage located at the existing Pantex facility near Amarillo, Texas.

EPA classifies your DEIS and proposed action as "EC-2," i.e., EPA has "Environmental Concern" and requests additional information. Although the EPA has no objections to the preferred action alternative, continued operation and storage at the Pantex site; we have identified some environmental concerns and are requesting additional information for clarification purposes. Our classification will be published in the Federal Register according to our responsibility under Section 309 of the Clean Air Act, to inform the public of our views on proposed Federal actions.

Detailed comments identifying our concerns and needed information are provided in an enclosure to assist you in preparation of the Final EIS. Should you have any questions, please contact the appropriate Regional Environmental Review Coordinator, Mike Jansky (EPA Region 6) at (214) 665-7451 or Dave Farrel (EPA Region 9) at (415) 774-1575, for assistance.

We appreciate the opportunity to review the DEIS. We request that you send our office two (2) copies of the Final EIS at the same time that it is sent to the Office of Federal Activities (2251A), EPA, 401 M Street, S.W., Washington, D.C. 20460.

Sincerely yours,

Robert D. Lawrence, Chief
Office of Planning and
Coordination

Enclosure

DETAILED COMMENTS
CONTINUED OPERATION OF PANTEX PLANT
DRAFT ENVIRONMENTAL IMPACT STATEMENT

BACKGROUND:

Most nuclear weapons use a nuclear package with two assemblies: a primary assembly is used as the initial energy source while a secondary assembly provides additional explosive energy release. The primary assembly has a central core, called the "pit," surrounded by a layer of high explosives. A "pit" is typically composed of plutonium-239 and other materials. The Department of Energy (DOE) proposes to continue conducting nuclear weapons operations at the Pantex Plant and to increase the on-site interim storage levels of pits from 12,000 to 20,000 pits. The DEIS also evaluates relocation of some or all of the Pantex interim storage activities to 4 alternate sites. The alternative sites include: Savannah River Site near Aiken, South Carolina; the Nevada Test Site near Las Vegas, Nevada; Hanford Site near Richland, Washington; and the Manzano Weapons Area at Kirtland Air Force Base in Albuquerque, New Mexico.

GENERAL COMMENTS:

Pollution Prevention

The EPA would like to commend DOE for Appendix G in Volume II on pollution prevention and waste minimization. We find Appendix G to be comprehensive in scope, informative to the reader, and a model which other DOE NEPA documents may find beneficial.

Interim Storage

FG-003/1
01.029

The DEIS makes reference to "interim storage"of plutonium pits at three DOE sites (Nevada; South Carolina; Washington State) and a Department of Defense site at Kirtland Air Force Base, New Mexico. However, the DEIS did not define what constitutes "interim storage," either a fixed period of years or decades, or until a permanent storage facility is approved, upgraded or built. If possible, the Pantex FEIS should define the minimum and maximum time limits expected by DOE for "interim storage" (we recognize the difficulty in this because nuclear storage projects often run into problems that delay their proposed timeliness).

Energy Efficiency and Water Conservation

FG-003/2
13.021

EPA suggests that Appendix G should reference the requirements of Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities (March 8, 1994), particularly for the 6 new construction projects at Pantex listed in Table 3.1.1.1-1 (gas analysis laboratory, materials compatibility assurance facility, etc.) Section 306 of Executive

FG-003/2
13.021
continued

Order 12902 contains specific requirements regarding the construction of new facilities owned by the United States. Additionally, the Final EIS would be strengthened if it could discuss whether this Executive Order has any implication on the proposed interim storage of plutonium pits in Nevada, South Carolina, New Mexico and Washington State in terms of energy and water conservation.

Plutonium Pit Weight

FG-003/3
01.030

It would be helpful if the Final EIS could provide the tonnage of the 8,000 to 20,000 pits that would be relocated under the interim pit storage alternative. If allowable under the national security considerations, it is recommended that the FEIS quantify the weight in terms of plutonium, other nuclear material, and other constituents such as Resource Conservation and Recovery Act (RCRA) regulated hazardous waste.

PANTEX ALTERNATIVE
(EPA Region 6)

FG-003/4
06.060

1. Page 4-57, second paragraph: In this paragraph and at other places in the text it is asserted that the discharge water from the plant meets the surface water quality permit requirements. Because it is acknowledged in the document that leakage from waterways and playas enters the ground, EPA guidelines for ground water quality are of concern here. Under EPA's "Strategy for the 90's" report of the Ground Water Task Force, the Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act (SDWA) are to be used as reference points in evaluating ground water quality. This draft EIS also recognizes the significance of these MCLs when it lists them as "decision criteria" for ground water analyses presented in Volume II. The requirements under the National Pollutant Discharge and Elimination System (NPDES) do not include all of the contaminants for which MCLs have been set for public water supply systems under the Safe Drinking Water Act and in many cases the limits set under NPDES are higher than those under the SDWA. Under those circumstances, we recommend that Pantex consider protecting the ground water by either lining the ditches and playas with impermeable materials or, alternatively, treating the effluent to the level required to maintain, or restore to, SDWA MCLs in the ground water. Discussion on this matter should be included in the Final Statement.

FG-003/5
06.061

2. Page 4-62, last paragraph: The first bullet describes "unsaturated sands of the Blackwater Draw Formation and upper Ogallala" at the surface, but the diagram on page 4-64 indicates that the Blackwater Draw Formation consists of clay. This inconsistency should be clarified in the Final Statement.

FG-003/6
06.062

3. Page 4-65, third paragraph: It is stated that the perched aquifer "exhibits radial flow." By way of clarification, the Final EIS should note that the flow is radial from Playa #1,

Comment Documents

FG-003/6
06.062
continued

suggesting that the playa is a major source of recharge locally.

FG-003/7
06.063

4. Page 4-67: The map illustration depicts a domestic water well to the southeast of the Pantex property, just outside the area of the perched aquifer. The well appears to be in the flow direction of the ground water in the perched aquifer and may be in danger of contamination from ground water in the perched aquifer. The Final EIS should identify the boundaries of the contaminated perched aquifer and establish what risk may exist, if any, for the potential contamination of the Ogallala aquifer.

FG-003/8
06.064

5. Page 4-71, third paragraph: It is indicated here that the quality of surface water being discharged is described earlier at Section 4.6.1.1. However, there is no description of the discharge water quality at the point cited. It would be helpful if the FEIS could provide a complete description of the discharged water chemistry within the text.

FG-003/9
06.065

6. Page 4-72, second paragraph: It is difficult to visualize all the information about water quality and contaminant locations described here and would be helpful to have one map to display this information in the Final Statement. It would also be helpful if the FEIS could have a section describing the past and current chemical quality of discharges. Section 4.6.1 makes a general attempt at this goal but is too generalized. The Final Statement should list specific contaminants and major components of water chemistry, and describe any changes through time. A table showing concentration ranges, averages, etc., would be appropriate for this discussion.

FG-003/10
05.026

7. A number of contaminants have been identified in the soil and ground water (Table 4.5.1.3.3-3) at the existing site. The Final EIS should document what measures have been taken to avoid potential contamination by the sources identified.

NEVADA TEST SITE (NTS) ALTERNATIVE
(EPA Region 9)

Groundwater and Seismicity at Nevada Test Site

BACKGROUND:

FG-003/11
06.066

Two sites at the Nevada Test Site (NTS) were assessed for the interim storage of plutonium pits, the P-Tunnel area and the Device Assembly Facility area. The Pantex DEIS (Volume I, p. 5-8) indicates that ground water at the two NTS sites is characterized by a "deep water table," although depth to ground water is not specifically quantified in the DEIS.

A prior Department of Energy EIS reviewed by EPA Region 9(FEIS, Tritium Supply & Recycling, October 1995, Volume I, p. 4-114) stated that the depth to ground water at NTS ranges from 500 to 2,400 feet. The Tritium FEIS also indicated that "there are... areas of perched water that lie at considerably shallower depths"

FG-003/12
05.027

at NTS. The DEIS (Volume I, p. 5-16) states that earthquakes pose the greatest natural threat to storage of plutonium pits at NTS. The Cane Springs Fault was identified as the most significant seismic risk. However, the DEIS indicates that four faults in the NTS vicinity (Mine Mountain Fault, Carpetbag Fault, Yucca Flat Fault and Cane Spring Fault) "are capable of generating earthquakes of up to 0.85g," which is an 8.5 quake on the Richter scale.

According to the Tritium FEIS (Volume I, p. 4-117), the maximum credible earthquake on the Cane Spring Fault is expected to produce a peak acceleration of 0.67g, a 6.7 quake on the Richter scale. The Cane Springs Fault is three to five miles from the Device Assembly Facility.

The following comments relate to the proposed interim storage of plutonium pits at NTS in terms of seismic risk and the potential for ground water contamination should the plutonium pits be damaged in a quake:

1. The FEIS should recognize that the P-Tunnel at the NTS is due west of two parallel faults, the Carpetbag Fault approximately five miles away and the Yucca Fault approximately seven to ten miles away. The Tritium FEIS (Volume I, p. 4-117) describes both the Yucca and Carpetbag Faults as "capable faults," as defined by the Nuclear Regulatory Commission regulations 10 CFR Part 100, Appendix A. However, the Tritium FEIS reported that the "possible magni- tude, intensity, and acceleration of earthquakes along the Yucca and Carpetbag faults have not been estimated." The DEIS gives the impression that quakes along any of the four faults in the NTS area could have an 8.5 magnitude on the Richter scale (Volume I, p. 5-16).

FG-003/13
14.138

EPA believes that the FEIS should provide more documentation as to potential ground water impacts should an earthquake harm the plutonium pit facility or render it inaccessible. In particular, we are concerned that DOE may have concluded that leaving the plutonium pits inside the P-Tunnel (should it collapse) may have less environmental impact than attempting to retrieve the pits from inside a collapsed P-Tunnel (due to wording in the Pantex DEIS that impacts to workers and the public from radionuclide releases would be "negligible" because the plutonium containers would be sealed inside the collapsed tunnel).

Additionally, potential NTS impacts to ground water such a scenario were not discussed in the Pantex DEIS. We recommend that the FEIS provide more information on the depth to ground water in the Device Assembly Facility and P-Tunnel areas and whether keeping plutonium pits in a collapsed tunnel may ultimately cause a migration of radioactivity to ground water.

FG-003/14
06.067

The Pantex FEIS should discuss whether either of the
areas is characterized by "perched water...at considerably
shallower depths..." as described in the Tritium FEIS. If
so, the Pantex FEIS should provide additional information on
the ground water impacts that are reasonably foreseeable
should the plutonium pits be damaged in a quake. The Pantex
FEIS should also outline DOE's intentions regarding the
retrieval of plutonium pits in such a situation, as well as,
the feasibility of monitoring the pit storage facility. The
DEIS (Volume I, p. 5-17) gives the impression that the
plutonium pits would remain entombed.

FG-003/15
22.021

2. We ask that the FEIS provide further discussion
regarding the wording on p. 5-17 of Volume I that "Some
mitigation of a tunnel collapse would be needed after a
major seismic event. A separate assessment of the risk
associated with the mitigation would be necessary..." The
Pantex FEIS should better define what is meant by "some
mitigation" and a "separate assessment" (would the separate
assessment be a NEPA document?). The FEIS should discuss
what risks would be analyzed in the separate assessment:
radionuclide emissions, worker health and safety, ground
water contamination, etc.

FG-003/16
14.139

3. The Pantex Summary (Table S-2) identifies the
environmental impacts associated with the alternative pit
storage relocation sites. For NTS, the range of potential
accident scenarios are limited to two: puncture of a pit
due to a forklift accident and an aircraft crash. Potential
seismic hazards at NTS are not recognized in Table S-2, as
they were in Volume I. We, therefore, recommend that Table
S-2 be modified to recognize NTS seismic hazards. Table S-2
should also reflect seismic conditions that may exist at the
proposed interim pit sites in South Carolina, New Mexico and
Washington State. Modifications to Table S-2 should be
incorporated into the FEIS.

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ALL INDIAN PUEBLO COUNCIL
Pueblo Office of Environmental Protection

Post Office Box 3256 • Albuquerque, New Mexico 87190 • (505) 884-0480 • FAX (505) 883-7682

May 28, 1996

Nanette D. Founds
U.S. Department of Energy
Albuquerque Operations Office
P O.B Box 5400
Albuquerque, NM 87185-5400

Dear Ms. Founds,

This letter is in response to the Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components. The All Indian Pueblo Council's Pueblo Office of Environmental Protection are glad for the opportunity to comment of this document.

The Pueblo Office of Environmental Protection has the responsibility of protecting the environment of the nineteen Indian Pueblo tribes in the state of New Mexico. We have reviewed the draft EIS with this in mind.

TG-001/1
06.042

There should be an addition to Table 6.5-4 in the Water Resource row. This table in the draft EIS has only the New Mexico state environmental statutes. Of these 19 Pueblo Indian tribes, six have received EPA approval for water quality standards under the treatment of state designation. These six are Isleta Pueblo, Sandia Pueblo, San Juan Pueblo, Santa Clara Pueblo, Picuris Pueblo and Nambe Pueblo. And of the six, Isleta Pueblo is the closest in proximity and downstream on the Rio Grande river from the Manzano Weapon Storage Area at the Kirtland Air Force base which is one of the alternative sites. Other Pueblo tribes have draft water quality standards that they anticipate approval soon.

It is only proper and respectful to mention the Pueblo water quality standards in table 6.5-4.

Sincerely,

Toney R. Begay

Toney R. Begay, Sr. Environmental Scientist
All Indian Pueblo Council
Pueblo Office of Environmental Protection

CC: Everett Chavez, AIPC/POEP
Blane Sanchez, Isleta Pueblo
File

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

TO: Sidney Wheeler, Intergovernmental Relations DATE: June 14, 1996

FROM: Ginny King, TNRCC Natural Resource Trustee Program

SUBJECT: **Joint Trustee Comments to the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components**

As Lead Administrative Trustee (LAT) on behalf of the State Trustees, Texas General Land Office (TGLO), Texas Parks and Wildlife (TPWD), and Texas Natural Resource Commission (TNRCC), this memo is written to provide the State Trustees' comments on the "Draft Environmental Impact Statement for the Continued Operation of the Pantex Superfund Site and Associated Storage of Nuclear Weapon Components."

General Comments:

The Trustees for the State of Texas strongly support the President of the United States and the Department of Energy (DOE) in the unilateral efforts to reduce the number of armed nuclear warheads worldwide. We further recognize the difficult responsibility of storing and stockpiling the Nation's disassembled nuclear weaponry. However, the DOE is one of the Federal Trustees for natural resources and has the responsibility of protecting those natural resources from injury on behalf of the public. In order to protect those natural resources from further injury, the Trustees recommend that the DOE incorporate more stringent environmentally protective practices at the Pantex Superfund site.

The Trustees do not oppose the DOE plan to construct an expanded Hazardous Waste Treatment and processing Facility (HWTPF). However, contamination in the perched aquifers beneath the site indicate that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. A treatment facility that is constructed and maintained properly will prevent further injury to natural resources. In addition, the increase of industrial discharge volume to 2.9 million liters may exacerbate contamination problems if additional measures are not taken by DOE to protect valuable groundwater resources. DOE should insure that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

Specific Comments:

1. Page 1-12, Section 1.2.2.3 Environmental Restoration: The information communicated in this text does not necessarily constitute restoration of the natural resources that have been injured as a result of the releases of hazardous substances at this site. In order to perform actual environmental restoration, the nature and extent of contamination must be determined to evaluate the potential injuries to natural resources. After such a determination, and in

This information is duplicated in the following letter.

cooperation with the other Federal and State Trustees, restoration projects should be designed that will appropriately compensate the public for injury to natural resources. Performing remediation as needed to comply with all appropriate regulatory requirements does not necessarily constitute compensatory restoration for injury to natural resources. In order to reduce DOE's residual liability for injury to natural resources, the State and Federal Trustees encourage DOE to continue to work with the Trustees during the remedial process so that appropriate restoration will be incorporated into remedial activities.

2. Page 3-2, Section 3.1.1 Proposed Action: Care should be taken to ensure that the continued operation of Pantex Plant activities including "quality assurance testing of weapon components and the research and production of weapon components" is conducted in a fashion that will not increase DOE's liability for injury to natural resources.

3. Page 3-3 Performing environmental protection and environmental restoration activities: please see specific comment #1.

4. Page 4-2, Affected Environment: The document states that an area of 50 miles surrounding the Pantex site will be considered the region of influence. The Trustees are concerned that this area will not encompass the potential area of natural resources that could be impacted since:

   a) the lateral extent of the perched aquifer has not been determined; and

   b) documented contamination in the Ogallala and its flow direction provide the potential for this contamination to impact various environmental receptors outside this radius.

5. Page 4-3, section 4.2 Impact Assessment Methodologies, geology and soils: Impacts should be assessed on the destruction of any geologic feature not just those specified unique.

6. Page 4-3, Section 4.2 Impact Assessment Methodologies, water resources: The qualitative assessment of water quality impacts from wastewater and stormwater runoff does not adequately address potential impacts to surface water and groundwater resources at the Pantex Plant. Furthermore, it does not consider existing contamination in the sediments, surface water and groundwater and their cumulative impacts. The text should be corrected to reflect what actions would be necessary to thoroughly address the potential impacts to these natural resources.

7. Page 4-4, Biotic Resources: The text states that US Fish and Wildlife Service and appropriate State agencies have been used in the process of determining whether Pantex Plant operations would impact any plant or animal. This is incorrectly stated. The Trustees understand that an ecological screen has not yet been completed for this site and an ecological risk assessment has not been performed. The text should be corrected to reflect what has actually been assessed at this site and which agencies were involved.

8. Page 4-37 Environmental Restoration Process at Pantex Plant: see comment #1

Review Comments by the TNRCC NRTP
Page 3

9. Page 4-55 Affected Environments: The text states that there is not evidence that contaminants found in the perched zone have migrated to the Ogallala aquifer. This is inaccurate and should be corrected to reflect that there is documented contamination in the Ogallala aquifer.

10. Page 4-62, Section 4.6.1.2 Groundwater: While the discharges that are permitted by EPA and TNRCC have protective standards which presently do not allow excessive levels of contaminants, existing contamination is already present in the perched aquifer and the playas. Therefore, the continual discharge of wastewater provides a hydraulic head potentially driving those contaminants into the Ogallala. Contamination in the Ogallala has been documented and more stringent actions are required in order to prevent further migration of contamination which could result in greater injury to an extremely valuable groundwater resource.

11. Page 4-69, Section 4.6.1.2 Groundwater, Perched Aquifer portion: see comment #9

12. Page 4-72, Groundwater Quality: The absence of trinitrotoluene in the perched aquifer may not be due to a reduction in the discharge of this contaminant but rather an indication of it breaking down to degradation compounds in the environment. Also, the text states that levels of trichloroethene occurring at the site barely exceed the Risk Reduction Standards (RRS) decision criteria of 5 micrograms per liter. Data used to make this determination may not be representative of actual levels of contamination at the site. To accurately determine what is occurring at this site, properly screened intervals in groundwater monitoring wells to accurately measure "sinking chemicals, metals, radio nuclides and high explosives," as well as the proper suite of analyses, should be employed for all potential contaminants of concern.

13. Page 4-78, Section 4.6.2.1 Impacts of Continued Operations; Weapon-related activities, Surface water: A thorough evaluation and consideration of existing contamination in surface water and sediments of receiving waters at the Pantex site is needed to adequately assess the potential impacts of waste water discharges. Cumulative impacts of preexisting contamination and projected waste loads must be considered.

14. Page 4-79, Section 4.6.2.1 ... Groundwater: Potential impacts to the groundwater quality from wastewater discharge activities are not negligible. See comment #10.

15. Page 4-80, Section 4.6.2.1 Groundwater: The TNRCC permit does not include radionuclide parameters. In order to prevent further injury to natural resources, DOE regulatory oversight should be shared with another appropriate agency. Also, see comment #10 and 15.

cc: Richard Seiler, Manager, TNRCC NRTP
Don Pitts, TPWD
Diane Hyatt, TGLO
Bob Short, USFW Arlington
Steve Spencer, DOI
Ron Gouguet, NOAA CRC Region 6
Geof Meyer, TNRCC RCRA

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF WASTE MANAGEMENT
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATIONS OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Industrial and Hazardous Waste Division/Corrective Action Section:

1. Hazardous Waste Treatment and Processing Facility (HWTPF) - As noted in the EIS, the Hazardous Waste Treatment and Processing Facility is necessary for compliance with the Agreed Order and Site Treatment Plan, which was negotiated in good faith with the TNRCC and issued on October 3, 1995. The No Action alternative in the EIS eliminates the HWTPF at Pantex, which threatens to put Pantex in noncompliance with the Agreed Order. At no time during the negotiations of the Agreed Order did DOE indicate that construction of the HWTPF was contingent upon an alternative selection process such as represented in the EIS. It is the TNRCC's opinion that, since the current activities at Pantex are the same now as they are in the No Action alternative, DOE should modify the No Action alternative to include development and use of the HWTPF. In other words, DOE should consider the fate of the HWTPF independent of any actions associated with the EIS.

2. Ogallala Contamination - The EIS should be revised to reflect that the Ogallala has been impacted by Pantex operations, as evidenced in recent contaminated samples obtained from Mr. Cockrell's private off-site wells.

3. Homestead Wells - The EIS should note that the low vertical permeability of the fine grained zone may be compromised by abandoned homestead wells. These wells could provide contaminant pathways through the fine grained zone to the Ogallala. The potential for this to occur has been demonstrated at the Cockrell farm east of the Pantex Plant.

4. Facility Boundary - The EIS should mention that DOE will take whatever action is practicable to clean contaminated groundwater to the residential drinking water standards beyond the facility boundary (page 4-69).

5. Regulatory Oversight - The TNRCC would be more willing to embrace Pantex's mission within the State of Texas if DOE would promote independent regulatory oversight for radioactive source, special nuclear, or byproduct material. We applaud DOE's willingness to share its information concerning radioactive contaminants; however, it is our opinion the public would be better served and potential waste management errors minimized if the oversight authority was shared with the TNRCC.

6. <u>Risk</u> - The risk from ingestion of hazardous substances should also be included when calculating risk to on-site workers. The EIS only accounts for risk from inhalation.

7. <u>Pantex Plant Playas</u> - The Risk Reduction Rules (RRR).(30 Texas Administrative Code (TAC), §335, Subchapter S), which include references to the Texas State Water Quality Criteria (30 TAC §307), do apply directly to the Pantex Plant Playas, contrary to the statement on page C-2.

8. <u>Surface Water Quality Values</u> - The surface water quality values determined in accordance with the RRR take precedence over the Risk Based Concentration Guidelines from EPA Region 3 (Section C.1.2). The EPA Region 3 Guidelines are not appropriate standards to apply when values are available in the Texas Surface Water Quality Criteria, the Federal Safe Drinking Water Act, or the Texas Regulations for Control of Radiation (TRCR) (30 TAC §336).

9. <u>Tables C.1.2-1 through C.1.2-3</u> - The standards listed in Table C.1.2-1 should cite values based on the RRR, rather than EPA Region 3 Guidance. For instance, the standard for antimony should be 0.006 milligrams per liter (mg/L), based on the RRR, rather than 0.015 mg/L cited for EPA Region 3 Guidance.

   The standard for gross alpha activity, according to the RRR, should be 15 picocuries per liter (pCi/L), rather than N/A. No water quality standard is provided by the Texas Surface Water Quality Criteria; therefore, the RRR specify use of the drinking water standard:

   The proposed drinking water standard of 50 pCi/L (4 millirems per year) should also be cited for beta particle activity.

   The TNRCC requests that DOE revise Table C.1.2-1 to cite the more stringent surface water quality standards for radionuclides that are developed in accordance with the RRR. As such, the standard for plutonium-239/240 would be 2E-8 microcuries per milliliter (μCi/ml), based on the TRCR standards. Radium-226 and Radium-228 would be 6E-8 μCi/ml, based on proposed federal Drinking Water Standards. Tritium would be 1E-3 μCi/ml, based on the TRCR standards. Uranium-234 and Uranium-238 would be either 3E-7 μCi/ml, the TRCR standards, or 20 μg/L, the proposed Drinking Water Standard, which ever is more stringent.

10. <u>Constituents of Concern</u> - The constituents of concern for groundwater should not be limited to those constituents that exceed risk based concentrations (Section C.2.2, page C-4). In addition, the nature and extent of contamination must be based on background values or laboratory Practical Quantitation Limits (PQL), rather than risked based values. These issues were addressed in DOE's revised Sampling and Analysis Plan and the TNRCC's subsequent approval with modification.

**TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED
OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE
OF NUCLEAR WEAPONS COMPONENTS (March, 1996)**

<u>Monitoring Operations Division/Ambient Monitoring Section:</u>

1. The footnote on National Ambient Air Quality Standards (NAAQS) in Table 4.7.1.3-1 in Volume 1 is inaccurate. Both ozone and PM10 NAAQS are based on expected exceedances, meaning that non-sampling days must be accounted for when calculating attainment determination. The NAAQS is attained when the expected number of days per calendar year, averaged over a three-year period, with maximum hourly average concentration for ozone and 24-hour average concentration for PM10 above the standard is equal to or less than one. SO2 annual, NO2 annual, and lead quarterly NAAQS are not to be exceeded. CO one-hour and 8-hour and SO2 3-hour and 24-hour standards cannot be exceeded more than once per calendar year.

2. In the discussion of air monitoring results on page 4-93 of Volume 1, it is stated that methylene chloride was found at 213 ppbv on July 6, 1993. There is no mention that this concentration was seven times the effects screening level (ESL). Further review and analysis of the methylene chloride data by Toxicology and Risk Assessment staff concluded that this one time episode would not result in any long- term health effects. Although there is detailed discussion of slightly above ESL concentration of 1,2 dibromoethane, this additional discussion on methylene chloride is left out.

3. TNRCC air monitoring at Pantex has found a number of exceedances of the PM10 NAAQS. Although modeling by TNRCC and the EIS staff did not predict possible PM10 violations, actual exceedances happened mainly due to blowing dust and localized earth moving activities. Precisely this kind of scenarios are anticipated in the Consolidation Alternative if additional construction activity takes place at Pantex. The EIS addresses this issue in section 4.7.6 on page 4-118 by stating that mitigation measures will be undertaken to alleviate temporary dust emissions from construction activities. These are standard TNRCC- approved mitigation measures for particulate emission control.

4. TNRCC Modeling staff reviewed Appendix B, Air Quality Analysis, of the Sitewide EIS and their comments are submitted separately. Additionally, the EIS used the same model, the Industrial Source Complex Model, that the TNRCC used for modeling Pantex emissions. EIS modeling was performed in accordance with the EPA guidance document, "Guidelines for Air Quality Models" (revised) and TNRCC guidance document, "Air Quality Modeling

Guidelines." The modeling approach used by the EIS is different from the one used by TNRCC. However, both models arrived at the same conclusion.

5. TNRCC used a tiered modeling approach that included a blend of screen and refined modeling techniques because of the large number of fugitive emission locations, buildings, and pollutants, whereas the EIS modeling used a refined dispersion model to accommodate the large number of emission sources and pollutants.

6. In the TNRCC approach, the TNRCC modeling results were added to the results of the modeling conducted by Radian Corporation in support of a permit application. Radian modeling addressed predicted impacts of emissions from the burning ground and container storage area. Therefore, TNRCC used an additive modeling approach to account for emissions from some of the buildings to assess plant wide emission impact. Using this approach, TNRCC modeling concluded that no predicted exceedances of the criteria pollutant impact public health. The maximum concentrations of alcohols predicted at the property line was slightly above the ESL, but concentrations of alcohols predicted at the nearest residence was below the ESL.

7. Using a different approach, EIS modeling also concluded that there would be no exceedance of the NAAQS for criteria pollutants and that the only hazardous air pollutant that exceeded its ESL was alcohols. Again, predicted maximum concentrations of alcohols for 11 residences located near Pantex were below ESL.

The nonradiological air quality impacts due to the No Action Alternative and the Consolidation Alternative will be minimal, especially if mitigation measures are taken to control particulate emissions due to increased vehicular traffic and construction activity.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Air Quality Planning Division/Permit Modeling Unit:

Data reviewed were contained in Tables B.3.6-1 through B.3.6-9 and Tables B.4.1-1 through B.4.2-3 of the EIS. Please note that no modeling input and output files were available to assist in our review. Therefore, a comparison was made of the emission rates and results presented in the EIS to the emission rates and results reported in the TNRCC's *Modeling Analysis of the Pantex Plant Amarillo, Texas,* dated June 1995.

Some of the sources modeled by the TNRCC were not listed in Table B.3.6-1 of the EIS, so we assumed they were not modeled. However, in the TNRCC analysis the predicted concentrations for the pollutants emitted from the omitted sources, plus all other applicable sources, were less than the respective National Ambient Air Quality Standard (NAAQS). Following is a list of pollutants and omitted sources:

- CO emissions from EPNs 54, 85, and 160,
- NO_x emissions from EPNs 85, 157 and 160, and
- PM_{10} emissions from EPNs 157 and 160.

All predicted concentrations in the EIS were less than those reported by the TNRCC except for alcohols, hydrogen chloride, methylene chloride, and PM_{10}. Except for alcohols, the concentrations for all pollutants were below the respective Effects Screening Level (ESL) or NAAQS. The predicted concentration for alcohols was only slightly higher than the TNRCC-predicted value and less than twice the ESL.

The EIS Tables B.4.2-1 and B.4.2-2 do not include all the pollutants reviewed by the TNRCC. Therefore, we assumed that the EIS did not include an evaluation for them. However, the TNRCC reported in its analysis that no concentrations for these pollutants were predicted to exceed an ESL or state standard. The omitted pollutants follow:

1,3,5- Trinitrobenzene	2,6-Dinitrotoluene
1-Butanol	2-Nitronaphthalene
2,4,6- Trinitrotoluene	2-Ethoxyethanol
2,4-Dinitrotoluene	Acetone

Acetylene
Aluminum
Ammonia
Barium
Benz(a) anthracene
Benz(a) pyrene
Bismuth
Butadiene
Butane
Butene
Calcium
Chlorinated Fluorocarbon
Copper
Cyanogen
Cyclohexane
Cyclohexanone
Dimethylformamide
Dioxane
EthaneEthyl Acetate
Ethyl Ether
Ethylene
Formic Acid
Iron
Isobutane
Isobutanol
Ketene
Lithium
Magnesium
Methane
Methane, dichloro
N-Butyl Alcohol
Non-F Solvents
Ortho-dichlorobenzene
Propane
Propene
Pyrene
Pyridine
Silicon
Tetrahydrofuran
Titanium
Total Suspended Particulate
Trichlorofluoromethane
Trichlorotrifluoroethane

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Toxicology & Risk Assessment Section:

1. On Page 4-93, Paragraph 2, 2nd Sentence: "AQCR 211 is designated by EPA as "better than national standards" for total suspended particulates..."

   Comment: To our knowledge there is no national standard for total suspended particulates. EPA replaced the Total Suspended Particulate standard with the particulate matter standard during the late 1980's.

2. On Page 4-95, Paragraph 5, 2nd Sentence, there is a typographical error.

   Comment: "TRNCC" should be changed to "TNRCC".

3. On Page 4-95, Section: Air Quality Modeling and Corresponding Tables:

   Comment: It is not clear in the narrative whether the air dispersion modeling referenced was conducted as part of the Agreement in Principle or as part of the permit application submitted by the DOE.

4. On Page 4-97, Table 4.7.1.3-4:

   Comment: The following ESLs need to be corrected:

   Ethene, Trichloro: 135 ug/m3 for the annual ESL
   1350 ug/m3 for the 30-minute ESL.

5. On Page 4-98, Table 4.7.1.3-4:

   Comment: The following ESLs need to be corrected:

   Methanol: 262 ug/m3 for the annual ESL
   2620 ug/m3 for the 30-minute ESL.

6. On Page 4-99, Table 4.7.1.3-4:

   Comment: The format of the ESL should be converted to be consistent with the other ESLs represented in the table (e.g., 135 ug/m3 should be 1.35 x 10E2).

JUL 12 '96 16:17 FR ROGER MULDER 512 463 6178 TO 95058456392 P.02/38

STATE OF TEXAS
OFFICE OF THE GOVERNOR

GEORGE W. BUSH
GOVERNOR

July 12, 1996

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Dear Ms. Founds:

Enclosed are the comments from the State of Texas regarding the Pantex Site-Wide Environmental Impact Statement. As you know, a request has been made to extend the commenting period since the Final DOE Standard for calculating the probability of an aircraft crash into the Pantex storage areas has not been released.

While we believe it is imperative that an extension for comments should be granted on those issues related to the aircraft crash estimates, comments on the rest of the document are included in this submission.

Once again, the Office of the Governor would like to thank the U.S. Department of Energy for the opportunity to offer comments on the document. As has been stated on numerous occasions, the State of Texas remains committed to ensuring that all current and future missions at Pantex be conducted in a safe and environmentally sound manner.

This office continues to believe that the Site-Wide EIS correctly concludes that a continuation of current dismantlement and disassembly missions at Pantex will have no significant impact on the health of workers nor any significant adverse impacts on the environment in the Amarillo area.

Likewise, this office continues to believe that any future missions at Pantex related to plutonium can be successfully carried out, provided the following three criteria are met:

Post Office Box 12428 Austin, Texas 78711 (512) 463-2000 (Voice)/(512) 475-3165 (TDD)

JUL 12 '96 16:17 FR ROGER MULDER 512 463 6178 TO 95058456392 P.03/38

Pantex Site-Wide EIS Comments
July 12, 1996
Page Two

1. Continued Local Support Is Earned
2. Proven Technology Is Utilized
3. Independent Oversight Is Guaranteed

During the public hearings in Amarillo on April 22 and 23, 1996, a number of issues were raised directly related to the Pantex Site-Wide EIS. A few of those are:

Comment:

SG-003/1
14.151

In Section 4.14.2.1 (p. 4-219 of the text) and in Figure 4.14.2.1-1 (p. 2-224) a classic error is made in explaining potential latent cancer fatalities. The error is to use risk estimates for exposures to large populations and to assume that applying that risk estimate to a specific group of workers allows for definitive conclusions about that group. In this example, the figure provides the correct explanation. The text is misleading and might cause confusion in the community by indicating that the 330 plant workers would suffer a certain number of cancers.

Question:

SG-003/2
14.152

Health effects are important to understand. The section on continued operations talks about health effects for workers. A statement is made that workers *would* experience additional cancers.

In the figure, a different explanation is used. The statement in the figure is that an average number of cancers could occur if many groups of workers were exposed. The final statement was that the *most likely outcome is zero cancers.*

What is the correct explanation?

Pantex Site-Wide EIS Comments
July 12, 1996
Page Three

Comment:

SG-003/3
12.030

Table S-1 in the Summary, under intrasite transportation, presents person-rem information (Summary page-18). The table is supported by Section 4.12 in the main text. An underlying baseline person-rem appears to be incorporated into the estimates for the Proposed Action alternative. Neither the main text nor the table clearly state the assumptions used. The person-rem shown for the Pit Storage Relocation alternative adds the estimated person-rem for pit storage relocation and the person-rem from the 2,000, 1,000, and 500 weapons levels under the Proposed Action alternative. Thus, while implementing the Pit Storage Relocation alternative, plant workers are assumed to receive the person-rem associated with the Proposed Action alternative. The radiation exposures for individual workers for the alternatives are within regulatory guidelines and do not have any public health significance.

Questions:

SG-003/4
12.031

In Table S-1 for the Proposed Action alternative, 50 workers receive 61 person-rem for 2,000 weapons. Next, 50 workers receive 48 person-rem for 1,000 weapons. Finally, 50 workers receive 41 person-rem for 500 weapons. How does one scale these numbers? The same type of calculations are made for the No Action alternative. Again, the numbers for person-rem do not follow the amount of work.

In the Pit Storage Relocation alternative, the amount of person-rem from the Proposed Action alternative appears to be added to what happens for pit storage relocation. How can one add the person-rem for these two alternatives? Is the same person-rem used two different times?

Comment:

SG-003/5
14.153

Appendix D, "Human Health," does very little to explain how the impact to human health is derived or calculated. This appendix is more of an explanation of the risk assessment methodology than human health.

Pantex Site-Wide EIS Comments
July 12, 1996
Page Four

Comment:

SG-003/6
14.154

The U.S. Department of Energy's Office of Emergency Management (NN 60) and the Office of Emergency Response (DP 23) fund the DOE's Atmospheric Release Advisory Capability (ARAC) which is housed at the Lawrence Livermore National Laboratory. ARAC's computer models, which have world-wide acceptance, have been called into service in many real-time responses to both real and potential accidental releases of radioactive material. The Three-Mile Island nuclear power plant accident in 1978, the 1986 Chernobyl disaster in the former Soviet Union, and the U.S. Air Force Titan II missile accident in Damascus, Arkansas are just a few examples. In addition, the ARAC models have been utilized in every nuclear weapons accident exercise since NUWAX 79. Pantex Plant is an "ARAC Site" and is linked to the ARAC center in Livermore via a computer-to-computer connection. ARAC operators are familiar with Pantex operations and can respond in a matter of a few minutes with a computer model graphic output showing the trajectory of the plume of contamination in the event of an accident. When, and if, a real accident occurred at Pantex it would be the ARAC models and the ARAC capability that DOE would call upon to response in real time.

Question:

Since ARAC is funded by Doe Headquarters and is ready to respond to a radiological accident at Pantex, why did DOE choose to use a model like ERAD to assess consequences for this EIS?

Comment:

SG-003/7
09.018

In Volume I, Section 4.2 "Impact Assessment Methodologies " (p.4-4), under "Biotic Resources," it is stated that "Impacts to wetlands are mostly related to the potential discharge of contaminants to the playas."

Question:

How can impacts to wetlands be related to potential discharges of contaminants? Only actual discharges can have impacts.

SG-003
STATE GOVERNMENTS

JUL 12 '96 16:19 FR ROGER MULDER 512 463 6178 TO 95058456392 P.06/38

Pantex Site-Wide EIS Comments
July 12, 1996
Page Five

Comment:

Table 4.11.1.6-1 presents revenues for the governing bodies within the Pantex ROI (p. 4-165).

Question:

If Pantex is reduced to the 500 weapons activity level, what would be the impact to these revenues?

Again, thank you for allowing us to comment. I look forward to resolving these important issues.

If you have any questions, please call me at 512/463-1866.

Sincerely,

Roger Mulder

ROGER MULDER
Director, Pantex

SG-003
STATE GOVERNMENTS

JUL 12 '96 16:19 FR ROGER MULDER 512 463 6178 TO 95058456392 P.07/38

TDH

Texas Department of Health

David R. Smith, M.D.
Commissioner

1100 West 49th Street
Austin, Texas 78756-3189
(512) 458-7111

Carol S. Daniels
Deputy Commissioner for Programs

Randy P. Washington
Deputy Commissioner for Health Care Financing

Radiation Control
(512) 834-6688

Roy L. Hogan
Deputy Commissioner for Administration

July 2, 1996

Ms. Nanette Founds
U. S. Department of Energy
Albuquerque Operations Office
Post Office Box 5400
Albuquerque, NM 87185-5400

Dear Ms. Founds:

SG-003/8
14.155

Enclosed are comments on the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage. Enhancement of public safety, protection of public health and the prevention of environmental degradation are crucial factors for assessing Pantex Plant mission accomplishment. Texans must be assured that these issues will receive sufficient attention prior to any decisions regarding plant operations. Thorough and complete assessment of consequence analyses to a satisfactory confidence level is required to support the decisions under consideration.

Efforts now underway and programmed to begin in the near future to update assessments and refine estimates of radiological and other health impacts from plant operations on the workers and on the general public must be maintained on schedule to increase confidence in and acceptance of the continued mission at Pantex Plant. We will continue to follow these important issues to satisfactory conclusion.

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Page 2, U. S. Department of Energy

We appreciate having been provided the opportunity to participate in this process. If we can be of any further service, please do not hesitate to contact us.

Sincerely,

Joseph A. Martillotti
Pantex Special Project Coordinator
Division of Compliance and Inspection
Bureau of Radiation Control

Enclosure

cc: R. Mulder/Office of the Governor
V. Battley/DOEAAO

TEXAS DEPARTMENT OF HEALTH
Bureau of Radiation Control
Pantex Plant Sitewide Environmental
Impact Statement DRAFT Comments

SG-003/9
14.156
In the Summary, page S-9, right column, it is stated that 8.1 E-6 Latent Cancer Fatalities (LCF) per year would result from and aircraft crash into a facility with a weapons high explosive detonation. Scenario 3, described in Volume I, page 4-229 conflicts with this statement, indicating that the increased risk is 1.8 E-11 latent fatal cancers per year. Table 3.14.2.1-4 in Volume I page 4-228, Excess Cancer Fatality Risk for Scenario 3 lists 5.1 E-6. These figures need to be verified, reconciled, and, if necessary, corrected.

SG-003/10
14.157
In the Summary, page S-10, left column, it states that from an aircraft crash into Zone 4 facilities, 1.5 E-6 LCF per/yr for 20,000 pits and 9.8 E-7 LCF per yr for 8,000 pits would result. Table 4.14.2.1-4, Volume I, page 4.228, Scenario 9 lists 6.0 E-8 excess cancer fatality risk. For Zone 4 weapons storage, 6.8 E-7 LCF/yr is given on page S-10. Scenario 3 in Table 4.14.2.1-4 lists 5.1 E-6 excess cancer fatality risk. Page 4-250 lists the increase in fatal cancer risk as approximately 2.2 E-11 increase in fatal cancer risk (compared to a baseline risk of 1.5 E-3 per yr). These figures need to be verified, reconciled, and, if necessary, corrected.

SG-003/11
02.028
In the Summary, page S-11, right column, the discussion on Stockpile Stewardship and Management Draft PEIS omits the "Downsize Pantex with transfer of HE Operations" option briefed as a preferred alternative at the April 22-23, 1996 meetings. The Stockpile Management Preferred Alternatives Report, pages 17 through 20 discusses fiscal impacts related to the transfer of HE operations for fiscal years 1996 through 2020. If this issue is anticipated to impact on the Texas Panhandle during the tenure of the Pantex SWEIS, the effect of transporting a large number of HE components over the roadways needs to be included.

SG-003/12
02.029
In the Summary, page S-12, right column, the Light Water Reactor disposition alternative from the Storage and Disposition of Weapons-Usable Fissile Materials PEIS has not been removed, although it was indicated in the April meetings that the LWR was no longer being considered for Pantex. This issue requires clarification.

SG-003/13
14.158
In the Summary, Table S-1, page S-20 gives a 4 E-12 increase in fatal cancer risk, whereas in the same table, on page S-26 a duplicate entry gives 3 E-12. Volume I, page 4-229, Scenario 3 lists an increased risk of 1.8 E-11 LCF per year. Table 4.14.2.1-4, Scenario 3 gives 5.1 E-6 Excess Cancer Fatality Risk. Volume II page 4-250, right column lists 2.2 E-11 increase in fatal cancer risk (per yr). These figures need to be verified, reconciled, and, if necessary, corrected.

SG-003/14
14.159
In the Summary, Table S-2, page S-25 right column, sixth line, between "in" and "0.04", insert "0.11 LCF and".

SG-003/15
14.160
In Volume I, page 4-155, right column, the projected population in the ROI in 2055 ranges between 214,353 and 246,464. Figure 4.14.2.1-1, page 4.223 gives the ROI population of 267,107 for risk estimates. Volume II, page D-28, left column, gives the population in the ROI as 267,107 for fatal cancer estimates. An explanation of the different populations is necessary, or one of the ROI needs to be re-named.

SG-003/16
14.161
In Volume I, page 4-215, right column, the statement concerning the Pantex Epidemiologic Surveillance 1994 Annual Report should be updated to indicate that the report has been released. (The 1995 Annual Report may also be available by the time the Final Report is issued.)

TDH/BRC Pantex SWEIS Comments, Pg 2

SG-003/17 14.162 In Volume I, page 4-223, Figure 4.14.2.1-1, fifth line from bottom incorrectly refers to Table 4.14.2.1-3. The correct reference is Table 4.2.1.1-4. A similar error was noted in Volume II, Appendix E, page E-23, left column at the end of paragraph E.3.1.6.

In Volume I, page 4-264, shipment of chemical high-explosive material does not address shipment of main charges from other DOE sites. The "Downsize Pantex with transfer of HE operations" option", presented as the preferred option in the SS&M PEIS, would necessitate large numbers of shipments of these components. The deletion of relatively few raw HE shipments and subsequent increase in transportation risks from these components needs to be adequately assessed here.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

June 27, 19

Mr. T C. Adams
Governor's Office of Budget and Planning
P.O. Box 12428
Austin, Texas 78711

Re: U.S. Department of Energy (DOE)
Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components
TX-R-96-04-03-0001-50-00

Dear Mr. Adams:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the above-referenced Environmental Impact Statement, and our technical review comments are enclosed. The joint comments of the State's natural resource trustees are also enclosed.

SG-003/18 06.095 The TNRCC is concerned that contamination in the perched aquifers beneath the site indicates that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. The DOE should insure that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

In order to reduce DOE's residual liability for injury to natural resources, the State and Federal trustees encourage DOE to continue to work with the trustees during the remedial process so that appropriate restoration will be incorporated into remedial activities.

SG-003/19 22.024 We applaud DOE's willingness to share its information concerning radioactive contaminants; however, the TNRCC permit does not include radionuclide parameters. And as we have stated before, the TNRCC recommends that the DOE share regulatory oversight with another federal or state agency to minimize the potential for further injury to natural resources.

P.O. Box 13087 • Austin, Texas 78711-3087 • 512/239-1000

Mr. T.C Adams
Page 2
June 27, 1996

Thank you for the opportunity to participate in this review process. I believe these comments will assist the DOE in considering use of the Pantex facility. If you have any questions regarding these comments, please feel free to contact Mr. David Duncan, Director, Intergovernmental Relations Division, at (512) 239-3510.

Sincerely,

Dan Pearson
Executive Director

Enclosures

cc: Commissioners

Texas Natural Resource Conservation Commission -

INTEROFFICE MEMORANDUM

TO: Sidney Wheeler, Intergovernmental Relations DATE: June 14, 1996

FROM. Ginny King, TNRCC Natural Resource Trustee Program

SUBJECT: **Joint Trustee Comments to the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components**

As Lead Administrative Trustee (LAT) on behalf of the State Trustees, Texas General Land Office (TGLO), Texas Parks and Wildlife (TPWD), and Texas Natural Resource Commission (TNRCC), this memo is written to provide the State Trustees' comments on the "Draft Environmental Impact Statement for the Continued Operation of the Pantex Superfund Site and Associated Storage of Nuclear Weapon Components."

General Comments:

SG-003/20 22.025

The Trustees for the State of Texas strongly support the President of the United States and the Department of Energy (DOE) in the unilateral efforts to reduce the number of armed nuclear warheads worldwide. We further recognize the difficult responsibility of storing and stockpiling the Nation's disassembled nuclear weaponry. However, the DOE is one of the Federal Trustees for natural resources and has the responsibility of protecting those natural resources from injury on behalf of the public. In order to protect those natural resources from further injury, the Trustees recommend that the DOE incorporate more stringent environmentally protective practices at the Pantex Superfund site

SG-003/21 06.096

The Trustees do not oppose the DOE plan to construct an expanded Hazardous Waste Treatment and processing Facility (HWTPF). However, contamination in the perched aquifers beneath the site indicate that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. A treatment facility that is constructed and maintained properly will prevent further injury to natural resources. In addition, the increase of industrial discharge volume to 2.9 million liters may exacerbate contamination problems if additional measures are not taken by DOE to protect valuable groundwater resources. DOE should insure that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

Specific Comments:

SG-003/22 22.026

1. Page 1-12, Section 1.2.2 3 Environmental Restoration: The information communicated in this text does not necessarily constitute restoration of the natural resources that have been injured as a result of the releases of hazardous substances at this site. In order to perform actual environmental restoration, the nature and extent of contamination must be determined to evaluate the potential injuries to natural resources. After such a determination, and in

Comment Documents

Review Comments by the TNRCC NRTP
Page 2

SG-003/22 22.026 continued

cooperation with the other Federal and State Trustees, restoration projects should be designed that will appropriately compensate the public for injury to natural resources. Performing remediation as needed to comply with all appropriate regulatory requirements does not necessarily constitute compensatory restoration for injury to natural resources. In order to reduce DOE's residual liability for injury to natural resources, the State and Federal Trustees encourage DOE to continue to work with the Trustees during the remedial process so that appropriate restoration will be incorporated into remedial activities.

SG-003/23 01.040

2. Page 3-2, Section 3.1.1 Proposed Action: Care should be taken to ensure that the continued operation of Pantex Plant activities including "quality assurance testing of weapon components and the research and production of weapon components" is conducted in a fashion that will not increase DOE's liability for injury to natural resources.

SG-003/22 22.026 continued

3. Page 3-3 Performing environmental protection and environmental restoration activities: please see specific comment #1.

SG-003/24 06.097

4. Page 4-2, Affected Environment: The document states that an area of 50 miles surrounding the Pantex site will be considered the region of influence. The Trustees are concerned that this area will not encompass the potential area of natural resources that could be impacted since:

a) the lateral extent of the perched aquifer has not been determined; and

b) documented contamination in the Ogallala and its flow direction provide the potential for this contamination to impact various environmental receptors outside this radius.

SG-003/25 05.040

5. Page 4-3, section 4.2 Impact Assessment Methodologies, geology and soils: Impacts should be assessed on the destruction of any geologic feature not just those specified unique.

SG-003/26 06.098

6. Page 4-3, Section 4.2 Impact Assessment Methodologies, water resources: The qualitative assessment of water quality impacts from wastewater and stormwater runoff does not adequately address potential impacts to surface water and groundwater resources at the Pantex Plant. Furthermore, it does not consider existing contamination in the sediments, surface water and groundwater and their cumulative impacts. The text should be corrected to reflect what actions would be necessary to thoroughly address the potential impacts to these natural resources.

SG-003/27 09.019

7. Page 4-4, Biotic Resources: The text states that US Fish and Wildlife Service and appropriate State agencies have been used in the process of determining whether Pantex Plant operations would impact any plant or animal. This is incorrectly stated. The Trustees understand that an ecological screen has not yet been completed for this site and an ecological risk assessment has not been performed. The text should be corrected to reflect what has actually been assessed at this site and which agencies were involved.

SG-003/28 22.027

8. Page 4-37 Environmental Restoration Process at Pantex Plant: see comment #1

Review Comments by the TNRCC NRTP
Page 3

SG-003/29 06.099

9. Page 4-55 Affected Environments: The text states that there is not evidence that contaminants found in the perched zone have migrated to the Ogallala aquifer. This is inaccurate and should be corrected to reflect that there is documented contamination in the Ogallala aquifer.

SG-003/30 06.100

10. Page 4-62, Section 4.6.1.2 Groundwater: While the discharges that are permitted by EPA and TNRCC have protective standards which presently do not allow excessive levels of contaminants, existing contamination is already present in the perched aquifer and the playas. Therefore, the continual discharge of wastewater provides a hydraulic head potentially driving those contaminants into the Ogallala. Contamination in the Ogallala has been documented and more stringent actions are required in order to prevent further migration of contamination which could result in greater injury to an extremely valuable groundwater resource.

SG-003/31 06.101

11. Page 4-69, Section 4.6.1.2 Groundwater, Perched Aquifer portion: see comment #9

SG-003/32 06.102

12. Page 4-72, Groundwater Quality: The absence of trinitrotoluene in the perched aquifer may not be due to a reduction in the discharge of this contaminant but rather an indication of it breaking down to degradation compounds in the environment. Also, the text states that levels of trichloroethene occurring at the site barely exceed the Risk Reduction Standards (RRS) decision criteria of 5 micrograms per liter. Data used to make this determination may not be representative of actual levels of contamination at the site. To accurately determine what is occurring at this site, properly screened intervals in groundwater monitoring wells to accurately measure "sinking chemicals, metals, radio nuclides and high explosives," as well as the proper suite of analyses, should be employed for all potential contaminants of concern.

SG-003/33 06.103

13. Page 4-78, Section 4.6.2.1 Impacts of Continued Operations, Weapon-related activities, Surface water: A thorough evaluation and consideration of existing contamination in surface water and sediments of receiving waters at the Pantex site is needed to adequately assess the potential impacts of waste water discharges. Cumulative impacts of preexisting contamination and projected waste loads must be considered.

14. Page 4-79, Section 4.6.2.1 ... Groundwater: Potential impacts to the groundwater quality from wastewater discharge activities are not negligible. See comment #10.

SG-003/34 06.104

15. Page 4-80, Section 4.6.2.1 Groundwater: The TNRCC permit does not include radionuclide parameters. In order to prevent further injury to natural resources, DOE regulatory oversight should be shared with another appropriate agency. Also, see comment #10 and 15.

cc: Richard Seiler, Manager, TNRCC NRTP
Don Pitts, TPWD
Diane Hyatt, TGLO
Bob Short, USFW Arlington
Steve Spencer, DOI
Ron Gouguet, NOAA CRC Region 6
Geof Meyer, TNRCC RCRA

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF WASTE MANAGEMENT
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED
OPERATIONS OF THE PANTEX PLANT AND ASSOCIATED STORAGE
OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Industrial and Hazardous Waste Division/Corrective Action Section:

1. Hazardous Waste Treatment and Processing Facility (HWTPF) - As noted in the EIS, the Hazardous Waste Treatment and Processing Facility is necessary for compliance with the Agreed Order and Site Treatment Plan, which was negotiated in good faith with the TNRCC and issued on October 3, 1995. The No Action alternative in the EIS eliminates the HWTPF at Pantex, which threatens to put Pantex in noncompliance with the Agreed Order. At no time during the negotiations of the Agreed Order did DOE indicate that construction of the HWTPF was contingent upon an alternative selection process such as represented in the EIS. It is the TNRCC's opinion that, since the current activities at Pantex are the same now as they are in the No Action alternative, DOE should modify the No Action alternative to include development and use of the HWTPF. In other words, DOE should consider the fate of the HWTPF independent of any actions associated with the EIS.

SG-003/35 06.105 2. Ogallala Contamination - The EIS should be revised to reflect that the Ogallala has been impacted by Pantex operations, as evidenced in recent contaminated samples obtained from Mr. Cockrell's private off-site wells

SG-003/36 06.106 3 Homestead Wells - The EIS should note that the low vertical permeability of the fine grained zone may be compromised by abandoned homestead wells. These wells could provide contaminant pathways through the fine grained zone to the Ogallala. The potential for this to occur has been demonstrated at the Cockrell farm east of the Pantex Plant.

SG-003/37 06.107 4 Facility Boundary - The EIS should mention that DOE will take whatever action is practicable to clean contaminated groundwater to the residential drinking water standards beyond the facility boundary (page 4-69).

SG-003/38 13.030 5. Regulatory Oversight - The TNRCC would be more willing to embrace Pantex's mission within the State of Texas if DOE would promote independent regulatory oversight for radioactive source, special nuclear, or byproduct material. We applaud DOE's willingness to share its information concerning radioactive contaminants; however, it is our opinion the public would be better served and potential waste management errors minimized if the oversight authority was shared with the TNRCC.

SG-003/39 14.163 6. Risk - The risk from ingestion of hazardous substances should also be included when calculating risk to on-site workers. The EIS only accounts for risk from inhalation.

SG-003/40 06.108 7. Pantex Plant Playas - The Risk Reduction Rules (RRR) (30 Texas Administrative Code (TAC), §335, Subchapter S), which include references to the Texas State Water Quality Criteria (30 TAC §307), do apply directly to the Pantex Plant Playas, contrary to the statement on page C-2

SG-003/41 06.109 8. Surface Water Quality Values - The surface water quality values determined in accordance with the RRR take precedence over the Risk Based Concentration Guidelines from EPA Region 3 (Section C.1.2). The EPA Region 3 Guidelines are not appropriate standards to apply when values are available in the Texas Surface Water Quality Criteria; the Federal Safe Drinking Water Act, or the Texas Regulations for Control of Radiation (TRCR) (30 TAC §336).

SG-003/42 06.110 9. Tables C.1.2-1 through C.1.2-3 - The standards listed in Table C.1.2-1 should cite values based on the RRR, rather than EPA Region 3 Guidance. For instance, the standard for antimony should be 0.006 milligrams per liter (mg/L), based on the RRR, rather than 0.015 mg/L cited for EPA Region 3 Guidance.

The standard for gross alpha activity, according to the RRR, should be 15 picocuries per liter (pCi/L), rather than N/A. No water quality standard is provided by the Texas Surface Water Quality Criteria; therefore, the RRR specify use of the drinking water standard.

The proposed drinking water standard of 50 pCi/L (4 millirems per year) should also be cited for beta particle activity.

The TNRCC requests that DOE revise Table C.1.2-1 to cite the more stringent surface water quality standards for radionuclides that are developed in accordance with the RRR. As such, the standard for plutonium-239/240 would be 2E-8 microcuries per milliliter (μCi/ml), based on the TRCR standards. Radium-226 and Radium-228 would be 6E-8 μCi/ml, based on proposed federal Drinking Water Standards. Tritium would be 1E-3 μCi/ml, based on the TRCR standards. Uranium-234 and Uranium-238 would be either 3E-7 μCi/ml, the TRCR standards, or 20 μg/L, the proposed Drinking Water Standard, which ever is more stringent.

SG-003/43 06.111 10. Constituents of Concern - The constituents of concern for groundwater should not be limited to those constituents that exceed risk based concentrations (Section C.2.2, page C-4). In addition, the nature and extent of contamination must be based on background values or laboratory Practical Quantitation Limits (PQL), rather than risked based values. These issues were addressed in DOE's revised Sampling and Analysis Plan and the TNRCC's subsequent approval with modification.

JUL 12 '96 16:23 FR ROGER MULDER 512 463 6178 TO 95058456392 P.18/38

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

<u>Monitoring Operations Division/Ambient Monitoring Section:</u>

SG-003/44 07.024

1. The footnote on National Ambient Air Quality Standards (NAAQS) in Table 4.7.1.3-1 in Volume I is inaccurate. Both ozone and PM10 NAAQS are based on expected exceedances, meaning that non-sampling days must be accounted for when calculating attainment determination. The NAAQS is attained when the expected number of days per calendar year, averaged over a three-year period, with maximum hourly average concentration for ozone and 24-hour average concentration for PM10 above the standard is equal to or less than one. SO2 annual, NO2 annual, and lead quarterly NAAQS are not to be exceeded. CO one-hour and 8-hour and SO2 3-hour and 24-hour standards cannot be exceeded more than once per calendar year.

SG-003/45 07.025

2. In the discussion of air monitoring results on page 4-93 of Volume 1, it is stated that methylene chloride was found at 213 ppbv on July 6, 1993. There is no mention that this concentration was seven times the effects screening level (ESL). Further review and analysis of the methylene chloride data by Toxicology and Risk Assessment staff concluded that this one time episode would not result in any long- term health effects. Although there is detailed discussion of slightly above ESL concentration of 1,2 dibromoethane, this additional discussion on methylene chloride is left out.

SG-003/46 07.026

3. TNRCC air monitoring at Pantex has found a number of exceedances of the PM10 NAAQS. Although modeling by TNRCC and the EIS staff did not predict possible PM10 violations, actual exceedances happened mainly due to blowing dust and localized earth moving activities. Precisely this kind of scenarios are anticipated in the Consolidation Alternative if additional construction activity takes place at Pantex. The EIS addresses this issue in section 4.7.6 on page 4-118 by stating that mitigation measures will be undertaken to alleviate temporary dust emissions from construction activities. These are standard TNRCC- approved mitigation measures for particulate emission control.

SG-003/47 07.027

4. TNRCC Modeling staff reviewed Appendix B, Air Quality Analysis, of the Sitewide EIS and their comments are submitted separately. Additionally, the EIS used the same model, the Industrial Source Complex Model, that the TNRCC used for modeling Pantex emissions. EIS modeling was performed in accordance with the EPA guidance document, "Guidelines for Air Quality Models" (revised) and TNRCC guidance document, "Air Quality Modeling

Page 1

JUL 12 '96 16:24 FR ROGER MULDER 512 463 6178 TO 95058456392 P.19/38

SG-003/47 07.027 continued

Guidelines." The modeling approach used by the EIS is different from the one used by TNRCC. However, both models arrived at the same conclusion

SG-003/48 07.028

5. TNRCC used a tiered modeling approach that included a blend of screen and refined modeling techniques because of the large number of fugitive emission locations, buildings, and pollutants, whereas the EIS modeling used a refined dispersion model to accommodate the large number of emission sources and pollutants.

SG-003/49 07.029

6. In the TNRCC approach, the TNRCC modeling results were added to the results of the modeling conducted by Radian Corporation in support of a permit application. Radian modeling addressed predicted impacts of emissions from the burning ground and container storage area. Therefore, TNRCC used an additive modeling approach to account for emissions from some of the buildings to assess plant wide emission impact. Using this approach, TNRCC modeling concluded that no predicted exceedances of the criteria pollutant impact public health. The maximum concentrations of alcohols predicted at the property line was slightly above the ESL, but concentrations of alcohols predicted at the nearest residence was below the ESL.

SG-003/50 07.030

7. Using a different approach, EIS modeling also concluded that there would be no exceedance of the NAAQS for criteria pollutants and that the only hazardous air pollutant that exceeded its ESL was alcohols. Again, predicted maximum concentrations of alcohols for 11 residences located near Pantex were below ESL.

SG-003/51 07.031

The nonradiological air quality impacts due to the No Action Alternative and the Consolidation Alternative will be minimal, especially if mitigation measures are taken to control particulate emissions due to increased vehicular traffic and construction activity.

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TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED
OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE
OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Air Quality Planning Division/Permit Modeling Unit:

SG-003/52 07.032 Data reviewed were contained in Tables B.3.6-1 through B 3.6-9 and Tables B 4.1-1 through B.4.2-3 of the EIS. Please note that no modeling input and output files were available to assist in our review. Therefore, a comparison was made of the emission rates and results presented in the EIS to the emission rates and results reported in the TNRCC's *Modeling Analysis of the Pantex Plant Amarillo, Texas*, dated June 1995.

SG-003/53 07.033 Some of the sources modeled by the TNRCC were not listed in Table B.3.6-1 of the EIS, so we assumed they were not modeled. However, in the TNRCC analysis the predicted concentrations for the pollutants emitted from the omitted sources, plus all other applicable sources, were less than the respective National Ambient Air Quality Standard (NAAQS). Following is a list of pollutants and omitted sources:

- CO emissions from EPNs 54, 85, and 160,
- NO_x emissions from EPNs 85, 157 and 160, and
- PM_{10} emissions from EPNs 157 and 160.

SG-003/54 07.034 All predicted concentrations in the EIS were less than those reported by the TNRCC except for alcohols, hydrogen chloride, methylene chloride, and PM_{10}. Except for alcohols, the concentrations for all pollutants were below the respective Effects Screening Level (ESL) or NAAQS. The predicted concentration for alcohols was only slightly higher than the TNRCC-predicted value and less than twice the ESL.

SG-003/55 07.035 The EIS Tables B.4.2-1 and B.4.2-2 do not include all the pollutants reviewed by the TNRCC. Therefore, we assumed that the EIS did not include an evaluation for them. However, the TNRCC reported in its analysis that no concentrations for these pollutants were predicted to exceed an ESL or state standard. The omitted pollutants follow:

1,3,5- Trinitrobenzene
1-Butanol
2,4,6- Trinitrotoluene
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Nitronaphthalene
2-Ethoxyethanol
Acetone

SG-003/55 07.035 continued

Acetylene
Aluminum
Ammonia
Barium
Benz(a) anthracene
Benz(a) pyrene
Bismuth
Butadiene
Butane
Butene
Calcium
Chlorinated Fluorocarbon
Copper
Cyanogen
Cyclohexane
Cyclohexanone
Dimethylformamide
Dioxane
EthaneEthyl Acetate
Ethyl Ether
Ethylene
Formic Acid
Iron
Isobutane
Isobutanol
Ketene
Lithium
Magnesium
Methane
Methane, dichloro
N-Butyl Alcohol
Non-F Solvents
Ortho-dichlorobenzene
Propane
Propene
Pyrene
Pyridine
Silicon
Tetrahydrofuran
Titanium
Total Suspended Particulate
Trichlorofluoromethane,
Trichlorotrifluoroethane

JUL 12 '96 16:25 FR ROGER MULDER 512 463 6178 TO 95058456392 P.22/38

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
OFFICE OF AIR QUALITY
REVIEW COMMENTS
OF THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPONS COMPONENTS (March, 1996)

Toxicology & Risk Assessment Section:

SG-003/56 07.036

1. On Page 4-93, Paragraph 2, 2nd Sentence: "AQCR 211 is designated by EPA as "better than national standards" for total suspended particulates..."

   Comment: To our knowledge there is no national standard for total suspended particulates. EPA replaced the Total Suspended Particulate standard with the particulate matter standard during the late 1980's.

SG-003/57 07.037

2. On Page 4-95, Paragraph 5, 2nd Sentence, there is a typographical error.

   Comment: "TRNCC" should be changed to "TNRCC".

SG-003/58 07.038

3. On Page 4-95, Section: Air Quality Modeling and Corresponding Tables:

   Comment. It is not clear in the narrative whether the air dispersion modeling referenced was conducted as part of the Agreement in Principle or as part of the permit application submitted by the DOE

SG-003/59 07.039

4. On Page 4-97, Table 4.7.1.3-4:

   Comment: The following ESLs need to be corrected:

   Ethene, Trichloro: 135 ug/m3 for the annual ESL
   1350 ug/m3 for the 30-minute ESL.

SG-003/60 07.040

5. On Page 4-98, Table 4.7.1.3-4:

   Comment: The following ESLs need to be corrected:

   Methanol 262 ug/m3 for the annual ESL
   2620 ug/m3 for the 30-minute ESL.

SG-003/61 07.041

6. On Page 4-99, Table 4.7.1.3-4:

   Comment: The format of the ESL should be converted to be consistent with the other ESLs represented in the table (e.g., 135 ug/m3 should be 1.35 x 10E2).

L 12 '96 16:25 FR ROGER MULDER 512 463 6178 TO 95058456392 P.23/38

DIVISION OF EMERGENCY MANAGEMENT
TEXAS DEPARTMENT OF PUBLIC SAFETY

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JAMES R. WILSON
Director

TOM MILLWEE
Coordinator

July 5, 1996

Roger Mulder
Director, Special Projects
Environmental Policy Division
Office of the Governor
1100 San Jacinto, Room 415
Austin, Texas (via Interagency Mail)

Dear Mr. Mulder:

We have reviewed the draft *Pantex Site-Wide Environmental Impact Statement*. Our comments are attached.

My point of contact for this matter is Russ Lecklider. Please contact Mr. Lecklider at 424-2429 if you have any questions regarding our comments.

Sincerely,

Tom Millwee
State Coordinator

STM:RPL:ss

Attachment: DEM Comments on Draft *Pantex Site-Wide Environmental Impact Statement*

RL-1-96/07:sv-ele

JUL 12 '96 16:25 FR ROGER MULDER 512 463 6178 TO 95858456392 P.24/38

Division of Emergency ManagementComents
on the
Draft *Pantex Site-Wide Environmental Impact Statement*

Section 4.16, Intersite Transportation of Nuclear & Hazardous Materials·

Section 4.16.1 indicates that non-radiological consequences of transportation were not considered in the analysis. Various DOE publications indicate that DOE is considering moving the high explosives fabrication mission from the Pantex Plant to Lawrence Livermore National Laboratory (LLNL) or Los Alamos National Laboratory (LANL) or both. It appears that such a relocation could significantly increase the risk of a hazardous materials transportation accident. Currently, explosives are shipped to Pantex in bulk and fabricated into components; the components are then installed in weapons. This arrangement requires a limited number of bulk shipments of explosives to Pantex and means that fabricated HE components are transported within the Pantex Plant site.

Should the high explosives fabrication mission be moved to LLNL or LANL, bulk shipments would be made to those laboratories and the HE components would be fabricated and packaged for shipment at those sites. The components would then have to be shipped by Safe Secure Tractor-trailer (SST) over public highways for substantial distances to the Pantex Plant for use. Since packaged, fabricated components typically occupy much greater volume than the raw materials used to make them, a substantial number of hazardous materials shipments would be required. Such shipments increase the risk to the public of traffic accidents and the effects of accidents involving explosive cargo, which frequently include fires and explosions.

JL-1-96/C7:ou-a1e

JUL 12 '96 16:25 FR ROGER MULDER 512 463 6178 TO 95858456392 P.25/38

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Date: July 11, 1996

To: Roger Mulder
Office of the Govenor

From: Randall Charbeneau

Subject: Draft EIS for Pantex

SG-003/62 06.112
- The sections that deal with Geology and Soils, and with Water Resources are generally well done. One issue that is still not adequately covered relates to the perched aquifer. The extent of the fine-grain zone which forms the perching layer is not known. The question of what happens to the perched aquifer is not discussed. Does the fine-grained zone pinch out with the perched aquifer groundwater flowing off the side, down to the Ogallala? Alternatively, will the perched aquifer eventually migrate through the fine-grained zone and down to the Ogallala? All that the Draft EIS acknowledges is "Recharge to the area aquifers is not fully understood."

SG-003/63 06.113
- Groundwater was not considered as a pathway for exposures potentially impacting human health. An obvious concern of some people in the area is contamination of the Ogallala from Plant activities. In what way were groundwater scenarios considered, and what pathway assumptions were used?

SG-003/64 06.114
- Table C.2.2-2 in Volume II provides data on chemical concentrations measured in the perched aquifer. A great deal of data is here, but I do not believe that it represents all available data. The Draft EIS should explain what data was used and what data was not used, and why.

- The conclusions drawn with respect to potential impacts on Geology and Soils, and Water Resources appear to the well based.

Bureau of Engineering Research

JUL 12 '96 16:26 FR ROGER MULDER 512 463 6178 TO 95058456392 P.26/38

BUREAU OF ECONOMIC GEOLOGY
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10100 Burnet Road, Bldg 130 · Austin Texas 78758-4497

July 10, 1996

U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Attention: Ms. Nanette Founds

Dear Ms. Founds:

The following are review comments on the "Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components" from staff at the Bureau of Economic Geology of The University of Texas at Austin.

General Comments:

SG-003/65 05.041 SG-003/66 06.115 | Sections 4.5 and 4.6, which describe water resources and geology and soils, do not provide sufficient information for the reader to determine if environmental impacts could result from continued operations and storage of nuclear weapons at Pantex.

SG-003/67 05.042 | Some of the maps in this document are used without referencing or obtaining permission of the author. Figure 4.5.1.2-1 was published by Gustavson (1981), but attributed to DOE (1981). Figure 4.5.1.2-2 was prepared by Davis, Pennington and Carlson (1989), but attributed to DOE 1995.

Specific Comments:

SG-003/68 05.043 | Page 4-27, Geomorphology, para. 1, ln 13. It is inaccurate to state that playa basins could play a role in the contamination of ground water at Pantex Plant. Playa basins and ditches have been shown to be the sites where contaminated surface water is recharged to the subsurface (Gustavson and others, 1995).

SG-003/69 05.044 | Page 4-27, Stratigraphy, para. 1, ln 4. The Blackwater Draw and Ogallala Formations beneath the Pantex Plant are not lithified and therefore are not rocks. The correct term is sediments. Rephrase sentence to "The stratigraphy of the *sediments and* rocks . . ."

SG-003/70 05.045 | Page 4-27, Stratigraphy, para. 2, ln 6. The upper unit of the surface soil (Pullman clay loam) of the Blackwater Draw Formation is the A horizon and it contains no caliche. The first soil carbonate is found at a depth of about 24 inches in the upper part of the B horizon (US Department of Agriculture, Soil Conservation Service, 1972, Pullman Series: Established Series, 4 p).

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Ms. Nanette Founds
July 10, 1996
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SG-003/71 05.046 | Page 4-29, Stratigraphy, para. 1. The variable lithologies of the Ogallala and Blackwater Draw Formations are not described. These descriptions should include a brief discussion of the complex heterogeneity of the Ogallala and Blackwater Draw because the variation in sediment types controls ground water flow in the formation.

SG-003/72 05.047 | Page 4-29. Sentence describing the lower part of the Ogallala implies that the fine-grained zone is the base of the lower Ogallala and generally confuses channel deposits above the fine-grained zone (which actually falls within the middle part of the Ogallala) with predominantly fluvial Ogallala sediments within the lower part of the Ogallala Fm below the fine-grained zone.

SG-003/73 05.048 | Page 4-29, Stratigraphy, para. 1, ln 29. The fine-grained zone is not a sandstone. Limited available core from the fine-grained zone shows interbedded sands, silty sands, and muds. Because of the variability of sediments in this unit, the vertical hydraulic conductivity varies by 3 orders of magnitude. Geophysical logs and core show that at least part of the fine-grained zone consists of fining upward sequences of fine sand, silty to clayey sand, and mud. Furthermore, these sediments are not lithified; thus, they are not sandstones.

SG-003/74 05.049 | Page 4-30, Figure 4.5.1.1-2. Well PXSB-03 is not just coarse sand. There are about 50 feet of sand and gravel near the bottom of the well.

SG-003/75 05.050 | Page 4-31, para. 3, ln 1. Salt dissolution and accompanying subsidence or collapse are rapid processes on a human time scale. More than 2,000,000 tons of salt are dissolved each year along the eastern margin of the High Plains in the Texas panhandle. Furthermore, about 2 years ago a very large sinkhole (250 ft wide and more than 60 ft deep) formed in northeastern Hall County, which like the Pantex Plant lies in the salt dissolution zone shown in figure 4.5.1.2-1. Development of this sinkhole was described in the Amarillo newspaper.

SG-003/76 05.051 | Page 4-31, para. 3, ln 1. No attempt is made to describe the role of salt dissolution and subsidence in the formation of playa basins. High solute loads in streams draining the region indicate that these processes are active regionally. No mention is made of the potential effects, if any, of dissolution-induced subsidence at the plant.

SG-003/77 05.052 | Page 4-31, para. 3, ln 11. While it is true that sinkholes or fractures associated with salt dissolution have not been described in Carson County, several playas on or near the Pantex Plant have been associated with dissolution induced subsidence. Furthermore, sinkholes or fractures have been identified in adjacent Armstrong *and Donley* Counties to the south, *in Potter County to the west,* and in . . .

SG-003/78 05.053 | P. 4-32, Figure 4.5.1.2-1. Gustavson (1981) who compiled the information on which this map is based, showed that sinkholes or fractures have been recognized in Oldham, Potter Donley, Briscoe, Motley, and Dickens Counties in addition to the counties shown here.

SG-003/79 05.054 | Page 4-33, para. 2. Davis, Pennington, and Carlson (1989) reviewed in considerable detail the history of earthquakes in the Texas Panhandle. Events are shown using the Richter scale.

Ms. Nanette Founds
July 10, 1996
Page 3

SG-003/80 05.055 | Page 4-33, Soil Types, para. 2 or 3. No attempt is made to point out that Randall clay soils are Vertisols and that deep desiccation cracks and root tubules, which are potential pathways for recharge, are characteristic of these soils. Furthermore, these soils have a udic moisture regime, which means that water moves down through the soil at some time in most years. That is, recharge occurs through even these clay soils.

SG-003/81 05.056 | Page 4-33, Soil Types. In the discussion of soil sampling activities, there is no mention of the preliminary soil sampling that took place as a result of the May 1989 tritium release. This is a significant problem resulting from this omission for two reasons. First, there is no mention of this event or the known areas of contamination within this report. Second, there have still not been any characterization efforts completed beyond the initial preliminary assessment, to determine the amount of contamination from this tritium release. This lack of characterization continues despite, at least using one data set, the apparent increasing tritium levels in perched ground water in the area of playa 1.

SG-003/82 05.057 | Page 4-35, Figure 4.5.1.2-2. Pantex is incorrectly located on the map. The correct location is approximately 1/4-inch to the northeast of the center of the black square or immediately adjacent to the system of faults and earthquake locations that mark the buried Amarillo Uplift. The city of Amarillo is not located on the map.

SG-003/83 05.058 | Page 4-60. The statement is made that there is no surface expression of sinkholes or fractures associated with salt dissolution in Carson County. We argue that, based on seismic data at the plant, the playas themselves are a sinkhole-like expressions of salt dissolution.

SG-003/84 05.059 | Page 4-50, Wepons Related Activities, para. 2, ln 2. The statement is made that the "potential impacts due to subsidence (resulting in sinkholes and/or surface rupture) are considered negligible because salt dissolution is a slow process relative to human activities." While the rate of salt dissolution may be slow relative to geologic time, the surface expression of salt dissolution can be catastrophic and result in the loss of life and property. Another inaccurate statement in this same paragraph refers to the absence of sinkholes in Carson County. Paine (1994) demonstrated that many playa basins in the vicinity of the Pantex Plant formed as a result of surface subsidence over areas of salt dissolution. In this context playa basins are similar to sinkholes found elsewhere in the salt dissolution zone. Thus, it is inaccurate to imply that there are no subsidence features in Carson County by simply stating that there are no sinkholes. A better approach would be to explain that sinkholes are the product of catastrophic, rapid collapse into an underground cavern. Playa basins on-the-other-hand formed in part as the result of relatively slower surface subsidence over areas of salt dissolution.

SG-003/85 06.116 | Page 4-55, Affected Environment, para. 2, ln 19. The statement is made that there is no evidence that the contaminants found in the perched aquifer have migrated to the Ogallala aquifer. Only a few (2 or 3) Ogallala aquifer monitor wells are located in areas where there is perched ground water present. There are no Ogallala monitor wells beneath badly contaminated areas such as Zone 12, so there are no data on which to base the conclusion that no contamination has occurred. Furthermore, the unsaturated zone between the Ogallala and perched aquifers has not been sampled so it is not known if these waters and sediments have been contaminated.

Ms. Nanette Founds
July 10, 1996
Page 4

SG-003/86 06.117 | Page 4-62, Ground water, para. 1. There is no discussion of sediment heterogeneity, which strongly affects ground water flow rates.

SG-003/87 06.118 | Page 4-63, Figure 4.6.1.2-1. Why are there no monitor wells in the area of playa 4 ? Considering all of the discharge that has occurred from zone 12 south to playa 4, it would seem appropriate to determine the nature of the hydrogeology in this area.

SG-003/88 06.119 | Page 4-65, Perched Aquifer, para. 2, ln 1. Contrary to this confusing statement, there are areas at Pantex where perched ground water is present, but where gravel channels are not present and vice versa. The presence of gravel channels does not control the presence of perched aquifers; it is the presence of a stratigraphic horizon (in this case the fine grained zone) with a vertical hydraulic conductivity lower than the flux of recharge water moving through the unsaturated zone. It is quite obvious that if the gravel channels were underlain by a coarse sand then no perched aquifer would have formed.

SG-003/89 06.120 | Page 4-69, para. 4, ln 6. If the spread of contaminants in the perched aquifer is limited to the confines of the perched aquifer in buried channel deposits, then why are there so many perched aquifer monitor wells in Zone 12 with contaminants, but located outside the gravel channel as mapped on page 4-66? It seems obvious that something other than gravel channels is, at least in part, controlling flow in the perched aquifer and that contaminants are present in perched aquifer water outside the gravel-filled channel.

If you have any questions concerning these comments, please call me at (512) 471-0232.

Sincerely yours,

Thomas C. Gustavson
Senior Research Scientist

TCG:mk

cc: R. Mulder, Governor's Office
T. Grimshaw, BEG
J. Raney, BEG

JUL 12 '96 16:20 FR ROGER MULDER 512 463 6170 TO 95058456392 P.30/38

COLLEGE OF ENGINEERING
THE UNIVERSITY OF TEXAS AT AUSTIN
Center for Transportation Research · Suite 200
3208 Red River · Austin, Texas 78705-2650 · (512) 472-8875 · FAX (512) 480-0235

July 12, 1996

Mr. Roger Mulder
Director, Pantex
Office of the Governor
P. O. Box 12428
Austin, TX 78711

Dear Mr. Mulder,

We have reviewed both the Draft Site Wide EIS and the draft working documents used for preparing the Final EIS. We have also met with DOE personnel and contractors preparing the DOE Standard for evaluating probabilities for aircraft accidents. After this review, we present the following written comments and request that they be addressed in the Final EIS.

SG-003/90
15.088

1. As of this date, July 11, 1996 - the eve of the closing of the comment period for the draft EIS - those personnel from Tetra Tech responsible for preparing the Final EIS have not (1) received the Final DOE standard, (2) have not received the final technical support documentation, and (3) have no idea if the probability of an aircraft crash into a Pantex plutonium storage facility is 1 or 100 in a million. Therefore, at the close of this comment period, we can not verify their results because none is available. What is known is that everything published in the draft EIS will be changed based upon the new DOE standard.

SG-003/91
15.089

2. The aircraft crash rates are fixed in the DOE standard; however, do not have access to either the Technical Support Documentation nor the data from which the accident crash rates (usually reported as accidents per hundred thousand flying hours) have be calculated into a crash probability for each takeoff, for each landing, or an inflight rate per square mile. This calculation requires many assumptions and several different steps. From interviews, we have determined the draft DOE standard does a credible job in establishing these crash rates. However since DOE contractors have denied access to both the data and the technical support documentation, we request that that the following points of potential errors be addressed by the DOE contractor, reviewed by a competent authority, and be included in the Final EIS:

SG-003/92
15.090

A. Military Crash Rates - Military aircraft perform touch and go landings for proficiency training only with an instructor on board. Additional landing practice is accomplished as a low approach with the wheels not touching the runway. The civilian tower counts this low approach as two operations (1 takeoff and 1 landing) but no record of a landing is recorded in the military records. We request details of how this discontinuity in the raw data is accounted for in the DOE standard. We request that following data be published in the Final EIS for all military aircraft with significant impact at the Pantex facility: accident and crash rates per hundred thousand flying hours; average hours per sortie; average landings and low approaches per sortie; and number of crashes attributed to landing, takeoff, and inflight categories.

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Mr. Roger Mulder
July 12, 1996
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SG-003/93
15.091

B. General Aviation Inflight Crash Rates - It was pointed out in interviews that there are 422 off-airport crashes per year of general aviation aircraft in the United States which are considered in the calculation of the probability inflight crash rate. This data may be true, but it would be overly conservative to assume the probability of crash into a vacant or farming square mile was equal to the probability of crash into a built up areas such as the Pantex compound. Many general aviation crashes are the result of engine failure, nearly all general aviation aircraft have flight controls that function without power and pilots are trained to attempt forced landings in those emergencies. No pilot given a inflight situation where some flight control remains, would aim at the Pantex compound rather than away from the reinforced structures at the compound. Given the good weather conditions at Amarillo and the relatively open spaces surrounding the Pantex compound, the crash rate cited in the DOE standard should be greatly reduced for the local application of inflight general aviation aircraft.

SG-003/94
15.092

3. In general we feel the DOE standard is a tremendous improvement in accuracy over the previously used Solomon model for predicting the probability of an aircraft crash into a facility. The Solomon model was far too overly conservative in the estimate of the contribution of high altitude overflight aircraft. Since this new DOE standard corrects the inflight contribution of the Solomon model, we would logically expect that the probability of an aircraft crash into the Pantex plutonium storage facilities should decrease from previous studies that used the Solomon model. We request that the Final EIS provide some narrative description of the new calculation of hit probability in comparison to the previously conducted studies and a short justification for the differences in the findings.

SG-003/95
15.093

4. After reviewing the draft EIS and conducting interviews, we recommend that the DOE standard in its application to the Pantex facility be localized for the conditions and aircraft traffic in the following ways:

A. The small military aircraft subcategory which makes up a large portion of the traffic at Amarillo Airport must be studied by specific aircraft types. The T-38 and T-1 aircraft which are the dominate aircraft types in the traffic stream must have separate hit probabilities as well as separate release probabilities.

SG-003/96
15.094

B. The closure of Reese AFB in Lubbock, Texas by December 1996 will have a significant effect on the forecast T-1 and T-38 traffic at Amarillo Airport and therefore attempts must be made to use the actual forecast numbers rather that past history for these aircraft.

SG-003/97
15.095

C. The collection of RAMS data at Amarillo Airport has provided the Department with a very good record of the number and types of aircraft and their ground track in comparison to the Pantex facility. This data should be used when necessary to adjust DOE standard crash rates which are based upon a total average of all airports throughout the United States. The takeoff ground tracks for Runway 04 do not follow the typical pattern assumed when the data was collected for the DOE standard.

SG-003/98
15.096

D. When using the RAMS data, insure that military aircraft that are in formation be counted as multiple aircraft rather than as a single aircraft.

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Mr. Roger Mulder
July 12, 1996
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SG-003/99 15.097 E. The Pantex facility has super stout structures and consideration of the structural capacity and resistance to aircraft penetration should be accurately modeled.

SG-003/100 15.098 F. The effective aircraft crash skid length should be localized to consider the local conditions at the Pantex facility.

SG-003/101 15.099 G. The FAA and DOE have agreed to several mitigation measures to reduce the probability of aircraft impact into Pantex and we applaud those efforts. The draft EIS provided an estimate of the effectiveness of these measures using the Solomon model which were significant. Although the application of this new model in the DOE Standard will probably estimate the effectiveness of these measures as insignificant, we believe they are significant and should be estimated separately.

SG-003/102 15.100 5. We recommend that DOE continue to collect radar data at the Amarillo airport as a mitigation item for the Site Wide EIS. We highly recommend that the current method of tracking radar should be improved with DOE funding a state-of-the-art system that is equal to the noise monitoring systems installed at many major airports in the US. This system should be automated and integrated with a geographical information system and be turned over to the airport for their use in airport planning.

Sincerely,

Michael T. McNerney, Ph.D., P.E.
Director
Aviation Research Center

MTM:ls

JUL 12 '96 16:29 FR ROGER MULDER 512 463 6178 TO 95058456392 P.33/38

James C. Rock
Department of Nuclear Engineering
Texas A&M University
College Station TX 77843-3133

11 July 1996

Subject: Aircraft Accidents and the Draft Pantex Site Wide Environmental Impact Statement (SWEIS)

SG-003/103 15.101 1. First, let me start by observing that the Department of Energy (DOE) has created the best available models for assessing the probability of an aircraft accident at any point in the country. Second, DOE is to be congratulated for using their models in their Environmental Impact Assessments. Third, DOE is continuing to improve their aircraft accident models. Unfortunately, this continuous improvement poses difficulty for those who try to comment on the draft SWEIS for Pantex. A major shift in modeling assumptions occurred between July 1995 and July 1996. The predicted annual risk of an aircraft accident in any square mile has increased as a result of changes in the model, not as a result of changes in the aeronautical environment in the vicinity of the Pantex Plant

COMMENT: The aircraft accident risk depends as much on the aeronautical environment as it does on the assumptions of the model used for predictive purposes. The final SWEIS must clearly portray both effects. It is important that this issue be addressed in the Executive Summary as well as in the EIS itself.

SG-003/104 15.102 2. The discussion in the SWEIS points out that an Aircraft Accident can be an initiating event in a scenario that leads to public exposure to radioisotopes. Because this is a very unlikely event, the authors attempt to quantify the probability of the event. The Draft SWEIS used the Draft DOE Guidelines for Aircraft Accident Prediction (July 95, Revised). During the period of public comment, HQ DOE announced its intent to publish final guidelines, now promised for mid-July 1996. Further, DOE wants the final SWEIS to be based on the final guidelines. The new paradigm is that aircraft accident locations are best predicted on the basis of the locations of previous accidents The location probability density function is a smoothed average over the whole nation for en route accidents For near airport accidents it is a smoothed function of all accidents as a function of distance and direction from a composite runway. This is a major change from the draft guidelines and prior accident models. These assumed the impact location would be near the point along an established "flyway" where an aircraft encountered difficulty and used probability factors with dimensions of accident probability per mile of flight.

J. C. Rock, Texas A&M University 11 July 1996 1

SG-003/104 15.102 continued

Preliminary calculations show that the new model predicts accident rates 2 to 10 times higher than the older models.

QUESTION: Since the Pantex SWEIS will be the first to use the new DOE Aircraft Accident Guidelines, and since it may be used to compare predicted accident probabilities at Pantex to those at other DOE facilities, how does DOE intend to explain the changed paradigm to members of the public and to senior decision makers?

SG-003/105 15.103

3. In cooperation with FAA, DOE has initiated several mitigation measures to reduce the probability of an aircraft accident involving Pantex facilities. These include moving the back course localizer 6 degrees west and creating GPS instrument approaches that move takeoff and landing operations more than 2 miles away from Pantex. Plans exist to move the VOR onto the airport from its present location near then Pantex fence line. This will reroute high altitude traffic away from Pantex facilities. Unfortunately, the new accident model, based only on the history of previous aircraft accidents, is unable to demonstrate reduced accident probabilities from mitigation measures. From conversations with Kamiar Jamali, DOE did not intend this model to be used for mitigation design. It is designed to provide a common basis for comparing one DOE location to another. Nevertheless, as existence proof for the benefit of mitigation measures, note that the White House is surrounded by a no-fly zone.

QUESTION: Request that DOE insure that the final SWEIS give appropriate credit for mitigation measures completed and contemplated. See the next comment for a suggestion.

SG-003/106 15.104

4. To better understand the true flight environment at Amarillo, DOE installed the RAMS system to record the flight tracks of every aircraft operating near the Pantex Plant. This data has been analyzed by Dr. Y.T. Lin of Sandia Labs. In his paper, "Assessment of Aircraft Risk Reduction at Pantex Plant," he uses actual RAMS data to compute the probability density function for aircraft distance from zone 4 for all recorded aircraft. Dr Lin uses this data to make three relevant points:

1. It shows dramatic differences in overflight activity on days when the USAF is flying compared to days when there are no military flights

2. Only a small fraction of all flights approach within 2 miles of zone 4

3. The daily total of high altitude en route flights and low altitude en route flights provide no clue as to the location of the VOR or of the FAA route structure. These flights are better modeled as uniformly distributed.

QUESTION: Can Dr Lin's approach to analyzing RAMS data be used to demonstrate efficacy of mitigation measures?

SG-003/107 15.105

5. The proposed DOE Standard 3014-96, uses a hierarchical accident analysis scheme starting with simple, conservative models and progressing towards complex, accurate models. A screening level of risk < 1E-6 / yr is recommended. If at any point in the progression, the aircraft crash probability falls below this level, no further analysis is required. It is presumed that other initiating events become more important than aircraft accidents at this probability level. There are two problems with this approach. First, it leads some to believe that only when the aircraft accident probability is below 1E-6 / (sq mi* yr) has an adequate margin of safety been provided. Second, the base accident rate for general aviation aircraft is on the order of 500 /yr over 4,000,000 sq mi, or about 1E-4/(sq mi * yr). There are four other categories of aircraft in the DOE guidelines, each with their own accident rate: large military, small military, commercial air carrier and commercial air taxi. Thus, the total aircraft accident probability in the continental United States is above the screening rate, and full analysis is mandated by the DOE standard.

COMMENT: DOE should very clearly explain the meaning of their screening level and of any aircraft accident probabilities computed for the Pantex SWEIS. The Pantex SWEIS will be the first to use the new geographic based guidelines. Other DOE laboratories and locations have analyzed their aircraft accident risk using earlier draft guidelines. Since DOE claims the aircraft accident model is designed to compare relative risk among DOE facilities, the revised prediction for all DOE sites should be included in the Pantex SWEIS. This means that the new guidelines need to be applied to all DOE operating locations so that Pantex can be viewed in proper relationship to the others

SG-003/108 15.106

6. Although the geographic modeling approach is an interesting exercise, the SWEIS should also contain complete Amarillo Aircraft accident data from 1970 to 1996. This data should then be explained in the context of the aircraft accident model. That is, based on the accident model, is the real experience an expected outcome?

COMMENT: Suggest using the binomial distribution to estimate the confidence in the predicted accident rate. Use confidence interval principles to determine if the location and frequency of observed accidents are in reasonable agreement with the model.

SG-003/109 15.107

7. Personnel at HQ DOE understand the difficulty of explaining the aircraft accident probabilities to the public. In a lively discussion at SAIC on 9 Jul 96, hosted by Tim Haley and chaired by Kamiar Jamali, the suggestion was made that EIS analyses not report the aircraft accident probabilities. These probabilities are intermediate results from the model and do not indicate public health risk. An accident is merely a potential initiating event. The suggestion was that the EIS should focus on the release probabilities, instead. This movement from "hit probability" to "release probability" involves many intermediate layers of modeling. First, one must assume the angle of impact for the aircraft. Second, assume an impact velocity and

SG-003/109 15.107 continued

compute the skid distance during which the aircraft retains sufficient kinetic energy to penetrate a storage magazine or transport trailer and storage container. Third, compute the probability that an aircraft will impact within the dangerous skid distance from the facility heading toward that facility. Fourth compute the probability that a fire or a dense part of the aircraft will penetrate or destroy the facility. Clearly, the probability that all of the above events occur together is many orders of magnitude smaller than the simple probability that an aircraft hits near a critical facility or transporter. It is also clear that values assigned to the coefficient for each step affect the confidence interval about the point estimate of the release probability. The understandable tendency is to assign worst case values to all parameters to create an upper bound on the estimated release probability. For purposes of communicating to the public, it is desired to have an estimate of the central tendency, the median or the mean value of the release probability as well.

COMMENT: Include both the worst case and the mean value of the release probability due to aircraft accidents. The difference between point estimates of the worst case and of the typical case will give public officials an internally consistent estimate of the safety factors built into the prediction algorithm used.

SG-003/110 15.108

8. Not all structures proposed for storage and handling operations at Pantex are constructed in the manner and with the materials assumed in the DOE structural vulnerability analysis. That analysis seems to assume standard rebar reinforced concrete construction techniques. At Pantex there are some facilities that are more stout and some that are less stout than the analysis in the draft SWEIS seems to assume. Bundling the stout structures into the analysis probably creates a pessimistic estimate of the true risk of release.

COMMENT: Suggest DOE obtain data from a test involving crashing an F-4 into a section of a commercial reactor containment vessel. Use that data as a basis for assessing the likelihood that a small military aircraft crash could be an initiating event for a release incident in a stout structure. Then assess the effect on the overall risk to Pantex operations.

SG-003/111 15.109

9. The present model seems to assume that an accident that results in internal spalling of a structure will produce a release. This assumption seems overly conservative for pits stored in approved storage or shipping containers. Again, the data from the F-4 Crash Test may provide valuable clues to the appropriateness of the analytical assumptions in the release models.

COMMENT: Clarify in the EIS the release probability from spalling incidents. This may be one of the factors leading to an overly pessimistic assessment of the consequences of an aircraft accident. Since pits will be stored without chemical explosives, spalling seems an unlikely source for damaging both the storage container and the cladding on the pit.

SG-003/112 15.110

10. In the aircraft accident consequence analysis, the DOE model assumes that either a direct impact or a skidding impact can lead to a release. The model assumes that the aircraft (or its dense structures acting as kinetic missiles) retains dangerous velocities for the entire skid. In reality, the velocity slows continuously during the skid. The target area is computed from the actual facility dimensions, the aircraft wingspan and the skid distance. The skid distance is the dominant factor in target area.

QUESTION: Why not use a linearly decreasing velocity as a conservative means for estimating remaining kinetic energy during a skid? This would dramatically reduce the area involved in target zones and would refine the point estimate of critical aircraft accident probability.

SG-003/113 15.111

11. The structural damage modeling assumes all aircraft in a single FAA category pose similar risk to structures. These categories are useful for licensing, air traffic control and taxing purposes, but may not be ideal for accident analysis. For example, both a T-37 and an F-15 are included in the small military category. The T-37 has much less kinetic energy than an F-15, and has much smaller components that could become missiles. The damage potential of a T-37 matches that of many general aviation aircraft better than it does an F-15. Nevertheless, the default portions of the DOE guidelines treats them identically.

QUESTION: Why does DOE use FAA categories rather that a more technical criteria to group aircraft? Suggest a product of wing loading and gross weight as a better metric. Aircraft with high wing loading always approach faster than those with low wing loading. Aircraft with high gross weights always have more stout pieces in their structures and engines than aircraft with low gross weights.

SG-003/114 15.112

12. Dr Lin's analysis of nearest point of approach for each flight trajectory provides an alternative for site-specific accident modeling. It is not likely that his work can be extended to a full analysis of RAMS data within the promised schedule for the final SWEIS. However, his work does suggest that a careful examination of consequence analysis assumptions may be in order. One is tempted to believe that aircraft flying directly over a facility may pose the greatest risk. However, any aircraft impacting a facility from within a cone above that facility must impact at a very large glide slope angle. At angles greater than 30 degrees, there is virtually no skid distance. Thus the facility floor plan is the target area for impact from above. Because this area is much smaller than that assumed in the DOE guidelines, the probability of this accident is much smaller

QUESTION: Can the distribution of the points of closest approach be used to determine both the slant range and the line of sight angle to critical facilities? The effective target area for each facility will depend strongly on the impact angle. This effect is not included in the DOE guidelines because they default to a specified point estimate of the impact angle. The basis for

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SG-003/114 15.112 continued

this assumption is apparently discussed in the technical support documents for the DOE Standard, but that is not yet published, and may not be published for several more months.

COMMENT: A Monte Carlo analysis is likely the right means for accommodating this important effect.

SG-003/115 15.113

13. A full risk assessment of aircraft accident potential would include a term for a collision between an aircraft and a transport trailer, either on site during transport between structures or off site during cross country transport. No such term is evident in the draft SWEIS.

COMMENT: Suggest that the probability of an aircraft accident impacting a transporter be computed. Due to the short duration of exposure while in transit, it is expected that this risk will be shown to be negligible compared with other risks associated with fixed storage facilities.

SG-003/116 15.114

14. The tiered approach to aircraft accident modeling encourages the analyst to perform increasingly complex computations if the screening level has been exceeded in the prior step. The next step for the Pantex modeling effort involves using actual aircraft specific accident rates rather than using average accident rates for each of the identified five aircraft categories. It is also possible to use available accident rates for the most commonly observed aircraft in a category and to use the category specific rates for the remainder.

COMMENT: If accident rates are assigned to specific aircraft (such as the USAF T-1, T-37 and T-38 aircraft), then verify that the appropriate rates are used for the remaining aircraft in that category. These may be derived from aircraft specific accident data or estimated by marginal analysis of the entire category to determine the portion of the accident rate appropriate to the remaining aircraft types.

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COPY

TOM HAYWOOD
STATE SENATOR
[illegible]

The Senate of
The State of Texas

CAPITOL OFFICE
[illegible]

DISTRICT OFFICE
[illegible]

April 19, 1996

U.S. Department of Energy
Office of Reconfiguration
P.O. Box 3417
Alexandria, VA 22302

U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, DC 20026

RE: Comment on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons Useable Fissile Material Draft Programmatic Environmental Impact Statements (PEIS)

To Whom It May Concern:

As the Texas State Senator representing 36 Northern Texas Counties, including Carson County in which the Pantex facility is located, I want to thank you for the opportunity to provide comment on the United States Department of Energy's (DOE) Draft Programmatic Environmental Impact Statements (PEIS) on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons Usable Fissile Materials. This letter will also serve as my comment on the Pantex Site-Wide Draft Environmental Impact Statement, as most of the issues addressed in that document are identical to the issues addressed in the SSM and S&D PEISs.

I want to stress my support for DOE's earlier decision to abandon plans to transfer assembly/disassembly function to the Nevada Test Site. Your decision to select Pantex as the preferred alternative for those functions recognizes that transfer to Nevada would have been cost prohibitive, and would not have provided adequate facilities to meet future needs. However, the failure to recognize Pantex as the preferred site for new and/or consolidated stockpile management facilities has overlooked the best site for maintaining the integrity of the United States nuclear stock-

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U.S. Department of Energy
April 19, 1996
Page Two

pile and attaining maximum efficiencies and cost savings.

Before addressing the two Impact Statements individually, I want to stress that any current or future Department of Energy functions at Pantex must be conducted in a safe and environmentally sound manner. While I am confident that current procedures are more than adequate, I also am adamant that any expansion at Pantex be implemented in the same fashion. The residents of the Texas Panhandle have come to expect Pantex operations to be handled in a way that does not impair their health or safety, and future plans should recognize that necessity.

<u>Stockpile Stewardship and Management PEIS</u>

Pantex is the most cost effective alternative for any new construction of SSM facilities. Labor costs, utility rates, and water and land availability at Pantex, as well as public and political support in the surrounding community, are more amenable to DOE needs than at any other site.

Pantex should be considered as a site for all future defense related programs to complement activities at the national laboratories, including the planned Atlas Facility and the plutonium pit fabrication site at Los Alamos National Laboratory. The location of additional defense related programs at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost.

While the Department of Energy makes no mention of a strategic plutonium reserve to meet future national security needs, the PEIS mentions that strategic storage should be co-located with disassembly. Pantex should clearly be the preferred site for such a mission in coordination with its management functions.

The strengths identified above supporting increased stewardship and management for Pantex also support the continuation of High Explosives (HE) fabrication at that site. Just as strategic and surplus storage should remain with disassembly, HE functions should remain co-located with assembly. The DOE SSM draft indicates that Pantex should retain HE capabilities on site to process inventories accrued from dismantling; therefore the continuation of HE functions at Pantex is clearly the least expensive alternative available to DOE. I strongly disagree with the draft PEIS statement that siting HE activities at Pantex offers no advantages over the national labs. The cost of transferring such functions is cost prohibitive, and such plans ignore the possibility of future weapon production activities, which would require a full HE capability at Pantex, and ignore the admitted necessity of continued limited HE activity at Pantex.

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U.S. Department of Energy
April 19, 1996
Page Three

I believe that many factors argue for the continued operation of HE activities at Pantex, in addition to an expansion of its existing stewardship and management activities. In all of the above cases, I want to stress that the Department of Energy should insist that budgetary comparisons between Pantex and other sites are accurate and include capital, transportation, training, remediation, and other costs.

Fissile Materials (Plutonium) Storage and Disposition PEIS

As the sole Department of Energy authorized facility for assembly and disassembly of nuclear weapons, Pantex has served our country for more than 40 years. It has handled these functions in a safe and efficient manner, and should continue to do so.

As our nation continues its program of dismantling a large portion of our nuclear deterrent, one of the challenges we face is processing, storing, or disposing the fissile materials that remain. Pantex clearly offers the best solution to this vexing problem.

Acknowledging the importance of cost savings, Pantex has the existing capability to store the plutonium already at the site, and could easily expand and upgrade existing facilities to meet any or all of the storage options being considered by DOE. For the reasons identified in the SSM PEIS, the Pantex facility could accomplish this with minimal cost and difficulty.

Pantex already houses more than 8,000 surplus pits, with more pits scheduled for transfer from the Rocky Flats facility. The re-creation of storage facilities at another site, and the costs and dangers associated with transporting large amounts of plutonium across the country, makes little sense budgetarily or politically. The common sense solution to this problem is to site strategic storage and surplus functions at the same place as disassembly. Since facilities for all three functions already exist at Pantex, this common sense solution is practical, reasonable, and unarguable.

All possible factors argue for Pantex's continued and expanded role in storage of disassembled fissile material. It has the necessary safety, security, and surveillance, it has the most cost efficient operations, it has existing structures and facilities, and it is the closest production site to Los Alamos, the planned pit fabrication site.

Based on the reasons outlined in the above two comments on the draft Programmatic Environmental Impact Statements, I urge the Department of Energy to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions, as well as consolidation of all plutonium storage, disposition, and related functions.

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TEXAS HOUSE OF REPRESENTATIVES

Committee on
Environmental Regulation
74th Texas Legislature

Warren Chisum
Chairman

Mike Jackson
Vice Chairman

March 27, 1996

U.S. Department of Energy
Office of Reconfiguration
P.O. Box 3417
Alexandria, VA 22302

Re: Comment on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statements (PEISs).

Thank you for the opportunity to comment on the U.S. Department of Energy's (DOE) Programmatic Environmental Impact Statements (PEISs) on Stockpile Stewardship and Management (SSM) and Storage Disposition (S&D) of Weapons-Usable Fissile Materials. Please also consider this my comment on the Pantex Site-Wide Draft Environmental Impact Statement, since most of the issues addressed in these documents are identical.

First and foremost, I am adamant that any current and future functions at Pantex will be conducted in a safe and environmentally sound manner. Our first priority is to ensure any expansion at Pantex be implemented in a way that does not impair the health or safety of area residents or have an adverse effect on the environment. These goals serve as a prerequisite to any current or future activities at Pantex, including expansion.

I. Generally: I am pleased that DOE selected Pantex as a preferred alternative for assembly/disassembly, thereby abandoning earlier plans to transfer those functions to the Nevada Test Site (NTS) which would have been cost prohibitive and never been adequate to meet future needs. However, by failing to recognize Pantex as the preferred candidate site for new and/or consolidated stockpile management facilities, the DOE overlooks the best site for maintaining the integrity of the U.S. nuclear stockpile and attaining maximum efficiencies and cost savings.

II. SSM PEIS:

1. Pantex is the best place to site new construction/stewardship activities. Pantex is perhaps the most cost-effective alternative for any new construction of SSM facilities. Labor costs, utility rates, water and land availability at Pantex, as well as public and political support, are more favorable than those at any other Complex site. It is appropriate to consider Pantex as an alternative site for all future defense-related facilities to complement activities at the national labs (such as planned Atlas Facility and plutonium pit fabrication site at Los Alamos National Laboratory (LANL)). DOE makes no mention of a strategic plutonium reserve that is necessary to meet future national
security needs, even though the PEIS mentions that strategic storage should be co-located with disassembly. Pantex should be the preferred site for such a mission in coordination with its management functions. The location of additional defense-related activities at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost to the American people. In its deliberations, *DOE should insist that budgetary comparisons between Pantex and other sites are accurate, and include capital, transportation, training, remediation, and other costs.*

2. Pantex is the best site to continue High Explosives fabrication. Consistent with the strengths identified above for increased stewardship and management duties, the high explosives (HE) functions should also remain at Pantex. Because the production assembly/disassembly functions remain at Pantex, the HE fabrications duties should be present at the corresponding site. After all, the SSM Draft admits that Pantex must retain HE capabilities to process the inventories already on site from dismantling. Therefore, the least expensive alternative is to maintain HE functions at Pantex. I adamantly disagree with

Derek Seal, Committee Clerk
Office: Texas Capitol Extension, Room E2.154 • 512-463-0776
Mail: P.O. Box 2910 • Austin, Texas • 78768-2910 • FAX 512-463-5896

Robert Saunders, Edmund Kuempel, Mark Stiles
Jerry Yost, Robert Talton, Dianne Delisi, Charlie Howard

the statement in the draft PEIS that there are no advantages to siting high explosives at Pantex as opposed to the national labs. The capital outlay alone necessary for transfer is cost prohibitive. In addition, should future need arise for new weapons production, it will be critical to have the HE facilities at the weapons production/assembly site.

III. Fissile Materials (Plutonium) Storage and Disposition PEIS: As the sole DOE-authorized facility for assembly and disassembly of nuclear weapons, Pantex has historically handled these functions in a safe and efficient manner for more than forty years. One of the challenges faced after dismantling a significant portion of the nuclear stockpile is processing or disposal with the materials that remain. The DOE is considering several options. Once again, acknowledging cost savings considerations, Pantex could continue to store plutonium which is already at the site and upgrade facilities for any and all storage options being considered by the DOE with minimal cost and difficulty. Pantex currently safehouses more than 8,000 surplus pits and plans are being made to ship additional pits from Rocky Flats to Pantex. It makes little sense to re-create storage facilities at another site and then unnecessarily transport large amounts of plutonium across the country from Pantex. The budgetary and political costs for such a decision would be enormous. Because of these costs, Pantex also should be designated the preferred site for any disposition options and related functions. It makes budgetary and policy sense to site disposition where storage already exists. Furthermore, it makes no sense from any perspective, budget or otherwise, to site strategic storage at one site and surplus at another. Pantex should be selected for both storage functions. Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role with minimal costs and it is the production site closest to Los Alamos, the planned pit fabrication site.

IV. Conclusion: Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions as well as consideration of all plutonium storage and disposition and any related functions. Again, thank you for the opportunity to comment on these documents.

Sincerely,

Warren Chisum

Warren Chisum

Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

May 13, 1996

The Honorable Hazel R. O'Leary
Secretary of Energy
7A257 Forrestal Bldg.
1000 Independence Ave., S.W.
Washington, D.C. 20585

Re: COMMENTS REGARDING FUTURE ACTIVITIES AT PANTEX

Dear Secretary O'Leary:

Upon review of the three interrelated environmental impact statements ("EISs") regarding the reconfiguration and future of the Department of Energy's nuclear weapons complex,[1] I am becoming increasingly concerned that the Department of Energy ("DoE") may soon decide to process plutonium pits at the Pantex facility. I am furthermore concerned–once again–that the Texas Panhandle will become the *de facto* permanent dump for the nation's surplus plutonium supply. Given the 24,000 year half-life of plutonium and the distinct possibility that the environmental, political, and social issues surrounding any other permanent disposition of plutonium will not be resolved in the foreseeable future, this is an ominous development for Texas.

I have attached previous correspondence between DoE and my office dating back to 1991. As is readily apparent from that correspondence, I have long been firmly opposed to both propositions. Unfortunately, it now appears that we are moving closer to decisions by DoE that will unfairly burden Texans during the coming decades and needlessly impose risks on the farmers and ranchers who depend upon the Ogalalla Aquifer underlying Pantex.

A decision by DoE to begin plutonium reprocessing, with its attendant problems and risks for residents throughout the Panhandle, or a decision to store surplus plutonium (*i.e.*, nuclear waste) on a medium- or long-term basis, is unacceptable to this office. Accordingly, I have instructed my staff to renew its efforts to develop all available legal options to prevent DoE from turning the Texas Panhandle into a *de facto* nuclear waste dump, or another Rocky Flats.

I realize that you and your office have made great strides in incorporating the concerns of all stakeholders in your decision-making process. For that, you deserve much credit. Unfortunately, I do not believe that the

---

[1] The three EISs are: (a) the PEIS on Storage and Disposition of Weapons-Usable Fissile Materials (which discusses, *inter alia*, the mixed-oxide fuel option in the most detail and discusses the alternatives, including a facility to cut the pits in two and process them into metal or oxide; to process other types of plutonium; and to mix plutonium with uranium to make mixed oxide fuel (MOX) to be used in nuclear power plants); (b) the Site Wide EIS for Pantex (which discusses the Pit Reuse facilty in lesser detail); and (c) the PEIS on Stockpile Stewardship and Management.

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Page 2

solutions that DOE appears to be adopting solve the environmental and bureaucratic problems associated with storing and/or disposing of plutonium for decades, centuries, and even millennia.

Sincerely,

Dan Morales

Dan Morales
Attorney General

Enclosure

c: DOE-Office of Fissile Materials Disposition
c/o SAIC-PEIS
P.O. Box 23786
Washington, DC 20026-3786

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Jay Rose
Office of Reconfiguration
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

May 20, 1991

Mr. James R. Nicks
Associate Deputy Assistant Secretary for
Nuclear Weapons Complex Configuration
U.S. Department of Energy
DP-40; GA-045
1000 Independence Avenue, N.W.
Washington, D.C. 20585

Re: Requests for Additional Hearing in Texas for Reconfiguration PEIS scoping

Dear Mr. Nicks:

I respectfully request that the Department of Energy ("DOE") add an additional scoping hearing location in Austin, Texas for its Programmatic Environmental Impact Statement ("PEIS") on the reconfiguration of the nuclear weapons complex. The importance of the reconfiguration issue to all of Texas demands, I believe, no less.

In its March 4, 1991 announcement of the dates and locations for the planned PEIS scoping hearings, DOE listed only a single hearing for Texas--Amarillo, on July 24, 1991. 56 Fed. Reg. 8990. Unfortunately, the Texas state capital, where the central offices of the state agencies overseeing DOE's Texas operations are located, is more than 500 miles from Amarillo. Traveling to Amarillo to make a presentation at DOE's scoping hearing would be an undue drain on state resources and could result in fewer comments from state agencies. Although state agencies will likely submit written comments in response to DOE's solicitation, we believe that the spirit of DOE's public notice and comment process, which includes these hearings, would be better served by personal appearances by state officials. 56 Fed. Reg. 5590, February 11, 1991.

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AN EQUAL EMPLOYMENT OPPORTUNITY EMPLOYER

Page Two

The holding of an additional hearing in Texas would not require DOE to establish any new precedents in scheduling scoping hearings. First, providing two hearings in a state would not be inconsistent with DOE's plan to hold two hearings in New Mexico in Albuquerque and Sante Fe, which are less than 100 miles apart. Second, providing a hearing at a location not being considered for expanded activities would not be inconsistent with DOE's plan to hold a hearing in Atlanta, Georgia despite the proximity of facility locations in Columbia, South Carolina and Oak Ridge, Tennessee (only 215 and 225 miles away, respectively).

Thank you for your cooperation. Please do not hesitate to call me or Special Assistant Attorney General Sam Goodhope at (512) 463-2191 if you have any questions.

Sincerely,

Dan Morales

Dan Morales
Attorney General

DM/lb

cc: Governor Ann Richards
Lieutenant Governor Bob Bullock
Chairman Buck Wynne, Texas Water Commission
Mr. Steven Spaw, Texas Air Control Board
Commissioner Rick Perry, Texas Department of Agriculture
Commissioner Robert Bernstein, Texas Department of Health
Speaker Gib Lewis, House of Representatives
Senator Lloyd Bentsen
Senator Phil Gramm
Texas Congressional Delegation

Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

October 16, 1991

Secretary of Energy
James D. Watkins
Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Secretary Watkins:

As you know, the nation's nuclear weapons are disassembled at the Pantex Plant near Amarillo, Texas. Your department has also identified the Pantex Plant as the primary storage or disposal site for the radioactive components of retired nuclear weapons until such time as you develop alternative, long-term storage or disposal sites. (DoE, "Nuclear Weapons Complex Reconfiguration Study," January 1991, DoE/DP-0083, p. 161; and Adm. R.M. Barr, "Testimony Before the Senate Committee on Governmental Affair," January 25, 1991.)

I am writing you today to express my profound concern that the Pantex Plant may ultimately become the long-term storage or disposal facility for fissile material from disassembled nuclear weapons if your department is unsuccessful in securing a permanent storage or disposal facility elsewhere. I strongly urge you to share with state officials your department's short-term and long-term plans for storing or disposing of fissile material at Pantex. Texans must be involved in your decisions regarding these important matters, which will have a great impact on our state for generations to come.

Reductions in the nuclear weapons stockpile announced recently by President Bush indicate that the total amount of plutonium from disassembled weapons to be stored or disposed of will reach 84,000 pounds. This figure does not include other fissile material (such as highly enriched uranium) obtained from disassembled warheads, nor does it take into account the increasing rate of nuclear weapons disassembly likely to result from the rapid improvement in United States-Soviet relations. Furthermore, this figure does not include the significant, if not substantial, amount of mixed waste (i.e., radioactive waste mixed with hazardous waste) which will be generated.

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Secretary Watkins
October 16, 1991
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Texans certainly take pride in the role of Pantex workers, who are retiring weapons of great destruction in the face of decreasing global tensions and the reduced threat of nuclear war. As Attorney General of Texas, however, I am responsible for the protection of the citizens and the environment of our state, and I am committed to preventing Pantex from becoming the *de facto* long-term waste disposal site for the fissile material of the Department of Defense and the Department of Energy.

Sincerely,
Dan Morales
Dan Morales
Attorney General

cc: Honorable Lloyd Bentsen
Honorable Phil Gramm
Honorable Bill Sarpalius

Honorable Ann Richards

Honorable Teel Bivins
Honorable Rick Crawford
Honorable John Smithee
Honorable David Swinford

Secretary Cheney, Department of Defense
William K. Reilly, Administrator, EPA
John Hall, Chairman, Texas Water Commission

Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

March 3, 1992

The Honorable James D. Watkins
Secretary of Energy
United States Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Secretary Watkins:

Thank you for your letter of January 9, 1992, in response to my letter of October 16, 1991. Unfortunately, your letter provides little comfort about the Department of Energy's plans regarding the "staging" or storage of plutonium and other nuclear material at Pantex. I am further distressed by the testimony of the Department of Energy ("DoE") at the hearing before the Senate Governmental Affairs Committee on February 25, 1992.

I am profoundly concerned that DoE has failed to consult with the public and Texas state agencies in developing safe and viable plans for handling radioactive components from retired nuclear weapons until the department has developed alternative, long-term storage or disposal sites. Assistant Secretary Claytor confirmed at the Senate hearing that Pantex will be the "interim staging" area for plutonium cores extracted from approximately 15,000 nuclear weapons during the next ten years.

The thrust of Assistant Secretary Claytor's testimony is strikingly consistent with:

(1) DoE's position, stated on page 162 of the Nuclear Weapons Complex Reconfiguration Report, that "*[a] single DOE storage facility, preferably located at the weapon disassembly site, should be sufficient to serve all DOE interim requirements for fissile components*," and

(2) the testimony of Rear Admiral Barr, Deputy Assistant Secretary for Military Applications, before the Senate Governmental Affairs Committee on February 25, 1991. ("*Right now, there is storage at Pantex which we are using. . . We are looking at the long-term needs for a storage facility, probably at Pantex but not certainly, that would handle our needs for storing exactly the kind of things [i.e., dismantled nuclear weapons*

components, as well as plutonium and uranium removed from such weapons] we have been just talking about.")(Emphasis added.)

I do not know what DoE means by "interim staging" area, nor is it clear what DoE means by "storage facility." I am concerned, however, that these terms may imply that Pantex will ultimately become the long-term storage or disposal facility for material from dismantled nuclear weapons.

Pantex is not suitable for long-term or permanent nuclear material storage. The Ogallala Aquifer lies underneath a thin veneer of soil at Pantex. The aquifer is the lifeblood for ranchers and farmers in the immediate area as well as throughout the central United States. The citizens of Texas living in Amarillo and the surrounding communities receive their water directly from wells located near Pantex. The value of the agricultural industry, i.e., crops, livestock, and livestock products in the High Plains Trade Area surrounding Pantex, is approximately \$3 to \$4 billion dollars *per annum*. Texas supplies 25% of the nation's grain-fed beef; 75% of the state's beef production comes from the High Plains Trade Area.

In addition to the nuclear material or waste storage issue, I do not believe that DoE has fully considered the ramifications of quickly expanding (without adequate and comprehensive planning) the nuclear weapons dismantling process at Pantex. The General Accounting Office ("GAO") has reported persistent safety and health problems at Pantex. (Nuclear Health and Safety: More Attention to Health and Safety Needed at Pantex (GAO/RCED-91-103, April 15, 1991)). According to testimony presented by GAO at the Senate Governmental Affairs hearing on February 25, 1992, "[a]s a result [of these safety and health problems], DOE could not adequately ensure that [Pantex] was operating safely." (J. Dexter Peach, Assistant Comptroller General, GAO). Mr. Peach went on to testify:

> *Over the next several years, DOE must take custody of and dismantle thousands of nuclear weapons that the Department of Defense will retire. The capability of DOE to safely dismantle so many weapons could present a problem and tax the limited capabilities of DOE resources at the Pantex Plant.* (Emphasis added.)

I find it shortsighted and unacceptable, therefore, that DoE has not adequately involved state officials in developing workable long-term and short-term plans by which DoE can safely fulfill its nuclear weapons dismantling mission. A review of safety issues by the Defense

Secretary Watkins
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Page 3

Nuclear Facilities Safety Board is an inadequate substitute for full and meaningful state participation. I find it unthinkable, moreover, that DoE is about to begin an unprecedented nuclear weapons dismantling program in the absence of a formulated department-wide safety policy.

In order to allay my concerns about safety at Pantex, I would appreciate answers to the following:

(1) Has the Final Safety Analysis Report ("FSAR") for Pantex been completed yet? If so, has it been sufficiently updated to reflect the change in Pantex's mission? If it has not been updated, what is the schedule for revising the FSAR? (I request that I be furnished with a copy of the existing report(s).) The FSAR, I believe, will have a direct impact upon the local government needs analysis that is currently underway. Does DoE envision revisiting the needs analysis, given the change of Pantex's mission? Is DoE reanalyzing nuclear criticality in light of Pantex's new mission? What now is the worst-case scenario covered in the FSAR? What steps has DoE taken to address GAO's concerns? What further steps must now be taken in light of Pantex's new mission?

(2) Have emergency planning efforts been modified to take into account the new mission of Pantex? What analysis has been done with respect to the increased transportation needs associated with disassembling 2,000 warheads per year? How will the highways, streets and roads of Texas be impacted by the importing of thousands of warheads into the state? Will DoE guarantee funding to ensure that local and state agencies receive full reimbursement of oversight costs to ensure the safety of Texas citizens?

(3) As the nuclear weapons disassembly work increases, the handling and disposal of high explosive components from the weapons will increase. High explosive material known to be radioactively contaminated or potentially contaminated has been stored for several years awaiting final disposal. Other such material has been burned. A large-scale disassembly program as currently envisioned by DoE will produce unparalleled quantities of high explosives that will require disposal. What are DoE's plans to ensure that safe disposal and burning of the high explosives will keep pace with the dismantling process? Do more environmentally sound disposal methods exist?

(4) A number of hazardous and radioactive materials are obtained from dismantled warheads, including Plutonium-239,

Secretary Watkins
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Page 4

Uranium-235, Uranium-238, Beryllium, high explosives, Lithium-6, and Tritium. What are DoE's plans for handling each of these materials? Are any additional materials being retrieved from the dismantled warheads?

(5) Regarding the "staging" of the plutonium pits, how many "igloos" are being used for plutonium "staging"? How many igloos are capable of "staging" plutonium, based upon the current FSAR? Such structures, initially designed for storing conventional explosives, may be inadequate for long-term "staging" of plutonium. Is DoE in possession of any studies or analyses regarding the adequacy of igloo storage for nuclear material? Please provide such studies or analyses to my office.

Given the unsuitability of Pantex as a "staging" or storage facility for dismantling nuclear weapons components, I strongly urge you to share with state officials your department's short-term and long-term intentions for dismantling, storing or disposing of nuclear weapons at Pantex, as well as documented responses to the questions listed above. It is essential that our citizens be involved in DoE's decisions regarding these important matters, as they will have a great impact on the State of Texas for generations to come.

As the Attorney General of Texas, it is my duty to ensure that the situation that has developed in other states does not occur in Texas. For example, in 1970 the Federal government assured the State of Idaho that nuclear waste would not be stored--"staged"--above the Snake River Aquifer after 1980. Unfortunately for the citizens of Idaho, plutonium-contaminated waste remains stored at the Idaho National Engineering Laboratory today, and furthermore the Snake River Aquifer has now been found to be contaminated with carcinogenic organic solvents. I must have assurances that plutonium and other radioactive materials will not remain indefinitely at Pantex in the same manner that radioactive and hazardous waste remains in Idaho, South Carolina and Washington.

I firmly believe that the only way to ensure that problems with plutonium and other nuclear waste do not arise at Pantex, as they have in other states, is to provide for independent state review and oversight. I therefore fully support the establishment of a Technical Review Group or Environmental Monitoring Council composed of state agency and Federal representatives, as well as independent experts from universities, other independent organizations, and other impacted parties. It is, of course, imperative that the group receive full funding from the DoE to carry out its responsibilities. Please put

Secretary Watkins
March 3, 1992
Page 5

me in touch as soon as possible with your designated representative in order that we may begin to formulate the charter for such a group.

Surely with so much at stake for the local communities and the State of Texas, the least we can expect is full cooperation from your department. A timely, positive response to this letter and the establishment and full funding of the Joint Technical Review Group or Environmental Monitoring Council would be good first steps on DoE's part.

In closing, I am putting DoE on notice that I am committed to preventing Pantex from becoming the *de facto* long-term nuclear waste disposal site for DoE and the Department of Defense. It is not satisfactory for you to respond to my concerns by saying that the "staging" and management of nuclear and hazardous material will be determined by the Record of Decision after the Programmatic Environmental Impact Statement is completed in 1993. We cannot wait until 1993--"staging" of plutonium at an facility ill-equipped for such purposes is occurring now in my state. We will cooperate with you and your department to develop a safe, sound and credible program to safely dismantle nuclear weapons, but we cannot stand by and allow a potential environmental disaster to develop in the State of Texas.

We, like all Americans, fully support DoE's efforts to reduce the threat to the world from nuclear weapons. We do not desire to impede the disarmament process or disparage the work our fellow-citizens are doing to dismantle nuclear weapons. However, I must insist that this work be done in a carefully planned, safe and environmentally sound manner. We must not exchange one set of problems for another. The proper approach at this stage is to develop and implement a safe and environmentally sound program, overseen and approved by the appropriate state agencies.

I have asked Special Assistant Attorney General Sam Goodhope to coordinate my office's efforts in this matter. He will be available to answer any questions your staff may have with respect to my intentions. He can be reached at 512/463-2191.

Thank you.

Sincerely,

Dan Morales

Dan Morales
Attorney General

Secretary Watkins
March 3, 1992
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cc: Honorable George Bush

Honorable Lloyd Bentsen
Honorable Phil Gramm
Honorable Bill Sarpalius
Honorable Albert Bustamante

Honorable John Glenn
Honorable Sam Nunn
Honorable James Exon
Honorable John Dingell
Honorable John Spratt

Honorable Dick Cheney, Secretary of Defense
Honorable William K. Reilly, Administrator of EPA

Honorable Ann Richards, Governor, State of Texas
Honorable Bob Bullock, Lt. Governor, State of Texas
Honorable Gib Lewis, Speaker of the House, State of Texas

Honorable Teel Bivins
Honorable Ron Lewis
Honorable Rick Crawford
Honorable John Smithee
Honorable David Swinford

John Hall, Chairman, Texas Water Commission
Steven N. Spaw, Executive Director, Texas Air Control Board
David Lacker, Bureau of Radiation Control
William Fisher, Bureau of Economic Geology
Robert A. Lansford, Chief, Division of Emergency Management, Department of Public Safety
Judge Jay Roselius, Carson County Judge
Keith Adams, Mayor of the City of Amarillo

Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

May 29, 1992

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable James D. Watkins
Secretary of Energy
United States Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Secretary Watkins:

Thank you for your response of March 26, 1992, in response to my letter of March 6, 1991. I also appreciate the briefing given to state and local government officials at Pantex on April 10, 1992. Your letter and the briefing have provided us useful and new information.

Unfortunately, the information we have received leads me to conclude that a crisis is developing at Pantex which will force the citizens of Texas to unfairly bear the burden of precipitous and imprudent action on the part of the Department of Energy ("DoE"). I remain deeply committed to preventing Pantex from becoming the *de facto* permanent nuclear waste disposal site for the DoE. Until the issue of a permanent storage location for the dismantled nuclear weapons components is formally resolved, I believe it is inappropriate to proceed with "interim" storage at Pantex.

Furthermore, DoE's current plan to dismantle thousands of nuclear weapons and store the plutonium at Pantex violates the National Environmental Policy Act of 1969 ("NEPA") because no site-specific environmental impact statement ("EIS") for such activities has been completed for Pantex. The EIS completed by DoE in October 1983 for Pantex is outdated and clearly does not cover the dismantling and storage activities currently underway at Pantex. A site-specific EIS must be completed for the reasons stated herein.

512/463-2100 P.O. BOX 12548 AUSTIN, TEXAS 78711-2548
AN EQUAL EMPLOYMENT OPPORTUNITY EMPLOYER

1. DoE's Current Efforts to Comply with NEPA With Respect to the Decision to Double Stack Plutonium-filled Drums are Insufficient.

DoE has already decided to complete an Environmental Assessment ("EA") regarding its proposed plans for multiple stacking and automated monitoring of the drums containing the plutonium pits. The EA is scheduled to be completed in December 1992.

At the present rate of disassembly, however, Pantex will be at full storage capacity and DoE will have to start double-stacking the plutonium-filled drums approximately one year from now--April 1993. Your staff has assured us that the double stacking will not begin until the EA and new Safety Analysis Reports ("SARS") are completed. However, unless the EA produces a finding of no significant impact ("FONSI"), an EIS will have to be completed on the new storage program. The new EIS on double stacking would have to be completed between December 1992 and April 1993 if the Pantex weapons disassembly program is not to be delayed.

It is impossible to do an accurate, satisfactory EIS in such a short time. This leads me to believe that DoE may already be assuming that the EA will produce a FONSI. The new storage program will produce what may be the greatest concentration of plutonium anywhere on earth, unless there is a similar facility in the former Soviet Union. It is difficult to conclude that no significant environmental impact is likely, and that therefore no EIS need be done. Yet, this is precisely what the EA must conclude if the disassembly program is not to be slowed or stopped in order to do an EIS.

The assumption that the EA will produce a FONSI violates NEPA because it predetermines the EA outcome and, furthermore, may improperly narrow the scope of the EA.

2. The DoE Determination to Change the Mission of Pantex from Assembly and Disassembly to Disassembly and Storage Constitutes a Major Federal Action Having a Significant Effect on the Environment: Therefore, DoE Must Complete an EIS Before Proceeding.

The storage configuration of the plutonium-filled drums constitutes only a very small part of the dismantling and storage process. Yet, the mere reconfiguration of drum storage has already caused DoE sufficient concern to complete an EA. Logically, if the reconfiguration of the drums by itself

Secretary Watkins
May 29, 1992
Page 3

necessitates the completion of an EA,[1] then clearly the proposed Pantex dismantling and storage program in its entirety establishes the need for a rigorous and full EIS. Such an EIS would fully inform your agency about all of the profound environmental and socio-economic ramifications associated with the proposed expanded nuclear weapons dismantling and storage program at Pantex.[2]

The fundamental change of Pantex's mission requires that the following issues, among many others, be addressed by DoE in a site-specific EIS:

1). What effect will the increased burning of high explosives have on the area surrounding Pantex?

2). What effect will the dramatic increased demand on workers and the facilities have on worker safety, productivity, and plant safety?

3). What effect will the storage of so many plutonium pits at one location have on security risks?

4). What effect will the new dismantling and storage program at Pantex have on the generation of low-level radioactive, mixed, and hazardous waste?[3]

5). What effect will legal and community opposition in other states to becoming the long-term repository for DoE's nuclear waste have on the period of time the disassembled nuclear weapons must be stored at Pantex?

---

[1] Although, as described above, I believe that an EIS must be completed before DoE can double stack the plutonium-filled drums.

[2] I note that in a hearing before the House Armed Forces Services Committee held on April 28, 1992, you testified that you have designated Kansas City to be the preferred consolidation site for the nonnuclear manufacturing activities associated with the weapons complex. Accordingly, given the Kansas City Plant's change in mission apparently, you directed that an EA be done for the Kansas City Plant.

[3] I note with considerable concern that DoE has included budget items for the fiscal years 1992 to 1996 for the construction of a $14 million incinerator at Pantex to burn low-level radioactive waste (depleted uranium, thorium, and tritium), hazardous waste, solvents, mixed radioactive/hazardous waste, and classified metal components generated at Pantex. I can only surmise that such a facility is required because of the increased nuclear weapons disassembly activity.

Secretary Watkins
May 29, 1992
Page 4

In sum, the changing of the mission of Pantex from assembly and disassembly to solely disassembly and storage of thousands of dismantled nuclear weapons clearly and logically constitutes a major Federal action triggering the need for a site-specific EIS for Pantex. The State of Texas therefore respectfully requests that DoE conduct an EIS (that fully complies with NEPA) regarding the dismantling and storage program currently underway at Pantex. The site-specific EIS must appropriately consider the alternatives to storing--interim or otherwise--disassembled nuclear weapons components at Pantex.

In closing, we have received reports that DoE may react negatively to our concerns about Pantex's operations and may consequently "penalize" our communities by deciding against possible Pantex expansion or by relocating Pantex operations to another facility. My response has been that it is unthinkable that DoE officials would engage in economic blackmail in order to avoid an open discussion of environmental concerns. I trust that I am correct on this point. Economic development and environmental protection and safety are not mutually exclusive. Pantex can be expanded safely and in a sound environmental manner. Working cooperatively, we can provide for economic expansion, as well as environmental protection in the Texas Panhandle.

I look forward to hearing from you within thirty (30) days from receipt of this letter. Thank you.

Sincerely,

Dan Morales

Dan Morales
Attorney General

cc Honorable Lloyd Bentsen
Honorable Phil Gramm
Honorable Bill Sarpalius
Honorable Albert Bustamante

Honorable John Glenn
Honorable Sam Nunn
Honorable Al Gore
Honorable James Exon
Honorable John Dingell
Honorable John Spratt

Secretary Watkins
May 29, 1992
Page 5

Honorable Dick Cheney, Secretary of Defense
Honorable William K. Reilly, Administrator of EPA

Honorable Ann Richards, Governor, State of Texas
Honorable Bob Bullock, Lt. Governor, State of Texas
Honorable Gib Lewis, Speaker of the House, State of Texas

Honorable Teel Bivins
Honorable Ron Lewis
Honorable Rick Crawford
Honorable John Smithee
Honorable David Swinford

John Hall, Chairman, Texas Water Commission
Steven N. Spaw, Executive Director, Texas Air Control Board
David Lacker, Bureau of Radiation Control
William Fisher, Bureau of Economic Geology
Robert A. Lansford, Chief, Division of Emergency Management, Department of Public Safety
Judge Jay Roselius, Carson County Judge
Keith Adams, Mayor of the City of Amarillo

P 852 480 161

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3. Article Addressed to:
JAMES D. WATKINS
SECRETARY OF ENERGY
U.S. DEPT. OF ENERGY
1000 INDEPENDENCE AVE., SW
WASHINGTON DC 20585

4. Article Number
P 852 480 161

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6. Signature – Agent
X ~~FORRESTAL BUILDING~~
WASHINGTON, D.C. 20585

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JUN 05 1992

8. Addressee's Address (ONLY if requested and fee paid)

The Secretary of Energy
Washington, DC 20585

December 21, 1992

The Honorable Ann W. Richards
Governor of Texas
Austin, Texas 78711

Dear Governor Richards:

I committed to you previously that an Environmental Assessment (EA) would be prepared, analyzing the potential environmental consequences of storing additional plutonium components (pits) at the Pantex Plant in Amarillo, Texas. In keeping with that commitment and the Department's policy to foster open communication, and in accordance the Department's regulations implementing the National Environmental Policy Act, I am forwarding to you this EA for State review and comment prior to approval by the Department. Additional copies along with the guidelines for providing comments have been forwarded to Ms. Susan Rieff, Director of Environmental Policy.

The proposed action described in this EA would increase the number of pits to be stored at Pantex for a period of time of approximately 5 to 10 years. The EA also examines other alternatives and their consequences. The proposed action would be implemented by expanding the current storage capacity at the Pantex Plant, employing additional existing facilities, and using a new storage configuration that permits more pits to be stored safely and securely in each facility. As an interim measure, the proposed action provides a cost-effective method for the Pantex Plant to continue its mission of disassembly of nuclear weapons coming out of the Nation's stockpile, without impact to the public or the environment. As part of our efforts, a Safety Analysis Report (SAR) was completed and is available for review by state representatives at the Pantex Plant.

Specifically, up to about 20,000 pits are proposed to be stored at Pantex Plant Zone 4 until long-term plutonium storage facilities are available as part of the Nuclear Weapons Complex Reconfiguration. The interim storage would be in effect pending the implementation of a decision on the long-term disposition and storage of plutonium in the nuclear weapons complex. The Department of Energy is currently developing a Programmatic Environmental Impact Statement (PEIS) on the reconfiguration of the nuclear weapons complex. That PEIS will address options for the long-term storage and disposition of plutonium and should be available for public review in late 1993. A final PEIS and Record of Decision are expected to be issued in mid-calendar year 1994.

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Mr. Roger Mulder of your staff previously requested and the Department agreed to expand the EA review period to 45 days from the date of receipt by the State of Texas. In addition, the Assistant Secretary for Defense Programs will be scheduling meetings with your office, the Attorney General, and other appropriate State officials and agencies to provide a technical presentation in order to facilitate full understanding of the EA and the analysis that was accomplished to support this EA.

I appreciate your past and continuing support for the important work that lies ahead for the Pantex Plant. We are very much aware of our responsibilities to the people of Texas and the great support they have consistently given to our Nation's defense efforts.

We are committed to assuring a safe and environmentally sound operation at the Pantex Plant. You should find the EA to be thorough in its analysis of the potential environmental impacts of the proposed action.

Sincerely,

Jim Watkins

James D. Watkins
Admiral, U.S. Navy (Retired)

Enclosure

Department of Energy
Washington, DC 20585

DEC . . 1990

Ms. Susan Rieff
Director of Environmental Policy
Office of the Governor
P.O. Box 12428
Austin, Texas 78711

Dear Ms. Rieff:

The U.S. Department of Energy (DOE) proposes to allow increased interim storage of plutonium pits at the Pantex Plant near Amarillo, Texas.

An environmental assessment (EA) has been prepared to analyze the potential environmental consequences of this proposed action and its alternatives. This EA was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations implementing NEPA, and the DOE NEPA regulations. Five copies of the EA are enclosed.

The Secretary of Energy has forwarded the EA to the Governor under separate cover.

Section 1021.301(d) of the DOE NEPA regulations [(57 Federal Register 15122 (April 24, 1992)] requires that DOE provide a State and any American Indian tribe that would host a proposed DOE action the opportunity to review and comment on an EA for that action before DOE's approval of the EA. This process is intended to foster early and open communication between DOE and affected States and Indian tribes. Accordingly, the enclosed EA is provided to the State of Texas for review. As requested by Mr. Roger Mulder, Office of the Governor of the State of Texas, the response period has been expanded to 45 days from the date of receipt by the State of Texas. Comments sent within this period will be considered prior to approval of the EA. Comments sent after that will be considered to the extend possible. If the State of Texas has any comments on this EA, please provide them to Mr. Daniel Rhoades, Acting Director, Pantex Program Office, DP-6.2, Defense Programs, U.S. Department of Energy, Washington, D.C., 20585, (301) 903-2410. If the State of Texas has no comments, please notify Mr. Rhoades as soon as possible.

If you or your office wishes to receive further information about this project, please contact Ms. Constance Soden, Director, Environment and Health Division, U.S. Department of Energy, P.O. Box 5400, Albuquerque, New Mexico, 87115, (505) 845-5586. For further information about the NEPA process, please contact Ms. Carol Borgstrom, Director, Office of NEPA Oversight, 1000 Independence Avenue, S.W., Washington, D.C., 20585, (202) 586-4600.

Sincerely,

Richard A. Claytor
Assistant Secretary
for Defense Programs

Enclosures

Comment Documents

cc:
Roger Mulder, Office of the Governor of Texas
Greg Rudy, DP-3.2
Henry Garson, DP-3.2

Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

March 19, 1993

The Honorable Hazel O'Leary
Secretary of Energy
Washington, D.C. 20585

Re: Environmental Assessment for the Interim Storage of Plutonium Components at the Pantex Plant

Dear Secretary O'Leary:

The Office of the Attorney General ("OAG") has reviewed the draft environmental assessment ("EA") for the "interim" storage of plutonium components at the Pantex plant. We appreciate the opportunity to review the draft EA and look forward to working with the Department of Energy ("DOE") to ensure that the operation of the Pantex plant does not threaten the health and safety of its workers and neighbors and the natural resources of the Panhandle area.

I strongly believe, however, that the draft EA is deficient and that until an environmental impact statement ("EIS") is completed, DOE will not be in compliance with the National Environmental Policy Act of 1969 ("NEPA"). The EIS process would ensure the full input of the public and ensure that DOE would take a "hard look" at the environmental and socio-economic consequences of its proposed activities, consider viable alternatives to the method currently chosen by DOE, and ensure that the adverse environmental and socio-economic consequences of its actions are minimized.

I have been deeply concerned about the activities at Pantex since I first came into office in 1991.[1] While I remain proud of the work done by the workers at Pantex, I also remain profoundly concerned that generations of Texans will be forced to live with a decision regarding the storage of thousands of pounds of plutonium made behind closed doors.

As you know, DOE has operated in the past pursuant to a policy of "decide, announce, defend." I believe that addressing this legacy is one of

[1] For your convenience, I have enclosed copies of all of the correspondence I sent to your predecessor, Secretary Watkins. See Attachment A.

512/463-2100 P.O. BOX 12548 AUSTIN, TEXAS 78711-2548

Secretary O'Leary
March 19, 1993
Page 2

your greatest challenges. Your office, reflecting the new direction of a new administration, has an historic opportunity to break with the past 12 years and to ensure that DOE does not continue with an exclusionary vision of how it ought to accomplish its mission.

DOE's conclusions regarding environmental impacts in the draft EA reflect the extremely--and impermissible--narrow crafting of the issue assessed by the draft EA rather than the reality of dismantling thousands of nuclear warheads over the coming years and storing, it would appear, nearly 50 tons of plutonium at a single site for an unknown period of time. Moreover, I believe that the conclusions constitute a post hoc rationalization of a DOE decision to turn Pantex into the de facto storage facility for plutonium, rather than the product of a "hard look" at the consequences of DOE's dismantling and storage activities it desires to undertake at Pantex.

More specifically, the draft EA is deficient for the following reasons:

(1) DOE has failed to adequately consider via alternatives to increasing the storage capacity at Pantex;

(2) DOE has improperly segmented the dismantling and storage activities undertaken and to be undertaken at Pantex; and

(3) DOE has failed to adequately assess the risk of dismantling thousands of nuclear warheads and storing the plutonium pits at Pantex.

I. DOE has failed to adequately consider viable alternatives to increasing the storage capacity at Pantex.

DOE's analysis of alternatives to the proposed action of expanded interim storage is extremely superficial at best. This failure to seriously analyze the alternatives indicates that DOE has already determined to go forward with increased interim storage at the Pantex plant and that the draft EA was produced simply to pay lip service to the requirements of the National Environmental Policy Act.

II. DOE has improperly segmented the dismantling and storage activities undertaken and to be undertaken at Pantex.

DOE has improperly segmented the analysis of its proposed increased activities at Pantex. While the possible environmental effects of increased interim storage are discussed, the draft EA completely ignores the environmental consequences resulting from the increase in

Secretary O'Leary
March 19, 1993
Page 3

dismantling activities necessitating the increased storage. The draft EA should include, inter alia, a comprehensive analysis of the increase in waste generated at the plant as a result of the increased dismantlement activities.

For example, in past DOE budget requests and in the Pantex Plant's Environmental Restoration and Waste Management Five Year Plan for Fiscal Year 1993, the Department refers to a high explosives incinerator (see page 6-31 of FY 1993 Five Year Plan). Given that the need for this incinerator necessarily relates to the increased dismantlement activities at Pantex, it would appear that the potential environmental impacts from the incinerator should have been discussed in the EA.

We also note that in the DOE budget request for FY 1993 that DOE requested funds for a "Hazardous Waste Treatment and Processing Facility."[2] According to DOE's description provided to OMB:

> This facility will permit the treatment and declassification of low-level radioactive waste (depleted uranium, tritium and thorium), hazardous waste, solvents, mixed waste, and classified metal components generated at Pantex Plant.

Again, it would appear that the potential environmental impacts from the waste treatment facility, in the event DOE pursues construction of the facility, should have been discussed in the EA.

Furthermore, the cumulative environmental effects associated with the increase in movement of warheads into Pantex, the generation of waste products, and the movement and storage of plutonium pits should have been more adequately analyzed.

III. DOE has failed to adequately assess the risk of dismantling thousands of nuclear warheads and storing the plutonium pits at Pantex.

DOE has failed to adequately address safety and risk issues in the draft EA. This is a fundamental deficiency of the draft EA.

A. Lack of Meaningful Safety Policy.

DOE has long been criticized for its failure in developing a set of comprehensive and satisfactory safety procedures, i.e., a "safety policy," for its nuclear weapons facilities. Without such an overarching, meaningful safety policy against which to measure fundamental safety policy decisions at its sites, it is difficult to understand how the DOE

2 See Attachment B.

Secretary O'Leary
March 19, 1993
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under your predecessor was able to adequately develop the "Safety Analysis Report" (or "SAR") which preceded the draft EA and upon which much of the analysis of the draft EA was based. Moreover, it is difficult to understand how, if the draft EA would have properly analyzed the complete range of dismantlement activities at Pantex, DOE could adequately develop SARS for each of the activities associated with the dismantlement and storage of the nuclear weapons.

As stated by the Office of Technology Assessment:[3]

> In its Final Report on DOE Nuclear Facilities, the DOE Advisory Committee on Nuclear Facility Safety ["ACNFS"] noted that the job of solving the operational and safety problems at the DOE weapons complex is "far from complete" and that some of the problems "will take into the next century" to correct.[4]

Although DOE did issue a new Nuclear Safety Policy in September 1991, DOE was subsequently criticized by the ACNFS in its final report for substituting nebulous language such as "continuous improvement" for measurable standards; for paying little attention to the largely chemical nature of the risk at some DOE facilities; and for inadequately treating the inevitable conflict between safety and production responsibilities by simply asserting that they are "compatible." The ACNFS's report stated that DOE needs to spell out how safety goals will be achieved, how priorities will be set, how self-assessments will be judged, and how progress and success will be measured.[5]

At this time, we are not confident that DOE under your predecessor provided sufficient guidance to its regional and field offices for them to make meaningful decisions about acceptable risks, risk assessment methodology, and procedures and policies to identify and minimize safety risks. Such decisions would, of course, be

[3] OTA Assessment Proposal: Managing Nuclear Materials from Warheads, Feb. 1, 1992; submitted to Senate Committee on Governmental Affairs.

[4] [Footnote in original.] Advisory Committee on Nuclear Facility Safety, "Final Report on DOE Nuclear Facilities," report prepared for the Secretary of Energy, U.S. Department of Energy, Washington, D.C., Nov. 1991, p.11. The ACNFS vigorously advocated the development of a department-wide safety policy which would allow different parts of the DOE to make internally consistent decisions between possibly conflicting values such as safety and production.

[5] See. Statement by J. Dexter Peach, Assistant Comptroller General, General Accounting Office, given at Hearing before the Senate Committee on Governmental Affairs of Nuclear Disarmament on Department of Energy, Feb. 25, 1992 ("Hearing"), p. 5.

Secretary O'Leary
March 19, 1993
Page 5

reflected in the SAR or SARS providing the basis or bases of the EA or EAs. I believe that production of an EIS would ensure the public that important risk and safety issues were clearly and fully analyzed.

More specifically, the draft EA does little to allay our concerns about the potential safety problems that could arise from DOE's proposed activities. Of particular concern to us is the analyses in the draft EA of the probability of an airplane crash with Zone 4 Pantex plant structures and the potential impacts on the Ogallala Aquifer from a plutonium dispersal accident in Zone 4. We refer you to the comments submitted by the Texas Air Control Board and the Texas Department of Public Safety (Division of Emergency Management). Furthermore, we refer you to several issues raised by the City of Amarillo and the Counties of Potter and Randall regarding potential effects of the maximum winds of a category F4 tornado, as well as the possibility of terrorist actions involving an aircraft.

In analyzing both the potential airplane crash and impacts on the Ogallala aquifer of a dispersal accident, it is apparent that DOE relied on inaccurate assumptions and employed inappropriate methodologies. **Given the seriousness of the deficiencies in these analyses, this office cannot have any confidence in DOE's ultimate conclusions concerning the possible environmental impacts of interim storage at the Pantex plant.**

B. Lack of Resources to Ensure Safety.

It is not only the lack of a meaningful DOE safety policy against which to measure a safety analysis which makes the draft EA deficient, it is also the lack of an adequate analysis of whether Pantex has the necessary resources to undertake its new mission.[6] As stated by the GAO:

> Over the next several years, DOE must take custody of and dismantle thousands of nuclear weapons that the Department of Defense will retire. **The capability of DOE to safely dismantle so many weapons could present a problem and tax the capabilities of DOE resources at the Pantex Plant in Texas.** Storage of weapon components at

[6] Until the last two years, the mission of Pantex was to construct and dismantle nuclear warheads. The components of dismantled weapons, including the plutonium pits, were shipped back to the facility from which they came originally. The mission of Pantex today--to dismantle thousands of warheads, store and manage the plutonium pits extracted therefrom, and to help maintain a nuclear weapon stockpile a fraction of the size which existed during the Cold War--is clearly different. Such a change in mission may in and of itself necessitate an EIS.

Secretary O'Leary
March 19, 1993
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> the plant, the projected workload to accomplish this work, and the transportation of weapons to the plant are important issues that need to be examined carefully. (Emphasis added.)[7]

I believe the adequacy of resources issue needs to be more fully addressed.

IV. Closing Comments

DOE provides no basis for the estimated interim storage time frame of 6-10 years. Given that DOE does not yet have a proposal for long-term plutonium disposition, the statement in the EA that the time required to implement decisions regarding long-term storage and/or disposition is expected to be within a 6-10 years time frame is not credible. I am concerned that the analysis of potential environmental impacts has been premised on an interim storage period that is unrealistic. If anything can be learned from DOE's civilian high-level waste site experience and the attempts by the states to locate low-level radioactive waste sites, it is that nuclear waste storage issues are very difficult to resolve and take far longer to resolve than first anticipated.

Many of the concerns raised in this letter are addressed in detail in the comments submitted to you by the Texas Air Control Board, the Bureau of Economic Geology, and the Texas Department of Health's Bureau of Radiation Control. Comments by other state agencies, individuals, and citizen groups identify other areas of concern in the draft EA. I am hopeful that the DOE will respond to each of these comments, especially those of the above-mentioned state agencies.

When DOE first proposed increased interim storage of plutonium pits at Pantex, I requested that your predecessor direct DOE to prepare an EIS that would address the impacts of the increased dismantlement and storage activities at Pantex. I respectfully repeat this request now. It is apparent from the draft EA that DOE will not run out of storage capacity at the Pantex plant until the fourth quarter of 1993, at the earliest. DOE has sufficient time to complete an EIS that will adequately address the potentially devastating environmental impacts that could result from the proposed increased interim storage.

The preparation of an EIS by DOE would demonstrate DOE's commitment under your guidance to fully protecting the health, safety,

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[7] Statement by Victor S. Rezendes, Director, Energy Issues, GAO, given at Hearing, p. 5.

Secretary O'Leary
March 19, 1993
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and environment of this state and its citizens and would mark an historic new direction for DOE towards full and legitimizing public participation and open decision making. I welcome your suggestions as to how we might encourage and support your efforts in the future.

Sincerely,

Dan Morales

Dan Morales
Attorney General

The Secretary of Energy
Washington, DC 20585

January 19, 1994

The Honorable Dan Morales
Attorney General
State of Texas
Austin, Texas 78711

Dear ~~Mr. Morales~~ Dan,

The Department has finalized the Environmental Assessment and issued a Finding of No Significant Impact limiting interim storage of plutonium components (pits) at the Pantex Plant to no more than 12,000 until further documentation can be prepared under the National Environmental Policy Act.

Over the past year the Department has been working with State and local officials to prepare an Environmental Assessment that examined the Department's plans for the interim storage of plutonium components in a way that addressed the concerns of the citizens of the Amarillo area and other interested stakeholders. Your staff has been extremely helpful in this regard. As a result of this dialogue, the Department has arrived at a better and more informed decision.

The decision supported by the Finding of No Significant Impact provides for the continuation of dismantlement activities at Pantex for approximately three years. During this period a more detailed Environmental Impact Statement will be prepared as described below. Based on the helpful input we received from State and local officials and other stakeholders, the Department is committed to the following:

- The Department will complete a Site-Wide Environmental Impact Statement covering all current and proposed facilities and activities at Pantex including dismantlement and storage of the resulting nuclear materials and classified weapons components (pits). A Record of Decision will be issued by November 15, 1996. Prior to the issuance of that Record of Decision, DOE will store no more than 12,000 pits at Pantex, unless a Presidential determination requires dismantlement of more than 2,000 warheads per year at Pantex. Information regarding an increase beyond 2,000 per year will be conveyed to the Pantex Citizen's Advisory Board.

- Subject to completion of the scoping process, the Department envisions that the Pantex Site-Wide Environmental Impact Statement will now address all storage requirements including alternative locations for all plutonium, highly enriched uranium, tritium, and classified weapons components that result from the Pantex dismantlement activities. Scoping meetings for this Environmental Impact Statement will be held in Amarillo and at other sites that might be affected by the activities at Pantex by no later than June 30, 1994. Likewise, public hearings on a draft Environmental Impact Statement will be held in Amarillo and at other sites that might be affected by the activities described in that draft Environmental Impact Statement.

- The Reconfiguration Programmatic Environmental Impact Statement is scheduled to be completed in 1995. It will analyze all reasonable long-term pit storage alternatives and discuss the disposition options that DOE is considering. The Record of Decision will include decisions on pit storage locations.

- The aircraft crash analysis in the 1983 Pantex Environmental Impact Statement considers such an accident credible and that offsite releases of radioactivity are possible. Therefore, the Department will review the existing Pantex emergency response plan to ensure it adequately addresses the consequences of an aircraft accident. DOE will immediately consult with the City of Amarillo, the Federal Aviation Administration and other stakeholders, as well as the Air Force, Army, Navy, and Marines, on the desirability and feasibility of using alternative civilian and military flight patterns and will publicly disclose the results of such consultations.

- DOE will ensure that the type and level of environmental monitoring at Pantex meets all legal requirements. DOE will consult with the public regarding the adequacy of environmental monitoring at Pantex and will make available to the public, in a timely manner, monitoring and inspection information.

- DOE will initiate consultations with the State of Texas to develop mechanisms for independent monitoring of pit storage, and will cooperate with requests made by the State to monitor pit storage. Storage will be carried out in a manner that DOE believes can be compatible with verification, although international verification procedures are not in place now.

- Background radiation exposure rates will be monitored and evaluated in Zone 4 at the Pantex Plant. A baseline will be established in consultation with the public and made available. Corrective measures will be developed for instances when the baseline is exceeded.

- Radiation exposure rates both inside and outside the plutonium storage magazines will be maintained at levels that do not result in doses to employees that exceed those allowed by the DOE Radiation Control Manual. Emphasis will be placed on ensuring that doses to employees will be maintained as low as reasonably achievable (ALARA). The performance of the Pantex site management and operating contractor in this area will be evaluated in accordance with DOE's Award Fee process. A contractor administrative limit of 1 rem-per-year effective dose equivalent is currently in effect for all Pantex operations. A reduction of the administrative limit to 500 mrem-per-year effective dose equivalent for Zone 4 operations will be implemented when the horizontal palletized multiple stacking configuration identified in the Environmental Assessment is approved.

- Monitoring of exposure rates both inside and outside the magazines will be conducted. Exposure rates that may potentially exceed DOE or administrative dose limits shall be promptly mitigated.

- Dismantlement at Pantex will continue and pit storage will be expanded to include the Zone 4 Steel Arch Constructions consistent with the Environmental Assessment and the Final Safety Analysis Report except that all magazines will use the preferred configurations in the Environmental Assessment.

- DOE has no current plans to process or reprocess plutonium at Pantex, conduct destructive analysis of pits at Pantex, transport pits from other sites to Pantex, or store special nuclear material other than in pit form at Pantex, except for: 1) staged weapon radioisotopic thermoelectric generators that await return to Los Alamos National Laboratory; 2) commercially obtained plutonium check sources used for radiation detection monitors; and 3) staged drums containing trace amounts of plutonium, resulting from weapon dismantlement operations at Pantex, that will be shipped offsite as waste. Any DOE proposal to change this position will require additional National Environmental Policy Act documentation and public review prior to a decision being made.

- In consultation with stakeholders, new procedures for information dissemination will be implemented.

- Any new Finding of No Significant Impact, should one prove necessary, that relies on the Environmental Assessment for Interim Storage of Plutonium Components at the Pantex Plant will be issued only after consultation with the State and other affected stakeholders regarding DOE's views on the need for a revised Finding of No Significant Impact and after a public meeting in Amarillo to consider the proposed Finding of No Significant Impact. If a new Finding of No Significant Impact is issued it will respond to comments received during the consultation and public meeting process.

Also, I want to take special note of the invaluable contribution on your part and that of your staff in facilitating the establishment of the Pantex Plant Citizen's Advisory Board. The establishment of the Pantex Advisory Board is an important and vital step in the Department's efforts to build trust and openness with the community.

A copy of the final Environmental Assessment along with the Finding of No Significant Impact is enclosed. As the Department moves to implement its commitments, we look forward to continued discussions and cooperation with the State of Texas, its elected officials, and its citizens.

Sincerely,

Hazel O'Leary

Enclosure

Office of the Attorney General
State of Texas

DAN MORALES
ATTORNEY GENERAL

July 1, 1994

Mr. David R. Rosson, Jr.
U. S. Department of Energy
Albuquerque Operations Office
P. O. Box 5400
Albuquerque, New Mexico 87185-5400

Re: Pantex Plant Site-Specific EIS

Dear Mr. Rosson:

As Secretary O'Leary is aware, I have been advocating the completion of a site-specific Pantex Plant environmental impact statement ("EIS") for the past few years. I am gratified that the Department of Energy ("DoE") has realized that such an EIS is in the best interests of the citizens of Amarillo and the Texas Panhandle. I have some comments, however, regarding the scope of the EIS.

DoE is in the midst of preparing at least three programmatic environmental impact statements ("PEIS"): the Nuclear Weapons Reconfiguration PEIS, the Waste Management PEIS, and the recently announced Fissile Materials Storage and Disposition PEIS. It appears that the PEISs are on different and unrelated time tracks. I am hopeful that the DoE will take immediate steps to ensure that the various NEPA-required documents that are being prepared by DoE will be coordinated.

DoE should acknowledge once and for all that shutting down operations at Pantex is simply not a reasonable alternative that requires EIS analysis. DoE clearly has no intention of shutting down the Pantex Plant. The false spectre of a Pantex Plant shutdown should be removed from any discussion of the Pantex Plant's future.

More specifically:

- DoE should state clearly the criteria for determining what is "surplus" plutonium and what is "strategic reserve" plutonium. DoE should also indicate how much plutonium each category contains.

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Mr. Rosson
July 1, 1994
Page 2

- The development of a mixed waste treatment facility at Pantex is neither practical nor desirable. The very small amount of mixed waste that is generated at Pantex does not justify the construction of a new mixed-waste facility.

- Storage, treatment, or processing of radioactive materials other than plutonium should not be considered to be within the scope of the EIS. Our concerns apply particularly, but not exclusively, to highly enriched uranium and tritium.

- Department of Defense facilities should be considered as alternative storage sites. This is particularly important in light of the storage problem that DoE was faced with earlier this year when it was quickly running out of storage space at Pantex before the environmental assessment on storage was completed. At that time DoE had essentially two options: violate NEPA or shut down the disassembly operations. DoE should have a backup storage facility so that the nation is not put in that same quandary again.

Many other issues must be carefully considered in the EIS, particularly the potential dangers of storing the nation's entire inventory of plutonium pits at a site that also serves as the nation's only assembly and disassembly facility. I continue to be seriously concerned about the possibility of <u>long-term</u> storage of plutonium at Pantex, particularly if the plutonium will require any form of processing. I also continue to be concerned about any potential processing or reprocessing of plutonium of any other radioactive material at the Pantex Plant, as well as the transfer to Pantex of plutonium from any other DoE site.

With further regard to the plutonium storage issue, I believe that the research facility established through the efforts of Congressman Sarpalius, other local elected officials such as Mayor Seliger, and the business community (and apparently supported by the community as a whole), should receive adequate funding to fully assess whether the design and construction of an enhanced plutonium management facility for the <u>interim</u> storage of plutonium would be viable or economic, and whether it, as an alternative to the present "igloo" storage system, would provide a significantly extra margin of safety for the citizens and environment of the Panhandle area. Inherent in such analyses would be a critical determination as to what constitutes "interim." Furthermore, the Pantex Plant Citizens Advisory Board ("PPCAB") ought to be fully consulted with as to what steps can be taken to ensure that "interim" plutonium storage does not become long-term storage.

Mr. Rosson
July 1, 1994
Page 3

When I received Secretary O'Leary's commitment in April 1993 to establish the site specific advisory board, the PPCAB, it was my desire that the board be meaningfully and fully included in discussions and analyses regarding environmental issues such as those that will be included in the EIS. Thus, as the scoping process continues and the preparation of the EIS begins, I trust that the Pantex Plant Citizen's Advisory Board will be kept fully informed by DoE and consulted with as appropriate. Thank you.

Sincerely,

Dan Morales

Dan Morales
Attorney General

c: Secretary O'Leary, Department of Energy

APR.-30'96(TUE) 09:18 DOE ASSISTANT MANAGE TEL:845 4665 P.002

OOM

TEXAS HISTORICAL COMMISSION

George W. Bush • Governor
John L. Nau, III • Chairman
Curtis Tunnell • Executive Director

The State Agency for Historic Preservation

April 22, 1996

Mr. Bruce G. Twining
Manager
Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Re: Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage.
(DOE, F2)

Dear Mr. Twining:

Thank you for affording us an opportunity to comment on the above-referenced EIS. We were surprised to learn that so many archeological studies have been conducted at the Pantex plant in recent years because this department has no record of consultation with DOE on archeological studies since 1992. At that time, we requested information on the archeological surveys DOE was proposing to conduct at Pantex (see enclosed copy). However, we never learned any more about this work until the draft EIS for the continued operation of the plant was sent to us for review last month.

According to the draft EIS, several surveys and archeological reports have been completed since 1992 (see enclosed copy of pages 4-148 and 4-149). However, because this office was not afforded an opportunity to comment on these reports, Section 106 consultation has not been completed. We have recently requested copies of all archeological reports prepared for Pantex since 1992 from the Amarillo Area Office, and look forward to reviewing them.

If we may be of further assistance, please contact Mr. Bill Martin of my staff at 512/463-5867.

Sincerely,

Tim Perttula

for James E. Bruseth, Ph.D.
Deputy State Historic Preservation Officer

Sincerely,

Tim Perttula

Timothy K. Perttula, Ph.D.
Assistant Director for Antiquities Review

JEB/TKP/wam

cc: Ms. Vicki Bartley, Pantex Plant

DEPARTMENT OF ANTIQUITIES PROTECTION

P.O. Box 12276 • Austin, TX 78711-2276 • 512/463-6096 • Fax 512/463-8927 • TDD 1-800-735-2989

SG-007
STATE GOVERNMENTS

APR.-30'96(TUE) 09:18 DOE ASSISTANT MANAGE TEL:845 4665 P.003

Pantex Draft EIS

Eras include standing structures, building foundations, and features reflecting these periods (Pantex 1995a:12-9). Brief histories of Pantex Plant covering the period 1942–1992 have been prepared by B.H. Carr (Carr 1992), N.A. Stricker and R.M. Poot (Legacy 1994 and 1994a). Pantex Plant began as Pantex Ordnance Plant in 1942, with its primary mission being the production of military ordnance. Since 1951, Pantex Plant has had Cold War and post-Cold War missions, including the fabrication of high explosive(s) (HE) for nuclear weapons, nuclear weapons assembly and disassembly, and repair and modification of existing nuclear weapons (Pantex 1995d:12-8, 12-9).

Surveys/Inventories

Surveys of archaeological resources have been conducted at Pantex Plant since the first professional archaeological study conducted by West Texas State University during the spring of 1981 (MH 1981). Over 4,000 hectares (10,000 acres) were surveyed during this initial effort, including the main Pantex Plant Site and Pantex Lake (Pantex 1995d:12-2). Other field investigations included the following: a 1992 Ditches and Playas *Resource Conservation and Recovery Act* Facility Investigation study by Mariah Associates; Phase II test excavations of 23 archaeological sites on Pantex Plant from 1993 through 1994 by Geo-Marine, Inc.; and a 1994 cultural resources survey of 1,700 hectares (4,200 acres) of previously unsurveyed land at Pantex Plant conducted by Geo-Marine, Inc. (Battelle 1993; USCOE 1994; USCOE 1994b). The 1994 study involved land owned by TTU and leased to DOE. In addition, 971 hectares (2,400 acres) of DOE land were systematically resurveyed in 1994 by Geo-Marine, Inc. (MH 1995b:1, 25).

Consultation incomplete

During the 1981 survey, remains of 42 prehistoric Indian camps and three pre-World War II farmsteads were identified. Except for one historic site (farmstead), all sites were found near Pantex Lake and Playas 1, 2, and 3 on the main plant site. None of the sites appeared to qualify for the National Register of Historic Places (NRHP). The 1992 survey of ditches and playas identified 5 new sites and 39 isolated occurrences (IOs). Three of the sites and 14 IOs were located along the perimeter of Playa 2, and 2 sites and 25 IOs were located along the perimeter of Playa 4. The 1994 survey on TTU land identified 6 Native American sites, 2 historic sites, and 17 IOs. The 1994 resurvey of DOE land identified 4 new prehistoric Native American sites and 22 IOs (MH 1995b:79).

A comprehensive survey of the historical resources at Pantex Plant was conducted from 1992 to 1994, when DOE authorized an inventory of World War II buildings constructed between 1942 and 1945 (Pantex 1995d:12-9; Legacy 1994 and 1994a). Initially, survey work focused on World War II standing structures, such as buildings used for magazine storage and bomb-loading lines, in the active zones of Pantex Plant. Through 1993 and 1994, survey efforts expanded to other World War II Era standing structures that had not been previously surveyed, and World War II Era foundations and ruins inside historical boundaries of Pantex Ordnance Plant. This effort inventoried an additional 29 World War II standing structures and documented 82 foundations and ruins (Pantex 1995d:12-9). Historical resources still exist in the general area of Pantex Plant and include structures such as guard tower foundations, the Dunnage Mill Complex ruins, standing and in-use water towers, and a control lab foundation.

Cold War operations at Pantex Plant date from 1951 to 1991. Although historical resource surveys for this period of Pantex Plant operations have not yet been conducted, plans are currently being developed to begin such a survey. Completion of this work, combined with the surveys and evaluations of archaeological and World War II resources, will

4-148

SG-007
STATE GOVERNMENTS

lead to the implementation of a comprehensive CRMP scheduled for completion by late 1998. The CRMP at Pantex Plant considers resources from the Cold War period to be among the most important historical resources at Pantex Plant (Pantex 1995d:12-16). As part of the comprehensive CRMP, an impact mitigation plan will be developed for preservation of cultural resources on Pantex Plant Site. Many of these resources have remained relatively undisturbed because of the security maintained by Pantex Plant during the past 50 years. Until a CRMP can be completed in CY 1998, cultural resources will continue to be managed and protected by DOE through interim plans and procedures and sections 106 and 110 of the NHPA.

Cultural Resources Eligible for National Register Listing

Eligibility criteria for listing cultural resources on the NRHP are contained in CFR, Title 36, Part 60 (36 CFR 60.4). Eligibility criteria are met if a cultural resource has integrity and exhibits any of the following characteristics:

- Association with events that have made a significant contribution to the broad patterns of our history.
- Association with the lives of persons significant in our past.
- Illustration of a type, period, or method of construction; for its aesthetic values or for its representation of the work of a master; or if it represents a significant and distinguishable entity whose components may lack individual distinction.
- It has yielded, or may be likely to yield, information important in prehistory or history.

Earlier survey work on prehistoric sites at Pantex Plant did not result in a consensus on prehistoric sites eligible for the NRHP (MH 1981; Mariah 1992). However, test excavations conducted from 1993 to 1994 on 23 prehistoric sites did result in a recommendation that 22 out of the 23 sites may be ineligible for listing (USCOE 1994b; Pantex 1995d:12-7). No determinations of NRHP eligibility for Native American archaeological sites at Pantex Plant have been made (Pantex 1995d:12-7).

Only one historic site at Pantex Plant was considered potentially eligible for NRHP listing; however, due to the amount of disturbance at the site and its failure to meet the evaluation criteria discussed above, it is likely to be ineligible for NRHP listing. No other historic sites were recommended as potentially eligible for NRHP listing (Mariah 1992:3; USCOE 1994b:174).

Numerous World War II historical resources at Pantex Plant are potentially eligible for listing under the criteria discussed above (Pantex 1995d:12-16). Based on recommendations by Legacy's 1994 survey, the Texas State Historic Preservation Office (SHPO) has prepared a list of 45 World War II Era properties potentially eligible for NRHP listing at Pantex Plant (Legacy 1994 and 1994a; Pantex 1995d:12-16).

4.10.1.2 *Native American Groups*

In 1994, 10 Native American tribes known to have traditional interests in the Pantex Plant area were notified by Pantex Plant regarding their potential interest in proposed activities to be addressed in the Pantex EIS; these included the following: the Comanche Tribe of Oklahoma; the Kiowa Tribe of Oklahoma; the Apache Tribe of Oklahoma; the Mescalero Apache Tribe; the Jicarilla Apache Tribe; the Cheyenne-Arapaho Tribe of Oklahoma; the Wichita and Affiliated Tribes; the Caddo Tribe of Oklahoma; the Delaware Tribe of Western Oklahoma; and the Fort Sill Apache Tribe (Pantex 1995d:8-5). The Jicarilla and

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TEXAS HISTORICAL COMMISSION

George W. Bush • Governor
John L. Nau, III • Chairman
Curtis Tunnell • Executive Director

The State Agency for Historic Preservation

May 1, 1996

Mr. Bruce G. Twining
Manager
Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Re: Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage.
(DOE, F2)

Dear Mr. Twining:

This letter replaces our letter of April 22 and provides clarification of our comments regarding the Pantex Draft EIS. We have learned that the EIS addresses Section 110 of the National Historic Preservation Act, not Section 106 as we had assumed in our letter of April 22. With the clarification of this issue by DOE at a May 1 meeting, we agree that the EIS addresses Section 110 issues. Moreover, the EIS is a good step toward achieving compliance with Section 110.

Concerning our comment that consultation with Section 106 has not taken place for archeological studies, we have found evidence in our files that DOE has consulted with this office about archeological sites at the Pantex Plant. Extensive consultation has occurred regarding historic buildings with representatives of the National Register Programs Office and Division of Architecture at the Texas Historical Commission. Our primary concern, however, was that the archeological reports listed on page 4-148 of the Draft EIS have not been formally submitted to us for review. This situation was also resolved at the May 1 meeting, with DOE agreeing to have its contractor prepare a timetable for the submission of the reports along with National Register eligibility determinations for archeological sites.

We regret any misunderstanding our initial comments may have caused. In an effort to prevent future miscommunication, DOE and our agency have exchanged letters specifying the appropriate points of contact for issues related to archeology and architecture at Pantex. If we may be of further assistance concerning archeological issues, please contact Mr. Bill Martin of my staff at 512/463-5867.

Sincerely,

James E. Bruseth, Ph.D.
Deputy State Historic Preservation Officer

Sincerely,

Timothy K. Perttula, Ph.D.
Assistant Director for Antiquities Review

JEB/TKP/wam

cc: Ms. Vicki Barley, Pantex Plant
Mr. Roger Mulder, Governor's Office

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SG-009
STATE GOVERNMENTS

TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

May 22, 1996

Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Attention: Nanette D. Founds
SWEIS Project Manager

Dear Ms. Founds:

Texas Parks and Wildlife Department (TPWD) staff has reviewed the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, Summary, Volume I-Main Report, and Volume II-Appendixes. TPWD has the following comments for your consideration.

SG-009/1
09.009

While we recognize Pantex efforts to discover the amount and extent of the historical contamination and Pantex current contaminant reduction in progress, we are concerned about impacts to wildlife from historic contamination listed in the report. Due to the unknown extent of the historical contamination, TPWD requests Pantex continue to describe the extent of contamination and encourages efforts to clean up or rectify the contaminant impacts. Consider incorporating a time line showing past efforts and future efforts in contaminant identification and clean up. If available, please send Joan Glass of our staff copies of completed reports describing potential wildlife impacts.

SG-009/2
09.010

TPWD is also concerned about the unidentified minnow species from Pantex Lake. Because there are 6 Federally listed *Notropis* with 2 additional State listed *Notropis* species, the minnow species should be identified by a competent scientist. You may request assistance in identification of the minnow by contacting the TPWD Freshwater Studies Program aquatic biologist, Kevin Mayes at 512/754-6844. Upon contacting Mr. Mayes for identification, a minimum of 5 specimens can be sent to him at 300 C.M. Allen Parkway, Bldg. B, San Marcos, TX 78666.

SG-009
STATE GOVERNMENTS

Department of Energy
Ms. Nanette Founds
Page 2

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components. Please call Dave Buzan at 512/389-4634 or Joan Glass at 817/867-7956 if you have any questions.

Sincerely,

Robert W. Spain, Chief
Habitat Assessment Branch
Resource Protection Division

RWS:JG:bsl

cc: Joan Glass, Texas Parks & Wildlife Department, Waco Office
Kevin Mayes, Texas Parks & Wildlife Department, San Marcos Office

BOB MILLER
Governor

STATE OF NEVADA

JOHN P. COMEAUX
Director

DEPARTMENT OF ADMINISTRATION
Capitol Complex
Carson City, Nevada 89710
Fax (702) 687-3983
(702) 687-4065

July 12, 1996

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Re: SAI # 96300158: State of Nevada's Comments on the Draft Environmental Impact Statement for the Continued Operations of the Pantex Plant and Associated Storage of Nuclear Weapons Components (DOE/EIS-0225D)

Dear Ms Founds:

Thank you for providing the State of Nevada the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the U.S. Department of Energy's (DOE) Pantex Plant located near Amarillo, Texas. As you may recall, in June of 1994, we provided extensive scoping comments on the Notice of Intent for this DEIS. In those comments, we noted that the Nevada Test Site was being considered as an off-site storage location for up to 8,000 plutonium pits. After reviewing the subject DEIS, we found that Nevada is still under consideration, along with three other off-site locations, for the storage of plutonium pits. To reiterate our comments presented in June 1994, the State of Nevada remains firmly opposed to storing nuclear components such as plutonium pits at the Nevada Test Site.

Proposed Action:

For the reasons discussed below, Nevada officials strongly support the Proposed Action in the DEIS, which stipulates that Pantex would retain storage of the plutonium pits and would provide for future storage of up to 20,000 pits over the next ten years. We support this interim action without regard to pending decisions concerning the long-term storage of strategic reserve pits and/or storage and disposition of surplus pits. As you know, these concurrent decisions are being evaluated in DOE's Stockpile Stewardship and Fissile Materials Programmatic Environmental Impact Statement (PEIS) documents.[1]

SG-010/1
02.030

In reference to interim storage of plutonium pits at Pantex, Nevada's position on this issue continues to be that DOE should adopt a proposed action for the permanent disposition of surplus plutonium pits before selecting new interim or long-term storage sites for this long-lived material. In addition, to reduce duplication in storage, transportation, and security costs and to address risks associated with the proliferation of weapons-grade plutonium, DOE should consider adopting a program that combines materials disposition (e.g., plutonium vitrification) with long-term plutonium storage.

Implementing the Proposed Action as defined in the DEIS would enhance such a program; it would also help prevent redundant shipping campaigns of plutonium bearing material on public roads and highways. This is important since excessive

[1] Stockpile Stewardship and Management Draft Programmatic Environmental Impact Statement (DOE/EIS-0236), and Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS (DOE/EIS-0229).

transportation of plutonium on public roads remains controversial and is generally unacceptable to the public. For all of these reasons, officials in Nevada have long stated that "DOE should link long-term materials consolidation and management with options for final materials disposition."[2]

Pit Storage Relocation Alternative:

SG-010/2
21.009

In reference to the detailed analysis of potential environmental effects at the two sites under consideration for pit storage at the Nevada Test Site (the Device Assembly Facility [DAF] and the P-Tunnel Complex), we concur that pit storage at either of these sites would not have any direct "significant" environmental impacts on existing environmental resources.[3] We note that new construction at the Test Site would occur within existing facilities [inside the DAF or P-Tunnel complex] and/or on adjacent lands that are already disturbed. Because of this, we have purposely forgone a detailed review of the "direct" environmental impacts presented in the DEIS. There are, however, certain "indirect" and largely cumulative impacts that could result from pit storage at the Nevada Test Site. For example, if plutonium pits were placed in the P-Tunnel complex, local and/or regional earthquakes could pose significant seismic risks that might lead to tunnel collapse. In this regard, we concur that, if Nevada is

[2] Letter dated October 29, 1993 from Robert R. Loux, State of Nevada, to Mr. Howard Canter, Deputy Assistant Secretary, Office of Weapons Complex Reconfiguration.

[3] In this context, environmental resources include: facilities and infrastructure; land resources; geology and soils; water resources; air quality; acoustics; biotic resources; cultural resources; socioeconomic resources; waste management; intrasite transportation; and aircraft accidents.

selected for pit storage, a separate assessment of the risks associated with seismic events would be required.[4]

Also, we were surprised that an analysis of indirect cumulative impacts was <u>not</u> provided in the DEIS for any of the off-site storage locations. This is significant, since a decision authorizing centralized plutonium storage and/or disposition will play a key role in determining the potential cumulative environmental impacts and radiological human health risks at the federal site(s) selected for such an activity. Hence, if DOE selects one of the off-site locations for interim pit storage (i.e., changing the proposed action), then a cumulative impact analysis must be provided for the selected site(s). Such an analysis must also account for impacts associated with interim pit storage in relationship to other department-wide programmatic decisions[5] involving treatment, storage, and disposition of other waste streams at the selected site(s).

SG-010/3
04.016

In an unrelated issue, we note that the Nevada Test Site is described in the DEIS as a "government owned, contractor-operated facility, currently managed by Bechtel Nevada [and] DOE owns the 864,000 acre site in Nye County, Nevada."[6] This statement is incorrect. DOE <u>does not</u> "<u>own</u>" the Nevada Test Site. The Test Site occupies public lands that have been withdrawn for nuclear testing purposes only. The Final EIS for Pantex must acknowledge that the Public Land Orders[7] for the Test

[4] See DEIS page S-17, paragraph one.

[5] Examples include decisions concerning treatment and disposal of low-level waste, mixed low-level waste, disposition of Greater-Than-Class-C, disposal of Special Case Waste, etc.

[6] DEIS, page 5-3 paragraph three

[7] Public Land Orders 805, 1662, 2568 and 3579. Bureau of Land Management (BLM), 1984. Continuation of Withdrawals, Department of Energy, Nevada Test Site 4310-84. (This file is located at

SG-010/3 04.016 continued

Site do, in fact, limit the use of the site to weapons testing and related research and development facilities only. Moreover, when the Nevada Legislature ceded its jurisdiction to the public lands that now comprise the site, it did so on the basis of certain stipulated uses (i.e., nuclear testing) as defined in the Public Land Orders. Thus, while many believe the lands comprising the Nevada Test Site are federal lands, they are in fact public lands that have been withdrawn for a specific national defense purpose, and that purpose does not include long-term storage of fissile materials, nor development of any major disposition technologies such as plutonium immobilization.

Since this is a viable issue that cannot be ignored or dismissed, officials in Nevada have continued to encourage the DOE to propose a path forward to address future federal actions that could alter the stipulated mission of the Test Site. These same concerns were recently repeated by DOE[8] and substantiated in formal comments prepared by the Department of Interior for the Nevada Test Site, Site-Wide Draft EIS (DOE/EIS 0243).[9]

the BLM State Office in Reno, Nevada.

[8] U.S. Department of Energy, February 1996. Storage and Disposition of Weapons-Usable Fissile Materials, Draft Programmatic Environmental Impact Statement, Summary (DOE/EIS-1229-D), Page S-20. (The PEIS states that certain alternatives, such as consolidation of Highly-Enriched Uranium along with an estimated 38 tons of weapons-grade plutonium at the Nevada Test Site (NTS), would be *"inconsistent with the NTS withdrawal."*

[9] In formal comments for the Nevada Test Site, Site-Wide EIS, the Dept. of Interior noted that "the Test Site is comprised of public lands withdrawn by the Secretary of the Interior, who has continuing responsibilities at the Test Site, for a specific use. The original orders (PLO No 805) withdrew lands for weapons testing . . . (and) a substantial change in use would require a new withdrawal." Letter to Carol M. Borgstrom DOE from Patricia Sanderson Port, DOE Regional Environmental Officer, April 24, 1996.

Summary:

SG-010/4 02.031

As previously suggested, State officials in Nevada believe that DOE should link long-term fissile materials consolidation and storage with options for final materials disposition, and we believe the proposed action presented in the Draft EIS for Pantex supports this concept. As such, we continue to advocate a strategy that would bring together long-term pit storage with one or more of the plutonium disposition treatment options being considered in DOE's Storage and Disposition PEIS.

SG-010/5 16.059

SG-010/6 11.049

Embracing this strategy will reduce risks and risk perception issues associated with the unnecessary transportation of fissile materials on public roads and highways throughout the country. Clearly, a prolonged shipping campaign of plutonium pits along the nation's highways, especially through large urban areas like Las Vegas, will cause significant adverse socioeconomic and cultural impacts even if no accidents occur. Research has demonstrated that nuclear-related activities such as radioactive material transportation have the potential to result in significant socioeconomic impacts.[10] These impacts originate in intense negative perceptions and avoidance behaviors by the public, and public and media interest in "things nuclear" makes it almost certain that these negative perceptions will adversely affect a community's quality of life and subsequently its commercial, residential, and business investment opportunities. Thus, we contend that DOE should do everything possible to limit the movement of these dangerous materials.

[10] See State of Nevada, Nuclear Waste Project Office. Publication numbers NWPO-SE 022-89; 056-93; and 063-95.

Again, we appreciate the opportunity to provide comments on the Draft EIS for the Pantex Plant. If you have any questions about these comments, please contact me or Mr. John B. Walker, Nuclear Waste Project Office, at 702-687-3744.

Sincerely,

Julie Butler

Julie Butler, Coordinator
State Clearinghouse, DOA/SPOC

JB\jbw
cc: Governor Bob Miller
Nevada Congressional Delegation
Perry Comeaux, Dept. of Administration
Robert R. Loux, NWPO
Harry Swainston, Deputy Attorney General
Lew Dodgion, Nevada Division of Environmental Protection
Affected State Agencies
Leo Penne, State of Nevada, Washington Office
John Thomasian, NGA
Terry Vaeth, Joseph Fiore, Don Elle, DOE/NV
Carol M. Borgstrom DOEHQ\NEPA
Ann Morgan, State Director, BLM
Members -- NTS CAB

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07/12/1996 14:56 6155320231 TDEC PAGE 02

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

RECEIVED BY

JUN 24 1996

JN SOLID WASTE ASSISTANCE

June 20, 1996

Justin P. Wilson, Commissioner
Tennessee Department of Environment and Conservation
c/o Mr. Dodd Galbreath, Tennessee Environmental Policy Office
14th Floor L&C Tower
401 Church Street
Nashville, Tennessee 37243-1553

Dear Commissioner Wilson

Document NEPA Review -- Draft Environmental Impact Statement: Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components, DOE/EIS-0225D, March, 1996

The Tennessee Department of Environment and Conservation, DOE Oversight Division (TDEC/DOE-O) has received a Draft Environmental Impact Statement (EIS) concerning the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components. The subject EIS has been reviewed in accordance with the requirements of the National Environmental Policy Act (NEPA) and associative regulations of 40 CFR 1500-1508 and 10 CFR 1021 as implemented, for your concurrence and transmittal to the following DOE office:

Ms. Nanette D. Founds
US Department of Energy
Albuquerque Operations Office
PO Box 5400
Albuquerque, NM 87185-5400

SG-011/1
16.036

After review and research, the Division has the following comments. In Section 4.16 Intersite Transportation of Nuclear and Hazardous Materials, "Depleted Uranium," Page 4-257 it is stated, *"DU components removed from dismantled weapons are shipped to the Y-12 Plant at ORR for prestorage processing and interim storage."* Please provide information on the metric ton

07/12/1996 14:56 6155320231 TDEC PAGE 03

Justin Wilson, Commissioner
June 20, 1996
Page Two

SG-011/1
16.036
continued

amount of depleted uranium currently stored on the Oak Ridge Reservation (ORR) and the metric ton amount that will be shipped from the Pantex facility. Please provide the historical metric ton amount of depleted uranium at the ORR. Also provide information on the environmental impacts for the interim storage of depleted uranium at the ORR. The Division contends that if the historical levels of depleted uranium stored (interim) at the ORR are exceeded, additional NEPA documentation should be prepared to adequately address the impacts to human health and environment.

The Division requests these comments be given full consideration in the preparation of the Final Environmental Impact Statement for Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components.

The Division looks forward to receiving future project documents and correspondence. If you have any questions regarding this Division's review, please contact Dale Rector at (423) 481-0995 or Steve Nisley at (423) 481-0163.

Sincerely

Earl C. Leming
Director

cm340.99

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2850

GARY E. JOHNSON
GOVERNOR

MARK E. WEIDLER
SECRETARY

EDGAR T. THORNTON, III
DEPUTY SECRETARY

July 3, 1996

Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, N.M. 87185-5400

Dear Ms. Founds:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPON COMPONENTS; U.S. DEPARTMENT OF ENERGY (MARCH 1996)

The following transmits New Mexico Environment Department (NMED) staff comments concerning the above-referenced Draft Environmental Impact Statement (DEIS).

(1) Some of the actions appear to (potentially) be in conflict with NMED laws and regulations.

SG-012/1
13.019

a) Vol. I, page 6-4, 6.5 Pit Storage Sites, under the paragraph referring to Kirtland Air Force Base. The U.S. Department of Energy (DOE) must be in compliance with the Federal Facility Compliance (FFC) Order issued by New Mexico under the provisions of the Federal Facility Compliance Act. The FFC Order has jurisdiction over generation and storage of mixed waste and site treatment plans for its disposition. (p.5-60, 5.5.1.10 Waste Management, "The pit storage operations would generate less than 1 cubic meter (1.3 cubic yards) of mixed, low-level, and hazardous wastes.")

SG-012/2
13.020

Mention of the New Mexico unilateral FFC Order is not included in Table 6.5-4.

(2) There are some deficiencies in the information provided which prevent an adequate environmental assessment of the project. Specific areas in the DEIS exhibiting information deficiencies include the following:

SG-012/3
15.077

a) Vol. I, page 5-63, 5.5 KIRTLAND AIR FORCE BASE, 5.5.1.12 Aircraft Accidents, "An analysis was performed to determine whether expected bomb loads (one to four 909-kilogram [2000-pound] bombs) could damage the Manzano storage magazines

Nanette Founds
July 3, 1996
Page 2

SG-012/3
15.077
continued

in the event of an airplane crash. With the minimum cover of 9 meters of granite and earth the magazines cannot be damaged by any foreseeable aircraft events."

Vol. II, page E-26, AIRCRAFT ACCIDENT ANALYSIS, E.3.2.4 Structural Calculation, "A survey of contour maps reveals that the approximate overburden for the Manzano WSA is approximately 3.05 meters."

Based on the aforementioned information , it is unclear which of the above statements is correct. If the second statement is correct, then the minimum overburden is 3 meters, and the analysis of the bomb loads should be further considered as a plausible accident analysis. Although a bomb load may not have impacts below 9 meters of granite, it may impact 3 meters.

SG-012/4
14.134

b) Vol. 1, page 5-65, 5.5.2 Resources Discussed in Detail, 5.5.2.1 *Human Health*, Impacts of Storing 20,000 Pits, "The combined worker dose from unloading and storage of 20,000 pits at the Manzano WSA would be 283 person-rem distributed over the 30 people directly involved in material movement."

If there is a collective effective dose of 283 person-rem, which is a sum of a population of 30 workers, then the average effective dose per worker is 9.43 rem. The maximum yearly allowable dose for radiation workers is 5 rem, according to DOE order 5480.11 "Radiation Protection for Occupational Workers" (1992, DOE). The projected radiation dose for these workers is in excess of the yearly allowable dose. The DEIS statement should be clarified and the calculation (inclusive of the population numbers) on person-rem provided.

SG-012/5
14.135

The term "person-rem" should be defined in the glossary section.

SG-012/6
14.136

c) Vol. 1, page 5-65, 5.5.2 Resources Discussed in Detail, 5.5.2.1 *Human Health*, Impacts of Storing 20,000 Pits, and Impacts of Storing 8000 Pits. Population doses and risk estimates from accidental releases are based on current populations. Pits are placed in interim storage for 20 years, for instance, and projected population growth is not reflected in the estimated doses (nor is risk) over this time period. Albuquerque has had a high increase in population in the last 20 years.

SG-012/7
17.013

d) Vol. 1, page 5-69, 5.5.2.2 Environmental Justice. The entire section relies on 1990 census data. The "no impact" decision does not consider projected population growth in this location over the period of time that the pits may be in storage. Albuquerque, for example, has had a substantial increase in population during the last 20 years.

3) A number of topics not covered in the draft document continue to be of concern to state residents; they are recommend for inclusion in the final version of the DEIS. The issues in question include the following:

Nanette Founds
July 3, 1998
Page 3

SG-012/8 14.137 • Does the close proximity of the pit storage to weapons presently stored in the Manzano WSA pose an increase in potential nuclear accidents? Why would they not pose a problem?

SG-012/9 02.026 • One alternative considered in the DEIS could have been placing plutonium in a permanent disposal, deleting interim storage (especially at Manzano WSA) as an alternative.

SG-012/10 16.031 • Transportation of the pits is a very serious task. What assurances exist for safe transportation? For example, are the transporters meeting speed limits, obeying other traffic rules and using defensive driving techniques to reduce transportation risks? If drivers are not complying with safe driving techniques, accident risks are increased. These concerns should be addressed in the DEIS.

We appreciate the opportunity to comment on this document. Please let us know if you have any questions.

Sincerely,

Gedi Cibas, Ph.D.
Environmental Impact Review Coordinator

NMED File No. 982ER

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CITY OF AMARILLO

May 3, 1996

KEL SELIGER
MAYOR

U.S. Department of Energy
Office of Reconfiguration
P.O. Box 3417
Alexandria, VA 22302

U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, DC 20026

Re: Comment on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statements (PEISs).

Dear Sirs:

Thank you for the opportunity to comment on the U.S. Department of Energy's (DOE) Programmatic Environmental Impact Statements (PEISS) on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials. Also, please consider these my comments for the Pantex Site-Wide Environmental Impact Statement (SWEIS).

As the mayor of Amarillo, I have an obvious personal stake in the activities at Pantex as this plant is the largest employer in the region. But my first and foremost responsibility is to the welfare of the people and environment which is why I am adamant that any current and future functions at Pantex will be conducted in a safe and environmentally sound manner. While the Amarillo economy would surely benefit from an expansion of Pantex, my first priority is to ensure any expansion be implemented in a way that does not impair the health or safety of area residents or have an adverse affect on the environment.

That being said, I noted with great interest at the April 22-23 hearings that many of our residents who make their living "off the land" (including public officials such as Congressman Mac Thornberry and St. Rep. David Swinford) have recognized DOE's findings that there are "no significant impacts" of any planned or current activities at Pantex. While the safeguarding the environment is a prerequisite to any current or future activities at Pantex, I want to ensure that Pantex is not "passed over" for any functions which could be perfomed safely. Further,

P.O. BOX 1971 AMARILLO, TEXAS 79186-0001 806/378-3000 FAX 806/378-9394

such incorrect applications of NEPA serve to mislead, and in some cases unjustly concern, our residents. I urge DOE to correct its findings which unfairly discriminate against Pantex by rankings which are not based on "significant" impacts.

I. Generally. By failing to recognize Pantex as a candidate site for new stockpile management facilities, the DOE overlooks the best choice for consolidation of functions to maintain the integrity of the U.S. nuclear stockpile and attain maximum efficiencies and cost savings. Pantex played an important role in our Cold War victory and the plant will continue to serve as the sole DOE site for maintaining a safe and reliable nuclear deterrent to meet our national security needs.

II. SSM PEIS:

1. Pantex is the best place to site new construction/stewardship activities. I support DOE's finding that Pantex is the best site for assembly/disassembly and related management functions. Pantex is perhaps the most cost-effective alternative for any new construction of SSM facilities. First, labor costs, utility rates, and water and land availability at Pantex, as well as public and political support, are more amenable than those at any other Complex site. The location of new or consolidated activities at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost to the American people. In this regard, I recall, at the 1995 Notice of Intent hearings in Amarillo, that DOE said it "will not build duplicative facilities, *unless DOE decides to do so.*" If I ran the City of Amarillo this way, we would be swimming in red ink. In its deliberations, *DOE should insist that budgetary comparisons between Pantex and other sites are accurate, and include capital and transportation costs.*

2. Pantex is the best site to continue High Explosives fabrication. Consistent with the strengths identified above for increased stewardship and management duties, the HE functions should also remain at Pantex. Since assembly/disassembly functions will remain at Pantex, it follows that HE fabrications duties should be present at the same site. Should the need arise for new weapons production, it will be critical to have the HE facilities at the production site. Further, DOE officials at the April 22-23 hearings admitted that it would cost more to move these functions to the labs, and that the labs lacked the critical quality-assurance capability which Pantex already possesses. How then can DOE assert that there is no cost advantage to either site? Again, DOE is ignoring not only the cheapest site, but the best site for maintaining our nuclear deterrent.

III. Fissile Materials Storage and Disposition PEIS. As the sole DOE-authorized facility for assembly/disassembly for nuclear weapons, Pantex has historically handled these functions in a safe and efficient manner. Once again, acknowledging cost savings considerations, DOE should maintain the current storage of surplus and Strategic Reserve plutonium which is already at the site and upgrade facilities for expanded long-term missions. Pantex currently safehouses more than 8,500 surplus pits and plans are being made to ship the pits from Rocky Flats to Pantex. It makes little sense re-create storage facilities at another site and then transport large amounts of plutonium across the country from Pantex. DOE said at the hearing "it made sense" to collocate strategic storage and assembly/disassembly to minimize transportation, and to collocate strategic storage with surplus storage, since the strategic stockpile may be declared surplus at some point. DOE should not only recognize that storage should follow disassembly, but also that certain disposition options should follow storage to minimize transportation and other costs. In addition, since most of the plutonium deemed surplus is already at Pantex, and given Pantex's close proximity to LANL (the new site for pit fabrication), it makes practical and economic sense to site any plutonium disposition functions at Pantex.

MG-001/1 15.087 IV. Site-Wide EIS. I am concerned about the "plane crash" analysis. As Mayor, I have been deeply involved in efforts to reduce overflights over the plant, and other preventative measures. How can it be that the probability of a crash causing a release has increased since your 1994 Finding of No Significant Impact, after Pantex and the Amarillo Airport? Even the DOE officials at the hearings conceded that their analysis had serious problems, and needed to be corrected. I urge your office to correct these errors, and act to avoid wrongfully depriving Pantex of future functions for which it may be selected.

V. Conclusion. Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management functions as well as consolidation of plutonium disposition and control. Thank you for the opportunity to comment on these reports.

Yours truly,

Kel Seliger

Kel Seliger
Mayor of Amarillo

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Clark County

Department of Comprehensive Planning

RICHARD B. HOLMES
DIRECTOR

CLARK COUNTY GOVERNMENT CENTER
500 S GRAND CENTRAL PKY STE 3012
PO BOX 551741
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July 5, 1996

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

SUBJECT: Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components [The "DEIS"].

Dear Ms. Founds:

With this letter, the staff of the Clark County Department of Comprehensive Planning is submitting its formal comments on the above-referenced *DEIS*. Members of our respective staffs have already identified or discussed many of these matters at a public hearing in Las Vegas on 25 April 1996 and at a teleconference on 5 June 1996 [See letter dated June 17, 1996, Bechtel to Bergman]. We feel that these exchanges were beneficial in that we were able to readily share our views and knowledge regarding the *DEIS* and related issues. Thus, the following comments either reiterate or expand upon our previous discussions.

MG-002/1
23.050

We recognize that the *DEIS* follows the standard NEPA-mandated DOE format of identifying alternatives and then comparing and contrasting these alternatives by describing potential impacts on a number of environments. This standard format is well-recognized as a reliable and valid process to identify traditional impacts that may result from a major federal activity such as that described in the *DEIS*. However, we feel that the approach falls short of addressing the concerns of those persons and institutions most affected by the proposed project, namely those located in proximity to the site of the proposed activity and those located along related transportation routes.

Residents of Clark County and visitors to the area certainly fall within this definition and we would expect that their perceptions and concerns would be taken into account as the *Pantex EIS* is finalized and the record of decision is reached. Accordingly, we have made comments in two areas, one covering general issues [Section 1.0] and the other addressing procedural issues [Section 2.0]. We appreciate your full consideration of our comments and we would be happy to elaborate on any of the points raised in this letter.

Letter to Ms. Nanette Founds
July 5, 1996
Page 2

1.0 General Issues

1.1 The EIS must take into account cumulative impacts on Clark County that may result from the selection of the Nevada Test Site [NTS] as a storage or disposal site for a number of DOE activities.

MG-002/2
21.007

Given the approach taken in the *DEIS* that identifies only impacts from this one activity, it is not possible to reliably estimate the impacts to a geographic area or jurisdiction that may result from a number of initiatives taken by DOE. That is, even though other related NEPA studies are mentioned, there appears to be no analysis of potential interaction among the various DOE activities that are referenced. While any one activity may have negligible impacts on Clark County, significant impacts would result from a scenario where the NTS is selected a major site for storage or disposal of nuclear materials. Based upon the fact that the NTS is mentioned prominently in a number of ongoing DOE EISs, this latter situation is a distinct possibility.

1.2 Clark County questions the intent of DOE to actively pursue the proposed action alternative of storage of pits at the Pantex Plant.

MG-002/3
01.031

The *DEIS* makes reference to extensive restoration work that is being planned or is in progress at the Pantex and Hanford sites. We question whether it is sound policy to conduct such environmental restoration work at Pantex, a majority which will be completed by 2000, and then store the plutonium pits on site, even for the short term. Given this, it would appear the pit storage relocation alternative may be more attractive than is presently represented in the *DEIS*. And, the NTS may emerge as the most feasible site for such relocation, since it is relatively close to the Pantex Plant, there are minimal environmental restoration plans for the NTS [as compared to other candidate sites] and there are frequent mentions of the NTS as a disposal or storage site in other DOE EISs.

MG-002/4
02.027

For example, the *Stockpile Stewardship and Management PEIS* includes an alternative which describes the complete closing of the Pantex Plant with its capabilities relocated to NTS, Los Alamos and Lawrence Livermore facilities. The Pantex *EIS* does not address the implications of this alternative. This issue should be addressed in the final *EIS* and the *Record of Decision*.

2.0 Procedures

2.1 The Region of Influence [ROI] for the NTS alternative must be expanded to include the Clark County Urban Area through which all shipments are planned.

MG-002/5
16.032

As with other DOE EISs, the defined region of influence for the assessment of impacts is 50 miles around a potential site. From Clark County's standpoint, this is a major flaw in the study since the bulk of the impacts would result from the transportation of the plutonium pits and not the storage itself. This is because the storage technology is relatively advanced and the possible NTS storage sites are well isolated and controlled. Use of the ROI around the specific storage site practically guarantees findings of no impact.

Letter to Ms. Nanette Founds
July 5, 1996
Page 3

MG-002/5
16.032
continued

However, all highway routes that are under consideration for shipment of the plutonium pits pass through Clark County on the most congested areas of the State of Nevada on roads that are undergoing major construction, and in areas where the number of accidents and accident rates are the highest in the state. Expansion of the ROI to at least 100 miles around the Mercury entrance to the NTS would allow full consideration of any impacts due to use of these routes.

MG-002/6
16.033

2.1.1 Perceptions of Risk. The interstate route [I-15] historically used for DOE shipments to the NTS and now being considered for the additional Pantex shipments, is within one-half mile of the Las Vegas Strip and downtown areas. This is among the most popular tourist destinations in the country. This means that over 3,000,000 tourists who visit this area annually would be exposed to transportation safety risks and may perceive the area as dangerous and/or one to avoid, even under incident-free operation. Should even a minor incident [e.g., unanticipated stoppage] or accident occur in this area, perceptions of its seriousness may be amplified to a point that fewer people may choose this area as their pleasure or business destinations. Even a minor downturn in the tourist cycle could have a devastating effect on the southern Nevada economy. Although the effects of perceived risk are not easily quantifiable, this variable must be taken into account as routes are screened and evaluated.

MG-002/7
17.014

2.1.2 Environmental Justice. The population along the Interstate and nearby connectors includes a disproportionate number of minority and low-income individuals [38% minority and low-income, as compared to Clark County's 24%]. In addition, U.S. 95, the connector between the Las Vegas Urban Area and the NTS, serves the fastest-growing area of the country with regard to new residents and highway construction. Designation of a transport route for plutonium pits along this corridor may serve to slow down such growth or, possibly, result in a general lowering of property values. Use of the constricted ROI causes these important issues to be ignored. This is another example where a procedural convention virtually guarantees that potential impacts may not be identified.

MG-002/8
16.034

2.1.3 Accident Analysis and Emergency Management Measures. Another example of the serious constriction placed on impact assessment by a 50-mile ROI has to do with the analysis of accidents and need for emergency management measures. Because the ROI takes into account only on-site areas, the impacts are so small as to be judged insignificant and transportation and emergency safety issues do not need to addressed. Further, the new storage/transportation container, the AT-400A, now under development, has not had real world experience and its operational characteristics and vulnerability to acts of terrorism are open to question. Again, this becomes insignificant if impacts are not being considered outside the narrowly-defined ROI.

In summary, we feel that all impacts that have been addressed in the *DEIS* must be reconsidered using at least a 100- mile radius from the *Mercury entrance* to the NTS in order to arrive at a realistic appraisal of potential impacts of relocation of the pits to that site. This would lead to a realistic appraisal of potential impacts due to transportation, the most public aspect of siting a storage area for plutonium pits [and other waste] at the NTS.

Letter to Ms. Nanette Founds
July 5, 1996
Page 4

MG-002/9
16.035

2.2 **Transportation route selection processes should employ techniques that provide for comparisons among routes based on variables agreed upon by DOE, officials of affected local jurisdictions and other stakeholders.**

While we accept the findings of the transportation risk analysis that is based on the probability of a occurrence times its consequences, we are not convinced of the validity of this approach for shipments to the NTS. The Clark County Urban Area, with Las Vegas as its hub, contains the major concentration of traffic and congestion in this mainly rural county. When the population, traffic, impedance, distance and other variables for links in the urban area are aggregated with those of all other links on a potential route, inside and outside Nevada, the relative weight and importance of the urban links is diminished. This then leads to a smoothing of the data and the usual result of insignificant risk.

We ask that the DOE take another approach in assessing risk and impact of transportation of nuclear materials - that of comparative risk assessment as endorsed by the U.S. Department of Transportation in its *Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials*, August 1992. This approach places emphasis on comparison of routes on variables that are important in decision-making processes, rather than on probability figures that are almost always insignificant and not interpretable to government decision-makers. For example, comparisons may be made on exposure of special populations, impact on environmentally sensitive areas and even relative risk of negative perceptions. This type of analysis on prospective routes selected for analysis in cooperation with affected jurisdictions would provide understandable results and a higher level of confidence in DOE actions than is now the case. As you know, Clark County is willing to provide up-to-date information for your use in such an approach.

We hope that these comments are helpful to you as you complete the *Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components*. We look forward to continuing dialogue with your staff regarding this important project.

Sincerely,

Richard B. Holmes

RICHARD B. HOLMES
DIRECTOR

cc: Clark County Board of County Commissioners
J. Ley, Clark County Manager's Office
D. Bechtel, Nuclear Waste Division

llpantex.ele

Leonard Nussbaum
Chief Executive Officer
P. O. Box 9138 806/373-2595 FAX 806/373-4504 Amarillo, TX 79105-9138

April 1, 1996

U.S. Department of Energy
Office of Reconfiguration
P.O. Box 3417
Alexandria, Virginia 22302

U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, DC 20026

RE: Comment on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile materials Draft Programmatic Environmental Impact Statements (PEISs).

Thank you for the opportunity to comment on the U.S. Departments of Energy's (DOE) Programmatic Environmental Impact Statements (PEISs) on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials. Please also consider this my comment on the Pantex Site-Wide Draft Environmental Impact Statement, since most of the issues addressed in these documents are identical.

First and foremost, I am adamant that any current and future functions at Pantex will be conducted in a safe and environmentally sound manner. Our first priority is to ensure any expansion at Pantex be implemented in a way that does not impair the health or safety of area residents or have an adverse affect on the environment. These goals serve as a prerequisite to any current or future activities at Pantex, including expansion.

I. Generally. I am pleased that DOE selected Pantex as the preferred alternative for assembly/disassembly, thereby abandoning earlier plans to transfer those functions to the Nevada Test Site (NTS) which would have been cost prohibitive and never been adequate to meet future needs. However, by failing to recognize Pantex as the preferred candidate site for new and/or consolidated stockpile management facilities, the DOE overlooks the best site for maintaining the integrity of the U.S. nuclear stockpile and attaining maximum efficiencies and cost savings.

Albuquerque Amarillo Austin Billings Clovis Corpus Christi Dallas Denver Farmington Ft. Worth Hereford Hobbs
Houston Laredo League City Livingston Longview Lubbock Odessa San Antonio Victoria Waco Wichita Falls

II. SSM PEIS:

1. Pantex is the best place to site new construction/stewardship activities. Pantex is perhaps the most cost-effective alternative for any new construction of SSM facilities. First, the labor costs, utility rates, and water and land availability at Pantex, as well as public and political support, are more amenable than those at any other Complex site. It is appropriate to consider Pantex as an alternative site for all future defense-related facilities to complement activities at the national labs (such as the planned Atlas Facility and plutonium pit fabrication site at Los Alamos National Laboratory [LANL]). DOE makes no mention of a strategic plutonium reserve that is necessary to meet future national security needs, even though the PEIS mentions that strategic storage should be co-located with disassembly. Pantex should be the preferred site for such a mission in coordination with its management functions. The location of additional defense-related activities at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost to the American people. In its deliberations, *DOE should insist that budgetary comparisons between Pantex and the other sites are accurate, and include capital, transportation, training, remediation, and other costs.*

2. Pantex is the best site to continue High Explosives fabrication. Consistent with the strengths identified above for increased stewardship and management duties, the high explosives (HE) functions should also remain at Pantex. Because the production assembly/disassembly functions remain at Pantex, the HE fabrications duties should be present at the corresponding site. After all, the SSM Draft admits that Pantex must retain HE capabilities to process the inventories already on site from dismantling. Therefore, the least expensive alternative is to maintain HE functions at Pantex. I adamantly disagree with the statement in the draft PEIS that there are no advantages to siting high explosives at Pantex as opposed to the national labs. The capital outlay alone necessary for transfer is cost prohibitive. When all costs are considered, transfer of HE functions from Pantex would cost taxpayers from $40 million to $50 million. In addition, should future need arise for new weapons production, it will be critical to have the HE facilities at the weapons production/assembly site.

III. Fissile Materials (Plutonium) Storage and Disposition PEIS. As the sole DOE-authorized facility for assembly and disassembly of nuclear weapons, Pantex has historically handled these functions in a safe and efficient manner for more than 40 years. One of the challenges faced after dismantling a significant portion of the nuclear stockpile is processing or disposal of the materials that remain. The DOE is considering several options. Once again, acknowledging cost savings considerations, Pantex could continue to store plutonium which is already at the site and upgrade facilities for any and all storage options being considered by DOE with minimal cost and difficulty. Pantex currently safely stores more than 8,000 surplus pits and plans are being made to ship additional pits from Rocky Flats to Pantex. It makes little sense to re-create storage facilities at another site and then unnecessarily transport large amounts of plutonium across the country from Pantex. The budgetary and political costs for such a decision would be enormous. Because of these costs, Pantex also should be designated the preferred site for any disposition options and related functions It makes budgetary and policy sense to site disposition where storage already exists. Furthermore, it makes no sense from any perspective, budget or otherwise, to site strategic storage at one site and surplus at another. Pantex should be selected for both storage functions. Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role with minimal costs and it is the production site closest to Los Alamos, the planned pit fabrication site.

IV. Conclusion. Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions as well as consolidation of all plutonium storage and disposition and any related functions. Thank you for the opportunity to comment on these documents.

Yours truly,

L.J. Nussbaum

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Amarillo Economic Development Corporation

June 5, 1996

U.S. Department of Energy
c/o Tetra Tech
One Town Center
6121 Indian School Road, N.E.
Suite 205
Albuquerque, NM 87110

By facsimile to 505/881-3283

Dear Sir or Madame:

Thank you for the chance to comment on the Pantex Site-Wide EIS, a document that is of great importance to the Pantex Plant, and consequently to the economic vitality of Amarillo and the Texas Panhandle.

In addition to my gratitude at the opportunity to comment on the PEIS, I appreciate DOE's commitment to operating in an environmentally sound fashion at Pantex. The continuation of environmentally sound operating and management principles at Pantex is essential to the continued operation of the plant and paramount to all further comments about current or contemplated missions being performed at Pantex.

I am pleased that the DOE has named Pantex as the preferred alternative for the assembly/disassembly mission, and I encourage DOE to name Pantex as the preferred site for continuation of the high explosive mission (in the SSM PEIS). Further, I encourage the DOE to continue the safe storage of surplus plutonium on an interim basis at Pantex.

After having studied the Draft Pantex Site Wide EIS documents, I offer the following comments(•) and questions(○) for inclusion in the comment summary document:

CO-002/1
11.022

- In the draft SWEIS (p.S-17) it is stated that at the 500 weapon activity level Pantex "would support 2,400 direct jobs and 3,940 secondary job," and that "personal income additions to the economy would be reduced to $365 million annually."
  - ○ Please explain why this degree of economic loss would have not only an Adverse, but a Significant Adverse, impact on the community.
  - ○ At the 500 weapon activity employment level, what would be the impact on revenues for the governing bodies within the Pantex region of

Bank One Center • Suite [illegible] • [illegible] South Tyler • Amarillo, Texas 79101
VOICE [illegible] • FAX [illegible] • E-MAIL [illegible]

CO-002/1
11.022
continued

influence compared to the current revenues present in Table 4.11.1.6-1 (p.4-165)?

- In Section 4.11.5 "Cumulative Impacts," referring to socioeconomic resources (p.4-170), it is stated,

  "This section describes the cumulative impacts on Pantex Plant. Cumulative impacts include the impacts of continued operations at Pantex Plant combined with impacts associated with the activities described in the Waste Management Draft PEIS, the Stockpile Stewardship and Management Draft PEIS, or the Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS."

CO-002/2
11.023

The Council on Environmental Quality Guidelines published in 40 CFR §1500-1508 define cumulative impact as follows (§1508.7)

  "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor by collectively significant actions taking place over a period of time." (Emphasis added.)

  - Why is there no socioeconomic analysis of the incremental impact of this action on the Pantex socioeconomic region of influence (ROI) when added to other past and present actions, such as the cancellation and shutdown in 1988 of the DOE's high-level nuclear waste repository in Deaf Smith County, and the more recent announcement of closure of the U.S. Department of the Interior's Bureau of Mines Helium Operations in Amarillo?

CO-002/3
11.024

- The socioeconomic analyses of the three EISs are not consistent. The SWEIS (p.S-17) assumes 1.65 indirect jobs n the region for every job at Pantex. The SSMPEIS (p.S-32) assumes 1.16, and the S&DPEIS (p.4-205) assume 3.51.
  - ○ Please explain these differences.

CO-002/4
11.025

- The Amarillo Economic Development Commission (AEDC) analysis, based on local knowledge of the area and a regional impact study performed by Dr. Ray Perryman of Southern Methodist University, gives a ratio of 2.77 additional jobs in the region to every 1 Pantex job (for a total job multiplier of 3.77).
  - ○ Why didn't the DOE use the AEDC analysis?

CO-002/5
17.012

- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and President Clinton's February 11, 1994, Memorandum for the Heads of all Departments and

CO-002/5
17.012
continued

Agencies requires an analysis of environmental effects on low-income and minority populations to include human health, social, and economic effects.

- Why do the draft SWEIS, SSM PEIS, and S&D PEISs analyze only human health effects of the proposed actions and not the social and economic effects, as required?

Thank you for your attention to these comments and questions.

Sincerely,

Bob Juba
Pantex Retention and Expansion Coordinator

cc: Hon. Mac Thornberry
Hon. Kel Seliger

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HANFORD ADVISORY BOARD

A Site Specific Advisory Board, Chartered under the Federal Advisory Committee Act

David Nulton
Director, NEPA Compliance and Outreach
Office of Fissile Materials Disposition
Department of Energy
PO Box 23786
Washington, DC 20026-3786

Sent by Facsimile to 1-800-820-5156 and by US Mail

May 3, 1996

Dear Mr. Nulton:

Re: Storage and Disposition of Excess Weapons Useable Plutonium and Special Nuclear Materials (SNM) (HAB Advice #46)

The draft Plutonium Programmatic Environmental Impact Statement (PEIS) indirectly considers Hanford as a potential site for certain activities within the scope of the plutonium safe storage and disposition program by the virtue of the site's current capability and plutonium possession. The Hanford Advisory Board is opposed to the piecemeal approach to nuclear material storage and disposition like that taken in the PEIS on plutonium disposition. We have on three previous occasions adopted advice to USDOE urging an integrated public discussion on these issues. (Board Advice #13, 34 and 38) We have a commitment from USDOE leadership to initiate such a process. Therefore, a ROD on the narrow choices presented in this EIS is premature pending the National Equity Dialogue. The Board is opposed to the use of the bore hole option at Hanford. At this time, the Board has not expressed a preference for one of the other disposal options. However, the Board does have a number of values/issues which relate to a plutonium (Pu) and spent nuclear material (SNM) program. Many of these values/issues have been previously provided to you as advice or recommendations for other Hanford programs. These values are:

1. Any plutonium or SNM storage or disposal program must be compatible and integrated with the TPA commitments and milestones and should not affect the rate or funding of cleanup. The program would have the safe disposition of Hanford plutonium as a priority.

HAB Consensus Advice #46
Subject: Storage and Disposition of Excess Weapons Useable Plutonium and Special Nuclear Materials (SNM)
Adopted: May 2-3, 1996 Page 1

Contact: Confluence Northwest, Facilitation Team
800 NW Sixth Avenue, Suite 342, Portland OR 97209-3715 Phone (503) 243-2583 Fax (503) 243-2602

2. Any plutonium program assigned to Hanford must be fully funded from new funding sources. This funding should include appropriate site infrastructure and overhead costs. Funding should fully cover the cost of treatment, storage and disposal of any new waste streams.

CO-003/1
13.009
3. The acceptance of plutonium at Hanford should not delay, defer, or negatively impact Hanford cleanup.

CO-003/2
22.013
4. Appropriate local and regional public information and involvement programs must be conducted by the agencies to ensure that the public is fully informed of the risks, hazards and impacts of such a program. This would be part of the national dialogue on all nuclear materials (noted above) prior to assignment of nuclear materials to a specific site.

CO-003/3
14.080
5. Any permit or plan approval for new Hanford programs/activities must be fully integrated and must comply with all State of Washington public health and safety rules and regulations.

CO-003/4
23.035
6. Equity impacts must be addressed in the assignment of new nuclear materials (including plutonium) to Hanford.

CO-003/5
16.026
7. The transportation of plutonium and special nuclear materials to Hanford storage will require careful planning of routes and consideration of weather emergencies to minimize the likelihood of an accident. Emergency preparedness for minimizing the impacts from an accident will require financial support from DOE for state, tribal, and local involvement, including adequate equipment and training. When materials are shipped, timely notification should be provided to transportation agencies.

8. The choice of disposal options re: Pu will be a determinant for sites such as Hanford. Prior to the choice of a disposal option, complete characterization of the material and the impacts of short and long-term disposition technologies must be reviewed by the public and regulatory agencies.

9. Acceptable processing techniques including waste processing must be developed as an integrated part of any new Hanford storage and disposal program. Permanent disposal of waste plutonium at Hanford is not acceptable.

HAB Consensus Advice #46
Subject: Storage and Disposition of Excess Weapons Useable Plutonium and Special Nuclear Materials (SNM)
Adopted: May 2-3, 1996 Page 2

10. A "systems" analysis approach should be utilized to select the most effective method for processing and interim storage. This analysis should adequately address public and worker health and safety and environmental issues.

11. If a plutonium disposition mission is assigned to Hanford, every effort should be made to use existing workforce, facilities, technologies, and other resources.

Finally, we note that this PEIS does not address cumulative impacts of nuclear material movement and disposition as required by NEPA.

The Health, Safety and Waste Management Committee of the HAB looks forward to further discussions and working with you on this issue. The Board looks forward to your written response, as called for in our charter.

Very truly yours,

Merilyn B. Reeves, Chair
Hanford Advisory Board

attachments: Board Advice #13, 34 and 38

cc: Thomas Grumbly, DOE
John Wagoner, DOE
Alice Murphy, DOE
Chuck Clarke, EPA
Mary Riveland, Ecology
Cindy Kelly, Designated Federal Official
Linda Lingle, Site Representative
Jim Mecca, DOE (by fax)
The Oregon and Washington Congressional Delegations

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CO-004
COMPANIES/ORGANIZATIONS **PAGE 1 OF 1**

Comment Form

United States Department of Energy

NAME: (Optional) Robert Mevard, ORISE
ADDRESS: P.O. Box 117; Oak Ridge, TN 37831
TELEPHONE: (423) 576-6676

Fact sheets for the all the EIS were well done, especially the Stockpile Stewardship & Management Draft PEIS fact sheets,

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PANAL Panhandle Area Neighbors and Landowners
HCR2 BOX 20 PANHANDLE, TEXAS 79068 (806)335-1050

July 10, 1996

Ms. Nanette Founds
U. S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Dear Ms.Founds:

On behalf of the Panhandle Area Neighbors and Landowners (PANAL), we submit the following comments for the *Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components.*

CO-005/1
11.050

We are greatly troubled by the fact that agriculture was totally discounted as the major economic stability of the entire area and the second-largest industry in the State. Providing a job for one in every five Texans and generating more than $40 billion annually for the State of Texas, agriculture cannot be slighted in this document. Beyond the economic consideration is something we must never forget - **AGRICULTURE PRODUCES THE ESSENTIALS OF LIFE.** As long as people need food, housing and clothes, they will need and depend on agribusiness. This factor was ignored in this environmental document, thus creating a document that is flawed in its most basic conjecture.

This High Plains Trade Area, which encompasses the northernmost 26 counties in Texas produces close to $6 billion annually in cereal crops and livestock, of which $3.25 billion annually is in value-added industry, and creates local economic activity in excess of $12.5 billion.

This region produces 96.8 percent of the state's sugar beets, 85 percent of its fed beef, 48.4 percent of its corn and 47.5 percent of its wheat. Over 100,000 jobs are generated by High Plains agriculture.

There are 14 million acres of agricultural land with 9 million acres in pasture and five million acres in crops. About 25 crops are produced commercially in this High Plains trade area. Primary crops include wheat, sorghum, corn, sugar beets, hay, soybeans, cotton and vegetables.

The area is known as the "cattle feeding capital of the world", with 6.16 million fed cattle in 1995 in 109 feedlots (17 more in neighboring Oklahoma and New Mexico). There are 13 packing plants with a total capacity of 5,291,000; fat cattle slaughtered in 1995 was 5,055,544.

People recognize the High Plains Trade Area as an agricultural region, but few realize the magnitude of the industry in terms of revenues, tax base, and employment for area residents. The wholesome quality of our agricultural products and the excellent reputation we have throughout the world must never be minimized. To have production agriculture in this area tainted by the suspicion of contamination from activities at Pantex could easily wipe out this critical section of our nation.

CO-005/2
04.017

In analyzing impacts in this document, the most important issue has to be the region in which the Pantex Plant is located. With the mission of Pantex and related activities being conducted in the heart of production agriculture and the beginning of the food chain, the presumption that these activities do not impact agriculture must be fully assessed.

CO-005/3
23.053

Provide us the data that proves DOE has not already contaminated our soil, air and water. Show us the documents where you have fully assessed the impact nuclear and high explosive activities have had and will have in the future on regional agriculture. Until agriculture is fully assessed the impacts from the range of alternatives cannot be adequately scrutinized.

To continue present operations at Pantex which includes storage of plutonium pits, fabrication of high explosives with the generation of more waste in all activities could not possibly be the environmentally perferred alternative if one considers that Pantex is in the heart of production agriculture. It is like putting poison in your cereal bowl. It certainly does not make sense to have these missions being done where we are growing your steaks, hamburger, bacon, wheat, pasta and cereal products. There are other alternatives for the Pantex missions that are not in areas where our food is being produced.

CO-005/4
06.126

A second major flaw in the document is the omission of the importance of the Ogallala aquifer to this area. As the single groundwater supply for 46 counties in the Texas Panhandle and the source of water for parts of seven midwestern states, it is paramount that nothing be done to damage this priceless resource.

What could be more important in an environmental document than a detail analysis of the water source, the future supply and the impacts to this source from present activities at Pantex. To ignore the tremendous impact that Pantex has already induced on this finite water source is inadmissable. We ask that you provide detailed analysis on the effects of Pantex activities on the Ogallala (which includes the perched layer), the complete scope of contaminents, the combined effects of these contaminants and how different constituents react in varing soils and water.

CO-005/5 06.127 We ask that the studies from the Bureau of Economic Geology (BEG) be included as part of the Pantex EIS. Why were the results of the years of work done by BEG not included in the draft document. These are valuable studies with extremely telling results. Provide the reports, analysis and statements produced by BEG in their study at Pantex in the final document.

CO-005/6 14.179 The entire approach to human health in the drft EIS is flawed. We are being asked to comment on a document which seems to be driven by the goal of reassuring the public that there are no health risks associated with the Pantex plant. It uses only optimistic scenarios of exposure, statistical methods that obscure potential risks and problems, evidence used is one-sided, a very theoreticl presentation which suggests more exactness in scientific knowledge than is supportable and seems designed to lend credibility where it is not necessarily due.

CO-005/7 14.180 Moreover, the theoretical approach is difficult to wade through--it obscures and hides assumptions and it is meaningless to public concerns because it is removed from everyday life experiences (e.g., pg. D-2, brief attempt to explain individual risk in terms of latent cancer fatalities).

We have many broad concerns with the approach, but we are forced here to comment on a very narrowly conceived document. We are in a compromised position because we are forced to play on the agencies ground, with no input into the design of a better draft EIS. We, again, are forced to be reactive rather than to confront these issues upfront in a collaborative pro-active manner.

CO-005/8 14.181 The data are one-sided. The use of prior studies and data in the draft EIS present only one side of a scientific debate about the effects of low level ionizing radiation. The presentationis very lopsided. Studies not cited suggest that health effects, including leukemia, thyroid cancer, and multiple myeloma, have been found in nuclear workers whose cumulative dose for their total working years was between 2.5 - 5 rem (Geiger et al 1992; Gilbert 1994; Kendall 1992; Kneale 1993; Wing 1991).

CO-005/9 14.182 On page 4-205 it is reported that the average ANNUAL dose to workers at Pantex is 111 mrem. If we take a worker who is at the plant for 25 years, then 111mrem * 25 years == a cumulative dose of approximately 2.8 (2.775) rem. This value is within the range for which health effects were observed in these studies. Moreover, if we take the Pantex control level of 500 mrem/year for most workers and 900 mrem/year of weapons operation workers we get cumulative doses over a 25 year working life of 12.5 rem and 22.5 rem, respectively. These values are all much higher than the levels at which health effects were observed in these studies.

CO-005/10 01.043 The Agency should re-evaluate the risks to workers from low level radiation exposures using the risk factors reported in these studies. Such a reanalysis would highlight the uncertainties associated with making predictions about the health effects of low level ionizing radiation. The issue of uncertainty in scientific theory is currently glossed by the misleading use of data from only one side of the debate.

CO-005/11 14.183 Moreover, as the scientific uncertainty highlights, the standards used by EPA, NRC, and DOE are not protective standards. They are politically negotiated standards that allow workers and communities in the vicinity of a nuclear facility to bear a higher cancer risk for the social benefits that are believed to come from the facility. These standards should not be used to suggest that there are safe doses of radiation--there are NO safe doses of radiation. This is a commonly agreed point at this time in the scientific community.

CO-005/12 14.184 The Aquavella 1985 study relies on a weak methodological approach and data sources (e.g., it compares workers to community at large). The critiques of this study are discussed in more detail in Dead Reckoning by Geiger et al 1992).

CO-005/13 14.185 More about one-sided data. Cancer registry data are not a credible source of data for detecting radiation effects in communities surrounding nuclear facilities (Sage 1994). This is a study that was done by Michael Sage, Director of CDC/ATSDR. Cancer registry data in Texas are discussed in the draft EIS on page 4-215.

CO-005/14 14.186 The draft EIS relies on inappropriate data to make risk estimates and comparisons in the communities surrounding the Pantex plant. Again, the most optimistic picture is painted with selective use of evidence and methods. More rigorous studies are needed to more effectively estimate risks--better exposure assessments, assessment of historical releases, and exposure pathways.

Without better data from these types of analyses, large uncertainties remain embedded in the draft EIS--and these are not mentioned or addressed. These are different kinds of uncertanities than what I mentioned above. Those were scientific uncertantieis. These are uncertanties in the data. A third kind of uncertanity occurs in measurements (because of lack of precision in instrumentation).

There are also inter-individual senstivity issues to the public. For example, studies (not reported in the draft EIS) have found that pre-natal x-rays, averaging between 20 mr - 400 mr have been found to double the risk of childhood cancer (Stewart and McMahon). Other studies have found effects from low level radiation exposure (e.g., Kerber 1993).

By the way, on page D-4 the Agency states that "since nondestructive examination using x-rays and gamma rays is a well established industrial practice, this contribution to worker risk is negligible." It may be a well established industrial practice, but there are newer studies that suggest the risks of low level exposure from x-rays may not be so benign-they clearly are not safe because, again, there is no safe level of radiation exposure.

CO-005/15 14.187 The draft EIS uses BEIR III and BEIR V reports (page D-1 - D-2). The risk factors derived from these reports are based on the hypothetical man. Thus, they do not adequately account for inter-individual sensitivity to exposures of radiation. There is no analysis of inter-individual sensitivity in the draft EIS, except the insufficient claim that conservative numbers and scenarios are used. This is not an analysis of inter-individual sensitivity. It is a way of obscuring uncertainties--again. I would direct the Agency to a growing body of research literature on ways to address inter-individual sensitivity. The agency should recalculate risk factors using a more sophisticated analysis of inter-individual sensitivity. This is not just necessary for inter-individual sensitivity among workers and men, women, children--it is also an issue for environmental justice. For example, the composition of the workforce at Pantex is 20% minority.

The accident scenarios analysis presents the most optimistic view possible. All administrative control and safety programs are assumed to function properly at all times (e.g., air locks). Numerous examples of malfunctioning or improperly used safety and emergency response equipment and procedures, malfunctioning emergency back-up systems, human errors, etc. have led to accidents in a variety of industries--some of them highly regulated, such as the nuclear power industry, aircraft carriers, offshore oil drilling facilities, airlines, space travel (space shuttle), etc. In many cases, the failures were of the type that were anticipated but they occured in sequences or combinations that were not; or the failure rates turned out to be higher than anticipated. Many of the failures can be associated with "human reliability" issues.

In the draft EIS there is no way to know how much attention was given to human error/reliability analysis in the evaluation of accident rates or consequences. As I noted above, the document assumes that all emergency response and administrative safety programs/control function at 100% at all times. Can the DOE provide data to support this claim? Do you have data about the rates of incidents--human errors in different tasks that are relevant to this study? What is your definition of "recordable" (i.e., reportable) incidents--what is include in Table 4.14.1.4-1. What are the data for events which did not result in a lost worker day?

CO-005/16 14.188 Describe in detail the safety and emergency response plans and training programs. For on-site employees and for off-site personnell (including those in the transportation system). What

CO-005/16 14.188 continued analyses/evaluations been conducted on the reliabilty and effectiveness of response? Can DOE supply data about the failure rates associated with the safety and emergency response elements (mechanical and human)?

CO-005/17 14.189 Have you completed task analyses of the high risk tasks--e.g., assembly and dissasembly of pits and explosive components? Generally, how has DOE studied and evaluated human error in the tasks done at Pantex?

In addition, the agency uses a baseline "activity level" of 2000 assemblies, disassemblies, testings, etc. per year. It states that the mix does not matter when calculating impacts-- does this mean risks from exposure from either incident free exposure or accident related exposure (page 3-2). There must be a failure rate. It might be small but it is not zero. They may be initiating events for accidental exposures, or higher than normal "incident free" exposures.

My question is whether there is any reason to believe that failure rates (human errors) in these tasks may be different? Is it "harder" to take a weapon apart than to put it together? I think of my bike or car, where bolts are stripped, pieces stick together, get old, etc. Can this happen? The mix of "activities" will probably change as dismantlement occurs.

Does the Agency have disaggregted failure rate data for the different "activities" included in the operations done at Pantex? Provide analysis showing that there are no differences in the failure rates associated with the different activities?

CO-005/18 14.190 The accident scenarios are all optimistic scenarios in the sense that no (or no significant) exposures result. Go through the exercise and show us what might be the effects of accidents that are not controlled perfectly--what might be exposure pathways, exposure levels, and health effects of such a scenario? Even if the possibility is small, we would like to see what the consequences are. In your words risk is the product of probability of occurrence and magnitude of consequences. What if worker exposure occurred because contamination did escape from air locks? What accidents have occurred at the plant? What were these accidents as shown in Table 4.14.1.4-1? Provide us with descriptions and any results of post-accident evaluations (including the methods of evaluation)? What worked well in containing them--and what did not? In other words, what features of the accident were not anticipated to occur together or with high frequency?

We would like a system of community monitoring for contamination off-site? With monitoring only done by plant personnel there is an implicit assumption that releases will only occur in controlled areas or that detection devices will observe every possible release. This does not seem to be a valid assumption.

CO-005/19
14.191
There is no analysis of synergistic effects among radiation exposures and chemical exposures and among chemical exposures with different types of contaminants. We ask that this issue be included in the EIS, citing and evaluating studies that address synergistic effects of chemical exposures of different types. What analysis have been done to justify a claim that this is not a significant issue?

CO-005/20
14.192
The agency only addresses inhalation exposure. But this is a bit confusing. "Inhalation is the only pathway acounted for in the assessment of chemical and radiological AIRBORNE hazards from normal operations" (pg. 4-205). Does this mean that there are exposure pathways of non-airborne hazards? For example, through groundwater contamination? Are these included in the analysis anywhere? Likewise, are there other pathways in accidents (non-normal operations)? Are these included in the accident analyses? How? Provide the data to support the claim that airborne hazards and inhalation exposure is the only significant pathway?

Environmental Justice

CO-005/21
17.024
The document is designed, again, to reassure. 20% minorities in the workforce is presented as a benefit of good hiring practices, minority populations are assumed to live to far away (17 miles) to have any risk associated with them.

CO-005/22
17.025
How was inter-individual senstivity to the worker population assessed in the study? It does not look like it was.
Do the training programs and safgety/information materials to workers and the community account for different literacy rates, primary languages. In the communities, how and who provides the information? Provide any data about the extent to which information about the Plant is known or understood, or the effects of radiation exposure are known/understood in the communities (minority and not)?

CO-005/23
17.026
The document did not address the issue of radiation exposure to laundry workers, etc. offsite or onsite. Often these kinds of exposures are predominantley to minority populations.

Thank you for the opportunity to comment onthis document. We look forward to a much more thorough and more improved document with the final draft.

Sincerely,

Doris & Phillip Smith

Doris & Phillip Smith
Co-chairs

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PANHANDLE 2000

May 2, 1996

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Office of Reconfiguration
P.O. Box 3417
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U.S. Department of Energy
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Re: Public Comment on the Department of Energy's Stockpile Stewardship and Management (SSM), Storage and Disposition (S&D) of Weapons-Usable Fissile Materials, and the Pantex Site-Wide Draft Programmatic Environmental Impact Statements (PEISs).

Dear Sirs:

Thank you for the opportunity to comment on the U.S. Department of Energy's (DOE) Draft Programmatic Environmental Impact Statements (PEISs) on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials, as well as the Pantex SWEIS. Also, please consider this our comments on the Pantex Site-Wide Environmental Impact Statement (SWEIS).

As we explained in our communication on these subjects during the past few years, we were appointed by the City Commission of the City of Amarillo, Texas, on February 8, 1991 to co-chair Panhandle 2000, a group of Amarillo-area citizens interested in the environmentally sound retention and expansion of Pantex. We were also requested to organize community support for Pantex. Ours is a broadly representative organization of individuals and entities who reflect the strong support of the vast majority of area residents for DOE's work in the Texas Panhandle at Pantex.

The issues addressed in the three Drafts are of paramount concern to the people sharing the Texas Panhandle with the Pantex Plant and the DOE. The dramatic employment reductions forecasted in the Draft SSM PEIS will severely impact the Panhandle economy. While Pantex is willing to participate, if necessary, in efficient downsizing of the nuclear weapons complex, any reductions at Pantex should come only after intensive cost and technical analyses to assure that national security needs are still being met in a cost-effective manner.

Ensuring confidence in the United States' nuclear stockpile and the safety and reliability of the nation's nuclear deterrent are vital issues that have been addressed by activities at the Pantex Plant for over forty years. As neighbors to the plant, we are very aware, and proud, of the critical role that Pantex plays in fulfilling our nation's goals for defense and energy needs. We look forward to maintaining a vital role in meeting our present and future national security needs.

The Administration's proposals to disseminate current Pantex functions to other sites seems certain to adversely affect the nation's ability to produce nuclear weapons in the future, and to dangerously weaken national security. This is reflected in the SSM PEIS's workload assumptions of 1,000 warheads in the future stockpile, a number far lower than even the 3,500 set in still-unratified START 2 treaty. We urge you to recognize the importance of DOE's production complex, and avoid surrendering the victory we gained in the Cold War through the planned obsolescence of our production capability, which can only be rebuilt at great cost in later years.

As DOE presses toward its Record of Decision regarding SSM and S&D functions, we find it necessary to begin with a summary of the existing facilities Pantex possesses which would require minimal upgrading to meet many of the needs presented in the Drafts. The following table presents the list of existing facilities that are available for particular stockpile management and plutonium storage missions:

Capability	Facilities
1. Weapons assembly/disassembly	Existing facilities in Pantex Zone 12
2. Nonnuclear components	Existing facilities with modifications
3. Nuclear components:	
a. Pit storage	Existing facilities with modifications
b. Pit reuse (minor)	Existing facilities in Pantex Zone 12
c. Replacement pit fabrication and reuse (major)	Existing facilities with modifications
d. Secondaries and cases	Existing facilities in Pantex Zone 12 with modifications
4. High explosives components	Existing facilities in Pantex Zones 11 and 12

Keeping this in mind, please consider the following comments on plans for the Complex as DOE prepares its final drafts on upgrading and/or downsizing facilities at the sites where Stockpile Management capabilities are located, and where Stockpile Storage and Disposition missions are contemplated.

I. SSM PEIS.

A. Assembly/Disassembly Functions at Pantex, and Strategic Reserve Storage.

We are pleased DOE selected Pantex as the preferred alternative for assembly/disassembly (A/D) functions, abandoning earlier, cost-prohibitive plans to transfer these functions from Pantex to the Nevada Test Site (NTS). Pantex's demonstrated experience and strong safety record, as well as the monumental costs associated with recreating A/D facilities elsewhere, make Pantex the ideal site in maintaining these functions.

Further, DOE mentions that strategic storage should be co-located with disassembly, but does not emphasize the protection of those reserves to meet future national security needs. Pantex should be the preferred site for such a mission in coordination with its stewardship functions. Parenthetically, Pantex should be selected for all S&D storage functions. It makes no sense from any perspective, budget or otherwise, to site strategic storage at one site and surplus at another.

Just as maintaining core scientific competencies in the three national laboratories will help ensure the safety and reliability of a smaller stockpile, *maintaining the core production competencies of Pantex* (the sole authorized site for weapons assembly) will ensure our ability to meet future national security needs for stockpile assembly and disassembly. Pursuing complete unilateral disarmament would run contrary to stated national security objectives. Absent total disarmament, we must maintain an assembly infrastructure capable retrofitting aged weapons and assembling new weapons as needed in the future. While DOE plans no new construction at the existing plant, Pantex should be considered for upgrading and/or new construction to prepare for these nuclear weapons production needs.

Finally, in its deliberations, *DOE should insist that budgetary comparisons between Pantex and other sites are accurate, and include capital, transportation, training, remediation, security, and other costs.*

B. High Explosives Fabrication at Pantex.

While we are pleased with Pantex maintaining A/D functions, we are very concerned that DOE did not name Pantex as the preferred site for continuing high explosives fabrication. In conjunction with the A/D functions, it is necessary to maintain HE fabrication at the corresponding site; thus, these functions should remain at Pantex.

The Draft SSM PEIS implies that Pantex would keep HE functions should it retain A/D functions. Since DOE intends to keep A/D at Pantex, Pantex should also retain HE fabrication. In any event, because of ongoing disassembly work at Pantex, DOE admits the plant "would have to retain disposition and disposal capability for the HE inventories currently on site and those expected from near-term weapon dismantlement regardless." In addition, should future needs arise for weapons production, it will be critical to have the HE facilities at the weapons production/assembly site.

If establishing core competencies at the labs are so important for high explosives, why is it not so for uranium functions? DOE has made it clear that in the instance of HEU, maintaining core competencies at the production site is a priority. Why not so for HE?

We adamantly disagree with the statement in the draft PEIS that there is no significant cost benefit to siting HE at Pantex as opposed to the national labs. Earl Whiteman of DOE's Albuquerque Field Office admitted in the April 23 PEIS hearing that it would be more expensive to relocate HE to LANL and LLNL, but he attempted to justify this saying it was "only for a one-time cost." This analysis raises serious questions as to the criteria used to determine the cost considerations for this and other transfers. The capital outlay alone necessary for transfer is admittedly cost-prohibitive; and while transferring HE functions may be less expensive than transferring other functions, the least expensive alternative is to maintain those functions at Pantex. DOE appears to be overlooking or ignoring other glaring considerations like the upgraded facilities and trained personnel at Pantex versus those present (or, more accurately, absent) at the labs. The assertion in the Draft SSM PEIS that it might be cheaper to transfer HE to the labs than it would be to downsize at Pantex is fantastic and defies logic since transfer would still ultimately require some duplication of facilities. In order to reach such a conclusion, one must assume that capital, training, and other costs are not taken into account. Incredibly, the Draft SSM PEIS assumes that the labs, which have failed in every instance to successfully implement *any* production on the magnitude necessary to meet national security needs, could for the first time accomplish this with high explosives. At the public hearings, Mr. Whiteman admitted that Pantex has both capabilities necessary for high explosives work (the quality assurance component), while he labs only have one (the ability to "press" explosives, but at a level which does not match Pantex). Finally, DOE must account for the costs and safety risks associated with transportation of high explosives components between the labs and Pantex. There is no justifiable reason for initiating the unnecessary costs and increased risks associated with transferring HE functions to the labs.

C. New construction/stewardship activities at Pantex.

Until recently, DOE concentrated research and development functions at the labs and production functions at the industrial sites. It appears DOE is headed in a new direction. While the drafts propose to continue concentrating all stewardship functions and to transfer particular industrial functions to the labs, the DOE overlooks the potential for Pantex to perform new stewardship functions complimentary to its current management functions. The scientific, technical, and managerial competence presently at Pantex, combined with additional technical resources from Mason & Hanger, Battelle, and the Higher Education Consortium, offer the human and material resources necessary for the future needs of the SSM Program.

Pantex has the necessary resources, with the required safeguards and security, to meet the goal to downsize and/or consolidate facilities while providing an effective and efficient production capability for a smaller stockpile. Facilities are currently in place to perform almost all the necessary mission elements of the stockpile management program, a fact that should not be overlooked as the DOE seeks to preserve the integrity of the nuclear stockpile under increasing budgetary constraints.

The obvious advantage of Pantex is, by utilizing the facilities already in place, DOE could eliminate the capital cost for establishing the same capabilities elsewhere. The cost of unnecessarily duplicating facilities (*currently in place at Pantex*) at another site would cost the DOE tens of millions of dollars in infrastructure alone, notwithstanding the additional expense of related transportation, environmental remediation, start-up and training costs required at a redundant site which would cost taxpayers additional millions of dollars.

Another fact that should not be overlooked is that Pantex is the candidate site located nearest to the LANL, the preferred site for the Atlas facility, and the planned site for plutonium pit fabrication. This facility is key to DOE's ability to address stockpile reliability and safety issues by means other than nuclear testing due to the indefinite extension of the nuclear testing moratorium in July 1993. The conclusion to be drawn is that the location of SSM Program functions at Pantex would not only take advantage of current storage and dismantlement capabilities, but would also capitalize on the geographical proximity of Pantex and LANL that would be conducive to the exchange of technological information necessary for effective management of a smaller nuclear weapons complex.

In addition to Pantex, the Texas Panhandle also boasts of the Amarillo National Resource Center for Plutonium (ANRCP) which is taking a lead role in environmental and nuclear research. The ANRCP is operated by the Higher Education Consortium, comprised of three of the nation's preeminent university systems (The Texas A&M University System, Texas Tech University System, and The University of Texas System). Consistent with the SSM Program non-proliferation objectives, the Consortium is coordinating the U.S.-Russian Summit Working Group on the Disposition and Accumulation of Fissile Materials in order to ensure that the nation's arms-control objectives are met. The involvement of the Consortium adds an academic dimension of research excellence and third party monitoring that ensures continued competency of the people who must make the scientific and technical judgments related to the safety and reliability of nuclear weapons. We want to stress that we view the role of the ANRCP as complimentary to the labs, and supplementing, not supplanting, their functions.

The Consortium and the development of the ANRCP are logical extensions of the current allocation of functions within the U.S. nuclear weapons complex. In light of continuing changes in the national security picture for the U.S., and given the importance of resolving dismantling issues and issues related to the future stewardship of the nuclear stockpile, the *siting of research and technical functions at Pantex for the SSM Program is highly appropriate*.

The significant nuclear stockpile still present in the former Soviet Union under sometimes suspect surveillance makes our continued cooperation with Russia regarding management of the nuclear stockpile critical to international security. The key role the

Amarillo National Resource Center for Plutonium is playing for DOE in SSM and fissile materials activities with Russia argue for an expanded role for Pantex.

Accordingly, it is appropriate to consider Pantex as an alternative site for future defense missions. The location of new activities at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost to the American taxpayers.

II. S&D PEIS.

A. Fissile Materials/Plutonium Storage and Disposition at Pantex.

In addition to DOE's hesitation to name a preferred site for HE, we are also concerned that the Draft S&D PEIS did not list a preferred site for plutonium storage and disposition. Whether the decision reached is for "No Action" or "Consolidate," plutonium will continue to be present at Pantex through assembly/disassembly operations. President Clinton last year announced that he was declassifying 38.2 metric tons of weapon-grade plutonium as excess to national security needs. Of that amount, 21.3 metric tons are located at Pantex. For this reason alone, Pantex should be the preferred site for storage, disposition, and utilization. Doing so would avoid the economic and other attendant costs of transporting plutonium to a new site as well as the massive infrastructure costs of unnecessarily recreating a Pantex-like facility at another site.

1. Storage.

As aforementioned, Pantex is already safely storing most of the weapons-usable surplus plutonium from the dismantled stockpile. Pantex presently has more than 8,500 plutonium pits stored on site and can easily be expanded to hold more than 20,000. We fully support the proposed action in the SWEIS to expand Pantex's storage capabilities to 20,000 pits. The plant is also scheduled to be upgraded to prepare the storage bunkers for receipt of plutonium pits relocated from Rocky Flats. This will increase further the plutonium stockpile present at Pantex.

One major concern is, as it is currently drafted, the S&D PEIS does not emphasize a continuation of the Strategic Plutonium Reserve necessary to meet continued national security needs. Once again, storage of the strategic reserve is a logical mission at Pantex as an extension of its assembly/disassembly functions and long-term plutonium storage consideration. Neither the SSM PEIS nor the S&D PEIS takes the logical next step by naming Pantex as the site for storage of strategic and surplus plutonium. At the hearing, Earl Whiteman of DOE said at the hearing "it made sense" to collocate strategic storage and assembly/ disassembly to minimize transportation, and to collocate strategic storage with surplus storage, since the strategic stockpile may be declared surplus at some point. Mr. Whiteman said that Pantex has a facility which is "exactly the right size" for strategic storage, and that there was sufficient space at Pantex for all functions. DOE should not only recognize that storage should follow disassembly, but also that certain disposition options should follow storage to minimize transportation and other costs. It is important that a stockpile of strategic reserve remain a stated objective of S&D functions included in either plutonium storage or pit fabrication duties. Since Pantex also is in close proximity to LANL, the preferred site for pit fabrication, designating Pantex as the alternative site for a strategic reserve would be the most cost-effective choice.

With regard to storage, the focus should be squarely on the issue of storing the pits safely, and we fully support storage of plutonium and other fissile materials at Pantex under both the "no action" and "long-term" alternatives, given adequate assurances that such storage is safe and environmentally sound. In addition to extensive environmental safety protections already in place, Pantex has built an elaborate security system to protect stored plutonium from potential theft. Safe storage is critical for maintaining the integrity of the stockpile and our commitment to international safety. Pantex is the only site currently capable of this level of protection to prevent possible proliferation of stolen weapons-grade plutonium.

Ensuring safety and accountability of our surplus plutonium stockpile can best be accomplished through the construction of a new consolidated storage and staging facility at Pantex. Such a facility would:

- Strengthen national and international arms control efforts by fostering continued and enhanced cooperation with Russia on transparency issues, and bilateral agreements to monitor dismantlement and maximize options for the disposition of surplus weapons-usable fissile materials;
- Ensure that storage and disposition of weapons-usable fissile materials is carried out in compliance with environment, safety, and health (ES&H) standards;
- Consolidate all nuclear materials which would provide significant cost savings for surveillance, storage, and disposition.

Siting a new consolidated storage facility at Pantex also would further the "stored weapons standard" which envisions the same high standards of security and accounting applied to storage of nuclear weapons being maintained for weapons-usable fissile materials throughout the process of dismantlement, storage and disposition. Pantex has put in place, and is accustomed to maintaining, the high security and accounting standards for nuclear weapons storage for decades as the Complex' sole site of disassembly.

Siting long-term storage at Pantex also will help us achieve the Administration's nonproliferation goals. No current treaty requires us to disassemble nuclear warheads, but only to disable the delivery vehicle; the warheads can remain intact under treaty, and the U.S. is disassembling voluntarily and unilaterally. If the U.S. is to strive for reciprocity, and encourage Russia and other countries to "go the extra mile" and disassemble nuclear arms as opposed to merely "dismantling" them, Pantex, being the sole U.S. site for disassembly, would be the consummate site for storage of fissile materials.

We disagree with DOE's findings that under either the "No Action Alternative," or the "Long-Term Storage and Disposition Alternatives," that Pantex has the greatest potential to experience adverse cumulative impacts. This conclusion is almost wholly based on what DOE terms as the "small, compact area" in which Pantex is sited. This conclusion fails to take into consideration the fact that DOE already owns the 10,000 acres on which Pantex is located, and that more land is available for any new or upgraded facilities, at no cost to the federal government. Further, Pantex is located 14 miles from a central city; the finding that cultural, socioeconomic (such as level of road service in the event of construction), and public and occupational health and safety impacts would be greater at Pantex is incorrect. For example, to imply that intersite transportation impacts would be greater at Pantex is absurd, since (1) Pantex currently houses the vast majority of plutonium pits, thus avoiding the lion's share of any transport (and the appurtenant budgetary, environmental, and political costs related thereto) if it was selected as the preferred alternative for S&D; and (2) is the site closest to LANL, the proposed site for pit fabrication. Even if one were to accept such a finding regarding Pantex, the differences between candidate sites would be so small to demand that they not be seriously considered as an accurate or meaningful criterion on which to base selection.

If DOE chose not to construct a new consolidated storage facility, we would support the upgrade of Pantex storage capability necessary to comply with current design and environment, safety, and health requirements.

2. Disposition Alternatives.

DOE has not yet decided on the preferred alternative for disposition or the sight for disposition, but whatever decision is reached, Pantex should be the preferred site since it is already the current storage site for plutonium removed from dismantled weapons and the site of strategic plutonium reserve.

While the *implementation* of any disposition option must be environmentally sound, the *ultimate decision* of which options will be chosen will be *based largely on national security considerations*, especially the success or failure to reach accord with Russia on these issues.

While the U.S. should take any unilateral actions it deems appropriate if its national security interests are maintained, the volatility of the former Soviet republics and the changing world scene dictate that *reciprocity* guide our actions. The Draft S&D PEIS identifies three major alternatives as reasonable for plutonium disposition: immobilization in glass or ceramic form; burning in reactors as MOX fuel; or deep burial in boreholes either directly or in immobilized form.

How do these options fit into reciprocity? The White House Fact Sheet on Nonproliferation contains the policy statement that the U.S. should "seek to eliminate...the accumulation of stockpiles of...uranium and plutonium," including those from civil nuclear programs. It is unrealistic to believe that any disposition decision by the U.S. which does not contemplate the use of plutonium as fuel will cause other countries - either with or without nuclear weapons - to abandon the use of plutonium in reactors. For example, Russia, with its large investment in its nuclear infrastructure, and its lack of financial means to convert to other forms of energy, is highly unlikely to forego the use of nuclear power, including the use of plutonium. Also, European nations like France, which lack the vast natural resources of oil, gas, and coal which the U.S. enjoys, have little incentive to give up their reliance on nuclear power. If that is the case, and in full recognition that reactor-grade plutonium can easily be used in weapons, the U.S. will be compelled for "reciprocity" and national security reasons to maintain plutonium in pits for some period of time and plan to utilize it through the mixed oxide fuel option. The U.S. cannot lead by positing unacceptable or unfeasible options; it must recognize the circumstances which it and other nations face, and pursue a course which will benefit its national security goals, and possibly other goals as well.

We are not convinced that plutonium is more of a liability than an asset. Why can't we make swords into plowshares, and utilize these resources - which took so much time, effort, and money to develop - and examine the peaceful uses of these materials? Examination of possible beneficial uses is one of the primary purposes of the research being conducted at DOE research facilities across the country. We strongly support, as part of this research, the review of long-term options for plutonium disposition, including environmental considerations. This review can involve research and policy study on the best forms of plutonium for storage, disposition, and utilization, storage options, security and safeguards and other issues.

Further, we believe that this option, with its emphasis on education and research, will help reverse the "brain drain" which could adversely affect the Nuclear Weapons Complex as its primary function changes. The Defense Nuclear Facility Safety Board has said that the government is losing most of its veteran experts. While DOE has attempted to address this problem through instituting a program to attract new young scientists to the Complex, we believe that more young scientists will have the incentive to develop and maintain expertise in these disciplines if the types of serious research which the "beneficial use" option offers is available through DOE.

The questionable efficacy of the "irreversibility" of vitrification or boreholes argues for use in reactors, at least for pits and other "MOX-able" plutonium. While we recognize that some plutonium "scrap" can only be disposed through avenues other than MOX, the extraordinary advances in science, especially in this important area, render naive the notion that sometime in the near future the technology to "reverse" vitrification, boreholes, or any other such "waste generating" process will be readily available to those who desire it.

Accordingly, we support a course which will provide a tangible demonstration to the affected citizens that there exist long-term disposition options which both fit our national security interests as well as a common sense desire to reap a beneficial use from these materials. The Administration should consider a joint program between Russia and

the U.S. (and perhaps other countries) which actually would take a plutonium pit apart, make plutonium oxide, fabricate mixed oxide fuel, and burn the fuel in a commercial light water reactor.

Such a policy would meet the "spent fuel standard" by making the plutonium as inaccessible for weapons use as the plutonium in spent nuclear fuel from commercial power reactors. It also recognizes the fact that the only course to safe disposition is to separate the atom through fission. It also looks beyond the spent fuel standard by maximizing the options available to DOE and the Administration with regard to disposition.

3. Environmental Safety and Health Criteria.

a. Airplane Crash Risk Analysis:

CO-006/1
15.044

The 1994 "Finding of No Significant Impact" arising from the Environmental Assessment found an airplane crash/accident occurring at Pantex to be an "incredible event" not justifying the preclusion of additional storage at Pantex. Even so, the plant subsequently worked with the Department of Defense and the FAA to reduce flights paths over Pantex, and took other steps to ameliorate the situation. However, the Draft SWEIS does not account for the reduced flights thereby exaggerating the probability for airplane accidents at Pantex and their resulting impacts, and, incredibly, *increases* the probability of a crash from the 1994 "FONSI." In the recent hearings, Nan Founds responded to this concern by saying that DOE is formulating its own analysis not dependent on FAA data, but also stated there were serious problems with DOE's analysis, which would be addressed. In its initial analysis, DOE is ignoring not only credible work already completed, but also the obvious reduction in accident potential for use in determining the ES&H of siting new functions at Pantex. This undermines the perceptions for fair and equal criteria for use in accurately comparing the various sites under consideration. We urge DOE to correct the analysis and avoid the wrongful preclusion of Pantex for consideration of additional functions.

b. Environmental Impacts of Potential Increased S&D Functions:

CO-006/2
02.018

In the Draft S&D PEIS, DOE characterizes Pantex as having the "greatest potential" to experience adverse cumulative impacts from an increased role in plutonium storage and disposition. However, this characterization is way beyond the means of DOE's cursory analysis. NEPA regulations require that environmental impact statements discuss "significant" impacts and support these with evidence. DOE has taken license to ignore these regulations by discussing potentiality and susceptibility without basing these in fact. We object to this type of characterization which unfairly and inaccurately misrepresents Pantex's ability

CO-006/2
02.018
continued

to handle an increased role in S&D. These conclusions also totally contradict those contained in the SWEIS which characterize the impacts as "minimal" and "negligible." It is imperative that DOE correct the inaccurate mischaracterizations before making its final decisions for plutonium storage and disposition missions.

4. Cost savings due to avoidance of transport of special nuclear materials.

Regardless of the final decision for storage and disposition, DOE must make accurate budgetary comparisons a primary consideration in its analysis of where to site these functions. *DOE should insist that budgetary comparisons between Pantex and other sites are accurate, and include capital and transportation costs, and also take into consideration the political consequences of transfers from Pantex.* We also urge DOE to compare on a "side-by-side" basis all six candidate sites for: (1) Conduct of operations; (2) Implementation thereof; (3) Security; (4) Relationship between management, unions, community; (5) Quality system programs; (6) OSHA/ ES&H envelope; (7) Engineering systems; (8) Radiation safety; (9) Applied technology; (10) Training programs; (11) Explosive and nuclear safety programs; and (12) Employee involvement in daily operations.

CO-006/3
16.028

Accurate comparisons between all sites under consideration should once again make Pantex the preferred site. Maintaining and expanding the interim storage facilities at Pantex would all but eliminate the significant transport costs, and the attendant environmental and political risks involved with moving these functions to another site. Eliminating the unnecessary transportation of radioactive materials, will translate into less cost and greater public safety and protection. Ignoring or miscalculating the risks and costs associated with weapons materials would be a serious omission.

We are confident that any fair comparison of economic and political costs will favor Pantex over the other sites included in consideration, since recreating this infrastructure at another site would be cost-prohibitive.

5. Economic factors.

Pantex is perhaps the most cost-effective alternative for any new construction of SSM and S&D facilities if DOE pursues that course. First, labor costs are low. The existing work force in the Amarillo area has the skills necessary to meet the construction and operation requirements for any new functions and to do so at highly competitive wage rates. With a civilian labor force of 110,200, the Amarillo Metro Area can provide the project with a large, well-educated, and comparatively inexpensive labor pool. Average wage costs for manufacturing employment in Amarillo are 18% below the national average. Second, utility costs are highly competitive. According to the Utility Data Institute, the SPS industrial rate currently ranks in the lowest 11 percent among U.S. investor-owned utilities. SPS has a long history of low rates and presently offers the lowest rates among investor-owned utilities in Texas. If new facilities were operational now, SPS's standard rate for this class of firm service at 80 percent load factor would average 3.2 cents per kWh. Also, land to house new construction is readily available. The Department of Energy presently owns the 10,000 acres on which the Pantex plant is located. More land is available for any new facility, at no cost to the federal government.

Finally, the City of Amarillo has excess water capacity to an extent enjoyed by no other candidate site, without depleting the Ogallala Aquifer.

6. Public and political support.

In addition to the economic factors listed above, local support for the Pantex Plant, and its expansion, is extraordinarily strong. A Shipley and Associates poll of the four county area surrounding the plant (Armstrong, Carson, Potter, and Randall) found that 99% of the respondents believe that Pantex is important to the local economy, 88% said that Pantex is a facility that they can be proud of, 79% favored Pantex expansion, and 88% agreed that Pantex is safe. In May 1991, a Lance Tarrance poll showed that 85% of area residents supported an expanded Pantex. Also, a July 1991, poll conducted by the Amarillo Globe-News showed that almost 75% of the respondents favored expansion of Pantex. Consideration of the results of the 1991 Tarrance poll (Republican) and the Shipley poll (Democratic) reveals that regardless of party affiliation of the pollster or time the poll is conducted, Pantex enjoys the overwhelming support of Panhandle residents, at a level perhaps unsurpassed by any other Complex site.

Area and state elected public officials are virtually unanimous in support of current and expanded plant operations. Essentially the entire 32-member Texas Congressional Delegation has pledged support for expansion and will be active in the effort in the future, as well as the Governor, Lieutenant Governor, area legislators, and other public officials. Thus, the message is clear from the nation's elected representatives that the role that Pantex plays in the future of the weapons complex is vital to the nation's nuclear deterrent and the safety and reliability of nuclear weapons.

III. Conclusion.

On all accounts, Pantex clearly is the best and most cost-effective alternative to DOE for stewardship and management, storage and disposition, and other defense-related missions. We respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new functions in DOE's Final PEISs and Records of Decision. Thank you for the opportunity to share our thoughts and concerns with you.

Yours truly,

Jerry Johnson
Co-Chair, Panhandle 2000

Wales Madden Jr.
Wales Madden, Jr.
Co-Chair, Panhandle 2000

peace action
Texas
formerly Texas Campaign for Global Security

Jan Sanders, Chair
7326 Malabar Lane
Dallas, TX 75230

July 11, 1996

To: Nanette Founds
U.S. Department of Energy
P.O.Box 5400
Albuquerque, NM 87185-5400

Please find enclosed Comments on the Pantex PEIS related to that facility's role in the "Stewardship and Maintenance" proposals for the U.S. nuclear weapons complex. If you should have any questions, do not hesitate to to call me (214)369-9388. Or call the national office of Peace Action at (202)862-9740 and speak with Carina Wood.

Additional enclosures include a New York Times article pertinent to my comments and a brochure about the organization.

I have just learned there is to be a hearing in Austin,TX in 10 days. I will be representing my group, if I'm able to make arrangements with this short notice.

Jan Sanders

cc Carina Wood

Comments re the PEIS for the Pantex Nuclear Weapons Facility

Submitted by Jan Sanders, Chair Peace Action Texas

July 1996

Peace Action Texas opposes the proposals now being put forward by the Department of Energy for the Pantex nuclear weapons facility. There are many reasons for our opposition. Our reasons include 1) the negative impact on the integrity of our foreign relations and our adherence to our international agreements related to non-proliferation, 2) the enormous drain on our national treasury, and 3) the drain of human and natural resources that could be devoted to life affirming endeavors such as education, health care, renewing our cities, etc. These comments, however, will address our concerns related to the programmatic impact on the environment.

Each and every step of nuclear bomb making involves long term damage or threat to the environment due to its use of radio-active materials. It is difficult to use ordinary words that are attempting to describe extra-ordinary conditions. Thus, "long term" is woefully inadequate in communicating the dangerous half life of, say, plutonium which physicist put at 200,000 years !

It is very irresponsible of the Department of Energy, who has learned throughout the Cold War era the environmental costs of bomb making, to put forward the proposals now under consideration. The names of the DOE facilities are like names on environmental tombstones--Hanford, Rocky Flats and more. Pantex has already been designated a Superfund site, don't add a tombstone for Pantex. Therefore, the processing of plutonium at Pantex is unacceptable, period.

The movement of dangerous materials has a level of risk due to the possibility of accident. Therefore, the movement of plutonium from other locations is a risk not worth taking. And the notion that more is better or even O.K. when it concerns making Pantex, located over the Ogallala Aquifer, a plutonium storage facility flies in the face of environmental protection !

CO-007/1
06.124

More about the aquifer. Two very important negative impacts--the draw down from the already dropping water reserves and the contamination into it. The proposal gives inadequate information and inadequate protection of the crop-feeding resource in the agriculturally rich eight state region where the Ogallala is located--not to mention the water supply for Amarillo.

As an antinuclear peace organization we celebrate the gradual dismantlement that is underway at Pantex under the START II agreement. But disassembly posses a whole new set of questions like-- "What's next?"

page 2 of 2

With all of the research, development, manufacturing and deployment poured into bomb-making we are very short on environmentally sound methods for storage and disposition. Instead of the euphemistically named and costly program that is before us, we should be considering a "green" Manhattan II.

CO-007/2
01.042

The requirements for dismantlement should be to:

1. ....dispose of the components in such a way that they are not and could not be used in a bomb again.
2. ....minimize, rather than contribute to, or perpetuate the waste stream of radio-active materials.

Until more research proves up the preferred option of radio-active waste disposal, I would suggest the vitrification process linked to observable and monitored storage. A totally unacceptable option is to dispose of the plutonium as MOX fuel to the discredited nuclear energy. I say discredited, because they, too have not been able to deal safely with their radio-active waste and continue to gobble up tax-payer's funds. The taxpayer and environmental concerns are highlighted in the attached New York Times article.

Passing on the plutonium to the nuclear industry and thinking it has been disposed of is like playing hot potato with an environmental time bomb.

One last environmental concern. Pantex is located near a regional airport with the runways feeding flights overhead. This poses yet another environmental risk Since Pantex was built the airport has grown as has the amount of plutonium on site.

The risks are unacceptable.

One of the forces that perpetuates this country's weapons appropriations is the protection of jobs, not national security needs. Surely, we have enough imagination to create a jobs program that does not risk destruction or even injury to the environment. If that fails us, it would be cheaper to pension workers until they found other work. The costs would be a bargain !

In case the concerns related to the environment are not enough, I would like to repeat my first paragraph. "Peace Action Texas opposes the proposals now being put forward by the Department of Energy for the Pantex nuclear weapons facility. There are many reasons for our opposition. Our reasons include 1) the negative impact on the integrity of our foreign relations and our adherence to our international agreements related to non-proliferation, 2) the enormous drain on our national treasury, and 3) the drain of human and natural resources that could be devoted to life affirming endeavors such as education, health care, renewing our cities, etc."

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TASK FORCE REPORT

PANTEX SITE-WIDE EIS

AIRCRAFT ACCIDENTS

CO-008/1 15.025 1. Draft EIS, Volume II-Appendixes, Page E-3, E.2.1
a. What is the relationship between the "j" value and the probability of the aircraft penetrating the magazine?

CO-008/2 15.026 b. Why is the term "scabbing" used on page E-3, Paragraph 1, when the term "spalling" is used on Page 4-249 to describe the same phenomenon? Explain the different terms.

CO-008/3 15.027 2. Page 4-241, Paragraph 3
a. What is the monitoring procedure and what is the maximum time frame the magazines remain open?

CO-008/4 15.028 b. Do pilots flying at night use the Pantex lights as a landmark, instead of using the VORTAC?

CO-008/5 15.029 3. Page E-5, E-2.2
Why is the 15° impact angle used in the analysis and the possibility of higher angle impacts ignored. The Value Jet DC9 that went down in the Everglades had an impact angle of about 75°. Please include a table of all the various impact angles, hit possibilities and release probabilities.

CO-008/6 15.030 4. Page E-8, E-3.1, Paragraph 1 and Page E-11, E-3.1.2
Add the statement, "The 4800 ft. Mean Sea Level ceiling over the Pantex Plant equals to only 1200 ft. above ground level."

CO-008/7 15.031 5. Page E-11, E.3.1.2
a. Why state that helicopters are "omitted" as a hazard because they do not fly over the plant? Neighbors observe them flying over the plant regularly. Helicopters often operate at high weights and high speeds.

CO-008/8 15.032 b. Are aircraft on post maintenance operation test flights from modification and maintenance facilities at the Amarillo Airport included in the report? These planes tend to circle over the plant repeatedly.

CO-008/9 15.033 6. Page E-15, 3.1.3, Paragraph 1
a. Why were only twenty-five days in May, 1995, used? To give a more accurate picture of over-flights, why not use thirty days, sixty days, six months?

CO-008/10 15.034 b. Do the distances of federal airways vary?

CO-008/11 15.035 c. Are distances measured from the centerline or from the edge of the VORTAC? How far from the centerline do they extend?

CO-008/12 15.036 7. Page E-15, E.3.1.3
a. It is a false assumption that all commercial operations from runway 04 are always bound for Dallas on the 105° airway.

CO-008/13 15.037 b. How many test flights for the modification and maintenance facilities at the airport use runway 04?

CO-008/14 15.038 8. Page E-30, Figure E.2.2-1
General aviation turbojet wingspans of up to 90 feet are common now, particularly among newer aircraft. Why are they not included?

CO-008/15 15.039 9. Page E-33, Table E.3.1.4-2
The skid distance of airliners and turbojets are comparable. Airliners use 1860 feet, but 37 ft. is used for general aviation turbojets. That being the case, a higher angle impact would be expected. The 37 feet at a 15° angle is unrealistic and misleading. Re-evaluate and define the aircraft categories and the skid distances of general aviation turbojets. Also, be consistent within the correlating tables, i.e. E.2.2-1 and E.3.1.4-2.

CO-008/16 15.040 10. Page E-22, E.3.1.6, Paragraph 2
Is the crash scenario in SWEIS different from that in Storage and Disposition PEIS? If it is, explain. Why?

CO-008/17 15.085 11. Pages E-5 and E-16, E.2.1 and E.3.1.4
a. Why is the value of "y" for military aircraft lower than that for commercial aircraft?

CO-008/18 15.086 b. The proximity of Amarillo to the major east-west routes, and the availability of an extremely long runway, makes for an attractive option in the event of an in-flight emergency for both military and commercial over-flights. In such an event, an aircraft is permitted to waive all regulations in the attempt to perform a safe landing. With the prevailing southerly winds, and the location of the Pantex plant, the chances of an aircraft making an over-flight of the hazardous facilities, while already in a degraded state, are extremely high. Will the facilities at Pantex be prepared for such an emergency?

BIOTIC RESOURCES

CO-008/19 09.001 1. Page 4-135, Paragraph 3
"Radiological surveys of beef cattle raised..." Clarify this statement and provide the citation. What type of studies were done, when were they conducted, and by whom?

CO-008/20 09.002 2. Page 4-139, Paragraph 1
Clarify whether the type of "stock tank" is an earthen structure on one of the drainage-ways to the playa or is a galvanized or metal structure.

CO-008/21 09.003 3. Page 4-139, Paragraph 2
"There are five playa wetlands in the vicinity of Pantex Plant Site: ...". Do you mean 5 playas designated as wetlands? There are many more than 5 playas in the vicinity of Pantex.

CO-008/22 09.004 4. Page 4-140, Paragraph 2
Correct typo "*P. amphibum*."

CO-008/23 09.005 5. Page 4-142, Paragraph 1
How do you explain the significant decline from the 1993 to the 1995 floristic survey in the *Echinocereus viridiflorus* population?

CO-008/24 09.006 6. Page 4-142, Paragraph 2
In the statement, "wetland resources would benefit from continued operations since officials are taking steps to ...", what specific steps have been agreed upon?

CO-008/25 09.007 7. Page 4-142, Paragraph 5
Correct typo, last sentence. ".. but these impacts would not (insert "be") considered significant."

CO-008/26 09.008 8. Page 4-143, Paragraph 4
In the statement, "Environmental protection activities currently ongoing at the plant meet all regulatory requirements of FWS," please cite the letter from FWS.

CULTURAL RESOURCES

CO-008/27 10.001 1. Why were the agricultural based lifestyle and the community of Panhandle, as a cultural impact, not evaluated? Most people in the neighboring communities are only one generation removed from the farm or their grandparents were farmers. Also, the supportive business and families are involved in this culture. The culture in general, and the resources associated with it, were not mentioned.

ENVIRONMENTAL JUSTICE

CO-008/28 17.004 1. The current definitions/criteria of environmental justice do not take into account the people in rural areas who are politically handicapped in comparison with a large urban center. The weight of the population in the urban area impacts elected representation to such a degree that the minority rural voters, in effect, have little voice, even when they are most highly impacted by decisions. Definitions that are based on race/ethnicity or income alone do not address this problem. This is the situation that exists around Pantex, where neighbors, no matter how well organized, cannot "outweigh" the numbers and interests of urban Amarillo.

CO-008/29 17.005 2. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and President Clinton's February 11, 1994 Memorandum for the Heads of all Departments and Agencies, requires an analysis of environmental effects on low-income and minority populations to include human health, social, and economic effects.

3. Why does the draft SWEIS analyze only human health effects of the proposed actions and not the social and economic effects, as required?

CO-008/30 17.016 4. How are individual minority sensitivities in the worker population assessed in the study? Do the training programs and safety information, materials to workers, and the community account for different literacy rates and/or primary languages? Does DOE have any data about the extent to which information about the Plant is known or understood, or the effects of radiation exposure are known/understood in the minority community? If so, provide the data.

CO-008/31 17.017 5. Was exposure to contaminated clothing, for example by minority laundry workers, considered? If so, how?

GEOLOGY AND SOILS

CO-008/32 05.001 1. Pages 4-38 and 4-39
These pages show that soil quality in many sites has been affected. How much soil has been affected? For example, Table 4.5.1.3.-1., page 4-38, lists 37 sites that have been affected by "burning ground." What is the size of each of these sites?

CO-008/33 05.002 2. Page 4-41, Paragraph 2
a. This paragraph states that the soil has been contaminated to a depth of 20 feet. It would be very useful for the report to indicate how the amounts of contamination are changing with time. For example, the amount at 20 feet may be increasing if downward movement from the surface is occurring, or it may be decreasing if degradation is occurring. What are the trends?

CO-008/34 05.003 b. There was no mention of soil remediation processes. Describe the number of processes that have been undertaken, or planned, for soil remediation that could be used to enhance the natural degradation processes of the contaminants present in the soil. Although extensive monitoring has occurred, there seems to be a minimum number of restoration studies.

CO-008/35 05.004 3. Page 4-29, Paragraph 1
Provide a citation for "Caprock Caliche."

CO-008/36 04.002 4. Page 4-40, Paragraph 1
"By virtue of 30 TAC 335.557 (3), the future land use designated at Pantex Plant is nonresidential." How are current agricultural activities on DOE owned land classified?

__General__

CO-008/37 04.013 Agricultural activities are one aspect of operations of the Pantex Plant. These agricultural operations impact Pantex Plant's natural resources considerably and yet have received only cursory mention in various sections in the SWEIS. Because agricultural activities have not been detailed in the document as a continuing operation of Pantex, are agricultural activities not to continue on the public's federal land, or has the public subtly been denied the opportunity to comment on this use?

HUMAN HEALTH RISKS

CO-008/38 14.011 — 1. Page 4-205, Paragraph 4
a. Exposure from inhalation is the only pathway assessed in Pantex SWEIS. Discuss exposure through other pathways such as water, soil, and vegetation.

CO-008/39 14.012 — 2. Page 4-208, Paragraph 2
Internal exposures, received when radioactive materials are deposited through inhalation, ingestion, or absorption, are considered minor contributors to worker doses; therefore, are not considered in this document. Define "minor."

CO-008/40 14.013 — 3. Page 4-207, Paragraph 2
a. List improvements/changes in work practices and scope that have been implemented to significantly reduce worker external exposure.

CO-008/41 14.014 — b. Discuss the cumulative effects from radiological exposure, hazardous chemical, toxic releases and emissions on individual workers and the public population.

CO-008/42 14.015 — 4. Page 4-208, Paragraph 6
"Effects Screening Levels (ESLs) may be unrealistic, to state that none of the chemical concentrations exceed ESLs, therefore they are not expected to have adverse health effects to members of the public." What is the basis for this statement, when synergistic effects have not been evaluated?

CO-008/43 14.016 — 5. Page 4-209, Table 4.14.1.2-1
Why are there no standards for 5 pollutants resulting from Plant sources in Table 4.14.1.2-1?

CO-008/44 14.017 — 6. Page 4-210, Table 4.14.1.2-1
a. The table lists significantly higher ESLs for several contaminates, i.e., MIK, and MEK. Correct the inconsistencies from the table on page 4-209.

CO-008/45 14.018 — b. Address latent cancer probability resulting from releases and/or daily operations emissions. Describe cancers not linked to radiological exposures.

CO-008/46 14.019 — 7. Page 4-215, Paragraph 2
The June 1994 study by the Texas Cancer Registry, TDH, focused only on cancers of the breast, prostate, brain, thyroid, and leukemia. Other radiation-associated cancers, such as bone and lung were not included. Why? What about other types of cancers? Include, or justify, other types not included.

CO-008/47 14.020 — 8. Page 4-215, Paragraphs 3 & 5
a. The epidemiologic study (Acquavella 1985) and the follow-up study conducted by

CO-008/47 14.020 continued — NIOSH only looks at mortality ratios. Is there an on-going health surveillance, either mortality or incidence, for ex-workers of Pantex?

CO-008/48 14.021 — b. Cancer is the only health issue addressed. What about all other health problems associated with nuclear and HE materials processes? Explain.

CO-008/49 14.022 — 9. Page 4-216, Paragraph 2
The yearly incidence rates (refer to work place injuries) measuring Pantex safety programs compares Pantex to national industries. Is this a likely scenario? Why?

CO-008/50 14.023 — 10. Pg. 4-217, Paragraph 2
This paragraph states that a fire limited to the interior of a facility would only cause internal releases in the room of the fire. Where would those internal releases eventually go? Wouldn't they have to go external? Explain.

CO-008/51 14.024 — 11. Page 4-218, Paragraphs 1 and 3
a. When and how will OSHA regulation of worker health and safety be implemented?

b. What will the reporting mechanisms be?

CO-008/52 14.025 — c. "DOE contractor operations at Pantex expose workers to hazardous constituents." Are workers fully aware of these exposures and of the combined effects to human health? Discuss in detail how workers are prepared for these exposures, consequences, and effects.

CO-008/53 14.026 — d. Daily routine emissions are not reported to the public. Shouldn't workers and the public be made aware of these routine emissions for human health reasons and environmental consequences?

CO-008/54 14.027 — 12. Page 4-219, 4.14.2.1
"The continuation of weapons-related operations at Pantex would result in the continuation of radiological exposure to plant workers." Have these workers been made aware of these health hazards? Do their families know the consequences of these health effects to themselves, also?

CO-008/55 14.028 — 13. Page 4-220, Table 4.14.2.1-1
a. The cumulative radiological doses and expected latent cancers to the public from normal operations have not been assessed. Why are these exposures not evaluated?

CO-008/56 14.029 — b. The combined toxic chemical, radiological releases and emissions are not evaluated for workers or off-site populations. Why? Give exposure rates for both groups.

CO-008/57 14.030 — 14. Page 4-221-Paragraph 4

CO-008/57 14.030 continued | Not all accident scenarios are evaluated. Only a subset that contribute a large fraction of the total risk from Pantex operations are analyzed. Give reasons why all potential scenarios are not evaluated.

CO-008/58 14.031 | 15. Page 4-222, Paragraph 3
"For the risk significant scenarios for Pantex, the frequency and consequence assessments are performed on a site-wide rather than a facility-specific basis." What would the outcome be if assessment were facility-specific?

CO-008/59 14.032 | 16. Pages 4-223 & 4-224, Figure 4.14.2.1-1
a. On the evaluation of risk, does DOE look at all types of cancers or only those noted in the workers study of 1985? If so, why?

CO-008/60 14.033 | b. What chemical and radiologic exposures are "non-involved workers" subject to? What steps are being taken to prepare these workers for unexpected health effects?

CO-008/61 14.034 | c. The document only analyzes accidents. Include routine emissions from normal operations.

CO-008/62 06.008 | 17. Pg. 4-234, Paragraph 4
In light of the BEG study, define the statement, "hypothetical plutonium dispersal accident does not pose a significant threat to the Ogallala aquifer."

CO-008/63 14.035 | 18. Page 4-237 - 239
The combined cumulative impacts resulting from adding the bounding alternatives in the other three documents to the Pantex EIS do not fully address all health effects. Give the complete combined cumulative health impacts of all four documents.

CO-008/64 14.036 | 19. Page 4-239, Paragraph 6
Provide a schedule for additional evaluations mentioned in this paragraph.

SOCIOECONOMIC RESOURCES

CO-008/65 11.013 | 1. Page 4-172
a. It is stated that the work force could reach 10,220. This is based on all Weapons and Disposition activities being done at Pantex. Discuss in a manner that shows the time frame and overlap of the break down between construction, weapons and disposition work, and the possibility that everything will not be done at Pantex.

CO-008/66 11.014 | b. Provide a work force break down by year and activity. If downsizing is required, and exceeds attrition, provide a downsizing plan.

CO-008/67 11.015 | c. Knowing that all of the above activities are likely to be limited to 10 to 30 years, if there is an adverse impact from Pantex downsizing, is there money available to the Pantex ROI for long term community assessment and planning?

CO-008/68 11.016 | d. The socioeconomic analysis of the three EIS's are not consistent. The SWEIS Summary (page S-17) assumes 1.65 indirect jobs in the region for every job at Pantex. The SSM PEIS (page S-32) assumes 1.16 and the S&D PEIS (page 4-205) assumes 3.51. Explain these differences. Why didn't the DOE use the analysis of the Amarillo Economic Development Commission (AEDC) which is based on local knowledge of the area? Their analysis gives a ratio of 2.87 to 1 (REF. Chamber Quarterly, 2nd Quarter, 1996, Amarillo Chamber of Commerce.)

CO-008/69 11.017 | e. In the draft SWEIS Summary (page S-17, Table S-1), it is stated that at the 500 weapon activity level, Pantex "would support 2,400 direct jobs and 3,949 secondary jobs" and that "personal income additions to the economy would be reduced to $356 million annually." Explain why this degree of economic loss would not only be an adverse but a Significant Adverse Impact to the community.

CO-008/70 11.018 | 2. Page 4-165
At the 500 weapon activity employment level, what would be the impact to the revenues for the governing bodies within the Pantex ROI, compared with the current revenues presented in Table 4.11.1.6-1 (page 4-165)?

CO-008
COMPANIES/ORGANIZATIONS

WASTE MANAGEMENT

CO-008/71
05.005
1. Page 4-37, Paragraph 2
The letters from EPA and TNRCC documenting their approval for the RCRA methodology undertaken by Pantex Plant should be cited.

CO-008/72
05.006
2. Page 4-41, Paragraph 2
Correct typographical error, next to last sentence: "Phase II characterization data is (are)..."

CO-008/73
05.007
3. Page 4-42, Paragraph 3
"The OSTP received waste water from Amarillo Air Force Base and Pantex Plant." Did it also receive waste water from Bell Helicopter and the Amarillo Airport?

CO-008/74
05.008
4. Page 4-43, Paragraph 2
Potential sources of contamination to Zone 12 groundwater includes the Burning Ground. It would seem that the Burning Ground is too distant from the Zone 12 groundwater location. Clarify.

CO-008/75
05.009
5. Page 4-43, Paragraph 3
a. Provide a map of the landfills locations.
b. Correct typo in sentence "Characterization data indicates (indicate)...

CO-008/76
05.010
c. "However, maintenance caps will be placed as needed over selected landfills as a voluntary measure to prevent potential water infiltration." If they <u>are needed</u>, would it be voluntary?

CO-008/77
05.011
6. Page 4-43, Paragraph 4
Inaccurate descriptions should be corrected:
a. "The ditches <u>also</u> receive <u>untreated</u> industrial waste waters from Zones 11 and 12.

CO-008/78
05.012
b. Playa 4 also receives <u>industrial</u> and storm water effluent from Zones 11 and 12. <u>Playa 2 receives industrial and storm water effluent from Zone 11</u>. <u>All of the playas receive storm water from agricultural areas</u>.

CO-008/79
05.013
7. Page 4-44, Table 4.5.1.3-2
Inaccurate descriptions should be corrected:
a. Flow system 1 consists of Playa 1 and the unlined manmade ditches that direct runoff and waste water discharge away from Zones 4, 11, and 12 to this playa.
b. Flow system 4 ...away from Zone 11 and Zone 12 south (insert) <u>to Playa 4</u>.
c. Flow system 5 also <u>includes Pantex Lake</u> (which received effluent from Old Sewage Treatment Plant via pipeline in prior years).

CO-008/80
05.014
8. Page 4-45, Paragraph 3

CO-008
COMPANIES/ORGANIZATIONS

CO-008/80
05.014
continued
Statements are not clear. "Characterization data indicated that contaminant levels were below remediation goals for all but two sites." Does this refer to 2 of the 12 sites in the AL-PX-11 group, or 2 locations within the HE burn site discussed in greater detail? If the 2 sites excepted are indeed 2 of the 12 sites, then they should be described and discussed, at least in the same detail as was the HE burn site.

CO-008/81
05.015
9. Page 4-45, Paragraph 4
a. Correct typo. "Characterization data is (are) ..."

CO-008/82
05.016
b. Was the environmental sampling for the DDT spill at the building or at the playa?

CO-008/83
05.017
10. Page 4-46, Paragraph 1
Where is "the denuded area near Playa 1" located and what is the cause of its being denuded?

CO-008/84
05.018
11. Page 4-47, Table 4.5.1.3-3
Under SWMU #143 RECOMMENDATIONS: "This area has not been characterized to background for several analytical groups, including pesticides, PCBs, and metals." Clarify. Does this mean that sampling and analyses have not disclosed concentrations that are consistent with background concentrations (i.e., have exceeded background values), or that sampling and analyses have not been done for these groups of constituents?

CO-008/85
05.019
12. Page 4-49, Table 4.5.1.3-3
a. Under AOC #15, DDT release at Bldg. 12-35, exactly where did the sampling take place?

CO-008/86
05.020
b. Correct typo, Building 12-5 Sump RECOMMENDATIONS: "Additional data is (are) ..."

CO-008/87
06.009
13. Page 4-55, Paragraph 6 (last paragraph and continuation on page 4-57)
Treated <u>and untreated</u> industrial discharges and storm water, from both <u>agricultural and industrial</u> areas, are directed to Playas 1, 2 and <u>4</u>. [See Table 4.6.1.1-2 page 4-59 that describes.]

CO-008/88
06.010
14. Page 4-56, Figure 4.6.1.1-1
Check figure for Pantex Lake. The figure provided does not appear to be Pantex Lake. Show full extent of Pantex Lake.

CO-008/89
06.011
15. Page 4-57, Paragraph 5
"Flow from the WWTF is <u>small</u>, but continuous." What quantity is "small"? This term seems inappropriate and subjective. Quantify.

CO-008/90
06.012
16. Page 4-60, Paragraph 2

CO-008/90 06.012 continued — At what cost is potable water provided to TTU?

CO-008/91 06.013 — 17. Page 4-61, Paragraph 6
Requirements provided for the "TNRCC draft permit" seem unusually similar to the current permit. Provide updated permit information.

CO-008/92 06.014 — 18. Page 4-62, Paragraph 3
"As discussed in section 4.6.1.1, surface water discharge permits have been in effect since the late 1980's,..." According to information you provided, a permit was first issued in 1980 (which is not "late").

CO-008/93 06.015 — 19. Page 4-58, Table 4.6.1.1-1
Why were burning ground structures not considered?

GROUND WATER RESOURCES

CO-008/94 06.016 — 1. Page 4-13, Paragraph 4
"The City of Amarillo has pledged 5,526 million liters per year (1,460 million gallons per year) as a part of potential plant expansion."

a. Are disposition missions considered expansion?
b. What is the supply source?
c. What are the time frame and conditions of the pledge?

CO-008/95 06.017 — 2. Page 4-78, Paragraph 2
"In 1989, 760 irrigation wells in Carson County pumped 115 billion liters (30.5 billion gallons) to irrigate approximately 3,460 hectares (8,550 acres). This is incorrect.
a. A check of Farm Service Agency irrigated acres in Carson County revealed 63,500 acres in 1995.
b. PGWCD estimated irrigation pumping of 26.3 billion gallons of water pumped in 1995.

CO-008/96 06.018 — 3. Page 4-78, Paragraph 4
"Pantex Plant is located in Panhandle Ground Water Conservation District No. 3, which has the authority to require permits and limit the quantity of water pumped. Presently, the Panhandle Ground Water District does not limit the quantity of water pumped." That statement is true for wells drilled and in use prior to July 19, 1995. For new wells, drilled after July 19, 1995, a landowner whose well produces more than 350,000 gallons of water per acre owned per year, on a section by section basis, will be required to obtain a High Production Permit from the District.

CO-008/97 06.019 — 4. Identified concerns:
a. Define the extent and migration of the contamination. More informationis needed to define the extent of the perched aquifer and whether it is in communication with the Ogallala aquifer.

CO-008/98 06.020 — b. Are fissures present that would allow movement of the perched water to enter the Ogallala aquifer?

c. We support the need for the continued careful monitoring of the perched aquifer.

CO-008/99 06.022 — 5. Page S-15, Table S-1
The table on page S-15 should show percentages, to give the reader perspective on water use. Example:
a. Plant used 230 million gallons in 1995
1.Texas Tech Farms used 66 million gallons (29%) of the total plant usage.

CO-008/99
06.022
continued

2. Nuclear weapons operations used 163 million gallons (71%).

b. City of Amarillo consumed 16 billion gallons of water in fiscal year 1995.

c. Pantex Plant including Texas Tech Farms used 1.4% as much as the City of Amarillo and 1% of water use went for nuclear weapons.

d. Considering the water also used for irrigation, the plant withdrew 0.6% of the regional withdrawal from the Ogallala aquifer. Nuclear weapons operations consumed 0.43% of the regional withdrawal.

Pantex 1995 Water Usage. Reference: Draft EIS for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, March 1996, page S-15.

CO-008/100
06.023

6. Page 4-63, Figure 4.6.1.2-1
Why are drinking water sampling locations (at the tap) provided on a figure titled to depict monitoring wells?

CO-008/101
06.024

7. Page 4-65, Paragraph 2
"The complete lateral and vertical extent of perched aquifers are being defined." Clarify.

CO-008/102
06.025

8. Page 4-69, Paragraph 2
Correct typo. "The conclusion drawn from this (these) data..."

CO-008/103
06.026

9. Page 4-69, Paragraph 6
Concerning the depth to groundwater calculations, were calculations made on the leased and owned land or just owned land?

CO-008/104
06.027

10. Page 4-69, Paragraph 4
"Although the effectiveness of the fine-grained zone to act as a barrier to vertical groundwater movement is not fully understood, ..." The word "barrier" should be changed to "retardant," to more correctly describe movement.

CO-008/105
06.028

11. Page 4-71, Paragraph 1
What does the statement, "In 1990, the recoverable volume of water in storage and available for use in the Ogallala aquifer was estimated at approximately ..." refer to? Does it refer to that volume beneath Pantex, contained in the High Plains Aquifer, or the entire multi-state regional "Ogallala" aquifer? Clarify.

CO-008/106
06.029

12. Page 4-75, Paragraph 1
"It is highly likely that this and other earlier releases contributed to the high concentrations of chromium..." (1976-1986) Are further investigations to be done to identify the source, or is it to be accepted as is? 1976-1986 seems rather recent to be the major contributor to the perched aquifer contamination problem. Verify dates and any other sources of chromium.

CO-008/107
06.030

13. Page 4-77, Paragraph 2
"Investigations to determine the potential for contaminant migration to the Ogallala aquifer from Pantex Plant are ongoing." Provide more specific information as to what investigations are ongoing or planned.

CO-008/108
06.031

14. Page 4-77, Table 4.6.1.2-3

a. Under "Source", the Carson County Well Fields should be clearly identified as "City of Amarillo's Carson County Well Fields."

b. Does Carson County irrigation use (1989) include gallons used by TTU for irrigation at Pantex?

CO-008/109
06.032

15. Pages 4-78, 79, Paragraph 5
Because the TNRCC and EPA requirements in the new permits will be quite different from the requirements of the permit complied with in 1994, it seems that the logic in this paragraph may be faulty. A statement that all parameters in the proposed draft permit have been met for x-number of years would be more persuasive. Update with current permit information.

CO-008/110
06.033

16. Page 4-79, Paragraph 4
The statement "Groundwater contamination has occurred in the perched aquifer as a result of past site-related activities, primarily through spills and unintentional releases," is not consistent with information provided by Pantex Plant. Past practices were past practices. Rather than try to explain them as spills and accidents, a more positive statement would be to provide some of the great strides that Pantex Plant has made in the past 7 years to correct these practices and investigate and begin to correct the extent of problems created by past practices.

CO-008/111
06.034

17. Page 4-80, Paragraph 6
Specify the "current activities" of UT Austin, TBEG, and TTU Water Resources Center.

CO-008/112
06.035

18. Page 4-82, Paragraph 7
Is the effluent volume a condition of the proposed draft permits?

CO-008/113
06.036

19. Page 4-83, Paragraph 1
"Since about 82% of the groundwater withdrawal in Carson County is for irrigation, conversion to dryland farming could have a major beneficial effect on the current rate of aquifer drawdown." Under Texas Law, groundwater is private property. This statement refers to property owned by others and is inappropriate and irrelevant to the SWEIS. Withdraw this statement.

WATER RESOURCES

VOLUME II - Appendixes

CO-008/114
06.088

1. C-6, Table C.1.2-3

Results from sampling and analyses from Bushland are provided as "background". Because some concentrations of analytes from Bushland samples exceed those measured in Pantex samples, how do you justify presenting these data as "background"?

CO-008/115
06.089

2. C-11, Table C.1.2-3

Provide a table that cross-references location descriptions for surface water. This would allow readers to recognize the locations at which samples reportedly exceeded or lacked water quality criteria (this table). (Table C.2.1-1 on page C-21 provides similar cross-reference information for the water wells). Some of these locations appear to be playas, waters of the U.S., but it is difficult to tell from the descriptions.

CO-008/116
06.090

3. C-13, Table C.1.2-3

Hexavalent chromium is shown to exceed the "standard" for 12-17 N, OW-WR-34, and Z-12 S. What was the total chromium for these same samples? (i.e., did the concentrations of hexavalent chromium in these samples exceed the measured concentrations of total chromium in the same samples? [in which chase the reported concentrations of hexavalent chromium may be exaggerated].)

CO-008/117
06.091

4. C-28, Table C.2.2-1

On the third line up from the bottom, the line reads "Parameter Units STD RRS". Is this an error?

TRANSPORTATION

CO-008/118
16.043

1. Page F-8

a. How will the Texas Department of Public Safety and local emergency medical services be handled in the Intersite Transportation Impact Assessment?

b. Will the safety analysis developed by DOE be acceptable to the Texas Department of Transportation?

CO-008/119
16.044

2. Page. 4-262, Paragraph 3

a. Paragraph states, "These shipments are made in full compliance with all applicable DOT regulations." This is stated for hazardous material shipments on pg. 4-264, Paragraph 2, as well. As a general comment, the draft EIS makes assumptions about the equivalence of design requirements and operations. They assume that the design requirements for vehicles, packaging, etc. are met at all times. How do they know this? Numerous studies on compliance with regulations in the transportation industry show that there can be a significant difference between what is supposed to be and what actually is. More-over, many of the databases that are used to assess the safety of hazardous materials transportation do not contain reliable and adequate data to make this assumption.

CO-008/120
16.045

b. Provide data about the operational reliability of the equipment, tasks, etc. and about the reliability of the inspection and monitoring systems upon which safety relies. Are there data about inspection and monitoring reliability? Has DOE assessed the completeness and reliability of the databases upon which they base their claims? Show with data that there is no significant difference between design and operations in this system. What are the data?

CO-008/121
16.046

3. Page. F-26, paragraph 2 on the left side of the page.

a. It is fallacy to say that "Because of the stringent regulations....there has never been..." The stringent regulations contribute to the result of no documented deaths of significant injuries, but they are not the only reason. Luck, the smart response of personnel, and other intervening factors not related to the quality of training and inspection plays a role.

CO-008/122
16.047

b. Did DOE assess how different combinations of "initiating events" may lead to accidents that could result in releases of hazardous/radioactive materials? What combinations of factors were used? Was there any attempt in the study to look at this issue?

CO-008/123
16.048

4. Appendix F, Tables and Figures R.5.1 - F.5.3

In the event of a large increase in actives how will the current system of transportation (including inspections, loading, packaging--in short, all the activities associated with moving an object from one site to another) react? Will more inspections occur? Will more people

CO-008/123 16.048 continued
be hired? Will more equipment be used? Or will the same number of inspections, equipment, and people be used to do more? How will this affect reliability in the system? (The research on human workload shows that increases in workload can increase failures/errors and that this may not occur in a linear fashion. Appendix F (tables and figures in F.5.1 - F. 5.3) are based on 100 observations. 100 observations over how many years (i.e., what frequency of shipments)? Generally, there is good reason to suspect that as frequency of activities increase, one might observe more errors or more frequent errors.) Please provide clarification for exposure, i.e. what activity provides the most exposure. Clarify exposure incurred by the repackaging of pits.

CO-008/124 16.049
5. Page 4-262, Table 4.16.1.1-3
Data from radioactive waste shipments are limited for the years 1992-94 only. Thus, one might expect that the "annual exceedence probability" (Figures in F5.1 - F.5.3) would increase in the event the rates of shipping increase. What data were used to make the assumption that failure rates would increase in a linear fashion? How would the probabilities of accidents and the risks change if a non-linear relationship were assumed (increasing failures with increasing workloads and shipments)? Can DOE do this analysis? Why are data presented based on only 100 observations? Are there more data than these?

CO-008/125 16.050
6. Page 4-269, Table 4.16.2.1-1.
a. Do the +/- factors around the base rate cover the extra shipments that would occur to send the materials to other sites? The description of action plans state that 2000 weapons assemblies/disassemblies per year is the current activity level. Is this the "base shipment schedule"?

CO-008/126 16.051
b. When assessing the risks in a transportation system, was the entire system--from design of components, regulatory context, inspections and monitoring, to preparing material for transportation, to loading, to shipping, etc., considered. If not, explain.
(The reason this is important has to do with how failures/errors at one time in the system operation can affect subsequent events. For example, if someone drives off the road when transporting one load the consequences only affect that single load of material. However, if there is an incorrectly designed or tested package (e.g. shipping container), it would affect all shipments using that package. This has occurred in the high level radioactive waste transportation system.

CO-008/127 16.052
c. Was a risk assessment completed for the total transportation system for improperly maintained equipment? Provide the data sources and the methodology used in this assessment. (It is not reasonable to assume that there will never be inspection failures.) How would such scenarios affect risk estimates?

CO-008/128 16.053
7. Page 4-256, Paragraph 1
a. There have been mistakes (errors) made in the design requirements and testing protocol of the DOT and NRC for packaging and testing, and thus in reported results.

CO-008/128 16.053 continued
There are errors and failures in monitoring and inspections so that malfunctioning/corrupted packaging continue to be used although they do not satisfy the testing requirements. Has DOE addressed such scenarios in their analyses? If not, explain..

CO-008/129 16.054
b. Regarding the adequacy of databases on pages F-18 and F-22, prior studies suggest that they may not contain complete or reliable data in all cases. (Ref. Does DOE account for such inadequacies in their assessments? For example, what is the uncertainty of these databases? Making assumptions that reflect the uncertainties, in the data resulting from their incompleteness and lack of reliability. Please reassess the risk.

CO-008/130 16.055
8. Page F-19, Figure F.6.3.1-1
a. Safety analyses that do not directly address the role of human error in contributing to risks are weak. Human error is often found to be the single largest contributor to failure frequencies. This EIS seems to focus on mechanical failures. Is human error included in the failure rates that are used in event trees? How are they incorporated? How are assumptions made about human error rates in a greatly expanded transportation system (under scenarios of shipping pits to other sites and increased rate of dismantlement)?

CO-008/131 16.056
b. How many more shipments would there be each year (approximately) if the pits are shipped to SRS, NTS, etc? How much larger/smaller are these rates than current rates? Are these different rates used to estimate different failure rates in the assessment?
c. Would risk estimates change at all, if times of shipments were changed (e.g., night time vs. day time vs. afternoon only vs. weekends, etc)?

CO-008/132 16.057
9. Page F-8,
a. How many shipments are actually anticipated per year? If pits are shipped elsewhere, how would shipment rates differ from FY 1997?

CO-008/133 16.058
b. What are the estimates for subsequent years? How much change will there be in the system rate of shipments over the assessed period of time? If they are being shipped to another location for storage, this would increase the number of shipments per year.

CUMULATIVE IMPACTS

CO-008/134 21.010 | 1. The combined cumulative impacts resulting from adding the bounding alternatives in the other three PEIS documents to the Pantex EIS do not fully address all the combined effects. Give the combined cumulative impacts of all four documents in each individual category of the document.

CO-008/135 21.008 | 2. Ref. p. 3-4; Would the six referenced upgrades require new, or additional, environmental documentation, if the proposed action is implemented?

AIR QUALITY

CO-008/136 07.042 | 1. Are TNRCC air monitoring results included in the air quality calculations? If so, please cite.

CO-008/137 07.021 | 2. Include a list of all air emissions on site.

CO-008/138 07.022 | 3. Have all available emissions been used in the mode?

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1

Comments of
SOUTHWESTERN PUBLIC SERVICE COMPANY
Amarillo, Texas
to
UNITED STATES DEPARTMENT OF ENERGY

Re: Drafts
Programmatic Environmental Impact Statement
for Stockpile Stewardship and Management, February 1996

Environmental Impact Statement
for Continued Operation of the Pantex Plant
and Associated Storage of Nuclear Weapon Components, March 1996

and
Storage and Disposition
of Weapons-Usable Fissile Materials, February 1996

May 7, 1996

2

Southwestern Public Service Company is the investor-owned electric energy provider to the Pantex Plant, near Amarillo, Texas, and to approximately 387,500 other customers (about one million persons) in the Panhandle and South Plains of Texas, eastern and southeastern New Mexico, the Oklahoma Panhandle, and southwestern Kansas. SPS through the past several years has been an attentive and active participant in United States Department of Energy public information/ participation activities related to DOE nuclear complex planning.

1. SPS actively supports the interests of Pantex and Pantex employees – so long as those interests are coincident with protection and improvement of environmental conditions in the Pantex region of influence and with prudent and rational national defense policies and strategies.

CO-009/1
22.014

2. At this juncture in the proposed and appropriate downsizing of the nuclear complex, we again strongly encourage the Department and Administration to predicate all actions related to the nuclear complex on the conservative assumption that at least rogue-state or terroristic nuclear aggression against the United States is probable.

U.S. vigilance and nuclear preparedness are key to coexistence with mad nations and persons.

In turn, the Pantex Plant is, uniquely, a key to economically efficient continuing nuclear preparedness.

SPS's further comments today on the three major draft environmental impact statements under review intentionally are brief. We forego repetition of comments filed with the Department in the past, and concentrate on issues of particular relevance to appropriate future missions for Pantex:

3. Fundamental to DOE's further consideration of the roles Pantex should play relative to the changing missions of the nuclear complex is the unequivocal recognition that even accumulatively, there would be NO significant adverse environmental impacts from retention and potential expansion of the variety of missions possible for Pantex.

CO-009/2
21.004

The summaries of the relevant draft EISs do not report this fundamental conclusion explicitly; rather, in some instances, the summaries misrepresent that conclusion, reporting, instead, effectively minuscule environmental potentialities that are characterized as "adverse" only because they do not equate to measurable "benefits." We suggest the rote language of EISs should be expanded to recognize effectively neutral outcomes (not merely "beneficial" or "adverse" consequences).

However, the underlying draft statements themselves are conclusive in regards to the actual insignificance of "adverse" potential impacts of expanded missions at Pantex. Moreover, DOE and consultant representatives in public meetings in Amarillo publicly and explicitly acknowledged that fundamental conclusion (see, especially, transcript of April 23, 1996, morning discussions).

Because the Department, through its representatives in Amarillo on April 23, committed to highlighting, in the subject Final Environmental Impact Statements, this fundamental and irrefutable conclusion about the actual insignificance of any adverse environmental impacts of increased missions at Pantex, Southwestern will not enumerate and rebut the litany of potential environmental concerns reflected in the EISs.

CO-009/3
23.036

5. (However, we do request that the Department include in the record "dockets" for these EISs the comments by SPS relative to listed potential environmental concerns recited in the draft Tritium Production-related EIS of 1995.

CO-009/3
23.036
continued

In those comments, SPS rebutted the overly sensitive, generally not really site-specific but knee-jerk and ill-informed, and frequently inaccurate characterizations of environmental "concerns" about expanded missions at Pantex. Clearly, those earlier characterizations of possibly "adverse" impacts, especially those related to uses of ground water, now are rejected by DOE. Nonetheless, a replete record supportive of the Department's April 23, 1996, publicly articulated conclusion that NO significant adverse impacts would result, is appropriate.)

6. Southwestern endorses the Department's "preferred alternative" for continuing assembly, disassembly, and pit reuse functions at Pantex. This "preferred alternative" is environmentally sound, and economically appropriate. Transferring these functions to the Nevada Test Site would be highly questionable in both regards.

7. We strongly encourage the Department to retain high explosives functions at Pantex (rather than relocating those functions to Los Alamos and Lawrence Livermore labs). There would be negative environmental impacts, of course, associated with transfer of those functions to the labs -- impacts related to construction and expansion of the labs' facilities, for instance. Those impacts would not occur at Pantex, where facilities already are available and in use for these very purposes. Additionally, there would be economic waste associated with such transfers; simply put, it would be more expensive -- by DOE's estimate, $50 million more expensive -- to move the functions than to retain them where they presently are performed.

Too, high explosives functions should be retained at Pantex because under the assembly/disassembly preferred alternative, Pantex would be required to continue to have high explosives capabilities sufficient to handle disposition and disposal of current inventories and those anticipated from near-term dismantling --

again, retaining the high explosives functions at the present site would eliminate the necessity of duplicating them elsewhere.

Finally, high explosives functions should be retained at Pantex because, should future need arise for new weapons production, it will be critical to have the high explosives facilities at the weapons production/assembly site -- which site, demonstrably, should be the Pantex site.

8. The environmental and related socio-economic impacts of new storage and disposition functions at Pantex (as outlined in the Fissile Material programmatic EIS) certainly suggests Pantex in fact is the prime candidate for those functions -- especially the storage functions (both those related to reserve weapons grade plutonium and "excess" materials, for which Pantex already has facilities and demonstrated expertise).

Clearly, the facilities and expertise for storage are existent at Pantex: the site provides storage for over 8,500 pits, and has FONSI (Finding of No Significant Impact) authority to house 12,000 pits. With slight modifications, the site likely could "FONSI-out," following an environmental assessment for 20,000 pits. Equally clearly, Pantex is well prepared to store some 21.3 metric tons of the 38.2 tons of the nation's "excess" plutonium -- the 21.3 tons are in place at Pantex now. Apparently, only slight expansion would be necessary to securely store the remainder.

Fundamental to this conclusion, too, are the obvious synergies of collocation of assembly/disassembly activities with necessarily attendant, on-site storage.

In fact, as a result of the (altogether appropriate) decision to continue assembly *and disassembly* at Pantex, all plutonium functions, including storage and

disposition, logically flow to Pantex. Incurring extraneous and unnecessary, and high, costs for redundant activities at separate sites would be imprudent.

9. Pantex is the nation's premier nuclear complex production facility; it is imperative that the "production core competencies" presently at the site not be lost or diluted by transfer of management (or production) functions to the labs.

The Department indicates that "stewardship core competencies" must be preserved, perhaps at the laboratories -- and the Department seems to indicate that may mean sacrificing "core production competencies" existent at Pantex. It would make better sense to maintain the stewardship competencies by visits or residency at Pantex, than to lose the production competencies that have evolved there.

Transferring assembly and disassembly functions to any site inexperienced in weapons production and, likely, incapable of significant weapons production, could prove disastrous should the need for an augmented nuclear arsenal arise (or *when* such need arises). Please, do not eliminate or significantly diminish our nation's most effective weapons production facility's competencies.

Relative to disposition alternatives, Southwestern Public Service Company notes that electric power and energy that could be used in immobilization and vitrification, or in processing for oxide fuel, would be priced very competitively at Pantex. (We refer the Department again to our comments, relative to electric supply and costs, in the Tritium Production EIS inquiry.) We are confident that Southwestern's position as a low-cost producer will encourage the Department to choose Pantex as the most cost-effective site for disposition activities.

10. DOE always should seek the most cost-efficient alternatives for the nuclear complex's operations. Generally, the most cost-efficient alternatives, rather

related to capital investments, transportation, training, security, energy utilities, etc., will be those available to the nation at Pantex.

CO-009/4
23.037

We request -- we are tempted to demand -- that fair and open cost comparisons among the alternative sites for each function be used in analyzing sites, and that such accountings be shared with the publics that have demonstrated interest in the nuclear complex.

11. Southwestern must specifically reject the conclusion in the Storage and Disposition draft EIS, under Phaseout, page S-21 (emphasis supplied), as it would apply to the Pantex region of influence: "All of the regional economic areas surrounding the DOE sites would experience a loss in employment with phaseout. However, *compared to total employment in these areas, the loss of jobs would have no or negligible impacts* at all the DOE sites."

CO-009/5
11.026

In fact, the impact of Pantex employment in the region of influence is highly significant to the region. Measured in terms of total payroll, Pantex is by far the area's largest employer. The reasonable job multiplier developed by Dr. Ray Perryman at Southern Methodist University, a multiplier of 3.87, applied to the some 3,500 employees at Pantex, suggests the site is responsible for a total of over 13,500 jobs. *Employment related to Pantex represents over 12% of the jobs in the Amarillo metropolitan area.*

Incidentally, the three subject EISs inconsistently analyze the indirect jobs created in the region by Pantex employment: The site EIS assumes 1.65 indirect jobs for each job at Pantex; the stewardship and management EIS assumes 1.16; the storage and disposition EIS, 3.51 (by far, the most consistent with Dr. Perryman's, which is the same, regional-experience-based multiplier employed by the Amarillo Economic Development Commission).

CO-009/5
11.026
continued

Certainly, we consider a potential 10% to 12% reduction in metro-area employment a major loss, and by no means a "negligible" concern. We strongly urge the Department to correct the socio-economic impact portions of all three EIS documents to accurately reflect the impact of Pantex employment in its region of influence.

12. Unlike other nuclear complex sites, for instance the notorious Rocky Flats, Hanford, and Savannah River sites, and yes, Los Alamos, Pantex has not had radioactive materials contamination problems. The nuclear complex-related operations at Pantex, in fact, apparently are the best-managed, relative to protection of the environment, in the nuclear complex. Partially to reward the superior, environmentally benign, history of the site, and certainly to capitalize on superior environmental performance, the Department should retain and expand the technically competent operations at Pantex.

Public support for retention and expansion of the Pantex operations has been nurtured by the facility's performance over many decades. Just as the public here has respected that performance, so should the Department.

Moreover, the Department must surely recognize in the resounding public support Pantex enjoys still further advantages to retention and expansion of the missions at Pantex.

In summary, the criteria for evaluating the alternatives and arriving at the most suitable Record of Decision -- the criteria of environmental impact, cost, and technical feasibility -- support retention and expansion of nuclear complex missions at the nation's premier production site, Pantex Plant.

Southwestern appreciates the opportunity to participate in this important decision making process, and welcomes questions and dialogue, directed to:

William T. Crenshaw
Environmental Issues Analyst
Southwestern Public Service Company
(806) 378-2120

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TRIDEC
TRI-CITY INDUSTRIAL DEVELOPMENT COUNCIL
901 N. Colorado • Kennewick, WA 99336-7885 U.S.A. • (509) 735-1000 • FAX (509) 735-6609 • 1-800-TRI-CITY

June 14, 1996

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
PO Box 5400
Albuquerque, NM 87185-5400

Draft Environmental Impact Statement
for the Continued Operation of the Pantex
Plant and Associated Storage of Nuclear
Weapons Components

Dear Ms. Founds:

The Tri-City Industrial Development Council (TRIDEC) is pleased to submit our views on the subject Draft Environmental Statement for your consideration. TRIDEC has been designated by the Department of Energy as the "one voice" spokesman for the Tri-Cities business community. Our membership is composed of over 550 separate business organizations and individuals having an interest in the economic viability of this area and the Hanford site. We request that you include our views in the evaluation of the issues associated with this draft EIS.

We are pleased to note that Hanford is considered as a potential site for the storage of a portion or all of the surplus weapons plutonium materials described in the draft.

Hanford has the technology and physical security capabilities to effectively and safely store these excess materials. At present, the site has both under and unutilized facilities which could be used for this purpose with comparatively limited modifications or additions. We consider the storage of this material to be easily accommodated; however, we do not believe that the community and stakeholders would support such an action by the Department unless the site were also to be utilized for the processing of the plutonium to a stable form for safe interim storage. Hanford would also be an ideal site for the processing of the excess plutonium either for vitrification or fabrication into reactor fuel for irradiation prior to disposal.

CO-010/1
02.013

The site has the capability by operation of either or both the Fast Flux Text Facility (FFTF) and the WNP-2 Nuclear Power Plant on mixed oxide cores to dispose of a substantial portion of the excess plutonium within the foreseeable future. This capability when coupled with the available mixed oxide fuel fabrication capabilities of the Fuel and Materials Examination Facility (FMEF)

Ms. Nanette D. Founds
June 14, 1996
Page two

CO-010/1
02.013
continued

offers a single site processing and irradiation for disposal capability not found at other potential storage sites. We believe that the Draft EIS should be revised to objectively evaluate this option in conjunction with the excess weapons disposal Draft EIS.

This area would be expected to be supportive of an excess plutonium storage and disposal mission provided that the related processing and fabrication tasks were also assigned here. Submitted herewith for the record is a position statement recently adopted by the Hanford Advisory Board which relates to the disposal of excess weapons materials by irradiation in the FFTF. The Hanford Advisory Board is a DOE sponsored stakeholder group representing various interests in the states of Oregon and Washington. This statement is consistent with the position we have stated above on this subject.

Although the storage of excess weapons plutonium at Hanford in available facilities without further processing or utilization is probably significantly more economical than the construction of new facilities at other sites, we do not feel that this is in the best interests of the community unless a concurrent processing mission was assigned to the site. A single purpose storage mission would be opposed due to the potential conflict of other diversification initiatives.

CO-010/2
16.027

An additional area of concern would be the "major issue" of transportation of the excess plutonium materials to the Hanford site. We believe that the Draft EIS needs to more fully evaluate the hazards and mitigation measures which would need to be implemented in support of the transportation of significant amounts of these materials to the Hanford site.

CO-010/3
21.003

We are pleased to note that the Draft EIS has not identified any significant environmental impacts from the use of existing Hanford facilities for this potential mission.

Thank you for the opportunity to present our views on this subject.

Very truly yours,

Sam Volpentest

Sam Volpentest
Executive Vice President

PC-001
PRIVATE CITIZENS

Comment Form

These comments apply to the following document(s):
Storage and Disposition Draft PEIS
Stockpile Stewardship and Management Draft PEIS
Pantex Site-Wide Draft EIS

United States Department of Energy

NAME: (Optional) RICHARD S. GOODOLL
ADDRESS: 7419 IMPERIAL DR. AMARILLO TX 79121
TELEPHONE: (806) 358 2059

I AM A CERTIFIED SAFETY PROFESSIONAL, AND I HAVE WORKED AT FOUR DOE FACILITIES, LOS ALAMOS NATIONAL LABORATORY, LIVERMORE NATIONAL LABORATORY, SANDIA NATIONAL LABORATORY, AND PANTEX. IN MY PROFESSIONAL OPINION PANTEX IS THE SAFEST AND MOST ENVIRONMENTALLY CONSCIOUS OF THESE FACILITIES.

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Comment Form

These comments apply to the following documents:
- ✓ Storage and Disposition Draft PEIS
- ✓ Stockpile Stewardship and Management Draft PEIS
- ✓ Pantex Site-Wide Draft EIS

United States Department of Energy

NAME: (Optional) ROBERT L. BASS
ADDRESS: 2608 So. PARKER AMARILLO, TX 79109
TELEPHONE: (806) 372-3390

I strongly support the continuation of the high explosive function at the Pantex facility. I oppose any effort to move these functions to the national labs. Pantex is the most cost effective DOE facility and has an excellent track record in doing the high explosive functions.

- I believe that Pantex should be chosen as the location for fissile materials storage and disposition functions. Pantex already stores surplus plutonium and has a safety and security record that is unmatched in the DOE complex. When given fair budget consideration, strong local support and national security interest, Pantex is the ideal choice for this function of fissile materials storage and disposition.

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PC-003
PRIVATE CITIZENS

PLEASE PRINT OR TYPE

Name DAVID L. MICHAELS
Address 6401 CLAREMONT DR
City AMARILLO State TX Zip Code 79109

MY COMMENT(S) ON THE PANTEX PLANT DRAFT ENVIRONMENTAL IMPACT STATEMENT IS/ARE:

GIVEN THE PAST EXPERIENCE WITH DOWNSIZING THE DOE BY RELOCATING MISSION ASSIGNMENTS FROM MOUND, PINELLAS AND ROCKY FLATS TO OTHER SITES, I'M CONCERNED ABOUT THE ALTERNATIVE REASSIGNMENT OF THE HIGH EXPLOSIVES MISSION TO THE LABS FROM PANTEX. PAST DONOR/RECEIVER SITE TRANSFERS HAVE YET TO PRODUCE ONE WR QUALITY PART AT THE LABS. THIS "LESSONS LEARNED" DOESN'T APPEAR TO BE CARRYING APPROPRIATE WEIGHT IN THE DECISION TO SITE HE OPERATIONS. H.E. MANUFACTURING MUST REMAIN AT PANTEX TO MAINTAIN QUALITY PROCESSES FOR WR USE AND PRIMARY [illegible] PRODUCTION SITE CORE COMPETENCY.

(USE BACK OF PAGE IF NECESARY)

Comments can be faxed to the SWEIS Faxline (1-800-822-5499), telephoned in on the SWEIS Hotline (1-800-788-0396), mailed in to DOE care of: Ms. Nanette D. Founds, US Department of Energy, Albuquerque Operations Office, PO Box 5400, Albuquerque, NM 87185-5400; or sent via the Internet to tetratec@indirect.com. Deadline is July 12, 1996.

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PLEASE PRINT OR TYPE

Name ELIZABETH SPROUL
Address 3319 ARLINGTON ST.
City AMARILLO State TX Zip Code 79106

MY COMMENT(S) ON THE PANTEX PLANT DRAFT ENVIRONMENTAL IMPACT STATEMENT IS/ARE:

I WANT PANTEX TO STAY IN OPERATION.
I REALIZE AT A LOWER CAPACITY WITH DOWNSIZING.
I BELIEVE IT IS A SAFE PLACE FOR STORAGE OF
PITS AND ASSOCIATED COMPONENTS. I SUPPORT
PANTEX AS A SAFE AND NECESSARY
INDUSTRIAL NEIGHBOR.

Elizabeth A Sproul

(USE BACK OF PAGE IF NECESARY)

Comments can be faxed to the SWEIS Faxline (1-800-822-5499), telephoned in on the SWEIS Hotline (1-800-788-0306), mailed in to DOE care of: Ms. Nanette D. Founds, US Department of Energy, Albuquerque Operations Office, PO Box 5400, Albuquerque, NM 87185-5400; or sent via the internet to tetratec@ladirect.com. Dealine is July 12, 1996.

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PC-005
PRIVATE CITIZENS

Comment Form

United States Department of Energy

NAME: (Optional) RODNEY C. WILCOX
ADDRESS: 40 CADENCE CT, AIKEN, SC 29803-7710
TELEPHONE: (803) 648-1456

SRS SHOULD RECEIVE A MAJOR PORTION/ROLE IN EACH OF THE RESULTING DECIDED PROGRAMS AS DETERMINED IN THE RECORDS OF DECISION. SRS HAS THE PEOPLE, FACILITIES, INFRASTRUCTURE, AND EXPERIENCE THAT IS NEEDED FOR SAFE, SECURE, COST EFFECTIVE AND INSPECTABLE OPERATIONS, MANAGEMENT, AND SATISFACTORY DISPOSITION OF WEAPONS-USABLE FISSILE MATERIALS. IN GENERAL THE SUPPORT FROM ADJACENT COMMUNITIES IS VERY FAVORABLE AND THIS NEEDED SUPPORT WILL GREATLY ASSIST DOE IN ACCOMPLISHING THE DESIRED MISSIONS.

FOR BETTER REASONS, THE EXCESS WEAPONS GRADE PLUTONIUM SHOULD BE UTILIZED TO MAKE MIX FUEL. SMALL REASONS SHOULD BE ELIMINATED AND RESOLVED TO ALLOW SUCCESSFUL USE OF MIX FUEL.

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Comments - PANTEX EIS

R.L. Geddes

- Continued storage at Pantex fails to advance the program of demilitarizing surplus pits or readying pits for recycle into the future stockpile. The pits should be moved to a disposition and manufacturing site and disassembly should progress. SRS is the only functional Pu site in the country and the only logical site to consolidate Pu.

PC-006/1
01.019

- Pits at Pantex are managed in facilities and operations which do not meet any of the DOE's standards for design and operation of nuclear facilities. Doubling the storage of pits under substandard conditions should not be considered a reasonable alternative. SRS is equipped to accept the pit storage mission, apply DOE's nuclear facilities and operations standards, and cost effectively integrate the storage function with the Department's other Pu mission

PC-006/2
14.082

- Storage of pits at Pantex should not be increased until the findings of the Pu Vulnerability Assessment are resolved.

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PC-007
PRIVATE CITIZENS

Comment Form

These comments apply to the following documents:
Storage and Disposition Draft PEIS
Stockpile Stewardship and Management Draft PEIS
Pantex Site-Wide Draft EIS

United States Department of Energy

NAME: (Optional) Horace T. Bright
ADDRESS: 484 Carolyn Dr. Spartanburg, S.C
TELEPHONE: (864) - 585 - 5559

The D.O.E. should not consider the Savannah River Site for continued operation of the Pantex storage or component work.

The contractor for Sav-River has no concern or value for environmental, its personnel + the public -

This past month a shipment to Oak Ridge Tenn. shows how concerned they are.

The State of Tenn will not let Sav-River ship to Oak Ridge

The Pantex storage & disposition of weapons - usable fissile mat. should stay in Carson County Texas. Conversion to (MOX) fuel for reactors. Then sold to the 109 commercial light water reactors.

Horace T. Bright

5-3-96

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Comment Form

These comments apply to the following documents:

- Storage and Disposition Draft PEIS
- Stockpile Stewardship and Management Draft PEIS
- Pantex Site-Wide Draft EIS

United States Department of Energy

NAME: (Optional) CLYDE ALLEY
ADDRESS: 8 CAMBRIDGE ROAD AMARILLO TX 79124
TELEPHONE: (806) 353-8273

SOCIOECONOMIC QUESTIONS (ATTACHED)
PANTEX PLANT WATER USAGE (ATTACHED)

SSM PEIS and S&D PEIS SOCIOECONOMIC QUESTIONS

MAY 0 [illegible] MD1a5A

- Please explain why LLNL and LANL Stockpile Management budgets show projected increases from 1996 to 2004 since the US has terminated the development of new nuclear weapons ?
  Ref. SSM PEIS Preferred Alternatives Report, pp 26,30.

- Are these projected increases in Stockpile Management at the two labs based on transferring missions to them which have previously been done at the production plants ?

- Please elaborate on a statement made on page 34 of the SSM PEIS Preferred Alternatives Report that " personnel from the laboratories could perform assembly / disassembly for some weapon surveillance operations to improve the programmatic tie between Stockpile Stewardship and Stockpile Management ".
  - Would laboratory personnel replace Pantex personnel for this work ? If not, explain.
  - Would this add to the projected layoffs at Pantex ? If not, explain.
  - Would the laboratory personnel be trained and certified to perform this work ?
  - What organization(s) would be responsible for safety, safeguards, and conduct of operations associated with this work ?
  - Explain how this would improve Stockpile Stewardship and Management ?

- Under Phaseout (page S-21) of the S&D PEIS the statement is made " All of the regional economic areas surrounding the DOE sites would experience a loss in employment with

phaseout. However, compared to total employment in these areas, the loss of jobs would have no dr negligible impacts at all the DOE sites."
- For which sites would the impact be negligible ?
- For which sites would the impact be significant ?
- What is the basis for determining the significance of the impacts ?
- How does the DOE plan to use this significance in their selection process ?

PC-008/1 11.048

* The socioeconomic analyses of the three EIS's are not consistent. The SWEIS (p. S-17) assumes 1.65 indirect jobs in the region for every job at Pantex. The SSM PEIS (p. S-32) assumes 1.16 and the S&D PEIS (p. 4-205) assumes 3.51.
  - Please explain these differences ?
  - Why didn't the DOE use the analysis of the Amarillo Economic Development Commission (AEDC) which is based on local knowledge of the area ? Their analysis gives a ratio of 2.87 to 1 (REF. Chamber Quarterly, 2nd Quarter, 1996, Amarillo Chamber of Commerce).

PC-008/2 17.018

* Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and President Clinton's February 11, 1994 Memorandum for the Heads of all Departments and Agencies requires an analysis of environmental effects on low-income and minority populations to include human health, social, and economic effects.
Why do the draft SWEIS, SSM PEIS, and S&D PEIS analyze only human health effects of the proposed actions and not the social and economic effects as required ?

* In the draft SWEIS (p. S-17) it is stated that at the 500 weapon activity level Pantex " would support 2,400 direct jobs and 3,949 secondary jobs" and that " personal income additions to the economy would be reduced to $365 million annually ?
  -Please explain why this degree of economic loss would not only be an adverse but a Significant Adverse Impact to the community.
  - At the 500 weapon activity employment level what would be the impact to the revenues for the governing bodies within the Pantex ROI compared with the current revenues presented in Table 4.11.1.6-1 (p.4-165) ?

* In the draft SSM PEIS (.I-4-450) please explain the statement " The downsizing A/D and HE fabrication alternative would result in the addition of 280 workers at Pantex "
  - If the statement is incorrect what would be the result ?

WATER USAGE : PANTEX PLANT

MAY 06 1996
m01258

- Plant used 230 million gallons in 1995.
  - Texas Tech Farms used 66 million gallons (29%) of the total plant water usage.
  - Nuclear weapons operations used 163 million gallons (71%).
- Amarillo Water District consumed 16 billion gallons in FY 1995.
- PC-008/3 06.128 Pantex Plant including Texas Tech Farms used 1.4% as much water as Amarillo District.
- Nuclear weapons operations used 1% of the water used by Amarillo.
- Considering the water also used for irrigation, the Plant withdrew 0.6% of the regional withdrawal from the Ogellala aquifer.* Nuclear weapons operations consumed 0.43% of the regional withdrawal.
- Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, March 1996, page S-15.

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Bergman, Donna A.

From: Matt Kennedy
To: UN91T41
Subject: DOE/EIS-0225D
Date: Thursday, May 02, 1996 4:56AM

Good evening,

PC-009/1 14.002 I was told I could e-mail this address with questions regarding DOE/EIS-0225D. My question relates to DOE/EIS-0225D, page 5-12, second column, second paragraph, line 6. The document states starting at line 5: "With an additional 0.11 LCF from pit handling, the total risk of *latent cancers among workers at the P-Tunnel would increase by 1.8 percent."

All references to latent cancers in that section titled "Impacts of Storing 20,000 Pits", refer to LCFs, latent cancer fatalities, except line 6 as indicated above by a "*". Does the increase of 1.8 percent refer to "latent cancers" as it states, or to "latent cancer fatalities" as the rest of the section would seem to imply.

Your response is appreciated.
Sincerely,

Matt Kennedy
E-mail address: At.Chew@worldnet.att.net

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PC-010/1
17.027

"If pits in SST's travel through Hispanic neighborhoods, residents would perceive that a threat to their health and safety."

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PC-011
PRIVATE CITIZENS

PAGE 1 OF 2

April 22, 1996

My name is Addis Charless, Jr. I own, live on, and operate a ranch ten miles north of the Pantex facility.

Although I am somewhat comfortable with the current mission at Pantex, I have marked reservations about an expanded role at Pantex that would include permanent storage of plutonium pits, other plutonium scrap, uranium, etc., as well as processing/reprocessing of same, and the possiblity that a nuclear reactor of whatever type might be built there to accommodate any burning of mixed oxide fuel (MOX), or to produce tritium.

PC-011/1
06.040

To expand Pantex's role to accommodate any or all of the above is to me grossly irresponsible in view of the fact that the plant lies above the largest fresh water aquifer in the U. S., and that said aquifer is the lifeblood of this area's agriculture industry. Why the Ogallala aquifer has not been classified as a Class I water source is a puzzlement to me.

PC-011/2
14.081

None of the draft PEIS's have adequately addressed what would happen to this area's farm and ranch economy if a significant accident releasing substantial quantities of radionuclides were to occur regardless of how well it were to be cleaned up. I think the public's perception of the contamination would be such that it would make our products unmerchantable not just for the immediately affected area, but for the entire Panhandle's products.

PC-011
PRIVATE CITIZENS

PAGE 2 OF 2

It is a further contention by Pantex boosters that no substantial water pollution has occurred except for the perched water above the Ogallala aquifer. On June 27, 1995, a water sample was taken from one of my windmill wells and submitted for analysis. The results yielded the following information:

PC-011/3
06.041

For 16 high explosives tested for, results were BQL.
For gross alpha, gross beta, Pu 239/240, Ra 226/228, Sr-90, tritium, U 234/238--detected, but below Safe Drinking Water Act maximums.

How much will these levels rise if Pantex's role is expanded? Is it something we are willing to risk? Is it truly necessary for the viability of Amarillo's or the Panhandle's economy? Is short term economic prosperity worth eternal contamination?

PANTEX DRAFT SWEIS COMMENT AND QUESTION

Section 4.11.5 on page 4-170 in Volume I, Main Report is titled "Cumulative Impacts" and is referring to Socioeconomic Resources: It states that "This section describes the cumulative impacts on Pantex Plant. Cumulative impacts include the impacts of continued operations at Pantex Plant combined with impacts associated with the activities described in the *Waste Management Draft PEIS, the Stockpile Stewardship and Management Draft PEIS, or the Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS.*"

The Council on Environmental Quality Guidelines published in 40 CFR §1500 - 1508 define Cumulative Impact in §1508.7 as follows:

PC-012/1
11.021

> " *Cumulative Impact* is the impact on the environment (emphasis added) which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

QUESTION:

Why is there no analysis of the incremental socioeconomic impact of this action, on the Pantex socioeconomic region of influence, when added to other past and present actions such as the cancellation, in 1988, of the DOE program of a mined geologic repository for spent nuclear fuel and high-level radioactive waste in Deaf Smith County, and the more recent announcement of closure of the U. S. Department of the Interior's Bureau of Mines Helium Operations?

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PC-013
PRIVATE CITIZENS

1. Go slow on disposal

2. With our present President we do not know from one day to the next what he is going to do!
   France is testing
   China is testing etc.
   It is foolish to be thinking of reducing the stockpile as it seem to be proposed.

3. The environment damage that you may seem will affect this area. No consideration is given to all the chemicals that is poisoning the human body by allowing the chemical companies to put all their chemicals into our food supply which will harm all humanity in the U.S.
   a. which is worse "the pollutants" put out by Pantex that affects the local population. or
   b. all the chemicals that go into our foods which affects the whole nation

PC-013/1 11.020 1. It will hurt the economy of this city to have another "payroll" eliminated. - the making of planes under plans to dispose of, and those already [illegible] : some are - the new "Bone. Bell Helicopter.

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DOE Public Meeting on
Draft Environmental Impact Statements
April 30,1996

There are three draft environmental impact statements on which the DOE is soliciting public comments. These three documents cover plutonium storage and management:

* The Pantex EIS considers SRS as an alternative for storage of up to 20,000 plutonium pits, most of which are currently stored at Pantex.
* The Stockpile Stewardship and Management EIS evaluates SRS as an alternative for plutonium recovery and remanufacturing of plutonium pits to maintain the nuclear stockpile.
* The Disposition of Weapons Usable Fissile Materials EIS considers alternatives for consolidating plutonium storage and technologies for disposing of surplus plutonium.

SRS is under consideration for a major role in each of these programs. Following are some points that relate to these issues:

(1) A key part of any decision concerning these programs is the attitude of the neighboring communities.

SRS's neighbors in Georgia and South Carolina have supported SRS operations since the location was named 46 years ago as a weapons material production plant. Over these years, operators of SRS have been prudent, responsible, and world-class in technical ability. This community naturally welcomes additional missions of this type and jobs and money coming in, especially after so much has left the last few years. We also know and trust the people at SRS. Because of the support SRS enjoys, we urge DOE to choose SRS as the site for the future needs discussed in these EIS's.

(2) In many cases SRS has the facilities and capability already in place for certain of the EIS alternatives, and additions needed could be installed very cost-effectively by DOE.

Storage of nuclear materials, for example, is commonplace activity at SRS, and SRS officials report that they are already planning a modular storage facility, which could be easily modified for additional capacity. The storage unit is budgeted at $150 million, and additional storage capacity would roughly double that number.

(3) If it is determined that the national interest requires a large scale effort to reconstitute the plutonium pits now in the stockpile, a large percentage of which are decades old and potentially unreliable, SRS has the expertise and many of the facilities to perform that job

cost-effectively.

The capital investment of that option is about $350 million, much of which would return to he community in the form of purchases and construction wages.

(4) Excess plutonium must be managed properly. Storage is an option, but there is also the possibility of obtaining energy benefit from plutonium by making mixed oxide fuels for use in nuclear reactors. SRS is a logical place for fuel manufacture because of the existing plutonium handling facilities and expertise onsite. This would represent construction and related expenditures of about $350,000.

At the same time, SRS is essentially the center of applied vitrification technology in this country, and would be the ideal location for vitrifying plutonium as an anti-proliferation action. Capital costs would be about $500 million.

(5) It must be remembered that SRS has the only active large-scale plutonium processing facility in the nation.

(6) SRS not only has the capability to perform each of these missions safely and effectively, but in fact, is the only site that which can perform all of the missions.

SRS has the technology, infrastructure support, and facilities to immediately implement the NEPA decisions. Only SRS retains large-scale functioning plutonium capability. Only SRS has experience at startup and operation of nuclear facilities with today's standards of operation. Only SRS can provide the Department the capability to merge all of its plutonium functions at a single site with billions of dollars of savings which will result from this approach.

W. Penland Mayson, Jr.
3028 Bransford Rd.
Augusta, Ga. 30909

W.F. Lawless, 4/30/96, page 1

Plutonium Disposition EIS. General Comments

by W.F. Lawless

The disposition of plutonium is a complex decision for all Americans because of the uncertainties derived from plutonium's very long 24,000 year half-life. Other factors add to this complexity:

1. The uncertain threat of global warming from the burning of hydrocarbon fuels (e.g., coal, natural gas, gasoline, fuel oil, etc.).

2. The uncertainty of environmental effects from wind, solar, and hydroelectric power.

3. The uncertainty of the proliferation of weapons material from commercial reactors that generate electricity with plutonium fuels in Russia, Japan, and Europe.

To moderate the threats from proliferation, the U.S. has decided to dispose of its approximately 50 MT of excess weapons grade plutonium in one of three forms: in deep bore holes, contaminating it with fission products, and burning it up in reactors. The first option is an unattractive safeguard against proliferation, the second option recovers no energy, and the last option recovers a minor amount of energy as it passes once-through commercial reactors. The last two options comply with the spent fuel standard, i.e., they are as resistant to proliferation as the 1000 MT of spent fuel now scheduled for disposal at Yucca Mountain. But there are uncertainties with the spent fuel standard.

4. The uncertainty of safeguarding the plutonium after the fission products have decayed; the uncertainty of heat damage to Yucca Mountain during the first few hundred years; and the

W.F. Lawless, 4/30/96, page 2

uncertainty from the radiotoxicity of plutonium and from the possibility of criticality events during the next 1,000,000 years at Yucca Mountain.

In contrast to the spent fuel standard, however, the SRS vitrified high level waste will be dangerous only during the time required for the decay of its fission products.

Mindful of the above facts, the options in the EIS overlook an environmentally better option. Before U-235 is used to produce electricity in the U.S., it is diluted with U-238, but U-238 exposed to U-235 creates plutonium. Thus, plutonium is a key ingredient of spent fuel. Even in the plutonium-disposition option three noted above, plutonium will be diluted with U-238 to create more plutonium as it burns up (NAS, p. 143n). Because of the uncertainties, DOE should include a fourth option.

5. The fourth option is to demonstrate the recovery and extraction of plutonium from excess weapons material and from spent mox fuel made from the excess weapons plutonium, to dilute it with non-fertile material instead of U-238 (e.g., Th-232 would generate fissile U-233; an aluminum or silicone mixture would not generate a fissile end-product), and to burn the plutonium in commercial reactors. The end result would be an environmentally safer standard for disposal at Yucca Mountain that could become known as the vitrified high-level waste standard. It would not only remove the threat of plutonium from the biosphere, but it would also reduce environmental threats (e.g., global warming, the mining of uranium, or the heat stresses at Yucca Mountain), recover the maximum amount of energy available from plutonium, and not generate new plutonium.

Specific Comments

1. Even if free, plutonium fuel relative to uranium fuel in a LWR is expensive (NAS, 1994, p. 24-5) and will require a subsidy (p. 164). Pu fuels are more economic for new advanced reactor concepts (for LMR's, see pp. 182, 186; for ALMR's, see p. 185). Fuel costs will be offset by the recovery of energy, utility repository subsidies, and the reduction of safeguard concerns (in WSRC, 1996).

2. A. Makhijani: "The United States is the only leading country that has wisely rejected the use of civilian plutonium because of its proliferation dangers and its high costs. It is therefore the only country that is in a position to exercise the leadership to persuade other countries to forgo civilian plutonium production, at least for the time being, and to put all separated plutonium into non-weapons-usable form." (Report, 1995, p. 15)

M. Lawrence: "Plutonium can be made into power reactor fuel and burned up in a reactor. Ample experience exists in the fabrication and use of mixed oxide fuels containing plutoinum. While the economics of using mixed fuels are not considered favorable, at least by the U.S. and especially in the near term, several countries use or plan to recycle plutonium as a matter of strategic national policy." (Report, 1995, p. 31)

N. Egorov, Russia Federation on Atomic Energy: "I would say that we, in both countries, have paid too high a price sometime ago to generate and create that material and that is why we must choose the most efficient way of disposition of this material. That is why the general position of the Russian Federation in terms of plutonium disposition is that we should use, in the longer-term, that material as a component of the mixed oxide fuel for commercial power plants." (Report, 1995)

Currently, seventeen European and two Japanese commercial reactors burn plutonium MOX fuels (NAS, 1994, p. 186). By the year 2000, more are planned for Europe, Japan, and Russia.

3. U-235/U-233 plus U-238 produces plutonium (NAS, 1994, p. 205). Non-fertile fuels do not contain U-238 (NAS, p. 156).

4. Plutonium stocks, from the burning of U-235/U-238 in commercial reactor fuels, are increasing at about 60-70 MT per year (NAS, 1994, p. 28).

5. Low quality weapons grade (WG) plutonium and reactor grade (RG) plutonium are both explosive (NAS, 1994, p. 32-33).

6. Plutonium is difficult to handle because it is radioactive and toxic (NAS, 1994, p. 68).

7. Americium content is higher in RG rather than WG plutonium (NAS, 1994, p. 121-2).

8. Spent fuel rods destined for the repository are contaminated with fission products and plutonium. This spent fuel standard is safe from proliferation for the first few hundred years, however, as the fission products decay, proliferation risks increase proportionately (NAS, 1994, p. 151; p. 191; the spent fuel standard is described on p. 143).

9. "Options for near-total elimination of plutonium may have a role to play in the longer-term effort to reduce the risks posed by global plutonium stocks." (NAS, 1994, p. 143)

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10. "Institutional issues in managing plutonium disposition may be more complex and difficult to resolve than the technical ones. The process must be carefully managed to provide adequate safeguards, security, transparency, and protection for environment, safety, and health; to obtain public and institutional approval, including licenses; and to allow adequate participation in the decision making by all affected parties, including the U.S. and Russian publics and the international community." (NAS, 1994, p. 144)

11. "...as long as civilian plutonium exists and continues to accumulate, options that went further than the spent fuel standard and sought to eliminate the excess weapons plutonium entirely would provide little additional security, unless the same were done with the much larger amount of civilian plutonium." (NAS, 1994, p. 148; p. 155)

12. U.S. policy under President Clinton: "On September 27, 1993, the Clinton administration announced a nonproliferation initiative that makes clear that, while the United States will not interfere with reprocessing in Japan and Europe, "the United States does not encourage the civil use of plutonium and, accordingly, does not itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes."" (NAS, 1994, p. 149)

13. Greater than 100 years may be necessary to destroy existing plutonium stocks (NAS, 1996, p. 209-219). The Academy does not recommend plutonium fuels (NAS, p. 221), but does recommend additional research on their use (NAS, p. 222), including high plutonium loadings to reduce the production of plutonium (NAS, p. 211). The NRC's Separations Technology and Transmutation Systems (STATS) is studying the burning of all actinides (NAS, p. 210).

DRAFT: 4/30/96: 6

14. The estimate by SRS to reprocess 40,000 MTHM of commercial spent fuel at SRS and dispose of the remains in a repository is about $8.6 billion versus $11.3 billion for dry disposal in the repository; the total costs for spent fuel, excess weapon materials, and spent Naval fuels is $15.5 billion to reprocess and dispose versus $28.8 billion to only dispose (WSRC, 1996). By comparison, T. Pigford estimates a cost of about $100 billion to reprocess 630 MTHM (telephone call, April 1, 1996; he figured $800-$2,000 per kg of heavy metal to reprocess, $1,200 per kg to fabricate, and $400 per kg to recover energy; see also the Academy "STATS" report). Including reprocessing and fabrication fuel costs, Eichholz (1985) estimated that u-235/plutonium fuels were competitive with coal and oil-fired utilities in 1981 (p. 627).

15. The age of the facilities at SRS, and the radioactive releases from them, have been raised as issues if spent fuels are to be reprocessed at SRS. The separations canyons at SRS are more than 40 years old, however, their equipment has been upgraded and is functional.

These issues regarding the canyons can be related to other man-made structures. The Eiffel Tower, the Douglas DC-3 aircraft, and the Empire State Building are all older than the SRS canyons. Technology is not necessarily dated by its age; the Titanic, which sunk on its maiden voyage, is a good example. When the Empire State Building opened in 1931, the life-span of the average American was around 47. In 1988, according to the U.S. Bureau of the Census, the average life-span of Americans had increased to about 75. During this period, at the rate of about 2 million visitors annually, 75 million visitors had toured the Empire State Building. If each visitor toured the Empire State Building within about one hour, because some tall concrete buildings are radioactive at about 5 μrads per hour (Eichholz, 1985, p. 108), the collective annual radioactive dose from the Empire State Building would be much greater than the dose to the population exposed to reprocessing releases from SRS.

DRAFT: 4/30/96: 7

References

Eichholz, G.G. (1985). Environmental aspects of nuclear power. Chelsea, MI: Lewis Publ.

National Academy of Sciences (NAS). (1994). Management and disposition of excess weapons plutonim. Washington, DC. National Academy Press.

Report. (1995). Plutonium Roundtable: Risks and solutions. A public education project on policy choices for nuclear weapons disposal.

Westinghouse Savannah River Company (WSRC). (1996). Chemical stabilization of defense related and commercial spent fuel at the Savannah River Site. Document No. NMP-PLS-950239.

U.S. Department of Energy (DOE). (1996, February). Storage and disposition of weapons-usable fissile materials draft programmatic environmental impact statement. Summary. Washington, DC: Office of Fissile Materials Disposition.

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CONSIDERATIONS CONCERNING THE

"FAULT IDENTIFICATION STUDY AT THE PANTEX PLANT"

by Marcia A. Keevan

June 1996

This report continues the work started by Charlene Barnard-Wants-to-Know

A very special thanks to Trish Neusch for requesting documents and assisting with editing. My deepest appreciation to Beverly Gattis of STAND and Boyd Deaver of the TNRCC for allowing me to use the research materials in their office libraries. Conversations with Mavis Belisle of the Peace Farm were invaluable in preparing this report.

-"too smart for their own good. Know too much"-

I don't believe anybody can "know" too much for their own good, but I have seen people who "know" alot of stuff become so involved in one activity that they become blind to the needs of others and generally blind to the world around them. They miss the obvious.

So, we should all be simple minded? Yes, and no. Truly, do you want a simple minded person to attempt open-heart surgery on yourself? Yes and no? A well-informed, open mind is more than just an attitude to be adopted or discarded according to the latest fad...

A well-informed, open mind is a requirement for survival. Such a mind sees the obvious as well as the obscured, and thus is better able to steer clear of harm's way-

Marcia Keevan

GENERAL OUTLINE OF CONTENTS

Fault Identification at Pantex Plant
Section A, page 1

CONSIDERATIONS CONCERNING THE

"FAULT IDENTIFICATION STUDY AT THE PANTEX PLANT"

by Marcia A. Keevan

June 1996

PC-016/1 05.032

In April of 1995, a study concerning fault identification at the Pantex Plant was sponsored by Mason & Hanger-Silas Mason Co., Inc. (M & HSM), a contractor for the Department of Energy (DOE), in order to satisfy a 'Note of Deficiency' pertaining to a hazardous waste permit application for the Pantex Plant located near Amarillo, Texas.

To the DOE's credit, there are numerous legitimate geological studies and documents used as references in this study, and an enormous amount of manpower appears to have been harnessed to discover more about the geological conditions that are found in the Pantex Plant area.

PC-016/1 05.032 continued

Unfortunately, because this study was under an important deadline to satisfy a requirement of a vital permit for continuing operations, it lacks the benefit of having undergone critical peer review. The data is interpreted and a conclusion is drawn using the opinion of only one expert: Daniel McGrath. The other experts mentioned in reference are not on record as sharing the conclusion he reaches. In fact, one of the geologists mentioned in reference has gone on public record supporting a totally opposite conclusion from the one reached in this study.* The DOE "Fault Study" is also: incomplete, poorly argued, erroneously formatted, concluded in haste, and thus; invalid.

Although the "Fault Study" is now over a year old, the existence of this study only became known to me a few weeks ago. Obtaining a copy for my research and review has been difficult. The officials at Mason and Hanger were not willing to release it, and my request for a copy of this report from them still has not been honored. The copy I am using was obtained from the files at the Texas Natural Resource Conservation Commission (TNRCC) office in Amarillo. It is available for public review according to the Texas Open Records Act.

PC-016/1 05.032 continued

The "Fault Study" contains multiple references to an investigation carried out by a team from the Argonne National Lab. The use of references attempts to support the conclusion that Pantex does not sit on top of a fault. Yet, in an apparent contradiction, the "Draft RCRA Zone 12 Groundwater Assessment", dated November 1995, and prepared by Argonne, clearly addresses the existence of a major fault beneath the Pantex Plant. The Argonne report includes a powerful visual aide* that depicts a deep, substantial fault they identify as the "Whittenburg Trough". It would seem to be obvious even to the most uninformed person that the experts from Argonne wished to draw attention to this feature.

- Greg Wilson, Petroleum Geologist, Southern High Plains Water Conference, January 8, 1994
- Argonne "RCRA Zone 12 Groundwater Assessment", Figure 2.2-Regional Cross Section through the Texas Panhandle near the Pantex Plant (Source: Dutton et.al. 1982)

Comment Documents

Fault Identification at Pantex Plant
Section A, page 2

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05.032
continued

The expert for the DOE correctly states that hydrogeological characterization studies conducted by the Texas Bureau of Economic Geology (TBEG) have focused on mechanisms that would allow for rapid transport of contamination to the Ogallala aquifer. He also includes the fact the faults would provide such a mechanism for the rapid transport of water. But the TBEG reports are oddly silent concerning the word "faults", and do not directly address any argument for or against the existence of a fault at Pantex.

On the following pages I shall address some of the specific facts concerning fault identification at the Pantex Plant, as well as make suggestions regarding substantial deficiencies.

[illegible] – June 17, 1996

On June 18, 1996 the D.O.E. delivered a more complete copy of this study to the Stand office, which I am still reviewing.

Fault Indentification at Pantex Plant
Page 3
Section A

PROOF. OF A CAPABLE FAULT

On page two of the "Fault Indentification Study at the Pantex Plant", Daniel McGrath correctly asserts the characteristics of a capable fault, (c.f. CFR 100 Part A):

" A capable fault has one or more of the following characteristics:

- Any movement in the Holocene time in the last 10,000 years
- More than one movement in the last 500,000 years
- Demonstrably associated seismicity
- Structural relation to another structure shown to be capable. *

This being the case to prove, let us now ask the questions...

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05.032
continued

1.) Do we have movement in the Holocene time in the last 10,000 years?

Answer: Yes. " Holocene faulting has occurred on one portion of the Amarillo Uplift-Wichita Uplift structure and may have occurred on another part of the same structure in Potter County." *
and:
" URS/Blume (1976) cite a Holocene (last 10,000 years) fault scarp 4 miles long, 20 miles northwest of Pantex Plant, on the Amarillo Uplift. Where the Amarillo Uplift extends into Oklahoma, about 150 miles from Pantex Plant, the Meers Fault also has a Holocene scarp. These two examples of Holocene faulting along the Amarillo Uplift structure show the presence of some level, although clearly not intense, of the tectonism along this Paleozoic uplift." **

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05.032
continued

2.) Do we have more than one movement in the last 500,000 years?

Answer: Yes. As stated above, "...a Holocene fault scarp 4 miles long, 20 miles northwest of the Pantex Plant, on the Amarillo Uplift... within the last 10,000 years..." **

PC-016/1
05.032
continued

3.) Do we have demonstrated associated seismicity?

Answer: Yes. "...recent 11-year span, from January 1, 1977 to March 31, 1988, more than two dozen quakes measuring 2 or higher on the Richter scale were detected in the Texas Panhandle and South Plains, Oklahoma Panhandle and far Western Oklahoma, and the southernmost strip of Kansas...quakes estimated to be 4 to 4.5 on the Richter scale occurred on March 27,1917; July 30,1925; July 20,1966; February 20, 1974;...and others during 1934,1948, and 1959.." ***
and:
"...Since local records began in 1882, there have been four earthquakes in the Plant area. These occurred on March 27, 1917; July 30, 1925; June 19, 1931; and July 20, 1966..." ****

* "Fault Indentification Study at the Pantex Plant" - April 1995- McGrath, page 1
** "Fault Indentification Study at the Pantex Plant" - April 1995- McGrath, page 7
*** Amarillo Globe News, Tom Allison, January 21, 1994, Amarillo, Texas
**** "Fault Indentification Study at the Pantex Plant"- April 1995-McGrath page 4

Section A
Page 4

PC-016/1
05.032
continued

4.) Do we have a structural relationship to another structure that has been shown to be capable?

Answer: Yes. "...Holocene faulting has occurred on one portion of the Amarillo Uplift... and may have occurred on another part of the same structure in Potter County" *

and:

" An assessment of natural hazards at Pantex Plant (Jacobs 1993) lists "three major subsurface faults and minor surficial fault" in the area of the Plant, as follows:

(1) 155 miles long, about 25 miles north of site
(2) 43 miles long, about 5 miles south of site
(3) 40 miles long, about 7 miles north of site
(4) 4 miles long, about 20 miles northwest of site, surficial

USR/Blume (1976) have suggested that faults (3) and (4) may connect. " **

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05.032
continued

If a capable fault must show one or more of the above characteristics, and we have just shown that all four characteristics are demonstrated, then it stands to reason that we have a capable fault.

Fortunately for all of us, recent seismic activities at and near Pantex have been light to moderate.

Pantex is currently classified as being in Earthquake Zone Number 1.

Ponder the very wise message contained within the following quote:

" Seismic hazards, most notably active faults, are considered unacceptable for nuclear facilities such as the Pantex Plant"- Daniel McGrath, Soil Scientist April 1995 ***

* "Fault Indentification Study at the Pantex Plant" - April 1995 - McGrath, page 1
** "Fault Indentification Study at the Pantex Plant" - April 1995 - McGrath, page 6
*** "Fault Indentification Study at the Pantex Plant" - April 1995- McGrath, page 2

Section B, page 1

SPECIFIC DEFICIENCIES
Concerning the:
"Fault Identification Study for the Pantex Plant"-April 1995

1. Holocene displacement datings have not been performed.*

2. Studies that would determine fault transmissivity and stability for siting purposes have not been performed.*

3. Structural sub-surface maps fail to include regional cross-sections that include the Dockum Group relationship to the plant in a meaningful way, or show the Plant as it relates to the Amarillo-Uplift feature.

4. The final TBEG reports had not been completed at the time that this "Fault Study" was submitted, therefore they could not be included in this study. TBEG has not offered any input concerning the conclusion reached in this study, though the author implies that there is agreement. If this is so, then it should be clearly stated.*

5. The focus of the Argonne investigation was to characterize the hydro-geological conditions at the Plant and to help assess the fate and transport of contaminants. The focus was not to study "faults" at Pantex, and yet Argonne makes a point of including a cross-section map depicting a specific fault.** Argonne's input into the conclusion reached by McGrath is not evident. All of the points mentioned above (#4) apply to Argonne as well.

6. The expert for the DOE neglects to mention that the outcome of the previous regional studies conducted by the DOE met with negative results. The high-level waste repository that was proposed for Deaf Smith County was rejected due to geological hazards. Some of the same experts who supported that notion have been seen around town this year. Research indicates that incompetent experts may have been consulted, again.

7. Concerning the copy of the "Fault Identification Study for the Pantex Plant" I have obtained from the THRCC, I have found numerous errors that cannot possibly all be dismissed as 'clerical' mistakes:
   a) Omitted pages: Section 2.6, Field Surveillance, Omitted
      Section 2.7, Seismic Studies, Omitted
   b) Identical pages: Pages 8 and 9 are identical in every way but page identification.
   c) Evidence of Altered Conclusion: There are two pages identified as page 12, and there is is not a page 11. The first 'page 12' is titled "3.0-Conclusions", and the text type is inconsistent with the type size used throughout the rest of the report. This indicates that the author may have been instructed to change his conclusions.
   d) Broken text: The text from the bottom of page 9 to the following page 10 does not correspond. A page seems to be missing...
   e) Inaccurate Table of Contents: Most of the Table of Contents does not correspond to the page numbers.

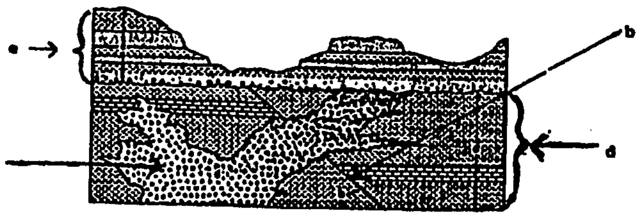
* New information uncovered by TBEG and others concerning geological hazards since last 1984 permit must be considered.
** Argonne, "Draft RCRA Zone 12 Groundwater Assessment" Nov 1995, Figure 2.2

Section B, page 2

SPECIFIC DEFICIENCIES-cont.
Concurning the :
"Fault Identification Study for the Pantex Plant"-April 1995

8. The expert for the DOE overlooks the fact that both 'subsidence caused by salt dissolution' and 'fault damage' can occur or be indicated together. These two types of geological events need not occur exclusive to each other, and do in fact often occur together. The premise he uses to support his argument is mistaken, and excludes a large body of related geological evidence. For example:

A generalization known as the "Principle of Cross-cutting Relationships" This pcicipie applies not only to rocks, but also to geologic structures like faults and unconformities.



Above fault b is younger than stratigraphic sequence d
Igneous rock c is younger than fault b
Rock e is youngest of all, by superposition

(The above example is not a picture of the Panhandle geology, but is used as an example of cross-cutting relationships. Actual cross-sections depicting the Panhandle region are shown in the appendix of this report.)

Fault identification at Pantex
Section C, page 1

SPECIFIC ACTIONS REQUIRED
TO ADDRESS DEFICIENCES;

1. Holocene displacement studies should be performed.

2. Siting for fault transmissivity and stability is indicated.

3. Structural sub-surface maps that include the Dockom Groups in a meaningful regional cross-section should be prepared and distributed for purposes of visual clarification. A regional cross-section, north to south, showing the picture all the way down to the Precambian basement, from Lubbock Co. to Roberts Co. should be presented as well.

4. Material that was obviously ommitted from the report needs to be included. (Field Surveillance section, Seismic Studies section)

5. The affects created by human activity unto the surface and sub-surface near the Pantex Plant should be considered in any "Fault Study". (e.g.: bulldozing, excavations, backfilled sink-holes, exploisves damage, farming... basically any human activity that has seriously altered the surface and sub-surface in such a way that would serve to mask geological features such as fractures, jointing, lineations, or subsidence)

6. TBEG and Argonne experts need to go on record in regard to their conclusions concerning seismic hazards such as faults that concern Pantex. Independent geologists should be consulted as well.

7. The following represents the most serious issue I have found concerning Pantex, and is a SERIOUS DEFICIENCY. "Lessons learned" from past projects proposed by the DOE concerning geology must be acknowledged Competent experts must be allowed to speak their opinions freely, without threat of coercion economically, academically, physically or morally. The DOE still has not gone far enough in this area, and the DOE must begin to fully recognize the moral obligation these experts, students, and workers have in issues concerning faults and contamination. DOE places too much burden on those it consults when the DOE requires silence concerning the hazards this dangerous industry brings with it wherever it goes. It is un-American to place good people in such a quandry about speaking freely. Keeping the exchange of information under such a heavy "lock-and-key" only serves to squelch the important exchange of ideas required to tackle these really BIG problems. Freedom to speak goes hand-and-hand with freedom to think. Thinking is a specific action required to address this deficiency.

8. The "Fault Identification Study for the Pantex Plant" needs to be rewritten. The above listed actions need to be taken and included in a new report.

9. Those activities at the Pantex Plant that are prohibited (by permit) to be conducted because of seismic hazards need to be relocated to a suitable site.

Fault Identification at the Pantex Plant
Section D, page 1

EVIDENCE SUPPORTING THE
EXISTENCE OF A FAULT AT PANTEX

In this section, I will try to use language that is clearly understood by the average reader.

"What are some of the types of features and activities that can tell us we have an active geological fault?"

1. Earthquakes (seismic activity)
2. Large cracks, fractures, sink spots (jointing, lineation, subsidence)
3. Certain types of water-flow movement beneath the surface soil (sub-surface hydraulic characteristics)
4. Core samples from wells can help to tell us about the way the layers of soils beneath the surface are "stacked".
5. Ground "radar type of equipment can help describe sub-surface layers, and is also helpful in detecting drastically contrasting layers of soil. Vertically tilted soil layers can be an example of historic faulting, as well as an example of underground erosion (subsidence) caused by moving groundwater. Eroison related subsidence can occur in conjuction with a fault, and subsidence can occur without a fault.
6. Ground movement is measured at various stations across America with special equipment that can detect vibrations. These vibration waves can be "followed" back to their strongest point (epi-center). The epi-center of an earthquake directs us to the FAULT responsible for the quake.
7. Photos taken from space can give us a picture that shows a larger view of the terrain. This viewpoint often discloses new clues concerning the structure of our planet.

• • •

EVIDENCE

1. "Do we have earthquakes here?"
ANSWER: Yes. (Page 3)

2. "Do our core samples at the Pantex Plant show contrasting vertical and horizontal layers?"
ANSWER: Yes. (TBEG, Argonne, McGrath)

PC-016/2
05.033

3. "Do we have evidence that the Pantex Plant is near an epi-center for earthquakes?"
ANSWER: Yes. The only local quake on record during this century that successfully damaged a man-made structure occurred in Panhandle, Texas. Panhandle is the closest town to Pantex. The strongest local quakes occurring during this century are said to have had epi-centers located about 10 to 20 miles from the Pantex Plant. (page 3)

Fault Identification at Pantex
Section D, page 2

cont.-EVIDENCE SUPPORTING THE
EXISTENCE OF A FAULT AT PANTEX

PC-016/3
05.034

4. "Do we have groundwater samples showing differences that can sometimes indicate a fault?"
ANSWER: Yes. According to the DOE expert, water in the Dockum group beneath the Pantex Plant is significantly better than the water found in other area Dockum wells.* This fact indicates that the Ogallala Aquifer is not a confined aquifer. The Ogallala Aquifer may be contributing to a more rapid recharge to the Dockum waters beneath the plant due to a fracture or fault. The TBEG report of May 1995 describes a large "channel" that is allowing water to to flow faster near the top of the "middle Ogallala perching horizon."** Further studies would tell us more about the lower horizons.

PC-016/4
05.035

5. "Did the 'ground radar' type of studies confirm that we have sharply tilted vertical soil layers beneath the Pantex Plant?"
ANSWER: Yes. And further study would provide more description of those layers.

PC-016/5
05.036

6. "Do we have sink spots (subsidence) at the Pantex Plant?"
ANSWER: Yes. The playas at Pantex are "sinks". Subsidence has influenced the development of many of the larger playa basins at the Pantex Plant.**

PC-016/6
05.037

7. "Did the expert for the DOE overlook the fact that he proved the case demonstrating the characteristics of a capable fault?"
ANSWER: Yes. Unfortunately, when scientific papers are not shared with other experts, even a good scientist can make a big mistake. A process called "peer review" involves many experts getting together to see if somebody's idea is right or wrong. "Peer review" is pretty important to scientists, because they can look alittle silly if they go on record with bad information or wrong ideas. Because we cannot control earthquakes, experts try to look very hard to identify the safest places to build important buildings such as the ones at the Pantex Plant. Experts agree that geological faults are not the safest places to build important buildings on. Buildings that handle very dangerous nuclear materials and hazardous chemicals are not suppose to be built on a capable fault.

PC-016/7
05.038

8. "Do we have experts who have indicated that the Pantex Plant was built on a geological fault?"
ANSWER: Yes. On January 8,1994, a petroleum geologist named Greg Wilson talked about his studies into the High Plains area. He indicated that Pantex was on a fault, and thought more studies should be done to prove this. Other experts from the Argonne National Lab have included maps in their studies that show a picture of a deep fault beneath the Pantex Plant. An expert from TBEG has shown that subsidence has playnd a part in the formation of playas on the High Plains. Some experts use very clear language to explain their positions, and some do not. Sometimes experts like to use very big, difficult words if they don't want to answer a question. We need to be careful about becoming confused when experts talk, and learn to look more carefully at the facts.

* "Fault Identification at the Pantex Plant" April, 1995, Mc Grath, page 5
** "Summary Hydrogeologic Assessment U.S. Department of Energy Pantex Plant, Carson Co. Texas" TBEG, May 1995

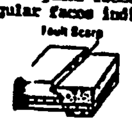
Fault Identification at the Pantex Plant
Section D, page 3

cont.-EVIDENCE SUPPORTING THE
EXISTENCE OF A FAULT AT PANTEX

In Section A, pages 3 and 4, I discuss the proofs of a capable fault as given in the "Fault Identification at Pantex Plant" report by Daniel McGrath. This page is designed to clarify some of the language used on those pages.

A fault is a break in the earth' crustal rocks along which there has been some movement.

A fault scarp has triangular faces on the ends of the divides (the spur ends). Such triangular faces indicate recent movement along the fault.



The word "Holocene" refers to our most recent period in geological time (within the past 11,000 to 12,000 years). Holocene displacement are considered to be very young, in geological time.

EXCERPT FROM "Design and Evalution Guidelines for Department of Energy facilities Subjected to Natural Phenomena Hazards" of June 1990, under the auspices of Lawrence Livermore National Laboratory (UCRL-15910)

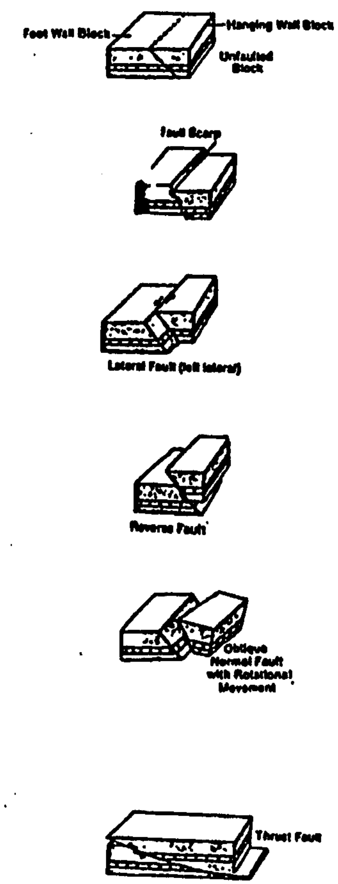
Page 3-1 "...Other earthquake effects that can be devastation to facilities include differential ground motion induce by fault displacement, liquefaction, and seismic-induced slope instability and ground settlement. If these latter earthquake effects cannot be avoided in facility siting, the hazard must be eliminated by site modification or foundation design. Existing facilities located on active fault traces, adjacent to potentially unstable slopes, or on saturated, poorly consolidated cohesionless soil or fill material pose serious questions as to their usage for critical missions or handling hazardous materials..."

EXCERPT FROM "Seismic Hazard and Building Structure Behavior at the Pantex Facility"
April 1976- URS/Blume

Page 37 "...hazard calculations were performed...The reason for performing this calculation is that there appears to be a concentration of seismic activity in the neighborhood of the site.."

Fault Identification at the Pantex Plant
Section D, page 4

TYPES OF FAULTS



Fault Identification at the Pantex Plant
Section E, page 1

A MESSAGE TO ACADEMIA AND RESPONSIBLE AUTHORITIES

PC-016/8 05.039

A hard look at the facts concerning the sub-surface surface conditions at the Pantex Plant, in the present (here and now) time is in order. Nearly every branch of specialized investigation is required to do this. Capable engineers, physicists, geologists, hydrologists, chemists, biologists seismologists and historians will need to be consulted to clarify the the current situation.

PC-016/8 05.039 continued

If academia chooses to mismanage the vast body of information that has been generated in recent investigations into the Pantex Plant, and deliberately presents a false model of the circumstances beneath the Pantex Plant, then they will also predict a false outcome. Anticipating change and predicting outcomes was once solely the responsibility of "seers" and prophets. But science, of its own curiousity, evolution, and arrogance now shares a responsibility for predicting accurate outcomes. The genie cannot be put back into the bottle, but perhaps the genie can be better understood and better disciplined. If each branch of the sciences now met openly to discuss and review the current information generated by the investigations conducted recently at the Pantex Plant, a more useful "band-aid" might be applied to the wound.

Some of the mysteries of the Universe may continue to elude man, but certainly the mysteries now known can be put to more beneficial uses. The "time" has more than passed for putting many of our technological advances to uses that would promote the greatest good. The Cold War is over, but the affects of this war linger.

Terrorist incidents might continue to plague the world for many years to come, as we have cowards in every walk of life (including science). An informed population will be better able to handle the difficulties to come than an uninformed population will be. This is true because:

Ignorance is expensive.
Ignorance is dangerous.
Ignorance can threaten our survival.
Ignorance is a lack of understanding, and people fear what they do not understand.
Fear can create panic.
Fear can start wars.
Fear separates people.
Fear cancels out vision.
And it is vision that drives hope.

While the actual facts may shatter some perceptions of reality, "the facts" need not dash all hope and vision. A changed reality simply requires a changed vision.

The new vision, as put forth in this paper, requires that academia and science keep the lines of communication open, and honest, and cautious not to formulate hasty conclusions. This new vision would ask government agencies to do the same. A new vision may stave off certain destructions only an ignorant, uninformed population would allow.

Fault Identification at the Pantex Plant
Section F, page 1

CLOSING

PC-016/8 05.039 continued

Neither the expert or the non-expert should become "lulled into complacency" just because the strength of local earthquakes during this century have been light to moderate. Geological fault-science has proven that the ground shakes hardest along fault lines. Although new or unknown faults can also surprise experts by suddenly becoming seismically active, known faults simply should not be ignored.

If the tectonic activity continues to increase substantially along the Pacific Rim, it could affect tectohic activity as far awy as places like the Panhandle of Texas. Assessing geological sensitivity for the purpose of siting work with dangerous actinides is urgent and vital.

Earthquake activity both at and around the Pantex Plant has been fairly consistent since records started a century ago. Not a single decade has passed in the Panhandle that some amount of seismic activity has not occurred.

Above all, the contamination concerns may become secondary to criticality concerns, as a chain reaction in a geological setting would generate radiation and extreme heat in addition to releasing fission product contamination.* As some experts very well know, it only takes small amounts of certain actinides suspended in water to achieve criticality. Because of the instability of the Amarillo Uplift/Whittenburg Trough/Potter County Fault connection to the Pantex Plant, and the threat the surface and groundwater may present to certain actinides indicated to already be trapped in the soil**, appropriate actions need to be taken promptly.

"Seismic hazards, most notably active faults,
are considered unacceptable for nuclear
facilities such as the Pantex Plant"-
Daniel McGrath, Soil Scientist
April 1993

* "Considerations of Autocatalytic Criticality of Fissile Materials in Geological Repositories April 4, 1996, W.E. Kastenberg and Staff at University of California, under the contract with Los Alamos National Lab.

** 1961 Plutonium disperal accident indicated in Morrison Knudsen Corp. Data Visualization For Miscellaneous HE/Radiation Release Sites, Sept. 18-19, 1995, Bldg. 12-44E "SWMU Reference Guide" 1995-1996, Potentially contaminated water with Plutonium in the sub-surface leaching beds under building 12-44E, following an accident in 1966.

BIBLIOGRAPHY
Page 1

Texas Bureau of Economic Quarterly Reports:
November 1991, November 1992, February 1992, August 1992, November 1993
February 1993, May 1993, August 1993, November 1994, August 1994, February 1995.

Texas Bureau of Economic Geology Milestone Reports:
3-29-91 Purchase Request/Description for BET Sorptometer (Lab equipment)2pgs.
3-22-91 a) Geophysical Transects of Pantex Plant and City of Amarillo 4pgs.
b) Geophysical Surveys
c) Aquiring research material
3-21-91 Core and Outcrop Descriptions (Gustavson)2pgs.
4-26-91 Drilling and Unsaturated Zone Modeling (Gustavson)3pgs
4-30-91 Hydrologic Monitor Installation 3pgs.
(NA) City of Amarillo Water Supply, Well Field Draft 4pgs.
2-6-92 Geophysical Logging (Paine) 5pgs.
4-6-92 Hydraulic and Chemical Parameters (Richter & Scalon) 25pgs.
4-30-92 Drilling Program Summory 21 pgs.
8-27-92 Hydraulic Conductivity (Richter and Scalon) 8pgs
9-1-92 BEG Drill Program 6pgs. text, 9 pages charts
9-28-92 Geostastisticals of Field Saturated Hydraulic Conductivity (Scalon) 5pgs.
3-31-93 Wastewater Disposal (Gustavson) 9pgs. tx, 6pgs. charts
4-15-93 Seismic Studies of Playa (Paine) 24pgs. tx, 13pgs. charts
6-1-93 Playa Basin Fills Near Pantex Plant (Hovorka) 9pgs text, 8pgs charts
7-21-93 #17 Preferential Flow 11pgs
(NA) Hydrological and Hydrochemical Data, Playa 5 11pgs.
10-21-93 Inorganic Geochemical Evolution of Groundwater (Fryar, Mullican) 16pgs
11-17-93 Numeric Modeling of Preferential Flow (Xiang) 11pgs. text
(NA) Inventory of Ogallala Aquifer Data
1927-1949
1950-1959
1959-1969
1970-1979
1980-1991
(NA) Preliminary Findings on Inorganic Geochemical Evolution of Ground Water (Fryar, Mullican) 11pgs. text, 41 pages charts
(NA) Areal Extent and Hydraulic Continuity of Perched Ground Water at Pantex (Mullican, Fryar, Johns) 17pgs
11-21-93 Hydrologic and Hydrochemical Data Compilation for Playa 5 and Pantex (Fryar, Mullican) 11 pgs.
11-15-94 Preferential Flow in Playa Settings Near Pantex 11pgs text, 4 pages charts
2-22-94 Shallow Seismic Data Acquisition Processing and Interpertation at Playa 3 (Paine) 32 pgs.

2-22-94 Regional Depositional Systems of the Tertiary Ogallala 19pg. 11 charts
5-3-94 Calibration and Sensitivity Analysis of an Ogallala Aquifer Ground Water Flow Model 81pgs
5-9-94 Solubility and Desorption Studies on High Explosives 5 pgs
8-5-94 Shallow Seismic Data Acquisition Processing Interpretation at Pantex (Paine)
1-11-95 Potentiometric Surfaces and Vertical Conductivity Measurements for the Perched Aquifers at Pantex (Fryar and Mullican) 10pgs tx, 9pgs chart.
5-1-95 Hydrologic and Hydro Chemical Results from Pumping Tests at the 11-14 Pond, Pantex
7-28-93 Extent and Hydraulic Continuity of Perched Ground Water (Mullican, Fryar, Johns) 11pgs
7-95 Stratigraphy of Playas in Pantex area, Pantex Lake and Playa 5 (Hovorka)
8-1-95 Quartenary Evolution of Playa Lakes on the Southern High Plains "" 102 pgs

BIBLIOGRAPHY
Page 2

TBEG FINAL REPORTS,

8-30-95 Fluvial and Eolian Depositional Systems Paleosols, and Paleoclimate. Late Cenozoic Ogallala and Blackwater Draw Formations, Southern High Plains, Texas, and New Mexico. 120 pgs

9-1-95 Summary of Hydrogeological Assessment U.S. Department of Energy, Pantex 127pgs

8-95 Investigation of Historic Discharges to Ditches and Playas (Texas Tech Wate (Ramsey,Rainwater)

8-30-95 Shallow Seismic Data Acquisition, Processing, and Interpretation, Playa 5, Carson County (Paine) 55pgs.

8-95 Report of investigations of the Soil-Gas Geochemistry of the Near Surface Playa Environment 99pgs.

7-25-94 Comparison of Infiltration and Evaporation Volumes for the Five Pantex Lakes (Greer) 58 pages (Texas Tech, Lubbock)

9-7-95 Chromium Contamination Mobility (Laun) 123pgs

7-1-95 Water Permit for Canadian River Authority Roberts to Hutchinson

3-4-94 Stratigraphy (Gustavson, Hovorka) 31pgs.

8-94 Report of American Association for the Advance Sciences (3 abstracts)

9-1-92 Pantex Characterization Study (Presented to Texas Alliance of Groundwater Representatives) (Gustavson)

8-95 Characterization of Gas Transport in a Playa Subsurface Pantex Site, (Nicot)

(This is the end of my TBEG References)
8 8 8

11-9-1994 Data Visualization Meeting Summary, Jacobs Engineering Group, Landfills

"Tectonic Structures of the Palo Duro Basin, Texas Panhandle (# 187)" by Roy T. Budnik, 1989 Bureau of Economic Geology

"Data Visualization For Miscellaneous High Explosives/Radiation Release Sites" by Morrison Knudsen Corporoation, Sept. 18-19, 1995

"Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards" -UCRL-15910, June 1990 by Bob Kennedy and Steve Short, under Lawrence Livermore Nat. Lab

"Seismic Hazard and Building Structure Behavior at the Pantex Facility" April 1976, by URS/Blume

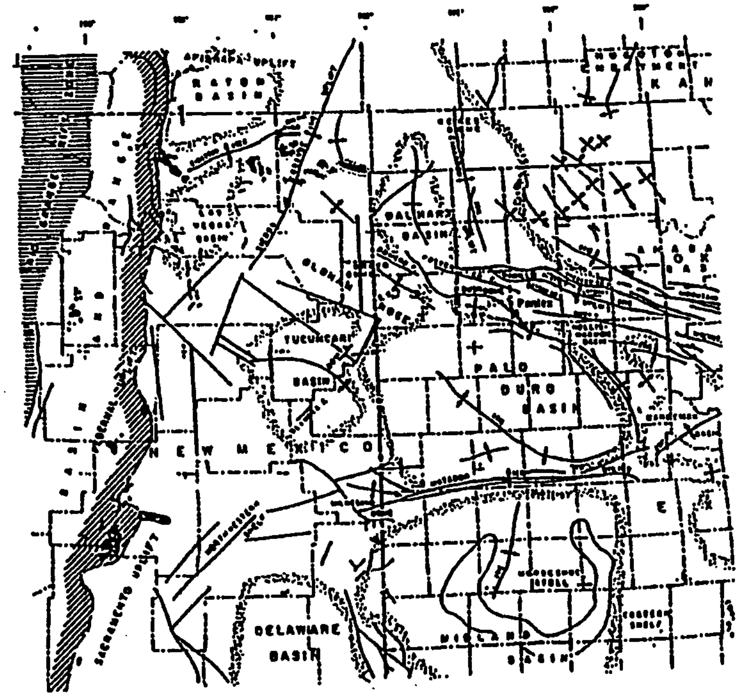
"The Earth Through Time" Third Edition, 1988, By Harold L. Levin

"Consideration of Autocatalytic Criticality of Fissile Materials in Geologic Repositories" By W.E. Kastenburg and the Department of Nuclear Engineering and Department of Materials Science and Mineral Engineering at the University of California, under contract to Los Alamos National Laboratory April 1996

BIBLIOGRAPHY
Page 3

- "The RCRA Zone 12 Groundwater Assessment"-November 1995, by Argonne National Laboratory/Battelle Columbus Operations
- "Quakes, Eruptions and Other Geologic Cataclysms" 1994, by Jon Erickson
- "Cambridge Encyclopedia of Earth Sciences" 1981,
- "1993 Environmental Report for the Pantex Plant" Battelle/Mason and Hanger
- "RFI Environmental Restoration SWMU Guide" 1994/1995

ATTACHMENT 1, Part 1



(Report of Investigation No. 187, Tectonic Structures of the Palo Duro Basin, Texas Panhandle-1989, by Roy T. Budnick, page 11)

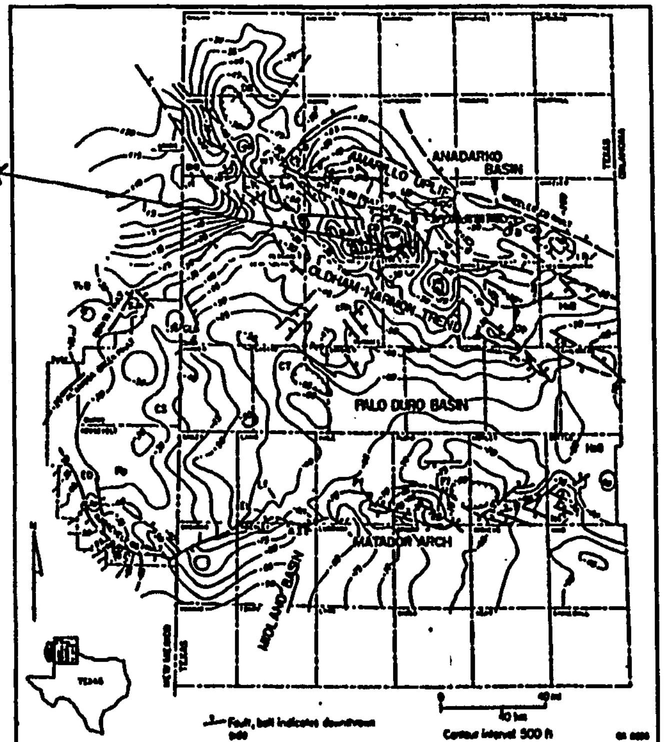


FIGURE 4. Structure-contour map, top of basement, southern Texas Panhandle. Based on well control and on seismic lines shown in figure 3. 6D=6666 Dome; Af=Arick field; A-I=Anton-Irish structure; Ap=Armstrong positive; Ayp=Arney positive; BrD=Bravo Dome; BuD=Bush Dome; Ca=Childress anticline; CB=Carson Basin; CD=Channing Dome; CS=Clovis Sag; CT=Castro Trough; cRh=central Randall high; DB=Dalhart Basin; Dp=Donley positive; ED=Elida Dome; Ff=Floydada field; GLh=Garcia Lake high; HaB=Hardeman Basin; HaB=Hollis Basin; IL=Illusion Lake structure; JHD=John Ray Dome; LD=Lela Dome; Lf=Littlefield structure; LFB=LeFors Basin; Ns=Nartlese structure; Pf=Petersburg field; Ps=Plaska structure; Rp=Roosevelt positive; SJh=San Jon high; TaB=Tascosa Basin; TuB=Tucumcari Basin; WDG=White Deer graben; WT=Whittenburg Trough; XL=Exell Dome.

7

ATTACHMENT 3

(Report of Investigation No. 187, Tectonic Structures of the Palo Duro Basin, Texas Panhandle-1989, by Roy T. Budnick, page 11)

ATTACHMENT 4

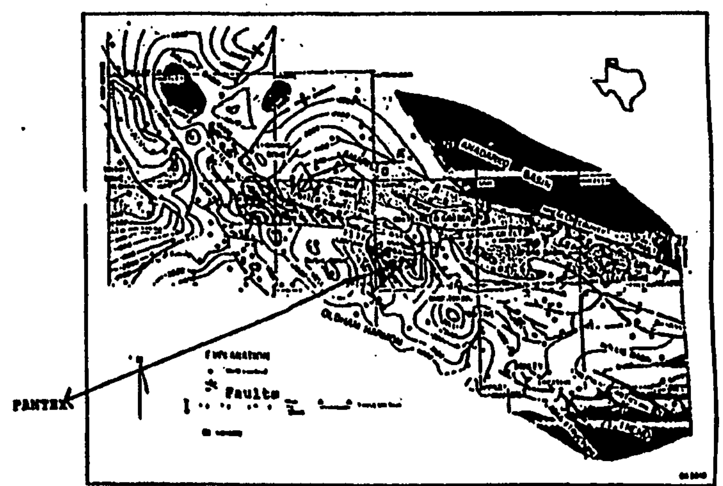
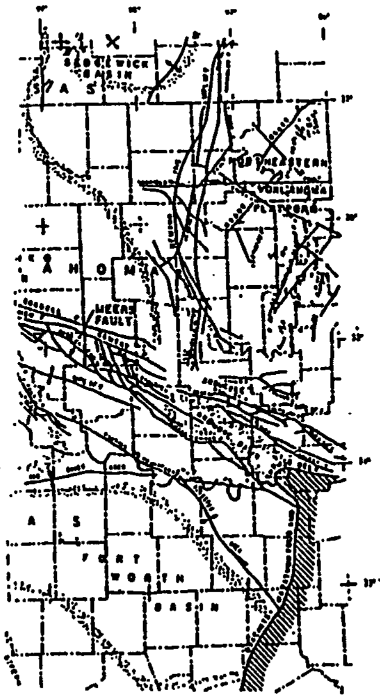


FIGURE 6. Structure-contour map, top of basement, Amarillo Uplift. Cross section A-A' shown in figure 10.

Attachment 1, part 2



Explanation

- Axis of dome
- Anticline and arch axis
- Basin axis
- Eastern edge of Rocky Mountains
- Ouachita-Marathon Fold and Thrust Belt
- Exposure of Late Cretaceous-Tertiary Intrusions
- Faults (undifferentiated)
- Late Tertiary-Holocene volcanics in Union County
- Rio Grande Rift Zone
- Site
- Outline of basins

Fault locations are based on various horizons. Structures from technical literature.

Sources: Adams, 1962; Baldwin and Muehlberger, 1959; BEG, 1977, 1983; Bayley and Muehlberger, 1968; Cole, 1962; Colner and Crum, 1933; Dane and Bachman, 1965; Dutton, 1979; Flawn, 1956; Ferguson et al., 1984; Foster et al., 1972; Gould and Lewis, 1926; Ham et al., 1964; Ham and McKinley, 1954; Harlton, 1963, 1972; Hills, 1970; Huffman, 1959; Jacobson, 1948; Johnson, 1976; Lucas and Lawson, 1962; Mohadis, 1952; Morrison, 1963; Miser, 1954; Myers et al., 1956; Nicholson, 1960, 1980; Pitt, 1973; Rogatz, 1939; Sellards and Baker, 1934; Stearns, 1972; Stemples et al., 1979; Totten, 1956; Woodward and Snyder, 1976.

Kilometers

Figure 2.2 Regional Tectonic Map

(Report of Investigation No. 187, Tectonic Structures of the Palo Duro Basin, Texas Panhandle-1989, by Roy T. Budnick, page 11)

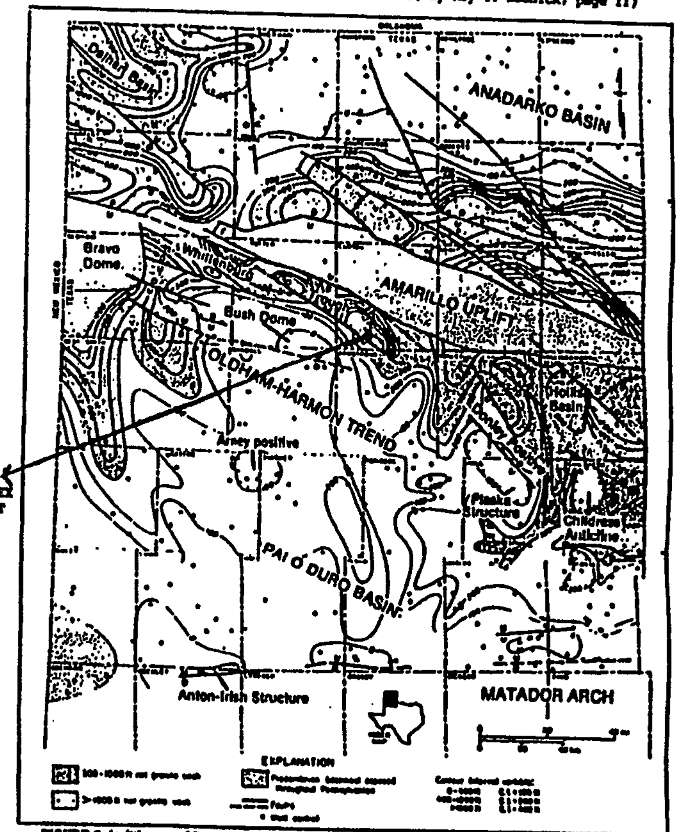


FIGURE 6. Isolith map of Pennsylvanian and Lower Permian (Wolfcampian) arkosic clastics (from Dutton, 1982). The clastics were derived primarily from the Amarillo Uplift and trapped in the Whittenburg Trough and other deep basins bordering the uplift. Some of the clastics reached the Palo Duro Basin through lows along the Oldham-Harmon trend.

(Report of Investigation No. 187, Tectonic Structures of the Palo Duro Basin, Texas Panhandle-1989, by Roy T. Budnick, page 11)

ATTACHMENT 5

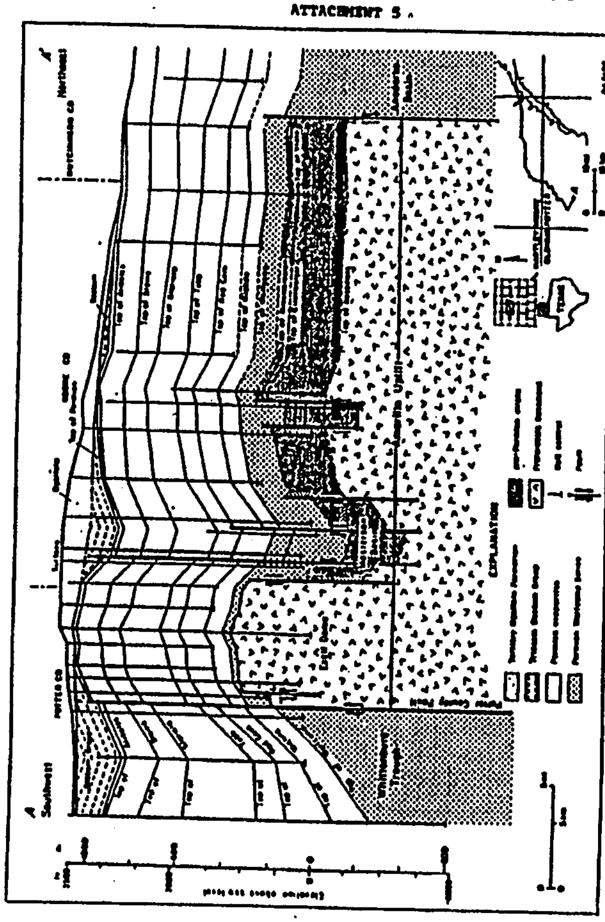


FIGURE 10. South-north cross section A-A' of western Amarillo Uplift. Uplift of Exell Dome since the Late Triassic has folded

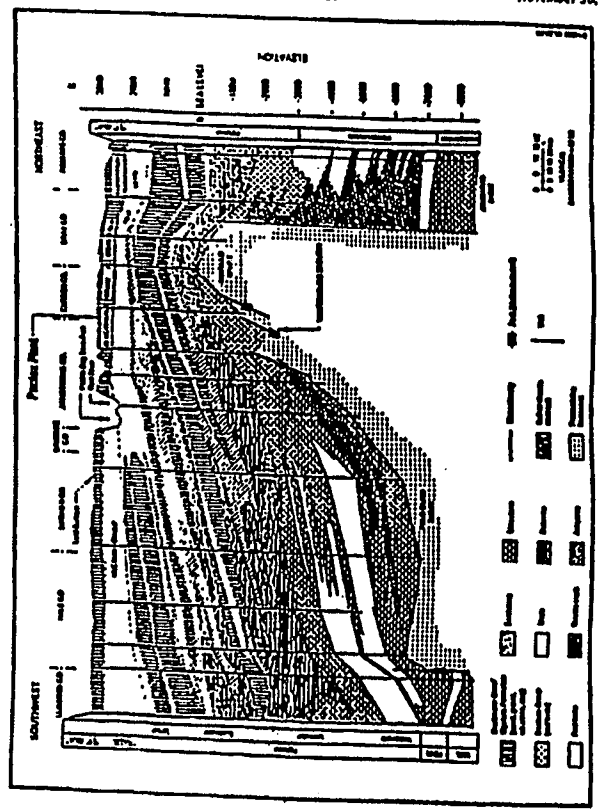


FIGURE 2.2 Regional Cross Section through the Texas Panhandle near the Pantex Plant (Source: Dutton et al. 1982)

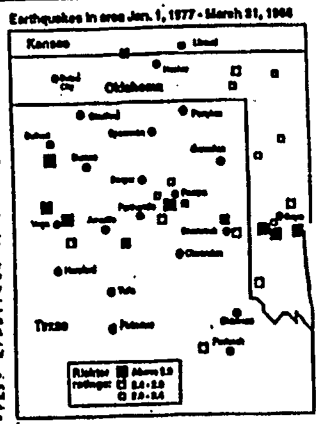
ATTACHMENT 6

Amarillo Globe

Panhandle not immune to temblors

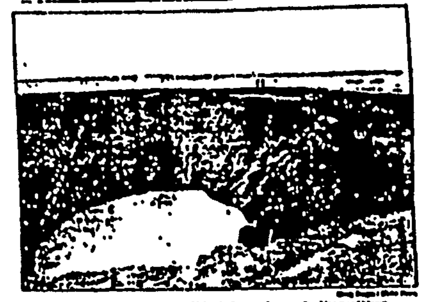
Aftermath:

Earthquakes in area Jan. 1, 1977 - March 31, 1988



ATTACHMENT 7

Globe-Times
C
Area



Sightseers take gander at hole that used to be a cotton field

ATTACHMENT 8

PC-017
PRIVATE CITIZENS

DRAFT EIS FOR THE CONTINUED OPERATION OF THE PANTEX PLANT
AND ASSOCIATED STORAGE OF NUCLEAR WEAPON COMPONENTS
Amarillo, Texas June 25, 1996

PC-017/1 11.045

1. What kinds of studies (if any) have been conducted to learn the effects of the proposed actions -- storage of large amounts of plutonium, chemicals, nuclear waste, uranium and other toxic substance and/or the porcessing/reprocessing of those substances on agriculture production, sales, uses, etc?

2. What were the results of such studies if any have been made? Agriculture is mentioned very briefly in the EIS. Agriculture is the major industry in the Texas panhandle and the only industry near the Pantex Plant.

PC-017/2 23.049

3. How can you determine the safety and purity of our agricultural activities and products if no thorough studies have been done?

PC-017/3 11.046

4. What studies have been made on the long term effects of those activities being proposed or possibly being proposed on our agricultural products? When were such studies made? How were they done? What results were found? Where were they done? Were neighboring farmers and ranchers consulted? Who? Major plans for the future of Pantex cannot be made until such studies are made and found to be possitive.

PC-017/4 14.128

5. What studies have been made on the short term and the long term health and safety of those of us living near the plant, agricultural workers on and around the plant, and the workers at the plant? Have past Pantex workers' health been studied? Have there been follow up health studies been made on the workers? How were the health and safety studies done? When? What are the results? No decision of the future of Pantex can be made until answers to these questions are assessed. Answers can only be found after adequate studies have been made.

PC-017/5 14.129

6. We are told the activities at the plant have not and will not have any effect or at most limited effect on the Pantex workers and on the neighbors and agricultural workers; yet, studies have not been made for those conclusions. We are relatively certain that past activities have been a serious threat to both workers and neighbors. The DOE and the contractors seem very reluctant to admit to those health and safety concerns. They appear to get very upset when any instances of health and safety get out. Why? Should not the public be kept informed of such matters? If not, why not?

PC-017
PRIVATE CITIZENS

pg 2

PC-017/6 08.002

7. Last October 4, 1995, a very large explosive charge was set off for an emergency management drill. Our home received major damages. We would have been better off to have torn our home down and rebuilt from the ground up. We were originally told that the charge was 110 pounds of explosive. Later, plant officials have said only 80 pounds of explosive was used. This was set off about one-half mile southwest of our home. We are now learning of other neighbors who have damages that possibly resulted from that explosion. Throughout the many years of living next to Pantex, the testing of high explosives probably caused damages to our homes resulting in cracking, breakage, etc. The regular shaking and jarring could not possibly do our homes and property any good.

PC-017/7 22.020

Will the DOE repair and/or replace or pay damages for all these damages? Will the DOE pay for the months of inconvience and nerve wreaking experiences we have been through?

PC-017/8 14.130

Most of us cannot afford to spend anywhere near what the DOE can and does to keep from paying claims. Example: the John Boll compensation case in which Mr. Boll was made very ill because of uranium toxic fumes while he was drilling a uranium plug from a warhead. The DOE spent hundreds of thousands of dollars to keep from paying about a $85,000 claim.

PC-017/9 14.131

8. In the event of a disaster that causes damages to our agricultural products and/or land, and/or our inability to market our products because of possible contamination, will the DOE pay for those damages at a fair market value in a timely manner? Will they pay willingly without our having to take them to court? Will the DOE pay us for the lose of our top soil and clean the damaged soil?

PC-017/10 06.058

9. There are at least 7 playa lakes just off the Pantex site on all sides of the plant. Rainwater runs off the plant site into the barrow ditches around the plant and drain into those off site playas. This drainage is not addressed in the DEIS. The Pantex lake receives none of the runoff. Why were the other playas excluded? The watershed on the south of Lake Meredith, a resevoir for 13 cities, begins on the northwestern corner of Pantex. Water from that section of the plant (where the various EIS's show a nuclear reactor or two may be constructed) runs into Lake Meredith.

PC-017/11 06.059

10. Page 4 - 79 use of water from perched aquifer and also the Ogalala aquifer is just not true as contamination in in the domestic wells of a neighbor to the east of the plant and a well to the south of the plant. Why are false statements being made? What measures are being taken to clean up the water off site? This contamination must be coming from the "PANTEX AQUIFER." Pantex awuifer is a result of the waste being run into on site playas. How will the contamination of the Ogalala be cleaned? How do you determine "insignificant" amounts? Does DOE define "insignificant" as anything or amount the DOE does not want the public to believe may be harmful? Can "insignificant" amounts become "significant" if ingested or exposed over long terms? What is the long term effect on health and safety?

PG 3

PC-017/12
02.025

11. Page 4 - 82 states that pit reuse is not a current activity at Pantex Plant. Can you assure us tht the reuse will never become an activity at Pantex? Is reprocessing, MOX, or other potential pit activities ever to be an activity at Pantex? If so, should not those issues be considered and studies on their effects on health and safety for workers, neighbors, and agricultural workers, the potential contamination of our water, air, and agricultural activities and products be addressed before the future at Pantex is determined?

PC-017/13
16.030

12. If transportation of toxid materials and/or radiation materials to other sites poses a threat to peoples along the route of transportation and to other travelers along the roadways, why would the storage of those substances not pose a greator threat to the health and safety of residents and workers at or near Pantex? We will have long term, 24 hours per day exposure which will be much greater than the meeting of a fellow traveler along the interstate or the exposure of someone in a roadside park.

PC-017/14
14.132

13. Is there a greater risk to farmers who are plowing and working the soil and harvesting of crops near the site than to the general public? What studies have been done to determine the potenttial of greater exposure? Should not those studies be done? Is there a danger to our children playing in their sandboxs or their swimming pools? Page 4 - 104 discusses collective dose to surrounding population in a 50 mile radius. Would not peoples living next to

PC-017/15
14.133

the plant, especially those downwind be expected to recbive a greater dose than someone who lives in Vega to the west, up wind, and about 40 miles away? Would not people downwind receive higher doses than those generally up wind? If not, we ask for your proof.

Thank you for giving us this opportunity to express our concerns and to ask for further studies before any decisions are made for the future of Pantex Plant.

Jeri and Jim Osborne
Route 2, Box 11
Panhandle, TX 79068
806-335-2163

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05/09/96 15:21 ☎ →→→ AL EISPS 003/005

4-9-96
Box 1??
K... Tx 790..

Dear Ms. O'Leary

I am a 65 year old family man who has lived in and around Amarillo, TX, and the Pantex plant most of my life.

I understand from reading newspapers that you would like to have people of this area express their opinions about the Pantex plant.

The most hazardous materials known to man, are being stored above ground in barrel like containers, This is insane in my opinion.

Pantex plant is located on the approach to Amarillo International Airport. This is just an accident waiting to happen in my opinion.

Pantex plant is located in the center of the nations bread basket. app. 3 million head of cattle are on feed for slater in this area. all kinds of vegetables and foods are produced in this area.

05/09/96 15:21 ☎ →→→ AL EISPS 004/005

PC-018/1
14.001

There are over 1 million people living in this area.

All of the above would be in danger of contamination if an accident did occur at Pantex.

I vote to close the Pantex plant as soon as possible, a few jobs are not worth the risk, in my opinion.

Sincerely
Jim Dee Smith

5-25-94

Mr Manett Founds

I am a 65 year old family man
I have spent most of my life in and around Amarillo Tx, and the Pantex plant is close by.

I would like to see the Pantex plant closed and the mess cleaned up.

Texas attorney General Dan Morales recently accused the D.O.E of turning the Pantex plant into a nuclear Dump. and I believe he is right.

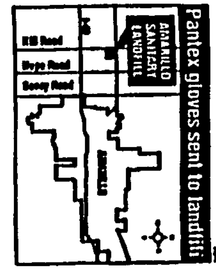
PC-019/1 13.010 Inclosed is another problem associated with the plant pointed out by Amarillo Globe news.

I feel like the people planners in Washington D.C. think there is nothing in the Texas panhandle but a few dirt farmers & prairie dogs, and maybe we are despensible.

Sincerely
Jim Dee Smith
Box 133
Kress TX 79052

City won't search for contaminated glove

Pantex gloves sent to landfill



PC-020
PRIVATE CITIZENS

David C. Losey
1628 Citation Drive
Aiken, South Carolina 29803-5224

May 7, 1996

Ms. Nanette Founds
U. S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Dear Ms. Founds:

I'd like to offer this comment on the EIS for the *Continued Operation of the Pantex Plant....*

The EIS summary states that "Pantex Plant has sufficient storage capacity to safely accommodate 20,000 pits." It would be good to have an assessment of how thoroughly the proposed pit storage facilities meet the DOE security requirements. For whatever reasons, DOE requirements are sometimes applied inconsistently between the DOE sites. The plan set forth in the EIS needs to be based on full compliance with DOE requirements.

Thanks for the opportunity to comment on this program.

Sincerely,

David C. Losey

David Losey

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J.M. OSBORNE
1011 MURRAY ST.
WICHITA, KS 67212
(316)721-7873

29 May 1996

Nanette Founds
U.S. Department of Energy
P.O.Box 5400
Albuquerque, NM 87185-5400

To whom it may concern:

I am writing in regard to the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components. In particular, I wish to discuss Appendix E - Aircraft Accident Analysis. Previously, I have commented on several aspects of the Aircraft Hazards Analyses that have been performed in support of the reconfiguration of the Pantex plant and was pleased to see that my some concerns have been addressed to varying degrees.

Restating my professional background, I am an aerospace engineer specializing in propulsion and aircraft performance. I earned my Bachelor of Science degree at Texas A&M University and have worked in the aerospace industry since 1983. More specifically, I have worked in the general aviation industry since 1985 and have participated in a number of aircraft certification programs. I am currently employed by an aircraft manufacturer, where I am involved in aircraft and propulsion system performance analysis and the interpretation of flight test data.

In order to make my comments easier to correlate to Appendix E, I have chosen to present them by paragraph number in the following table.

COMMENTARY ON DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONTINUED OPERATION OF THE PANTEX PLANT AND ASSOCIATED STORAGE OF NUCLEAR WEAPON COMPONENTS, APPENDIX E - AIRCRAFT ACCIDENT ANALYSIS

	SECTION	COMMENTS
	E.1	No comment
	E.2	First paragraph contains typographical errors.
PC-021/1 15.003	E.2	It is implied that the probability of an aircraft hitting a facility would be unacceptable if it exceeded 10^{-7}. DOT (FAA) Aircraft Systems Safety Analyses tend to place events with probabilities greater than 10^{-7} in the category of "improbable" and require that such an event not create any hazard. If the probability is the range, 10^{-9}, it is considered "highly improbable" and the event may result in a hazard but no loss of life. An event of probability, 10^{-13}, is considered "extremely improbable". No event that would be considered as "catastrophic" or resulting in the loss of life may exceed this order of magnitude in probability of occurrence. Since the perforation of or the scabbing of a structure containing nuclear weapons material is considered as having the potential for causing an explosion, this event must be considered as "catastrophic".
PC-021/2 15.004	E.2.1	The characterization of mode of operations is much improved over that in the original analysis, though I do have some question regarding the relative values of γ. I find it somewhat surprising that the value for military aircraft is lower than that for commercial aircraft. This is particularly troubling since fighter, attack and training aircraft tend to have a somewhat higher overall accident rate.

	SECTION	COMMENTS
PC-021/3 15.005	E.2.2	The impact angle used in the analysis is 15°. This approach ignores the possibility of higher angle impacts such as those demonstrated by the United Airlines Boeing 737 in Colorado Springs, the US Air Boeing 737 in Pennsylvania, the American Eagle ATR72 in Indiana and, more recently, the ValuJet DC-9 in Florida. (Incidentally, at least three of these accidents occurred during the "inflight" phase of flight.)
PC-021/4 15.006	Table E.2.2-1	General Aviation "Turbojets" have wingspans of up to 90 feet.
	E.2.3	No Comment
	E.2.3.1	No Comment
	E.2.3.2	No Comment
PC-021/5 15.007	E.2.3.3	I question the accuracy of the stated equation for the speed of sound in soil. This is stated as: $C_s = [(E_s \cdot g) \div \rho]^{0.5}$ where C_s = the speed of sound in soil (ft/sec) E_s = the modules of elasticity of soil = 470000 lb/ft² ρ = the density of soil = 130 lbs/ft³ g = the acceleration due to gravity = 32 ft/sec² (actually, g = 32.174 ft/sec²) Using these values, I calculate the speed of sound in soil to be 340 ft/sec. I find this to be quite low in light of the Sea Level, ISA value for the speed of sound in air (1116 ft/sec). Unfortunately, I do not have ready access to references regarding the values of E_s and ρ.
	E.3	No Comment
PC-021/6 15.008	E.3.1	It should be noted that the 4800 ft Mean Sea Level (MSL) ceiling for the prohibited airspace over the Pantex plant equates to approximately 1200 ft Above Ground Level (AGL).
	E.3.1.1	No Comment
PC-021/7 15.009	E.3.1.2	It is stated that helicopters have been omitted as a hazard "because they are forbidden from flying in the airspace over Pantex Plant and have little potential to penetrate facilities of interest." This is an incorrect statement. Helicopters are prohibited from operating over the Pantex Plant at altitudes of less than 4800 ft MSL. They are free to overfly the plant at higher altitudes. Further, some helicopters operate at extremely high weights and flight speeds. For example, let me submit the Sikorsky MH-53.
PC-021/8; 15.010	E.3.1.2	There is a typographical error in which the Saab SF340 is referred to as the SF34.
PC-021/9; 15.011	E.3.1.2	What category of operation do test flights by aircraft from the modification and maintenance facilities at Amarillo International Airport fall under?
PC-021/10 15.012	E.3.1.2	RAMS data from 25 days in May 1995 were used to determine the spectrum of overflights on each high-altitude jetway. Since this data is recorded by computer, why was the sample only 25 days? What was the reasoning behind the choice of May 1995? Was this period truly representative, or was this selection made as a means of weighting a particular result? Seasonal changes in both air traffic and preferred routings could result in different answers.
PC-021/11 15.013	E.3.1.2	Are stated distances to airways the distances to the airway centerline or to the edge of the airway. In general, federal airways extend 4 nautical miles to either side of the centerline. As they are defined by the VORTAC's, at some distances they may be somewhat wider than this minimum value.

PC-021
PRIVATE CITIZENS

	SECTION	COMMENTS
PC-021/12 15.014	E.3.1.3	All commercial operations from Runway 04 were assumed to be bound for Dallas on the 105° airway. What about test flights from the maintenance and modification facility located Amarillo International Airport?
PC-021/13 15.015	E.3.1 4	Again, I am surprised that the value of γ for military aircraft, particularly the small sub-category is lower than that for air carriers. Again, combat and training aircraft tend to have a higher accident rate than airliners.
PC-021/14 15.016	Table E.3.1.4-2	General Aviation Turbojet wingspan is too small. Examples of up to 90 feet are easily found - especially in the ranks of new products.
PC-021/15 15.017	Table E.3.1.4-2	Airliner landing skid distance is given as 1860 feet while general aviation turbojet landing skid distance is quoted as 37 feet. The landing speeds of both classes of aircraft are comparable so the skid distance must be treated as comparable. In fact, any general aviation aircraft that only skids 37 feet must have either been moving very slowly or impacted something very solid. With a 15° impact angle, this is unrealistic and misleading.
PC-021/16 15.018	Table E.3.1.4-7	Impact velocities stated in table are unrealistic. A general aviation turbojet moving as slowly as 152 ft/sec (90 knots) is indeed in serious trouble. These aircraft are fully as fast as airliners and many military aircraft. If an airliner can impact the facility at 422 ft/sec (250 knots), it must be assumed that general aviation turboprops and turbojets can as well. These aircraft are certified to the same regulations (FAR Part 25) as air transports and tend to operate in a similar manner.
	Table E.3.1.4-11	See comment on E.2
	Table E.3.1.4-12	See comment on E.2
PC-021/17 15.019	E.3.1.5	Similar comments to those in E.3.1.4.
	E.3.1.6	Stated probabilities for damage exceed guideline maximum by 2 orders of magnitude.
	E.3.2	No Comment
	E.3.2.1	No Comment
	E.3.2.2	No Comment
	E.3.2.3	No Comment
	E.3.2.4	No Comment
	E.3.2.5	No Comment
	E.3.3	No Comment
	E.3 4	No Comment
	E.3.5	No Comment

PC-021/18 15.020 As you can see, there are still a rather large number of inaccuracies in the analysis. I recognize that the Aircraft Accident Analysis has been performed in accordance with the guidelines presented in the Draft DOE Standard, "Accident Analysis for Aircraft Crash into Hazardous Facilities", however, it is my contention that this methodology itself is still lacking in a number of areas.

PC-021/19 15.021 I cannot dispute the contention that the likelihood of an aircraft crashing into a facility containing nuclear material is remote. My question for you now is "What if the unlikely happens?" If a light aircraft impacts an earth berm-protected igloo after sliding off most of its speed, the answer is most likely, "Nothing." Alternatively, if the aircraft is large and/or impacts the structure at a high velocity, the potential exists for a catastrophe of tremendous proportions.

PC-021/20 15.022 Moreover, the analysis only predicts the probability of and partial damage potential of an accident. No attention is given to the scenario of an intentional crash into the facility by a suicidal pilot. Where once this would have been unthinkable, the events of recent years have shown that the unthinkable can and does happen. After all, who would have anticipated the bombing of the World Trade Center, the bombing of a federal office building or the suicide of a distraught student pilot by crashing his airplane

PC-021
PRIVATE CITIZENS

PC-021/20 15.022 continued into the White House. As I pointed out in my comments on the Aircraft Accident Analysis, the prohibited airspace over Pantex extends only up to approximately 1200 ft above ground level. Under these circumstances, even basic single-engine general aviation aircraft beginning at a cruising speed of 90 knots (152 ft/sec) can go from legal flight to being imbedded in a hazardous facility in less than 8 seconds. There is simply no way to stop such an attack without undue danger to all air traffic in the area.

PC-021/21 15.023 Further, the recent ValuJet accident in Florida leads me to raise the question of emergency use of the runways at Amarillo International Airport. The proximity of Amarillo to the major East-West routes and the availability of an extremely long runway makes for an attractive option in the event of an inflight emergency. In such an event, an aircrew is permitted to waive all regulations in the attempt to perform a safe landing. With the prevailing southerly winds, and the location of the Pantex plant, the chances of an aircraft making an overflight of the hazardous facilities while already in a degraded state are extraordinarily high. Will the facilities at Pantex swallow and contain a crashing airliner as effectively as the Florida Everglades?

PC-021/22 15.024 The presentation of pages of probabilities does little to address the "What ifs" of the hazard presented by normal aircraft operations in the vicinity of hazardous facilities. Perhaps of more importance, these probabilities do nothing to address the possibility, though remote, of malicious intent. Further, normal aircraft safety analyses tend to address only the hazard to the aircraft and its occupants, with some consideration given to the event that injury might occur if the aircraft or its components strikes individuals on the ground. It is important to note that only limited damage to other than the aircraft itself is addressed. In the event that an aircraft hits and perforates a facility containing fissile material for nuclear weapons the potential for damage is not limited to the immediate vicinity. In this case, we are dealing with the potential for widespread impact, including regions far downwind of the accident site.

If I can be of any assistance, please do not hesitate to contact me at home or through my parents, Jim and Jeri Osborne.

Regards,

Mike Osborne

cc Jay Rose
Thomas F. Williams

PC-022/1
23.039

I would like to request you hold public hearings in albuquerque on the Part of Storage of nuclear weapons components as our city is one of the possible cites.

I especially think it is foolish, unhealthy and a danger to place nuclear weapons or components in a large metropolitan area such as albuquerque with 600,000 people.

Sincerely,
Bob Anderson

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PC-023
PRIVATE CITIZENS

PAGE 1 OF 2

P.O. Box 4734
Star City, WV 26504

June 20, 1998

Ms. Nanette Founds
U.S. Department of Energy
Albuquerque, NM 87185-5400

Dear Ms. Founds:

PC-023/1 23.038 Having reviewed the Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage, I have a few comments. First of all, I appreciate that this report has addressed many concerns expressed by citizens groups with regard to previous reports. The writers and compilers of the report should be complimented on their efforts in this process.

PC-023/2 06.046 With respect to water resources and water quality, I understand that groundwater and surface water contamination has been attributed to past activities at Pantex Plant. Heavy metals, solvents, etc. found in excessive concentrations in the perched groundwater can be linked to poor disposal practices in the past, and improved waste handling should limit future contamination. However, since soils in recharge areas (including playas and ditches) are contaminated, the contaminants can continue to move to the perched aquifers. I am concerned about the quality of water in some relatively shallow domestic wells in the vicinity. Your report states that at least two domestic wells draw water from perched groundwater.

PC-023/3 06.047 Also, it is possible that the water in the perched sources can move to the Ogallala aquifer. The hydraulic gradient of the Ogallala in the vicinity of Pantex indicates well drawdown under Pantex Plant toward the City of Amarillo well fields in Carson County northeast of the plant. In other words, contaminants that leach to the Ogallala under Pantex will likely move toward the wells supplying water to the City of Amarillo. The City of Amarillo has pledged up to 1,460 million gallons per year to Pantex Plant, up from the 221 million gallons used in 1994. If pumping rates from these well fields increase, the well drawdown will increase, thereby increasing the hydraulic gradient and increasing the rate of movement of these contaminants toward the city's water supply.

The Ogallala aquifer is a mined aquifer, meaning that the rate of water removed by pumping exceeds the rate of discharge. While agricultural irrigation is the largest "user" of the groundwater in the area, it is distributed over the entire aquifer, rather than from a relative small "point sink", such as the Pantex and City of Amarillo well fields. Also, many farms have been converted to dryland operation, because of the dropping water table in the aquifer and high energy costs associated with pumping.

PC-023
PRIVATE CITIZENS

PAGE 2 OF 2

Many other farmers have adopted more efficient irrigation technologies which conserve water and reduce energy usage and the associated costs.

PC-023/4 08.001 The EIS reported that risks to the public from acoustics and natural seismic activity are low. However, the report does not address structural damage to homes and buildings on and off site of the plant that have occurred due to explosions. One home off site of the plant suffered significant damage to its foundation, walls, roof supports, and plumbing as a direct result of a planned explosion at Pantex Plant.

PC-023/5 03.006 The "shock" energy from the explosion which caused the damage is similar to energy associated with acoustics and seismic activity. I hope that the Department of Energy has thoroughly inspected buildings on site which have been subjected to such energy from explosive testing over many years of Pantex Plant operations. Structural integrity of Pantex Plant facilities, especially storage locations for Plutonium pits, is extremely important to the safety of Pantex employees and area residents.

I appreciate the opportunity to express my concerns with respect to continued operation of Pantex Plant and associated nuclear component storage.

Respectfully,

Dana Porter

Dana Porter, P.E.
Agricultural Engineer

June 20, 1996

Vernon J. Brechin
255 S. Rengstorff Ave. #49
Mountain View, CA 94040-1734
(415) 961-5123

Ms. Nanette D. Founds
Pantex EIS Project Office
U.S. Department of Energy
Albuquerque, New Mexico 87185-5400
(505)845-4212

Topic: Public Comments on the Pantex Draft EIS

Dear Ms. Founds:

Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, located in Carson County, Texas (DOE/EIS-0225) (Pantex DEIS).

SUMMARY

PC-024/1 22.015 — p. S-4, right column, "Assembly of Nuclear Weapons," 11th line.
Remove the word "classified" since virtually all the components in the "physics package" are classified. Check the DOE book "Drawing Back the Curtain of Secrecy" "Restricted Data Declassification Decisions 1946 to the Present" (RDD-3) - January 1, 1996. Your description should also mention the D-T Tube neutron generators.

PC-024/2 22.016 — Throughout the EIS replace the word "staged" with the word "stored."

PC-024/3 01.020 — p. S-7, left column, "No Action Alternative," 2nd paragraph, 5th line.
The construction of the Hazardous Waste Treatment and Processing Facility should not be excluded under this alternative. Proposals, which make the No Action Alternative unreasonable under NEPA, should not be included.

p. S-7, left column, "Relocation of Interim Pit Storage Alternative"
I believe that this is the best Alternative, and I choose the option of storing 20,000 pits at the Manzano Weapons Storage Area, Kirtland Air Force Base. This area has an existing, large construction and security infrastructure along with a long history of safe weapons storage. This location would serve as a good final pit storage area as the Pantex operations wind down. Transportation to Albuquerque is quick and straightforward.

PC-024/4 14.088 — p. S-9, right column, top of 3rd paragraph.
I suggest that the release of chlorine gas, as the dominant accident scenario, may not be accurate. If the Pantex plant was targeted in a terrorist attack, that could prove to be much worse. Another point, is that the chlorine accident

2

PC-024/4 14.088 continued — may have been considered for a 10 year period, but the plutonium-239 will remain a hazard for over a quarter million years.

PC-024/5 02.014 — p. S-10, right column, "RELATED NATIONAL ENVIRONMENTAL POLICY ACT STUDIES"
The Pantex FEIS should reflect delays in other EIS such as the SS&M PEIS and the NTS EIS.

PC-024/6 02.015 — p. S-13, left column, boldface.
The title and the DOE control number for the NTS EIS should corrected to reflect changes that were made over six months ago.

PC-024/7 02.016 — p. S-13, right column last three lines.
This statement should indicate more than the existing waste connection. It should mention the proposals to store plutonium-239 pits there.

Main Pantex DEIS Volumes

Section 5.2 NEVADA TEST SITE

PC-024/8 04.006 — p. 5-3, left column, "The Nevada Test Site," 3rd line.
Change the word "owns" to "operates."
Change 350,000-hectare to 322,195-hectare and change 864,000-acres to 796,160-acres. The later values are the legal values.

PC-024/9 03.004 — p. 5-3, left column, last line.
The Final Pantex EIS should clearly explain the real reasons for the existence of the DAF and the P-Tunnel complex. The $100 million Device Assembly Facility was designed and constructed in anticipation of an expanded nuclear explosive testing program at the NTS. It was intended to be the assembly point for the nuclear explosive devices. Since our nuclear test moratorium went into effect in 1992, its primary mission ended about 3.5 years before it was completed. It is now being used to assemble nuclear and non-nuclear devices which involve large amounts of high-explosives. The Pantex DEIS does not address any compatibility problems associated with pit storage and high-explosive assembly work at the DAF.

PC-024-10 03.005 — The P-Tunnel complex was constructed for the Defense Nuclear Agency's (DNA) nuclear explosive test program which also ended in 1992. The tunnel complex was an alternate, and often much more expensive, way of performing underground nuclear explosion tests. Cost per test were often in the range of many tens of millions of dollars. Several DNA nuclear explosives test were conducted in this tunnel complex. Page 5-7, Figure 5.2-3.--Layout of P-Tunnel at the Nevada Test Site., contains a drawing of the existing complex. This map drawing should point out the locations and names of the nuclear test waste cavities. This, or a updated version of this map, should indicate where, in the vast tunnel complex, the proposed pit storage would take place. The Pantex DEIS makes no mention of where, in

PC-024/10
03.005
continued

the many miles of tunnels, the pits might be stored. The NEPA FEIS should provide such information.

PC-024/11
02.017

p. 5.6, left column, 3rd paragraph.
It mentions that "[t]he P-Tunnel is also being proposed for the long-term storage and disposition of weapons-usable fissile materials." The folks at the NTS are trying to sell the use of limited tunnel space for two different purposes at the same time. It is unlikely that it will be used for both purposes and therefore the competing EIS purposes need to be addressed.

PC-024/12
15.043

p. 5-10, left column, Section 5.2.1.12 Aircraft Accidents, 1st paragraph.
Though the airspace is now highly restricted, due to the past nuclear testing program and the activities of the surrounding U.S. Air Force's Nellis Air Force Range (NAFR). this may not remain so if there are major changes in the operating status of these facilities which are now under review in respective EISs.

PC-024/13
14.089

p. 5-11, Table 5.2.2.1-1.--Major Sources of Radiation Exposure in the Vicinity of the Nevada Test Site.
This table should be removed because it contains unnecessary information and is highly misleading in other respects. The term "Vicinity" can, and is likely to, refer to areas which are dozens of miles from the test site and up-wind of the test areas that are at the far side of the vast test site.
Under the heading "Other Sources," is "NTS - environmental radioactivity," which is shown to be at least 1,000 times less than any other source including global "Weapons test fallout," of which, the NTS was one of the primary sources.
This EIS was supposed to conform with all the requirements set forth in the "Code of Federal Regulations," Title 40, Chapter V, Part 1500.
"Agencies shall insure the professional integrity, including scientific integrity of the discussions and analysis in environmental impact statements" (40 CFR1502.24).

PC-024/14
06.045

p. 5-12, left column, "Impacts of Facility Upgrades," last five lines.
No mention is made, in this report, concerning the radioactive tritiated water that drains out of some of the tunnels and collects in ponds outside the tunnel entrances. Nor is there any mention of the possible collection of gaseous radionuclides, in the tunnels, that could originate from the waste in the expended test cavities.

PC-024/15
14.090

p. 5-17, left column, 1st line.
Though such an incident may result "...in no significant short-term radionuclide releases to the exterior environment" the next quarter million years might tell a different tale. The mitigation analysis, of such an event, should not be left to whatever kind of society follows us.

PC-024/16
04.007

And finally, I should mention that all the maps of the Nevada Test Site, that are presented in this document, need to be corrected before the Final Pantex EIS is issued. The maps should show the block of land that was withdrawn under Public

PC-024/16
04.007
continued

Land Order 1662, that was to be used in connection with the NTS (23 FR 4700).
A proper map of the test site can be found on page 4-10 of the "Draft Environmental Impact Statement for the Nevada Test Site and Off-site Locations in the State of Nevada" - January 1996 (DOE/EIS 0243).

-END- of my comments.

Sincerely,

Vernon J. Brechin

Vernon J. Brechin

cc: Mike Jansky - EPA Region 9

Pantex EIS

To Whom It May Concern
(1-800-822-5499)

July 5, 1996

From L.B. Thomas LT
3409 Pickard Ave, NE
Albuquerque, NM 87110

Subject: Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage Comments

Thank you for the opportunity to comment. I wish to present the following comments:

Thank you for the extra time to review the document. I would like to again request SSM and S & D add more time to their respective comment periods. Since the site wide was given three months, the PEISs should have at least 180 days to a year. They are far more complicated. Is DOE afraid?

Please respond as appropriate to my comments submitted to the SSM and S & D programs. Of particular importance are pit storage issues, non-proliferation issues, and future stockpile issues effecting Pantex operations.

Thank God one DOE site is not a National Environmental Research Park (NERP) or my personal favorite National Environmental Research Disaster Site (NERDS).

PC-025/1
23.051

In general, I do not understand how this EIS and its proposed action, no action, and alternatives meets the intent of NEPA. Please explain how this 2000, 1000, & 500 level analysis meets the intent of NEPA. I believe the levels are not different enough to analyze, please comment. Plus don't the impacts at 2000 cover 1000 and 500 levels, please comment on this issue. Please explain why an EA or supplemental EIS aren't more appropriate. Please provide a technical response including regulatory citations detailing why this EIS meets the purpose of NEPA when the alternatives are so similar? Should the analysis look at one level of activity and then limit detailing the what ifs at higher and lower levels if necessary. This would possibly reduce the size of the document by 50 percent.

PC-025/2
23.052

On Page 1-14 in the second column in the last paragraph. If the decision will be based on cost, technology, national security, and infrastructure considerations, which documents covering cost, technology, and national security will be used? This implies the decision maker will use the information to make the decision without public comment, does that meet the intent of NEPA? Will they be available

PC-025/3
03.008

to the public? Do the documents exist? When will these documents be completed? Why is infrastructure included in environmental impacts and as an additional consideration? Like my comments on SSM and S & D, if national security and nonproliferation so important why aren't the environmental impacts discussed in the infrastructure section as a capability, assets, problem, etc. in this document, please comment. SSM and S & D the environmental impacts of national security and nonproliferation, please comment. Does Pantex out perform its alternative sites on these issues? If so the decision maker needs to know to make a reasonably informed decision, please comment. Why isn't security capabilities addressed in infrastructure impact analysis so impacts can be reviewed and decide a true course of action? DOE should consider redoing infrastructure analysis to include security related environmental impacts.

PC-025/4
13.022

On Page 1-16 in column two in the first paragraph. What is the definition of abnormal? Is the chance of a similar accident greater than 1 in a million? If not, I would argue with DOE risk numbers that the incident is not abnormal. For consistency use risk assessment language for "abnormal." "Abnormal" means nothing. Use unlikely, extremely unlikely, etc. If this incident occurred, what calculations prove the event is abnormal? What number of similar operations were completed before the event occurred? How do you justify orders of magnitude difference between theoretical and actual experience, if one

1

Pantex EIS

PC-025/4
13.022
continued

exists? Why does the WM PEIS identify Pantex as a TRU waste generator (see appendix) if Pantex is "Abnormal?"

PC-025/5
22.028

In section 1.8 on Page 1-19. The US Justice Department and EPA (as Agency Consultations) should be consulted under the *Resource Conservation and Recovery Act* on issues raised in my SSM and S & D comments. Of interest why stored Pu at Pantex are not considered solid waste as defined in 40 CFR 261.2 (a)(1), (a)(2), (a)(2)i, (a)(2)ii, (a)(2)iii, (2)(b), (2)(b)1, (2)(b)2, (2)(b)3, (2)(c), (2)(c)(1), (2)(c)(2), 2(d), or 2(e). Why open burning of HE is not RCRA treatment? When does stored Pu meet the definition of land disposed (stored) as a solid waste? Why not if "accumulated speculatively", "inherently waste-like", scrap, dispositioned, recycled, studied, or burned? What would be the environmental impacts if stored plutonium meets the definition of a solid waste? I consider this a reasonable impact.

On page 3-2 in column one, in paragraph one. "The 500 weapons level represents the minimum level of activity required at Pantex Plant to maintain all of its mission capabilities" If this is true why does SSM look at a smaller number? Which EIS is accurate? The above statement is clear in stating both "500" as the minimum for "all" missions. Is the above statement an overstatement of the facts? This goes back to my other comment, that this EIS's alternatives and analyses are not real and do not meet the intent of NEPA, please comment in context of proving this EIS meets the intent of NEPA.

The Alternatives box on page 3-2. What are the possible management loop holes in the 12,000 number? See table 4.12.1.1-1 where shipments don't add up. Does this only count pits in Zone 4? Pits in partial disassembly stored as non-pits? Pits in Zone 12? Pits being dispositioned? Pits being staged? How hard is the 12,000 number?

PC-025/6
22.029

The sixth dash on Page 3-3. Why aren't HE components regulated by RCRA before burning? If I burn an experimental battery that contains lead and explosives but is a proprietary secret of my company is that RCRA treatment? Request consultation with EPA and the US Justice Dept on the response.

PC-025/7
01.033

The first two bullets in the second column on page 3-3. Where are security and nonproliferation activities? They are routine correct?

Page 3-5. Should the source appear right side up in the bottom right corner?

PC-025/8
01.034

On Page 3-7 in second column in the second paragraph. It appears a loop hole exists for DOE in dealing with the backlog of stored pits. If a container availability problem exists (like the FL container problem on F-2) DOE could store 20,000 pits without shipping one pit and not violate this EIS. What would be the hard number before DOE would stop dismantlement to put pressure on the transportation end? Lacking cans for shipment seems to make relocation alternatives unreasonable and thus not meeting the intent of NEPA, please provide technical justification. This EIS is flawed because the alternatives are not "technically mature" to use a DOE phrase found in SSM and S & D for rejecting analyses of alternatives. Lack of cans appears to be a reasonably foreseeable impact, please assess. The 12,000 alternative is not possible under this EIS.

PC-025/9; 01.035

On Page 3-8 last bullet of page. If shipping cans are lacking-why is 8,000 considered reasonable?

PC-025/10; 16.037

If weapons are shipped around the world without an AT-400A style container why does the Pu require a special container? Doesn't a weapon pose the greater risk potential?

PC-025/11
01.036

Three bullets in second column of page 3-8. The rational contains several fatal flaws. The ability which includes past performance in securing Pits, nonproliferation, and a safe and reliable stockpile should have been considered in qualifying the sites. Please reassess sites based on these new criteria. Please remember when addressing this comment DOE stated to great length how vital DOE's missions regarding nonproliferation, security, and a safe and reliable stockpile were. What is the National Academy of Sciences' position on plutonium storage?

2

PC-025
PRIVATE CITIZENS

PC-025/12 03.009 | On Page 4-11. What level of security is the burning ground, zone 10, and firing sites under? The nonshaded area of DOE owned property is under what level of security? The DOE leased property shading is not found in the legend-what level of security is this?

PC-025/13; 03.010 | Page 4-16. Should it be waste management activities' utilities?

PC-025/14; 03.011 | Page 4-18. Why Pit Storage Activity? Section 4.4, 4.5, etc. use Activities. In Waste Management Activities. Why no discussion about RCRA Closures?

PC-025/15; 03.012 | Page 4.18. Why Environmental Management? Section 4.4, 4.5, etc call it Environmental Restoration?

PC-025/16; 03.013 | Page 4.16 uses Environmental Restoration. Should page 4-18 include closures page 4-16 does.

PC-025/17 03.014 | General comment in section 4.3. Question why isn't more presented about nonproliferation and sanitization and demilitarization in this section? Please include environmental impact analysis of these issues in the infrastructure section based on methodology definition on page 4-3 as a support requirement and SSM & S & D emphasis to the issues. How are nonproliferation and sanitization and demilitarization infrastructure effected by the varying levels of activities as required by methodology on page A-1? Is there a backlog? What are the environmental impacts?

PC-025/18 04.010 | General comment. Is Pantex zoned for agriculture, ranching, water utility, irrigation, treatment, disposal, industrial, residential...? Please analyze the above operations for zoning compatibility including this example: If the plant is not zoned for residential use does the fire department qualify as residential?

PC-025/19 04.011 | On page 4-22. Recommend detailing the location of schools and elderly meeting places including elderly care facilities. It seems to me children and elderly are sensitive areas. Also wetlands should be identified for the same reason. Like children and the elderly, aren't wetlands sensitive areas requiring analysis?

PC-025/20 14.193 | Since Pantex playas are points of recharge to groundwater, under an accident scenario would not 1000 playas in the ROI pose a significant pathway to the groundwater, please comment. If an accident occurred what is the maximum amount of Pu, risk to the public, and other impacts to the groundwater from the playa pathway? What is the impact if all groundwater in the ROI becomes contaminated with trace amounts of Pu? Where are the nearest dairy cows? Should that be discussed due to high risk pathway to small children?

PC-025/21 05.028 | On page 4-39. Drop figure and place more detailed maps in appendix. Recommend using an example map in its place and refer to the appendix. The figure is silly. Otherwise include the location of the ditches and groundwater for completeness. Where is a comprehensive list of titled SWMUs in this EIS?

PC-025/22 05.029 | On Page 4-51, Environmental Restoration Activities. Question, "completed by 2000" is not consistent with other statements in the document.

PC-025/23 05.030 | On Page 4-51, Waste Management Activities The burning ground is an open area where fumed materials including metals, radioactive elements, etc. are released to the atmosphere and settle to the ground in the form of dust, water vapor, etc. and you state you do not expect impacts to the soil. How can that be, please comment. What is the representative contaminant deposition rate to the playas and burning ground? Does HE explode while being burned and chunks of things get spread about? Is it possible pieces sit around for years? Further, you state on page 4-52 the material is typically nonhazardous, how did the burning ground get contaminated? Please state you do not know or what the facts are. Page 4-52 what is the source of the table?

PC-025/24 06.069 | On Page 4-56 Buildings listed do not appear to match diagram on page 4-243? Figure appears to be crowded with information. Recommend simplification.

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PC-025/25 06.070 | On Page 4-60. Please explain. If a playa is a wetland, then a wetland is considered waters of the United States then why is a playa not waters of the State?

PC-025/26 06.071 | In section 4.6 a general comment. Do the number of wells located on the Pantex site represent significant pathways to increased groundwater contamination? What measures are taken to control this pathway? In the event of a Pu accident what is the possibility that the well is open and Pu enters the groundwater through the monitoring system? Assuming the well was open during an accident what is the release to the groundwater. What is the impact if Pantex loses groundwater usage? Adjacent land owners.

PC-025/27 06.072 | On page 4-63 why was OW-WR-20 utilized in cross section when the cross section should go from 6-1003 to 6-1004 to 6-1005? Why was 6-1015 left out? What are the impacts if these wells are utilized? What is the quality of the hydrostatic cross section input data (i.e. well logs)?

On Page 4-64. Why is the source upside down?

PC-025/28 06.073 | On Pages 4-66 and 4-67. Why did you change nomenclature on PM-21 (4-66) and OW-WR-21 (4-67)?

PC-025/29 06.074 | On Pages 4-66 and 4-67. Why isn't well PXSP-01A, PXSP-03, PXSP-04, etc listed in appendix C, table C.2.1-1? What level of QA has been completed on this section? Please include QA/QC certification documentation in appendix including signatures of key QA/QC personnel. Please provide documentation assuring QA/QC measures were implemented, met established goals, and necessary certification exists.

PC-025/30; 06.075 | Page 4-67. Why are wells off the Pantex Plant lacking well numbers?

PC-025/31 06.076 | In Table 4.6.1.2-1 on page 4-68. What is the reason the realistic estimate is an order of magnitude larger than the most conservative?

PC-025/32 06.077 | See Page 4-69. What is the source of the statement "These perched zones are believed to be hydraulically separate from the perched aquifer in Zone 12 at Pantex Plant?"

PC-025/33; 06.078 | And Page 4-69 in Ogallala Aquifer section. Vicinity of ROI, more accurate?

PC-025/34 06.079 | Also Page 4-70. Why aren't wells OW-WR-23, & 28 listed in Table C.2.1-1? Does OW-WR-40 leak water to the perched from the contaminated Playa 1? Is OW-WR-40 above or below the floodplain? Are any of the well heads located in the Pantex plant or vicinity below any floodplain? What are impacts if there are?

PC-025/35 06.080 | Page 4-76. I'm confused, how can a zone be a source but a landfill is a location? What does 12-SW, etc mean? What is OSTP?

PC-025/36 06.081 | Appendix C is difficult to review in support of section 4.6 because, DOE flip flops the nomenclature for well numbers. As an example table C2.1-1 well ID as 15-20 but C.2.2-3 as PR-16, please standardize. Page 4-77 isn't it three wells for lead: PR-16, OM-39, and PR-41?

PC-025/37 06.082 | Page 4-78 What is the source of the 704 million liters? What is the source of the 760 irrigation wells? What is the source of the two private wells? Do you suspect more? What would be the impact of more perched wells?

PC-025/38 06.083 | Page 4-79 "the quality of the wastewater discharge is such that it will not degrade..." What is the source of the statement? Please explain position in greater detail. Doesn't the playa carry contaminants to the Ogallala? If (regionally) perched water is used to supply cattle with water, would WWTP water be used as cattle drinking water. If not, how can the above statement be true?

PC-025/39; 06.084 | Table 4.6.2-1, are margins included? Why is the liter conversion included?

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PC-025/40; 06.085 | Table 4.6.2.2-1 and Table 4.3.2.2-1 have different sources?

PC-025/41; 06.086 | In section 4.6.2.2 starting on page 4-81. What are sources of water use in each of the 6 projects?

PC-025/42; 07.014 | Page 4-94 The Target Range is were you explode nuclear devices?

PC-025/43; 07.015 | See Pages 4-96, 4-99. What are the Sources of the information in the tables?

PC-025/44 07.016 | General comment section 4.7. Poor QA/QC of data has occurred in Appendix B supporting section 4.7. Examples included below of showing incorrect data are as follows: page B-44, chromium, 45.4kg, 1000, 1hr; page B-44, chromium, 363kg, 1 hour; page B-45, cresol, 1000, annual, #11; page B-45, cresolic acid, annual, #11; page B-46, ethyl benzene; page B-48, HF, 363kg, 24 hour, #3; page B-49, ketone, 363kg, annual, #8, # 10; ketone 363kg, 1 hour, #2; Page B-50, methylene chloride, annual, #2; page B-50, naphthalene, 45.4kg, 1 hour, #5; page B-51, NO2, 45.4 annual, is totally incorrect; page B-51, NO2, 363kg, #1, #2, #5, #9, #11; page B-51, NO2 BGU, is totally incorrect. page B-52, toluene, 500, 1 hour, #10; page B-52, trichloroethylene, annual, #8, #9, #10, #11.

These are only examples determined by visual inspection of data presented in appendix B not actual calculations. What level of QA/QC was completed? What level is required? Please provide QA/QC documentation including signatures assuring certification of data quality. What proof does DOE give that the analysis is of good quality? I believe DOE will blow off my comments in SSM, S & D, and Pantex projects regarding QA/QC. I believe I am presenting evidence that the QA/QC is technically substandard-prove I'm incorrect.

PC-025/44; 07.016 continued | Virtually every page of the table is incorrect to some degree. Is SSM and S & D data flawed? Other EISs?

PC-025/44; 07.016 continued | Table B.4.1-1 has numerous concentrations reported with identical roots but orders of magnitude difference. This is highly unlikely and points to poor QA/QC. Cresol residence #1 is in error. HF exponents are in error. Ketone exponents are in error. Lead is incorrect in the 3rd quarter.

PC-025/45 07.017 | Request extra public review time due to poor quality.

I am concerned the input data to the modeling is questionable due to errors noted in tables above. What assurance does DOE provide to certify input data is accurate? What methods were used to qualify input data? What QA/QC documentation exists for input data? Specifically, what level of quality exists for estimated emissions rates?

PC-025/46; 07.018 | General comment for section 4.7. Tables lack sources.

PC-025/47; 07.019 | Page 4-112. Please explain why the paper incinerator listed on page B-17, the wastewater treatment facility's SOx, and landfill activities PM10 are not included?

PC-025/48; 08.003 | Page 4-125, what are the impacts to animals especially birds as a result of these detonations? aren't detonations generally used by construction industry to chase off nesting birds?

PC-025/49 09.012 | Table 4.8.1.3-1, what is the impact to a human without ear protection over a 1/4 mile range? A lifetime for residents?

PC-025/50 09.013 | Section 4.9. Given the semi-arid climate, what impacts have occurred as a result of fires in the recent past? If fires have occurred in the past why isn't it included in the affected environment? Does Pantex use controlled burns to control vegetation? What is the impact? Does the plant dredge the playa systems? What is the impact? Is there a need to dredge in the near future?

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PC-025/51 09.014 | Page 4-139. There appear to be more than five playa lakes in the vicinity of Pantex Plant see page 4-56 of this EIS. Pratt Lake, Pantex Lake, and several to the north and south of the site, please comment. Page 4-142. Pit Storage Activities. Please describe non-adverse impacts to biotic resources.

PC-025/52; 09.015 | Page 4-142. ER activities. ."..would not considered significant." ?

PC-025/53 09.016 | Page 4-142. Waste Management. ."... will have a long-term beneficial impact on plant and animal species?" Landfills and an open burning activity that fumes metals and radioactivity are considered beneficial? Please provide documentation supporting statement. Any direct impacts to non-threatened, non-endangered species or non-wetlands? Please provide documentation supporting position.

PC-025/54 11.047 | Page 4-155. Given the fact that this is 1996 and the section uses 1990 data, has a significant change occurred in population since 1990 and the socioeconomic parameters to warrant estimating the affected environment closer to 1996 timeframe? How many visitors to Amarillo are there each year? Is that important? If I-40 closes due to Pantex accident, what are the impacts to East/West Interstates?

PC-025/55 12.022 | Page 4-174 According to table 4.12.1.1-1 Pantex is stockpiling nuclear explosives or pit components in Zone 12. Please comment since interzone transfers don't balance.

PC-025/56 12.023 | Page 4-174 In the magic numbers of 12,000 and 20,000, what is the maximum number of pit components that would not be included in the storage limits but would be managed in Zone 12 but not considered in storage under the definition of storage? Is this discrepancy accounted for in the analysis? Will these pits be in AT-400 containers? If a shortage of AT-400 containers exist would there be greater risk in Zone 12 management?

PC-025/57 12.024 | Page 4-174 Has the analysis accounted for the aging of pits and aging of containers? If Pantex has pits from the fifties, forty years of material fatigue from the radiation, thermal, handling, and other adverse environmental conditions must be enormous. Has DOE accounted for this?

PC-025/58 12.025 | In the Zone 4 West Activities section on page 4-181. DOE estimates 20-22 containers would be removed for surveillance activities. Should a problem become evident, what is the maximum number of surveys possible? What are the impacts? Was this considered?

PC-025/59; 12.026 | Page 4-182 What is a small number? Several magazines?

PC-025/60 12.027 | General comment in section 4.12. The tritium accident caused quantifiable radiological impacts to plant personnel, facilities, environment, and public. For comparison purposes, please compare tritium accident with intrasite transportation impacts. What is the maximum impact to plant personnel, facilities, environment, and public from tritium storage at Pantex? Has the explosive damage potential of stored tritium been evaluated?

PC-025/61; 12.028 | See Section 4.12.2. Since table 4.12.1.1-1 does not balance where are the impacts to storage activities in Zone 12 from pits, CSAs, and tritium?

PC-025/62; 12.029 | General question. What are the continuing impacts to transportation workers resulting from past tritium accident?

PC-025/63; 13.023 | See Section 4.13. Why only to 1994 for data? DOE reports annually correct? Status of permit modification? What impacts are expected? What is status of EPA CERCLA negotiations?

PC-025/64; 13.024 | Table 4.13.1.2-2 Why no margin for ER wastes? ER wastes are the most unpredictable!

PC-025/65; 13.025 | Table 4.13.1.1-2 In SSM and S & D the number of burning ground facilities is expected to be reduced to one. Are the 9 trays and 3 pans expected to be closed in the near future like the cages and pits?

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PC-025/66; 22.030 | General question section 4.13. Are pits a solid waste?

PC-025/67 22.031 | On Page 4-193. Is demilitarization and sanitization of weapons components RCRA treatment? Are classified weapon components that cannot be demilitarized and sanitized sent to NTS a solid waste? What is meant by declassified versus demilitarized and sanitized?

PC-025/68; 13.026 | In sections mixed waste and hazardous waste on page 4-193. Where is all the explosive burning waste noted in section 4.7 and table 4.13.1.1-2?

PC-025/69; 13.027 | Page 4-199. How accurate is the 1.45 factor? Why doesn't table 4.13.2.2-1 contain a margin?

PC-025/70 13.028 | Page 4-202. 14,000 LLW shipments over 20 years? That's 700 a year, almost 3 shipments a week not including weekends. Is DOE hiding waste at Pantex, the numbers presented in tables 4.13.1.2-1 through 3 don't show this to be true? DOE is considering a landfill for at most 2,500 cubic meters over 10 years. That's stupid! Why don't you landfill the NHW around 13,000 cubic meters over 10 years. 18,000 shipments of HW over 20 years? That's 900 a year, almost one shipment every day not including weekends. Is DOE hiding explosive wastes? DOE should think about a hazardous waste landfill for the 2,000 cubic meters over ten years.

PC-025/71; 14.143 | Page 4-205, isn't it more accurate that the majority of Pantex Plant workers receive no detectable (or observed) radiation exposures ...

PC-025/72 14.144 | Section 4-14. What's the big deal with the analysis? The death rate for us all is 100%. In the event of a serious accident resulting in deaths, shortened life spans, loss of the Ogallala, loss of agriculture, or other damages what are DOE's commitments to citizens of Amarillo (and others) for the damages. Is the answer "Nothing it was an act of god, war, the contractor was at fault?" I am serious when I ask this question-What are DOE and its contractors commited to should something go wrong? The people in Amarillo should know as well as the rest of us. Please don't answer the question with safety policy BS, legalese, etc. I want the answer to make the lawyers hurt a little bit from sticking their collective necks out. 100% restitution? What the country can bare? What the lawyers can squeeze out? What the politicians can get? We the People will do what is right, just, and in the finest tradition of America? What is the insurance?

PC-025/73 14.145 | Table 4.14.2.1-2's Frequency of Scenario uses carefully chosen words like Anticipated, Unlikely, etc. Please include the mathematical representation in the table (e.g. 10^{-2}) for the purpose of improved clarity. Please explain where the risk of a tornado is in table 4.14.2.1-2? Where is a lightening strike event? It is a well known fact that one is more likely to be hit by lightening than winning the lottery. Isn't a release of mercury likely? What about an accidental shooting? What is the risk of an employee being killed by an automobile on site? Where is electrocution of an employee or a construction worker? What about confined space entry problem?

PC-025/74 14.146 | Page 4-223. Should consider the Annual Risk to be calculated for the Texas Panhandle, I believe that is more representative of the Pantex area. Also consider showing the Annual Risks for Oklahoma, New Mexico, and Kansas.

PC-025/75 14.147 | In Scenario 7 on Page 4-231 How many reservoirs (or what percentage) fail during the scenario? Does the hydrogen released explode (like the Valujet oxygen problem) and propagate? What is the inventory of sympathetic explosive, flammable, and combustible material in the adjacent buildings to the vault. Any weapons in the adjacent buildings that could result in a scenario 9 event? What about stored/moving to being stored pits that would be near the vault and result in a scenario 8 event? Would the damaged reservoirs react like missiles? Would this result in further release from other reservoirs? If the vault is breached are others killed due to the hydrogen gas fire and reservoir missiles? How many people would be killed by the concussion blast of the aircraft impact and flammable material explosions resulting after the crash? How many people are likely to be in the area? What documentation is available to prove all

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PC-025/75 14.147 continued | the tritium is not released in a massive explosion? The estimated number of tritium container breaches is consistent with plutonium container breaches resulting from an aircraft crash? Are the reservoirs designed stronger than the Pu cans? In the event of a total release of tritium in the vault, a scenario 8 event, and a scenario 9 event; what is the probability and the consequence (in curies and fatal cancer probability)?

PC-025/76; 14.148 | What is the concussion blast resulting from impact? What is the kill zone from the impact and the resulting fire? What is the number of plant causalities?

PC-025/77 14.149 | The eleven scenario analyses are flawed since it does not allow for multiple scenarios resulting from one initial event. As an example, many aircraft accidents involve two planes however this analysis looks at only one impact location. Further a plane could lose an engine, as it breaks apart, into a weapon magazine while the remainder slams into a pit storage facility. Aircraft impact into tritium vault resulting in damage to pit and or weapon being moved and in near vicinity of ground zero.

PC-025/78 15.079 | Doesn't Amarillo have an airshow with fly overs during high risk maneuvers? Was this accounted for? If the incident rate for an airshow is higher than the general aviation conditions set forth in section 4.16, how does DOE justify the current NEPA analysis meets the intent of NEPA. In the last ten years how many airshow (US and world wide) accidents have occurred relative to section 4.15 parameters in determining frequency of crashes? Assuming an airshow high velocity impact with at least two impact scenarios per year over the period of this EIS, what are the impacts to the public from releases?

PC-025/79; 15.080 | In Scenario 7 on Page 4-231 What is the maximum tritium release in curies? Why isn't a direct high velocity aircraft crash into the vault considered?

PC-025/80 15.081 | General comment section 4.15. The VORTAC serves no real purpose. A crippled plane goes where it wants to. What is FAA and DOE going to do if the only way to bring a crippled plane in is over the plant? Shoot the plane down?

PC-025/81 15.082 | I would argue the total number of yearly flight operations is incorrect. Because neither the number of satellites or the Space Shuttle operations are included. I believe satellites have a nearly 100% orbital failure rate. Thus, a high velocity satellite impact is reasonable.

PC-025/82 15.083 | Table 4.15.2-2 information seems impossible given the recent Valujet accident where the plane blasted through a limestone formation. If the impact forces of that plane were used in analyzing impacts at Pantex what would change? Was the maximum velocity used in determining damage? Velocity is squared in the force equation correct? The calculations on page E-19 are flawed by using slow moving aircraft. The LLNL report seems contrived to show the damage would be minimal by using the 70th percentile velocities turning takeoff or landing. NEPA requires you to assess reasonable situations. Since the probability of an aircraft crash is independent of the damage it causes. I would argue a high velocity impact of a massive plane is just as likely as a small plane at low speed, thus NEPA requires you to analyze the impact of the most damaging scenario, please comment.

PC-025/83; 15.084 PC-025/84; 16.038 | General comment sections 4.15 and 4.16 please provide information on the level of QA/QC defending the analyses of these sections. I would like the same information as requested on water and air quality sections of this EIS.

PC-025/85 16.039 | If the FL container is the only certified container available for shipment purposes, would DOE use the FL container to ease the 12,000 limit on Pantex if the AT-400A is not available? Is this a reasonable alternative requiring DOE to analyze the use of the FL containers to prevent a shutdown at Pantex?

PC-025/86; 16.040 | If the FL container is certified why doesn't DOE order more FLs for storage purposes?

Pantex EIS

PC-025/87; 17.015 General comment for section 4.17. What are the Minority and Low-Income areas by US congressional districts in the ROI? Does this show greater impact potential? What about by Texas legislature districts? Page 5-55 Materiel vs. Material?

PC-025/88; 24.004 References general comment. How many Information Document versions are there (i.e. 1995a, d, and h)? Why so many PCs? What does PC stand for? What does nd stand for? Is N441.1 correct?

PC-025/89; 24.005 References general comment. Why only CDRs as source? Nothing better?

Appendix A The entire EIS is flawed since few of the methodologies presented in Appendix A are
actually followed by the sections and most contain major flaws. The following examples are given by
resource section: Land Resources assessment methodology is flawed because it does not assess
PC-025/90; 04.012 decontamination and decommissioning programs, as stated. There is a flaw since no zoning analysis
exists in the analysis to prove or disprove incompatibility. Were is an analysis of the Deed? Geology and
soils methodology is flawed since it does not describe what the assessment process is for the assessment.
PC-025/91; 05.031 The section dictates what the impacts are. Thus DOE has prejudged the results. The assessment does not
address the decontamination and decommissioning program, as stated. Water resources methodology is
flawed since the analysis is based on examining permitted discharges of the NPDES system for which
Pantex does not have a permit (the permit is pending). Groundwater analysis is flawed since groundwater
quality within the ROI but the analysis does not include other industrial, commercial, petroleum
exploration (especially saltwater intrusion, and secondary recovery impacts), CERCLA and RCRA sites
PC-025/92 contaminating the groundwater. The analysis does not analyze the contamination of the groundwater by
06.087 underground storage tanks or agriculture nitrates. This information is readily available through the State
of Texas. Your methodology specifically calls for ROI analysis of readily available information. The
analysis is further flawed because of the lack of analysis of playas within the ROI. Finally the analysis
ignores the number of wells located in the ROI as potential contamination pathways to the Ogallala or
whether any of these wells resident in a floodplain. The analysis does not include ROI damage from
PC-025/93; 07.020 farming and livestock (e.g. nitrogen, pesticides, herbicides, insecticides). Air does not assess methane
releases from activities (oil, gas, and livestock industries) in the ROI. Air does not include SO2 releases
PC-025/94; 09.017 in the ROI. Biotic resources does not analyze the number of playas within the ROI. Accident analysis is
PC-025/95; 14.150 flawed because severe weather is not analyzed.

PC-025/96; 16.041 F-5, how many AT-400A containers are in existence? Does this pose a problem, please analyze?

PC-025/97; 16.042 F-19, Is it not reasonable that the most harmful event is a collision w/heavy truck resulting in a rollover and fire. It appears that the event tree is linear rather than dynamic. Thus the analysis overlooks the compounding effects and thus the maximum impacts

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Friday June 28/1996
FRANCES KELLER MATTHEWS
RT. 2 BOX 231 C6
LIBERTY, TEXAS
77575-9608

DEAR MS. FOUNES –

I AM GLAD TO HEAR THAT D.O.E. IS WORKING WITH UTILITY PHOTOVOLTAC GROUP AND SOLAR ENERGY INDUSTRIES ASSOCIATION. BUT I DON'T THINK STAR → SAVE TEXAS AGRICULTURE + RESOURCES KNOWS ABOUT THAT.

D.O.E. IS CHANGING AND CARING MORE THANKS TO S.T.A.R., STAND, PANAL, THE PEACE FARM, TX. NUCLEAR WASTE TASK FORCE.

PC-026/1
06.092

EVIDENTLY PANTEX CONTINUES TO USE OPEN, UNLINED DITCHES TO DISPOSE OF WASTE WATER + STORM WATER WHICH DISCHARGE INTO THE PLAYAS ON SITE + THEY ARE CONTAMINATED AND

PC-026/1
06.092
continued

THE OGALLALA AQUIFER CAN ALSO BECOME CONTAMINATED, THIS IS VERY SCAREY.

THE INTERNATIONAL COMMUNITY KNOWS THAT DRINKING WATER IS MORE VALUABLE THAN OIL COULD EVER BE.

I APPRECIATE STAR AND THEIR FINE WORK.

I APPRECIATE THE D.O.E. BECAUSE YOU CARE NOW.

I APPRECIATE THE EDISON ELECTRIC INSTITUTE AND THE D.O.E.

PLUTONIUM IS TOO DANGEROUS BECAUSE OF TERRORISTS AND HATE GROUPS WORLD-WIDE

3/. THE D.O.E. AND CONGRESS CANNOT allow Special INTEREST GROUPS TO BEHAVE UNSEEMLY. THAT'S A TOUGH call. HAS IT BEEN political?

Special INTERESTS RUNNING CONGRESS WON'T WORK.

SINCERELY-

Frances Keller Matthews

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PC-027
PRIVATE CITIZENS

PO Box 90336
Albuquerque, NM 87199-0336
July 2, 1996

Ms Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
PO Box 5400
Albuquerque, NM 87185-5400

SUBJECT: Draft Environmental Impact Statement (EIS) for the Continued Operation of the Pantex Plant and Associated Nuclear Component Storage

You must know that cities and people are not standing in line to be your next "national sacrifice", a term that is heard often these days. The hearing and repeating of that term may toughen people to the horror of it. Occasionally, someone will volunteer his own city for something risky but it always struck me as strange and disloyal for people to do that. We can look at your history and see what you will probably do to us as a community should you choose to put your "pit storage" here--look at what DOE has left behind in other places.

PC-027/1 01.038 Your glossy presentation books don't actually offer much choice or many alternatives. In fact, the choices and alternatives are very limited.

PC-027/2 22.023 I don't understand the need to store 20,000 pits anywhere. If we are dismantling the nuclear weapons, then we should get rid of the pits, not store them. People who know about nuclear stuff should have the knowledge and imagination to come up with some use for the pits. Perhaps some nuclear function could use that material for some purpose. I can't see why we should need so many for "strategic reserve and surplus". What is the idea behind this storage, to snap them back into nuclear weapons should we decide to change the rules?

As far as national defense goes, I wouldn't think nukes would be the weapon of choice now. There have been many advances in technology during the last 50 years and I bet we have cleaner, cheaper, more versatile weapons now. And, hopefully, we have learned something from the problems encountered during 50 years with nuclear weapons. How many of these pits do we actually need? I should get copies of your other documents referenced in your Summary on page S-3.

PC-027/3 01.039 Regarding your proposal to use Kirtland Air Force Base/Albuquerque as a pit storage site. Albuquerque is the largest city in our state. It is close to Kirtland AFB—they are separated only by a a gate guard—a person can place one foot in Albuquerque and the other on Kirtland Air Force Base. It's like storing nukes in the middle of a city. The highways are busy and prone to accidents. The airport is busy too. One accident and you've lost a major population center. Your publication gives the impression that there is more separation than there actually is between the base and the city. It takes only a few minutes to drive from the city to the Manzano site on the base.

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PC-027/3 01.039 continued Many people work on the base, it is a large local employer. The city and the base actually touch and the city grows every day. Albuquerque may have been a small town when the bomb was developed 50 years ago. It isn't small anymore.

PC-027/4 13.029 Reference page 6-17, Volume I Main Report, Column Potential Applicability/Permits: The word "permit" was omitted from this page on New Mexico while it appeared in the South Carolina page 6-14 and the Texas page 6-12. I know that water permits are required for businesses and individuals and would assuume that a government entity should also comply with the permit requirements, especially since this state has severe water problems. The word "permit" should be added those New Mexico areas where a permit is required. I realize that laws differ from state to state, but there are some areas where permits are required here.

Reference page 4-77, Volume I, Main Report. Decline of the Ogallala aquifier water levels. Albuquerque also has aquifier problems, a shortage of water and contamination of the water with TCE. The city is trying to come to grips with water problems, population growth, politics, business, etc., but not able to get it together yet. I think, in the Albuquerque general area, we all use pretty much the same acquifier so that drilling and pumping groundwater in one place has impact on another. Just because somebody drills a well doesn't mean that they can have all the water they can pump. We don't have our individual aquifiers—we have to share the ground water. There is not as much water available in our aquifier as thought and the water isn't recharged as quickly as believed and the connectivity between ground pumping and river trade-off is not clear. The shortage of water should be a concern to everybody when additional demands are made on the limited supply that we have. I have attached a few newspaper articles to document the water shortage here. A study is being done on our aquifier to find out exactly how much water we have—local wisdom is that we have a big water problem.

PC-027/5 04.014 Before planning to use the Manzano area as a "pit storage" site, coordinate with the base tennants to include Phillips Laboratory. The Manzano area is used for some research and development which may or may not be compatible with the your proposed nuclear pit storage.

PC-027/6 10.010 Reference historic and prehistoric resources in the Summary (Page S-24) and in the Volume I - Main Report page 3-59, item 3.5.1.8: "Twenty-seven historic and prehistoric archaeological sites have been found in the Manzano WSA. Of these sites, 8 have been recommended for inclusion in the National Register of Historic Places and 14 others are considered to be potentially eligivle for inclusion." Noted that you said there would be no impact to cultural and paleontological resources, but they may be so locked up because of security requirements that nobody will be able to see them. I would think that inclusion in the National Register of Historic Places might involve the possibility of a visit or a look at the site. Will that be possible if strengent security requirements are in effect?

PC-027/7 07.023 Reference Volume I, Main Report, Page 3-73, Air Quality: Albuquerque managed to get off the the EPA air monitoring program--if we hadn't gotten off we would have been in trouble. All winter long, Albuquerque citizens are not free to build fires in their fireplaces or woodstoves any time they want to—we get fined for burning on a "no burn" day. We have many "no-burn" days. Our houses are checked to see if smoke is coming out of the chimney on "no

PC-027/7 07.023 continued

burn" days. There is a telephone number to call to get a recorded message about whether we can burn a fire or not. We have to buy special gasoline for our cars in the winter time and we are nagged constantly about car pooling, etc., to cut air pollution, encouraged to have "no drive" times in order to improve air quality. The information you present about the air in this area is not complete because it doesn't reflect the constraints we have to work at in order to achieve acceptable air--the city, county and citizens work hard to get to this point. You plan to drive 120 vehicles 365 days a year and 30 vehicles 255 days a year making 30 and 50 mile trips and say that your contribution to bad air would be negligable. I don't know--we're really borderline on meeting the clean air specs and have to work hard to hold the line.

The "pit storage" proposal won't do a thing for Albuquerque--it is all loss and no gain.

Attached are some newspaper articles in support of some areas of my letter. The articles provide information about the water shortage in the Albuquerque area, about safety issues at Pantex and whistle-blowers at Hanscom, and about the need for an environmental study at Kirtland Air Force Base that addresses the cumulative effects of all the programs and projects there. The total cumulative impact should be addressed and studied. The environment bears the total weight of all the ongoing projects, yet the issue is addressed only in pieces.

Sincerely

Priscilla Tracy

Priscilla Tracy

Attachments
Newspaper Clippings (9)

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PC-028
PRIVATE CITIZENS

David Tracy
P.O. Box 900
Albuquerque NM 87199-0336
July 3, 1996

Ms. Nonnette Pounds
U.S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque NM 87185-5400

Subject: Draft EIS on "PIT" Storage at Pantex and Alternative Sites

SUMMARY DOCUMENT

PC-028/1 01.041 Page 5-7, 2nd column, 2nd para - It is not correct to state "and KAFB, near Albuquerque New Mexico" - Comment: KAFB is the southern boundary of Albuquerque, it is a joint use airport, (part of the city) - it's a part and adjacent to Albuquerque. Albuquerque is a major sized city, while the other candidate sites are located away from major cities. You should give major consideration to either keeping Pantex as the only site, or consider the other two choices.

PC-028/2 06.121 Page 5-8, 2nd column, 3rd para - Comment: The water usage and wastewater production are of a major concern in Mew Mexico and Albuquerque. The state is experiencing a major drought along with Albuquerque. Any additional water usage by KAFB drains the already lowering aquifers in Albuquerque. Go elsewhere!

VOL 1 MAIN REPORT

Page 2-1, 2-2 & Figure 2.1-1 - Comment: You state that Pantex already customarily ships nuclear components to the Nevada test site and the Savannah River site. Both of these are proposed alternative sites. Recommend that you pick one of these since procedures, practices and distribution are already in place. Both are not in a major city like KAFB is Albuquerque.

PC-028/3 04.015 Page 5-58, 2nd column, para 5.5.1.2 - The statement that Manzano WSA is currently being used, in part, of storage of furniture and documents is entirely misleading. Phillips Lab has a major R&D operation in the WSA. The addition of a Pit storage facility will have a major impact on access to R&D operations and dramatically change the security posture within Manzano WSA.

PC-028/4 06.122 Page 5-58, para 5.5.1.4 - Any additional water usage, by any operation puts additional demands on a drought ridden state. Additionally, Albuquerque is experiencing dwindling water supplies in their aquifers to include KAFB. Any additional water usage, even for Pit operations, is not necessary since DOE can

PC-028
PRIVATE CITIZENS

PC-028/4 06.122 continued select on the other alternatives and should.

PC-028/5 10.011 Page 5-58, para 5.5.1.8 - Comment: By placing the Pit storage area within Manzano WSA, the increased security will certainly reduce, even prohibit scientific and public access to the 27 historic sites. Consider the other alternative sites which don't present this type of problem.

PC-028/6 17.019 Page 5-69, para 5.5.2.2 - Comment: This section is listed as Environmental Justice. Of all the sites KAFB/Albuquerque has the highest, most diverse population, and putting the Pit storage activity in KAFB adds necessary risk to KAFB/Albuquerque.

PC-028/7 16.060 Kirtland Air Force Base also serves as an International Airport. Major highways almost borders KAFB to the west and north. This places the transport of nuclear Pits on about, and above KAFB/Albuquerque. The air traffic is extremely high and the highways are busy with Albuquerque, New Mexico, and intra/inter state traffic. The other alternative sites don't have this problem-select one of them.

PC-028/8 09.020 PC-028/9 10.012 The Biotic Resources (para 5.5.1.7) and cultural resources (para 5.5.1.8) will be in higher risk category. The higher risk not only includes possible contamination, but even more probable, the damage caused by increase of related activities like facility preparation, transportation to and from, and even from the additional 150+ humans to be placed on or about the Manzano WSA full time. Select another site, not KAFB.

PC-028/10 03.015 Page 5-58, para 5.5.1.1 - The recommendation to utilize the Manzano WSA facilities ignores a very real condition. The Manzano WSA was built I the mid 40's to 50's. Much of the facilities have not been improved over the years. The major Plants have water leakage problems along with the storage magazines. The electrical system is outdated and has chronic problems, the fence security system and fence are in need of major repair and upgrade. The facilities infrastructure, except for the Phillips Lab R&D facility at Manzano have been economically neglected and this is why Manzano WSA is not being utilized at historical or design levels. There will be significant cost, overlooked in this Draft EIS, in putting a Pit storage area on KAFB.

PC-028/11 15.115 Additionally, per Vol II, page E-23, para E.3.2, there is not automatic fire detection capability nor prompt response from local firefighters. This is a serious problem even if the rock overburden would shield the Pit storage area from aircraft crashes. There is still the ground attendant problems of mix of ground vehicles and equipment and humans.

General Comment: Strongly recommend the KAFB/Manzano WSA be dropped as an alternative site form Pit storage per comments above.

David S Tracy
David S. Tracy

Dennis Larson
916 Rocky Spring Rd.
Austin, TX
78753

6-30-'96

Ms. Nanette Founds
US DOE-Albuquerque Operation Office
POB 5400
Albuquerque, N.M. 87185

Dear Ms. Founds!

I am writing regarding the Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components.

PC-029/1 06.093 It seems to me that storing radioactive substances over the Ogallala aquifer is not a good idea. Is it true that high explosives from Pantex have been found in the Ogallala? Have wells in the area been contaminated with plutonium?

PC-029/2 01.037 Taking nuclear weapons apart at Pantex may make sense, but surely a better site for storage can be found. What do you think? I look forward to the seeing the better alternatives in the final Environmental Impact Statement.

Thank you.
I look forward to hearing from you.

Sincerely,
Dennis Larson

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PC-030
PRIVATE CITIZENS

3805 Overlook Dr.
Amarillo, TX 79109
July 12, 1996

Ms. Nanette Founds
U. S. Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87185-5400

Dear Ms. Founds:

In studying the Site-Wide EIS for Pantex, I want to make the same points that I have stated before in response to other documents; so I will confine myself to summarizing those without the accompanying arguments which are so familiar to us all.

Nothing should be sited at Pantex which would:

*Deplete or contaminate the Ogallala aquifer.

*Involve the processing or reprocessing of plutonium.

*Adversely affect the primary industry of agriculture.

*Bring waste from other sites to be treated or stored.

PC-030/1 02.032 While I am reasonably comfortable with interim storage of plutonium pits, I believe that facilities for long-term storage should not be constructed at Pantex or any other site when there is already an adequate facility at the Manzano Weapons Storage Facility at Kirtland AFB in Albuquerque.

PC-030/2 13.031 DOE should move with all possible speed to cease using the burning grounds for waste management at Pantex.

PC-030/3 06.125 No additional water should be channeled to the open ditches and playas at Pantex because it will accelerate the flushing of contaminants into the soil and eventually into the aquifer.
PC-030/4 05.060 The contaminated soil should be cleaned as soon as possible to mitigate flushing caused by storm run-off.

Thank you for this opportunity to comment.

Sincerely yours,

Louise Daniel

Louise Daniel

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June 17, 1996

Ms. Nanette Founds
U.S. Department of Energy, Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

Dear Ms. Founds:

The *Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* fails in its current form to provide the thorough or complete analysis necessary to evaluate the cumulative impact of many of the proposals being made for the plant. Sketchy detail in certain critical areas as well as overt omissions preclude the possibility of many decisions being taken based on substantive information.

PC-031/1
01.032

The promised analysis of alternative DOD storage sites looks only at the Manzano Weapons Storage Facility at Kirtland Air Force Base and seems to reject it since it is not included in the Storage & Disposition PEIS. As the facility is deemed technologically adequate, we may only conclude by inference from the very words of the document that the DOE takes a more cavalier attitude toward the safety of Panhandle residents than people who live in Albuquerque. The fact that more people would be threatened in the Albuquerque area in no way justifies placing that liability just 17 miles east of the city of Amarillo in the middle of such a highly productive agricultural area which is the beginning of a feed chain reaching across the world. Those who assert otherwise are more persuaded by convenience or dollars than reality . Is DOE so awash in funds that it can afford building new facilities when Manzano Mountain is more than adequate? Taxpayers as well as local residents deserve a better explanation than exists in this document.

The analysis of water usage laid out under the bounding options in this document represent extraordinary increases in Carson County pumping. The reactor option, depending on the number of reactors constructed (between 1 and 4), would represent between a doubling and more than tripling of current use if no other mission changes were considered. The kind of water consumption envisioned in this document (and others) has no place in the Panhandle even if it were destined for clean, safe and publicly acceptable purposes. The water simply is not there. For DOE to assert that this does not represent a significant impact in terms of the amount of water available both for domestic and agricultural consumption gravely impeaches the credibility of this entire document. Storage of hazardous nuclear materials and the processing or storage of nuclear waste has no reasonable place on top of what should be designated a sole source aquifer.

PC-031/2
07.013

Some of the most glaring deficiencies and omissions include the continuing use of the burning grounds with no alternatives examined. This facility is not technically acceptable and this document ignores the agreement with our citizen groups to analyze alternatives. The air modeling is inadequate, by the words of the document itself. How could DOE expect credible results with no modeling for residences on the south side of the Plant? There are still no monitors either at the perimeter or outside the plant measuring emissions that are not radiological. DOE continues to expect the public to swallow more of the dubious conclusions that have dogged their aircraft overflight analysis from the beginning.

PC-031/3
14.142

There is certainly no community health study upon which DOE can even base the assertions they make. The public, Pantex workers and former workers deserve adequate health studies of the cumulative impact and adverse health affects resulting from combined exposures to radiological substances, hazardous chemicals, toxic releases and daily emissions. DOE can not expect to be credible and has no basis to assert "no significant impact" until proper studies have been done.

DOE owes the people who have to live with the risk, reality, and consequences of its decisions a better and more complete analysis of the Pantex Plant. The final version of this document must correct the deficiencies and omissions.

Sincerely,

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PC–032
PRIVATE CITIZENS

- *NO!* To plutonium processing in the Texas Panhandle.
- *NO!* To bringing plutonium to Pantex from other sites.
- *NO!* To long-term storage of plutonium over the Ogallala Aquifer.
- *NO!* To facilities that handle nuclear waste or to processes that generate it.

I support jobs and development in the Panhandle that don't endanger workers, my family, our natural resources, or the reputation of Texas agricultural products.

Signed: ______________________

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Ms. Nanette Founds
U.S. Department of Energy
Albuquerque Operations Office
P.O.Box 5400
Albuquerque, New Mexico 87185-5400

July 19, 1996

Dear Ms. Founds,

The following are my comments concerning the Draft Environmental Impact Statement (EIS) for the Continued Operations of the Pantex Plant and Associated Nuclear Component Storage, otherwise known as the Pantex Plant Site Wide EIS (SW-EIS).

My husband Ronnie and I own and operate our family farm across the road from Pantex at the northwest corner of the plant site. We have raised our four children on our farm with all the normal hesitations of any parent when faced with the decision of whether or not you are doing what is best for your child. Living across the road from Pantex has not always been a concern of ours until 1991 when we were forced to pay attention by the city of Amarillo and DOE after our land was offered as available for expansion of Pantex if they located Complex 21 here in the Texas Panhandle.

The SW-EIS has several areas that are of concern to us and I will try to address those as briefly as possible and appreciate any answers you can give me to explain them.

1) Page S-5, col.2, par.4: How do we comment on a resource stewardship strategy if we cannot see one until the final EIS? This seems like a very important document that the public should be involved in, especially the neighbors and farmers. Could we please request a copy of this document as soon as it is available and ask that the comment period for this document be extended to a thirty day period after receipt of the document?

PC-033/1
13.032

2) Page S-6, col.1, par.1: It states that "Pantex also generates and manages recyclable materials." What are these materials and where are they recycled to? Do these include the various barrels of miscellaneous bolts and nuts that are sold at auction or to salvage that the general public can purchase? These barrels have been known to contain various parts that are far from nuts and bolts and are apparently parts of disassembled weapons and other confidential materials. I have seen confidential tags and various seals included in these barrels of supposedly recycled materials that I have been told by plant employees are confidential makeup and design. How did these materials make it into a barrel of miscellaneous bolts and nuts at a salvage yard and what are the procedures for recycling these bolts and nuts? Can any individual purchase these, and if so what is to keep them from copying the design and makeup of these parts?

3) Page 4-26, col.1, par.1: It is stated that an evolutionary Light Water Reactor (LWR) is listed as the bounding disposition alternative in the Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS (S&D-PEIS). It is listed to include the disturbance of approximately 700 acres of land during construction, and take approximately 350 acres for operations. Please explain

exactly where this reactor(s) would be located, as the map in the document (S&D-PEIS-pg 2-80) places this reactor right across the road from my farm. Will the DOE still require no further land for a buffer if this option is chosen? If it does require a buffer of land in addition to the current plant site, how much will be required and in what direction? Has it been discussed as to the water usage of the LWR(s) and if so how much water is proposed by each reactor? If water has been discussed, with the limited water supply we have already, why has this option not been dropped from the list? The Ogallala Aquifer is the major source of water for the whole of the Texas Panhandle and several other midwestern states. It has already been proven that the past and present activities at Pantex have contaminated the Ogallala and the level of water in the Ogallala has dropped dramatically in the past several years. Why locate a LWR here with the limited resources we have already and the contamination that is already present?

PC-033/2
08.004

4) Page 4-122,map & page 4-126&7,table: (Noise measurement locations and major noise sources in the vicinity of the Pantex Plant) On page 4-122 the map shows a noise measurement location marked "B" that is fairly close to my farm and house and another measurement location marked "T" that is fairly close to the target range. The table on page 4-126&7 lists these locations as having been tested on 9-9,15,&16 respectively. Could you please tell me if these were the times when qualifying was taking place at the target range, or were these just normal practice days? If the qualifying was taking place I would like to see earlier and later times of day for the readings. It seems very loud at my house when they are qualifying and they generally start very early in the morning, approximately 5-6 a.m. and sometimes are firing late at night, approximately 10 p.m. Could you please let me know also where that measurement location "B" is for certain? If it is close to my house, where it is located and what it looks like?

PC-033/3
01.044

5) Page 5-55, Kirtland Air Force Base. Under the Pit Storage Relocation Alternative (section 3.13) the pit storage function currently carried out at Pantex Plant would be transferred to another site. The Manzano Weapons Storage Area (WSA) is the candidate storage site at the Kirtland Air Force Base. After reviewing pages 5-55 through 5-75, I believe that the Manzano WSA would be the ideal location for the storage of the plutonium pits. The Manzano Mountain facility has the structure in place (storing office furniture at present); security is available; aircraft seem not to fly in a direct pathway to the WSA; water, air, and soil should not be adversely affected/ and the local population should be better protected from accidental releases in this type of facility with the 30ft coverage and better structure of the magazines. Some of the magazines at Pantex are 40 years old and have been proven to be unreliable for plutonium storage. I am referring to the heat build up in some of the magazines this past year and the installment of air conditioning units. Protection from aircraft intrusion is not as great at Pantex, or terrorist missiles and/or bombs. Security has been proven to be very lax at times at Pantex and the proximity of the plant to the Amarillo International Airport, (which is also used for military training flights), is also a concern. What are the reasons for not choosing the Manzano WSA over Pantex if that is a reality? If the DOD enters into a Memorandum of Understanding (MOU) with the DOE and Manzano is used for pit storage, would the employees in charge of the Manzano WSA be employees of DOE or DOD?

PC-033/4
05.061

6) In the Draft SW-EIS I did not find the impact on area farmers when they

PC-033
PRIVATE CITIZENS

PC-033/4 05.061 continued

are plowing, planting, or harvesting the crops on the possibly contaminated soils of the Pantex Plant property. If this information is available I would like a copy please, and if it is not I would like to have this included in the final SW-EIS.

PC-033/5 11.051

7) The agricultural industry and adverse impacts on this industry, as far as I could tell, have been included in only four paragraphs in the Draft SW-EIS. In this High Plains Trade Area agriculture plays a major role in the economic stability and I feel should warrant more in depth study as to the adverse impacts on such a valuable industry than are dedicated in this Draft SW-EIS.

PC-033/6 04.018

I would suggest that the DOE investigate this area further and include more in depth information in the final SW-EIS, (i.e., land devaluation in the immeditate vicinity of the Pantex Plant, comparing past land values to current values and then future approximate values if various facilities/functions are located here; land use or crop restrictions; monitoring information of the off-site vegetation and soils; and possible additional land use requirements/acquirements for various facilities if located here.) I have enclosed a DOE generated land use map of the Pantex Plant for your reference.

PC-033/7 10.013

8) I request a copy of the transcripts or notes taken from meetings with any of the affected tribes mentioned in the Draft SW-EIS. Gordon Yellowman commented at the recent hearing on June 25, 1996 and asked for a copy of the meeting notes. Nan Founds replied stating that they did not visit the individual tribes, but sent them a letter. She will send him a copy of the letter and comments received. I am requesting copies of this letter and the comments received.

Thank you for this opportunity to comment,

Sincerely,

Trish Neusch

Trish Neusch
HC 2 Box 19
Panhandle, TX 79068-9602
(806)335-9723

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Comment Form

These comments apply to the following documents:
Storage and Disposition Draft PEIS
Stockpile Stewardship and Management Draft PEIS
Pantex Site-Wide Draft EIS

United States Department of Energy

NAME: (Optional)
ADDRESS:
TELEPHONE: (   )

COMMENT (and background information):

PC-034/1/2
12.010

In the Summary, Table S-1, under intrasite transportation, presents person-rem information (p. S-18). The table is supported by Section 4.12 in the main text. An underlying baseline person-rem appears to be incorporated into the estimates for the Proposed Action alternative. Neither the main text nor the table clearly states the assumptions used. The person-rem shown for the Pit Storage Relocation alternative adds the estimated person-rem for pit storage relocation and the person-rem from the 2,000, 1,000, and 500 weapons levels under the Proposed Action alternative. Thus, while implementing the Pit Storage Relocation alternative, Plant workers are assumed to receive the person-rem associated with the Proposed Action alternative. The radiation exposures for individual workers for the alternatives are within regulatory guidelines and do not have any public health significance.

QUESTION:

PC-034/3
12.011

a. In Table S-1 for the Proposed Action alternative, 50 workers receive 61 person-rem for 2,000 weapons. Next, 50 workers receive 48 person-rem for 1,000 weapons. Finally, 50 workers receive 41 person-rem for 500 weapons. How does one scale these numbers? The same type of calculations are made for the No Action alternative. Again, the numbers for person-rem do not follow the amount of work. Why don't the workers receive only one half the amount of person-rem for a one half decrease in the work? Is there a certain amount of radiation that they receive no matter what?

PC-034/4
12.012

b. In the Pit Storage Relocation alternative, the amount of person-rem from the Proposed Action alternative appears to be added to what happens for pit storage relocation. How can one add the person-rem for these two alternatives? Is the same person-rem used two different times?

DRAFT SWEIS

COMMENT (and background information):

PC-034/5
14.083

In Section 4.14.2.1 (p. 4-219) text and in Figure 4.14.2.1-1 (p. 2-224) a quite classic error is made in explaining potential latent cancer fatalities. The error is to use risk estimates for exposures to large populations and to assume that applying that risk estimate to a specific group of workers allows for definitive conclusions about that group. In this example, the figure provides the correct explanation. The text is misleading and might cause confusion in the community by indicating that the 330 plant workers would suffer a certain number of cancers.

QUESTION:

PC-034/6
14.084

Health effects are important to understand. The section on continued operations talks about health effects for workers. A statement is made that workers *would* experience additional cancers.

In the figure, a different explanation is used. The statement in the figure is that an average number of cancers could occur if many groups of workers were exposed. The final statement was that *the most likely outcome is zero cancers.*

a. What is the average community member to think?

b. What is the correct explanation?

DRAFT SWEIS

COMMENT (and background information):

PC-034/7
14.085

The Department of Energy's Office of Emergency Management (NN 60) and the Office of Emergency Response (DP 23) fund the DOE's Atmospheric Release Advisory Capability (ARAC) which is housed at the Lawrence Livermore National Laboratory. ARAC's computer models, which have world-wide acceptance, have been called into service in many real-time responses to both real and potential accidental releases of radioactive material. The Three-Mile Island nuclear power plant (NPP) accident in 1978, the 1986 Chernobyl NPP disaster in the former Soviet Union, and the US Air Force Titan II missile accident in Damascus, Arkansas are just a few examples. In addition, the ARAC models have been utilized in every nuclear weapons accident exercise (NUWAX), since NUWAX 79. Pantex Plant is an "ARAC Site" and is linked to the ARAC center in Livermore via a computer-to-computer connection. ARAC operators are familiar with Pantex operations and can respond in a matter of a few minutes with a computer model graphic output showing the trajectory of the plume of contamination in the event of an accident. When, and if, a real accident occurred at Pantex it would be the ARAC models and the ARAC capability that DOE would call upon to respond in real time.

QUESTION:

Since ARAC is funded by NN 60 and DP 23 and ready to respond to a radiological accident at Pantex, why did DOE choose to use a model like ERAD to assess consequences for this EIS?

PC-034
PRIVATE CITIZENS

DRAFT SWEIS

COMMENT (and background information):

PC-034/8 11.027

Table 4.11.1.6-1 presents revenues for the governing bodies within the Pantex ROI (p. 4-165).

QUESTION:

If Pantex is reduced to the 500 weapons activity level what would be the impact to these revenues?

DRAFT SWEIS

COMMENT (and background information):

PC-034/9 14.086

In Table 4.14.1.4-1, safety statistics for Pantex are compared to general industry, manufacturing industry and chemical industry (p. 4-217).

QUESTION:

Since the largest industry in the Panhandle is agriculture should not the agricultural statistics be included here?

DRAFT SWEIS

COMMENT (and background information):

PC-034/10 14.087

Appendix D, "Human Health," does very little to explain how the impact to human health are derived or calculated. This appendix is more of an explanation of the risk assessment methodology than human health.

DRAFT SWEIS

COMMENT (and background information):

PC-034/11 09.011

In Volume I, §4.2 "Impact Assessment Methodologies" (p. 4-4), under "Biotic Resources," it is stated that "**Impacts to wetlands are mostly related to the potential discharge of contaminants to the playas.**" (Emphasis added)

QUESTION:

How can impacts to wetlands be related to *potential* discharges of contaminants? Only actual discharges can have impacts!

PC-034
PRIVATE CITIZENS

DRAFT SWEIS

COMMENT (and background information):

PC-034/12 06.043

In Volume I, §4.6 "Water Resources" (p. 4-57) it is stated that "Playas have also been identified as possible sources of focused recharge to the groundwater flow system at Pantex Plant. Unlined ditches have been used to dispose of wastewater and stormwater in the past."

As written, the implication is that the Pantex playas recharge the total groundwater system which includes the Ogallala aquifer. This is not true. At Pantex Plant the playas have been identified as a possible source of focused recharge to the perched aquifer and unlined ditches have been used to convey wastewater and stormwater.

DRAFT SWEIS

COMMENT (and background information):

PC-034/13 06.044

In August 1995, EPA issued a draft NPDES permit for the Pantex Plant, yet in Volume I (pp. 4-61 and 4-62), very little information regarding the substance of this draft NPDES Permit is presented.

QUESTION:

Why? And why does this section on NPDES Permits contain superfluous information about three-year old TNRCC draft permits on surface water discharges?

DRAFT SWEIS

COMMENT (and background information):

PC-034/14 10.003

In Volume I, §4.10.1.2 "Native American Groups" (p. 4-150), it is stated that "An inventory of traditional Native American sites identifying features such as petroglyphs, ceremonial areas, or sacred sites has not been conducted nor have any such sites been identified at Pantex Plant (DOE 1995K:4-280)." This statement is incorrect! Numerous archaeological surveys have been conducted on both DOE-owned and DOE-leased land for the purpose of identfying and recording of all Native American sites including any petroglyphs, ceremonial, or sacred sites. That part of the sentence that states no such traditional sites have been identified is correct. It is worthy of note that the stated reference is incorrect both qualitatively and quantitatively! Page 4-280 of the given reference discusses Oak Ridge National Laboratory; however, when one turns to page 4-300 of that reference one finds: "Native American resources associated with these groups have not yet been identified at Pantex, but the remains of temporary campsites, hunting locations, ceremonial locations, or isolated burials are possible."

QUESTION:

How can these words be used as a reference for the statement in the Pantex SWEIS? And why doesn't DOE know that these surveys have been conducted?

Comment Form

United States Department of Energy

NAME: (Optional) David R. Boyle
ADDRESS: Rm 223 WERC, Texas A&M Univ, College Station, Tx 77845-3118
TELEPHONE: (409) 845-8768 E-mail: DRB6624@AS.TAMU.EDU

The following is more of a "request" than a "comment"...

I'm a professor at the Texas A&M nuclear engineering department. We have underway an effort to produce nuclear-trained graduates who will be better prepared to work in the new area of weapons material disposition. This fall I'll be teaching a new course entitled, "Nuclear Weapons Material Management & Disposition." Many of the unclassified reports that you and your contractors have produced on this topic represent excellent teaching or background material for this course.

Would it be possible for you to send me a collection of relevant tech reports that might be applicable for this course? I'm not adverse to receiving a large box or boxes. I'm also willing to review a list of titles to make a down-select if you think that would work better. If you can help me out in this fashion, you'll be making a significant contribution to educating the public and helping to produce the young talent that the nation will need in the future to deal with these issues.

Thank you.

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HT01-01

DOE PUBLIC HEARING ON

STOCKPILE STEWARDSHIP PEIS

STORAGE & DISPOSITION PEIS

PANTEX SIDE-WIDE EIS

OPENING SESSION

APRIL 22, 1996

6:00 P.M.

KAROLYN FARMER, CSR, RPR

SONDRA L. CARGLE & ASSOCIATES
Certified Shorthand Reporters
4103 W. 49th Street
Amarillo, Texas 79109
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Portions of the transcripts unrelated to this EIS have been omitted.

OPENING SESSION

MR. LAWSON: We will now ask for qualifying questions from the audience.

JAN SANDERS: I'm Jan Sanders from Dallas, Texas. I'd like to ask the first presenter the size of the stockpile, the stewardship stockpile. What is the size of the stockpile?

MR. LAWSON: Did everybody hear that? I'm not sure -- I'm going to ask you to speak as closely as you can into the microphone. The question from the woman is to Earl Whiteman on what the size of the stockpile currently is.

JAN SANDERS: No, I'm not interested in the current size. The size from which we're discussing the stewardship, stewardship stockpile, how many?

MR. WHITEMAN: I'm not going to be able to satisfy you totally with an answer on that, because some of that is classified. I can tell you some of where we're at. First of all, since the end of the Cold War we've dismantled here at Pantex close to 8,000 nuclear weapons. We've come down significantly in the quantity of nuclear weaons the United States has. The United States and Russia, the former Soviet Union, have both

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signed the so-called START I treaty and are proceeding to ratify those treaties. Those treaties deal with a number of missles and delivery systems each country has. They don't count specifically how many weapons they have. But generally, if you translate the number of allowable missles to the number of warheads that could be on those missles, you'll see a number of 6,000 associated with the START I nuclear weapons stockpile. That's the so-called accountable warheads in that stockpile. That's not all the nuclear weapons the United States has. We don't know how many the Russians might have. There are additional weapons both for spares and maintenance purposes and there are also weapons that don't get counted in that system. The START II that we're talking about as far as what the U.S. Congress has ratified recently and the Russians have not yet ratified still does not count the number of weapons either side has. It counts the number of missles that they have. If you translate the number of missles to numbers of warheads, you'll get a number of 3500 accountable weapons. You'll hear that term used relative to START II. Again, that's not all the nuclear weapons either country has. We don't know how many the Russians might have, but the United States would have additional above that quantity, and that number is

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HT01-02

classified and we can't talk about it here.

JAN SANDERS: So there's the stewardship of 3500 plus -- I'm clarifying that therefore our stewardship is up 3500 nuclear warheads plus secured -- national security secret, possibly more than that?

MR. WHITEMAN: That's correct.

MR. LAWSON: Is there anyone else that has a question they would like to ask on the presentations that have just been made? Must have been good. Okay. If there are none other, at this point I would like to invite elected officials from the Federal, State, and local level to give brief presentations. Before I do that, remember that before we break to go into our individual sessions I want to take a head count of those of you who would prefer to be in one group or another or perhaps share. So you might be giving some thought to that. At this point, I have been given a few names of people who might like to speak. I won't know all of the individuals. I would like to ask if there are any Federal officials who would like to make a presentation. Representative Thornberry.

CONGRESSMAN THORNBERRY: I might take advantage of the podium for a second. I appreciate a chance to make a few comments. I know that many of the others who will be offering comments over the course of

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the next two days are going to talk about the outstanding record of Pantex and the level of community support and our willingness to look at and consider doing some additional missions.

I'm going to focus on some other kinds of questions, not because I don't think those issues are important or you ought to consider them, but as a member of the National Security Committee with responsibility to oversee the Department of Energy's weapons complex, I have tried to learn all I could about what we've got going and what we ought to be doing. And I'm not going to tell you that I know everything that these experts up here know, or that I know all of the answers, but I think I have learned enough to raise some issues of concern. And let me take a second to do this.

Of course, this is a great time of change brought about by the end of the Cold War. It was also brought about by the fact that the Department of Energy has not been as careful in the past as they should have been. And it's also been brought about by the fact that this administration has decided to stop nuclear testing. In my view, stockpile stewardship and stockpile management are important regardless of whether we resume some sort of low level nuclear testing. We ought to use a number of methods to make sure that our

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nuclear weapons are as safe as they could be, and reliable. And in doing all that, we are going to make a very serious mistake if we neglect to factor in the importance of the highly skilled workers at the production plants. I tend to agree with those people who think that we need a lot of smart people in the labs. I may even agree that we may need enough smart people in two labs to compete against one another. But every bit as much as we need smart people at Livermore and Los Alamos and Sandia, we need experienced, knowledgeable people in production plants who know how to take a design or procedure and produce a product that meets those requirements safely and efficiently time after time so we have weapons that are safe and reliable. That's what the folks at Pantex do.

It's kind of like if you're building a house. You sure need an architect to draw up the designs and consult with. But there is no absolutely no substitute for the skilled carpenters and plumbers and painters who know how to actually do the work, who know what problems there may be in transplanting those blueprints and procedures into concise components, and who have a proven track record of doing it time after time. I'm afraid there's an undercurrent in the DOE today that sometimes even rises to the surface which is a lack of

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appreciation for the importance of those workers on the assembly line at Pantex and the other places. If we lose them, we're a weaker country. And there ain't no numbers of Ph.D.'s at the labs that are going to replace what we've lost if that happens.

Frankly, I find it incredible that the Department of Energy would ask more and more of at least one of our production facilities and yet allocate less money for us to do that job. Yet that's what we're looking at in fiscal year 1997. If we can't keep the trained, experienced personnel at Pantex, this country simply won't meet the goals for stockpile stewardship and stockpile management, and we will begin to lose confidence in our nuclear deterrent and we will have been penny wise and pound foolish, in my judgment.

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22.002

I'm also concerned that we're focusing just on dragging out the life of the current weapons without taking positive steps toward replacing them. And it will be all too soon before the end of their design life is upon us. I think we've got a real question whether we are able to build nuclear weapons again and how. There's a lot of improvements that need to be made now and others that could be made in the near future, and all the while we have to be prepared to deal with changes that may occur in Russia and China and lots of

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HT01-02 (CONTINUED)

rogue countries throughout the world. And I'm not sure we're ready. That's something that bothers me.

On the one issue of the PEIS for which there was no preferred alternative, that is, high explosives, let me just say this: When you compare apples and apples, no one seriously disputes that the most cost effective option is to retain the existing mission at Pantex. That is the reason every single Republican and Democrat in the House and Senate that represents Texas wrote a letter to the Secretary of Energy making that point. It has all boiled down to the sole justification for moving high explosives to the two labs. It ends up being that we need to keep knowledge and competence of high explosives at the labs. Well, maybe. But we need to keep it in the production facilities, as well. You can do all the research you want and have all the knowledge you can handle, but if you can't translate that into real production, I'm not sure you're left with anything. There's no reason in the world the labs can't continue to send people to Pantex to keep them up on what's happening. But to remove high explosives out of the production complex, in my opinion, would be a big mistake. On disposition and the issue of what we're going to do with the excess plutonium and uranium, that is of key concern here. As you know, we've got lots of

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pits out there and more being added every day. Frankly, I'm a little disappointed at this stage that we don't have guidance on where the DOE is going to come down on what is to be recommended. I think we need to get on in making those key decisions. Two weeks ago when I visited Los Alamos, I was able to see firsthand some of the projects they have going on out there. It's certainly interesting. We have some promising technologies. But the country also needs leadership, and our area needs to have the confidence that DOE knows what it's doing and is doing the right thing. As long as I'm in Congress, I'm going to be involved in making those decisions and will do everything I can to see our area is protected and our nation is secure and our kids have a chance to grow up in a free and democratic society, which is part of what Pantex has contributed over the past four years.

MR. LAWSON: Thank you, very much, Congressman. I appreciate that. Is there anyone else representing Federal Government who would like to speak? Yes, please, sir.

JIMMY CLARK: I'm Jimmy Clark, district representative for Congressman Larry Combest. As mentioned earlier, the Congressman had hoped to be here tonight, but was unable to catch a flight into here. He

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Thank you for allowing me the opportunity to make a few remarks.

Many of the others who will testify
will discuss the outstanding record of the Pantex plant,
the unparalleled level of community support which the plant enjoys,
and the willingness to consider other missions
as we sort out the nuclear weapons complex after the Cold War.

I'm going to focus on some broader questions
which certainly affect Pantex
but also the larger security needs of the country.

I do so not because I disagree with the other points
or because I don't think they are important.
Pantex's record, its people, its community support,
and its openness to other possibilities are its key strengths
and no one else can match them.

But during my tenure in Congress, as a member of the Nat. Sec. Cmte, which oversees DOE weapons programs,
I have attempted to make a serious study
of our nuclear weapons complex,
in part because I represent one of its crown jewels
and in part because I believe
that a modern, effective nuclear capability
is absolutely necessary to our national security.

I won't say that I have learned all I can or intend to,
and I won't represent to you that I know all the answers
during this time of change and turmoil.

But I am confident that I know enough to raise some serious questions
that relate to the subject today and to our children's security.

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This is, of course, a time of great change
brought about by the end of the Cold War,
by the fact that the DOE was not as careful
in the past as it should have been,
and by this administration's decision to stop all nuclear testing.

<u>Stockpile Stewardship and Stockpile Management</u>

In my view, stockpile stewardship and stockpile management
are important for the nation
regardless of whether we conduct nuclear tests or not.

We should use a number of methods to make as sure as we can
that our nuclear weapons are safe and reliable.
In doing so, we are making a serious mistake
if we neglect to factor in the importance
of highly skilled workers at production plants.

I tend to agree with those who argue that we need smart people in labs
and maybe even that we need smart people at two labs
to compete against one another.

But every bit as much as we need smart people in labs,
we need experienced, knowledgeable people in production plants
who know how to take a design or a procedure
and produce a product that meets the requirements
safely and efficiently
time after time
so that we have weapons that are safe and reliable
on which we can stake our children's freedom.

That's what people at plants like Pantex do.

HT01-02 (CONTINUED)

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It's like if you're building a house,
you need architects to draw up the blueprints and to consult with,
but there is absolutely no substitute
for skilled carpenters, and plumbers and painters
who know how to get the work done,
who know what problems there may be
in translating the blueprints and procedures into precise components;
and who have a proven track record
of having done it — time after time.

I am afraid that an undercurrent in DOE today,
that sometimes even rises to the surface,
is a lack of appreciation
for the importance of those workers on the assembly line
at Pantex and elsewhere.

If we lose them, we are a weaker nation
and no number of PhD's at the labs
will replace what we've lost.

I find it incredible that DOE would ask more and more
of at least one of our production plants
and yet allocate less money for it to fulfill its mission.

If we can't keep the trained, experienced personnel at Pantex,
the country won't reach its goals for Stockpile Stewardshp and Mgmt
We will begin to lose confidence in our nuclear deterrent,
and we will have been penny wise and pound foolish.

I am also concerned
that we are just focusing on dragging out the life
of current weapons
without taking positive steps

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toward replacing our existing weapons
which will all too soon be at the end of their intended design life.

A real question is whether we will be able to build nuclear weapons again
and how.
There are many improvements which could be made now,
others which we will want to make in the near future,
and all the while we have to be prepared
to deal with changes in Russia, China and elsewhere.
I'm not sure we're ready.

High Explosives

Let me address the one issue in the PEIS
for which no preferred alternative was included,
that is high explosives.

When you compare apples to apples,
no one seriously disputes
that the most cost effective option
is retaining the existing mission at Pantex.

The sole justification to moving high explosives
to Los Alamos and Livermore
is that we need to keep knowledge and competence
of high explosives in the Labs.
OK - but we need to keep it at the production level too.

You can do all the research you want
and have all the knowledge you can handle,
but if you can't reliably and safely translate that knowledge
into real production,
you have nothing.

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There is no reason in the world
that the Labs can't continue to send people to Pantex as needed
for the manufacture of high explosives,
but to remove high explosives
completely out of the production complex
would be a big mistake.

Disposition -

The issue of what we're going to do
with the excess plutonium and uranium is of key concern here.

As you know, we've got several thousand pits stored here
with more being added every day.
I am disappointed that the PEIS gives so little guidance
on what's to be done.

We need to get on with making these key decisions.
Two weeks ago at Los Alamos,
I was able to see firsthand some of the work involved in the Aries project.

We have some very promising technologies,
but the country needs leadership.
and our area needs confidence that DOE knows what it is doing
and is doing the right thing.

As long as I am in the Congress,
I will be involved in making these decisions
and I will do everything I can
to see that our area is protected,
to see that our nation is secure,
and to see that our children have the opportunity to live in freedom.

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HT01-03

pits out there and more being added every day. Frankly, I'm a little disappointed at this stage that we don't have guidance on where the DOE is going to come down on what is to be recommended. I think we need to get on in making those key decisions. Two weeks ago when I visited Los Alamos, I was able to see firsthand some of the projects they have going on out there. It's certainly interesting. We have some promising technologies. But the country also needs leadership, and our area needs to have the confidence that DOE knows what it's doing and is doing the right thing. As long as I'm in Congress, I'm going to be involved in making those decisions and will do everything I can to see our area is protected and our nation is secure and our kids have a chance to grow up in a free and democratic society, which is part of what Pantex has contributed over the past four years.

MR. LAWSON: Thank you, very much, Congressman. I appreciate that. Is there anyone else representing Federal Government who would like to speak? Yes, please, sir.

JIMMY CLARK: I'm Jimmy Clark, district representative for Congressman Larry Combest. As mentioned earlier, the Congressman had hoped to be here tonight, but was unable to catch a flight into here. He

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asked that I make some comments here in his behalf. Congressman Combest would like to thank the Department of Energy for holding these series of public hearings here in Amarillo so that our Panhandle neighbors can have an opportunity to share their views. Since Pantex Plant's earliest origins in World War II as a site that built the conventional bombs for the U.S. Army, countless numbers of individuals across the Panhandle have made instrumental contributions to the United States winning of the Cold War. In the post Cold War era Pantex workers have once again answered the call to duty in peacetime and found a new role in dismantling nuclear weapons. Congressman Combest feels today that Pantex is not only ready but uniquely qualified to continue to enhance its role as a vital component of our nation's nuclear weapons industrial base as we prepare for our national security needs for the 21st Century. Congressman Combest fully appreciates the DOE's responsibility to reconfigure the country's nuclear weapons production for the 21st Century. As the Chairman for the U.S. House of Representatives Permanent Select Committee on Intelligence, he currently conducted a year-long review of what is commonly referred to as the intelligence community, the classified government agencies that collect information to advise the

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President and Congress on actions of foreign governments and terrorists. The legislative proposals he introduced as a result of the year-long review will ready the nation's secret intelligence gathering efforts for the -- bringing these agencies to end unnecessary duplication and work efficiently for better intelligence to keep America safe from nuclear proliferation. In the post Cold War era, many have called for a retreat of our resources and readiness regarding national security. The Congressman feels that the post Cold War era with nuclear proliferation leaves our nation more vulnerable than ever. Now that we no longer have the Soviet Union, we never know where the next threat is going to come from. We would like to urge DOE to reject these specious arguments and ensure that the nuclear weapons complex of the 21st Century maintains our nuclear deterrent for the foreseeable future. With nuclear weapons remaining a vital component of our national security into the 21st Century, Pantex is the only facility that can fulfill this mission. However, first and foremost the Congressman is adamant that any current and future functions at Pantex will be conducted in a safe and environmentally sound manner. The first priority for any expansion at Pantex is that it be implemented in a way that does not impair the health and

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safety of the area residents and have an adverse effect on the environment. Congressman Combest points serve adverse effect on the environment (sic) and they serve as a prerequisite to any current or future activities at Pantex. Forgive me, my bifocals are giving me fits up here. Congressman Combest doesn't take these points lightly. He was born and raised in the Panhandle. He grew up not far from the Pantex Plant on the family farm. Congressman Combest would never support any proposal or effort that would endanger the lives or environment of this region. This is his home, and members of his family still reside here. Congressman Combest is proud of the Pantex Plant's reputation as one of the cleanest facilities in the DOE's nuclear weapons complex. They have been good stewards of the land. As -- today in Washington the DOE's Pantex Plant has been recognized as a model facility and will receive the White House Closing the Circle Award for its efforts on waste and recycling activities. Only 22 facilities have received this award. Clearly, Pantex takes its environmental safety responsibilities very seriously, and the Congressman feels that this national award is highlighting their hard work. Pantex is perhaps the most cost effective alternative for any new construction of stockpile stewardship and management facilities.

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HT01-03 (CONTINUED)

Among many of the reasons, labor, costs, utility rates and water and land availability at Pantex, as well as public and political support are more agreeable than those of any other site in the complex. Pantex should be considered as an alternative site for future defense related facilities to complement activities at the national labs. Location of additional defense-related activities at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost to American taxpayers. In deliberations DOE should insist that budgetary comparisons between Pantex and other sites are accurate and include capital, transportation, training, remediation, and other costs. With the production assembly and disassembly functions remaining at Pantex, the high explosive functions should be present at the corresponding sites. Even the DOE draft admits that Pantex must retain high explosive capabilities to process the inventories already on site from dismantling. Therefore, the least expensive alternative is to maintain high explosive functions at Pantex. Congressman Combest would also take issue with the draft PEIS statement there are no advantages to siting high explosives at Pantex as opposed to the national labs. The capital outlay alone necessary for transfer is cost

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prohibitive. Also of importance, should future need arise for new weapons production, it will be critical to have high explosive facilities at the weapons production and assembly site. As DOE considers its options regarding dismantling of significant portions of the nuclear stockpile and searches for productive and environmentally sound uses for the dismantled components of the nuclear arsenal, Pantex and its functions are uniquely qualified for these new missions. Pantex has the necessary safety, security, and surveillance capabilities to accommodate and expand the role with minimal costs to the Federal Government. Once again, Congressman Combest would like to thank the Department of Energy for holding these hearings on the future of Pantex. He firmly believes that Pantex will continue to play a vital role in our nuclear weapons complex well into the 21st Century. Congressman Combest pledges to do what he can, working with Congressman Mac Thornberry in Congress, to ensure that Pantex is a vital component of our country's nuclear weapons industrial base. I appreciate the opportunity on behalf of Congressman Combest to be here at this public meeting and respectfully request the DOE to consider Congressman Combest's recommendations. Thank you.

MR. LAWSON: Thank you. Are there any other

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HT01-04

Federal representatives who would like to speak? Then I would move on to the State. I understand that State Senator Teel Bivins -- is he here?

SENATOR TEEL BIVINS: Thank you very much. I too would like to thank the Department of Energy for making these public forums available. I have to admit

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that stacking EIS on EIS on EIS has gotten a little bit confusing, at least for me and my staff. But we're trying to keep up with the rapidly changing developments that I know the agency has to face. First let me say generally that I'm pleased that the DOE has selected Pantex as the preferred alternative for assembly, disassembly, thereby abandoning their earlier thoughts of transferring those functions to the Nevada test site. I think that would have been cost prohibitive, and certainly that decision is based on common sense. However, I would add that by failing to recognize Pantex as the preferred candidate site for new and/or consolidated stockpile management facilities, that the DOE overlooks the best site for maintaining the integrity of U.S. nuclear stockpile and obtaining maximum efficiency for cost and savings. With regard to the stockpile stewardship and maintenance, the PEIS, a couple of thoughts. First of all, I think that Pantex is clearly the best place to site new construction for

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stewardship activities. Pantex is perhaps the most cost effective alternative to any of the new construction that is contemplated under this EIS. Secondly, I would echo what Congressman Combest stated with regard to high explosives. I too disagree with the PEIS statement that there are no advantages to siting the continuation of high explosive work at Pantex. That is in the face of common sense. Clearly we have a trained work force who has been conducting this function for many years now. And secondly, the cost of physically moving the infrastructure needed to conduct the activities is cost prohibitive and doesn't make economic sense. The EIS

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that deals with fissile materials, storage, and disposition is one that I have spent a good deal of time with. On the topic of storage, I feel like that we're seeing that Pantex in its current role is ideally sited for storage of plutonium pits. If it is anticipated that storage would be -- continue to be in that form, I don't think there's any question that Pantex, which is already contemplated to have, and I think the chart -- or will have 21,000 pits in storage of the -- I may be getting pits and tonnage mixed up. But certainly the vast majority of the pits in storage at Pantex, it makes sense to continue that function in that location. The issue of disposition and possibly the issue of storage,

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depending on how or what form the storage will be in, is one that I have given the most amount of thought to. In all the years that we've been looking at the future of Pantex here in Amarillo and concerned about its future, I think that the support for this institution has been demonstrated over and over again. And I believe that we would have that support for new missions in Pantex, but I believe there have to be three criteria that would be met before we should go forward. First of all, and I think probably most importantly, when we're thinking about disposition, as I understand it, the mixed oxide fuel process is probably the only one that would apply to Pantex, from my discussions. Vitrification and some of the other deep bore hole might not have a place in the Pantex future. But with regard to mixed oxide fuel reduction, I think that we've got to demonstrate that the process that is envisioned, the dry process, is one that is technologically feasible and is demonstrably safe. As I understand the process today, it is experimental and it shows great promise. But I think before we launch into such an exercise, we've got to demonstrate beyond a shadow of a doubt that that procedure can be done safely and environmentally soundly. The second criteria is that we've got to have community support for future missions at Pantex. To

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date, Pantex has enjoyed incredible community support, not just the city of Amarillo but the whole 26-county area of this region of Texas. I believe that that community support will be forthcoming for future missions at Pantex if the first criteria is met. And finally, as I have said before, I would reiterate, and I believe the third criteria for this type of future mission at Pantex has to be coupled with independent regulatory oversight of the Department of Energy. As I understand today, nuclear materials at DOE are not subject to independent regulatory oversight. And I think because all politics is perceptional, we have got to give the perception and the reality to the people of this area that these missions will be conducted safely. I think when you think about the material we're dealing with, public policy demands that we have checks and balances to ensure that we won't make mistakes that quite frankly this agency has made in the past. With those three criteria in place, I believe that the support that this facility has had will continue well into the future, and the people that have worked here and have families here will be able to continue working and living in the best place in the United States. Thank you very much.

MR. LAWSON: Thank you, Senator. You will

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leave a copy. I would ask if there are other officials. I believe State Representative David Swinford is here.

REPRESENTATIVE DAVID SWINFORD: Thank you very much. I have a written testimony that I'll just hand in and I will not take very much of your time. I concur 100 percent with Senator Bivins and Congressmen Combest and Thornberry that our first obligation should be the -- of any current or future expansions or conducting anything at Pantex should be in a safe and environmentally sound manner, and that should be our first priority as we look at anything. Like I say, I do agree with what they've said. Some of the things that I'd like to say is more on a personal note. I've toured the facility and had the opportunity to go out there on several occasions, and I found that facility to be progressive and modern and very safety conscious. I've also talked to many of the employees at Pantex, and I found them to be very smart and very dedicated. And I've got total faith in them that if Pantex was not safe and if we could have any problem here, they wouldn't work there. They're not idiots. They're very smart. They know what they're doing. So I sleep very well at night knowing that those people are there and doing that work. Just as many of you, I was -- I intend to be here

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a long time, and my grandchildren are going to occupy this area. And I certainly don't think that we would any of us want anything to happen to their rights and privileges to a safe environment. The so-called environmental problems that we hear about generally are old things that were not monitored years ago and that presently we are cleaning up trouble spots and making outstanding efforts to ensure the environmental safety for years to come. The people we have working at Pantex cannot be duplicated anywhere else in the world. That is reason enough for DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions, as well as consolidation of plutonium storage and disposition of any related functions. Those people cannot be duplicated, and I think people are the most important thing whenever you start having a relationship with something as dangerous as nuclear weapons. I trust them. I would encourage you to consider them as you proceed with your investigation.

MR. LAWSON: Thank you, sir. Are there any other representatives at the State level we should acknowledge that would like to speak? I suspect there are a few folks at the local level. One I have on my list here is the mayor of Amarillo, Kel Seliger.

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CAPITOL OFFICE
DISTRICT OFFICES
1111 S. TAYLOR
AMARILLO, TEXAS

DAVID SWINFORD
STATE REPRESENTATIVE

COMMITTEES
APPROPRIATIONS
AGRICULTURE and LIVESTOCK
LOCAL and CONSENT CALENDARS

April 15, 1996

COPY FOR YOUR INFORMATION

U.S. Department of Energy
Office of Reconfiguration
P.O. Box 3417
Alexandria, VA 22302

U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, D.C. 20026

Re: Comment on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statements (PEISs).

Thank you for the opportunity to comment on the U.S. Department of Energy's (DOE) Programmatic Environmental Impact Statements (PEISs) on Stockpile Stewardship and Management (SSM) and Storage and Disposition (S&D) of Weapons-Usable Fissile Materials. Please also consider this my comment on the Pantex Site-Wide Draft Environmental Impact Statement, since most of the issues addressed in these documents are identical.

First and foremost, I am adamant that any current and future functions at Pantex will be conducted in a safe and environmentally sound manner. Our first priority is to ensure any expansion at Pantex be implemented in a way that does not impair the health or safety of area residents or have an adverse affect on the environment. These goals serve as a prerequisite to any current or future activities at Pantex, including expansion.

I am pleased that DOE selected Pantex as the preferred alternative for assembly/disassembly, thereby abandoning earlier plans to transfer these functions to the Nevada Test Site (NTS) which would have been cost prohibitive and never been adequate to meet future needs. However, by failing to recognize Pantex as the preferred candidate site for new and/or consolidated stockpile management facilities, the DOE overlooks the best site for maintaining the integrity of the U.S. nuclear stockpile and ensuring maximum efficiencies and cost savings.

Pantex is perhaps the most cost-effective alternative for any new construction of SSM facilities. First, labor costs, utility rates, and water and land availability at Pantex, as well as public and political support, are more favorable than those at any other Complex site. It is appropriate to consider Pantex as an alternative site for all future defense-related facilities to

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POTTER AND MOORE COUNTIES

complement activities at the national labs (such as the planned Atlas Facility and plutonium pit fabrication site at Los Alamos National Laboratory. DOE makes no mention of a strategic plutonium reserve that is necessary to meet future national security needs, even though the PEIS mentions that strategic storage should be co-located with disassembly. Pantex should be the preferred site for such a mission in coordination with its management functions. The location of additional defense-related activities at Pantex would ensure that core technical capabilities are preserved at a location that can assure them at the most efficient cost to the American people. In its deliberations, DOE should insist that budgetary comparisons between Pantex and other sites are accurate, and include capital, transportation, training, remediation and other costs.

Consistent with the strengths identified above for increased stewardship and management duties, the high explosives functions should also remain at Pantex. Because the production assembly/disassembly functions remain at Pantex, the high explosives fabrication duties should be present at the corresponding site. After all, the SSM Draft admits that Pantex must retain High explosives capabilities to process the inventories already on site from dismantling. Therefore, the least expensive alternative is to maintain these functions at Pantex. I adamantly disagree with the statement in the draft PEIS that there are no advantages to siting high explosives at Pantex as opposed to the national labs. The capital outlay alone necessary for transfer is cost prohibitive. In addition, should future need arise for new weapons production, it will be critical to have the high explosives facilities at the weapons production assembly/disassembly site.

As the sole DOE-authorized facility for assembly and disassembly of nuclear weapons, Pantex has historically handled these functions in a safe an efficient manner for more than 40 years. One of the challenges faced after dismantling a significant portion of the nuclear stockpile is processing or disposal with the materials that remain. The DOE is considering several options. Once again, acknowledging cost savings considerations, Pantex could continue to store plutonium which is already at the site and upgrade facilities for any and all storage options being considered by DOE with minimal cost and difficulty. Pantex currently safeguards more than 8,000 surplus pits and plans are being made to ship additional pits from Rocky Flats to Pantex. It makes little sense to re-create storage facilities at another site and then unnecessarily transport large amounts of plutonium across the country from Pantex. The budgetary and political costs for such a decision would be enormous. Because of these costs, Pantex also should be designated the preferred site for any disposition options and related functions. It makes budgetary and policy sense to site disposition where storage already exists. Furthermore, it makes no sense from any perspective, budget or otherwise, to site strategic storage at one site and surplus at another. Pantex should be selected for both storage functions. Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role with minimal costs and it is the production site closest to Los Alamos, the planned pit fabrication site.

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Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions as well as consolidation of all plutonium storage and disposition and any related functions. Thank you for the opportunity to comment on these documents.

Sincerely,

David Swinford

COPY FOR YOUR INFORMATION

HT01-06

MAYOR KEL SELIGER: Thank you, Mr. Lawson. It is interesting as we listen to the comments made this afternoon by Mr. Swinford, Congressman Thornberry, Senator Bivins, and those made for Congressman Combest, that all of those are individuals who have earned their livelihood from the soil and the productivity of West Texas, every single one of them. It underscores a very important idea that environmentalists are truly people who eat and people who drink our water and people who raise their families in the proximity to the industrial processes that go on in this and any community. Several years ago, as the veil of secrecy began to be lifted from the atomic weapons complex and we looked at the problems that happened at Hanford and Rocky Flats, I think everybody realized, the people who live in the surrounding communities and the work forces who work in all of those plants, that a simple job is not worth risking one's life, one's ability to earn, and one's ability to live their life with their families. Indeed, everyone's environmental awareness has increased severalfold over the last few years. What we have seen over the last few years as we have been invited into these plants is there is a new emphasis in that complex, and that is on industrial safety and environmental responsibility. Indeed, as we provide livelihoods, that

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they must be lived in communities that are themselves safe and livable. We acknowledge and we appreciate the DOE making these communities part of this decision-making process. It is tremendously important. We found out some interesting things as we discussed the issues, particularly around storage and stockpile maintenance. In the hearing held last summer that Mr. Whiteman spoke about, an individual from the Department of Energy said that the Department of Energy would not duplicate any facility currently efficiently operating in the system, unless the Department of Energy decided to duplicate it. Lights went on in a lot of peoples's heads at that point as they began to understand why we have an extraordinarily high deficit. We assumed that the economic implications and the implications in industrial efficiently will also be adequately addressed in the Programmatic Environmental Impact Statement. When we look at disposition subjects, it is also interesting and we anxiously await the fact and feel it is important for people to realize that the National Academy of Sciences has quite definitively outlined the areas -- the feasible areas for disposition. We are anxiously awaiting the administration to pick the technical pathway to see to it that just as the nuclear weapons complex made this

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country safe in the era of the Cold War, it will also move ahead expeditiously in making it safe as we disassemble these weapons and treat these materials in a safe and responsible fashion. One thing we are certain of, we are confident of and grateful for, is the people who live in this area will be a part of that decision making capability, and for that we appreciate it.

MR. LAWSON: Thank you very much. I do have the name of Diane Bosch who would like to make a statement. And then I'll take anyone else on the local level who would like to speak.

MS. BOSCH: Good evening. For any of you that are not from Amarillo, you find out very quickly why the mayor is a tough act to follow. He's wonderful. Thank you for the chance to address the Department of Energy in this interactive workshop format. As an Amarillo City Commissioner since 1989, I have witnessed countless DOE hearings on Pantex. The give and take between the audience and the DOE officials is very informative to everyone in attendance. The DOE is to be applauded for the use of an interactive format and should continue to use it in future hearings. The DOE is also to be applauded for the open manner with which it has and continues to address local environmental concerns. We are also thankful that good management at Pantex by the

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HT01-07

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DOE's contractors, Mason & Hanger and Batelle, have prevented Pantex from having environmental problems of the type and magnitude found at other DOE sites. As is evident by the large turnout tonight, this community strongly supports Pantex. This support comes in large measure from the DOE's commitment to our local environment. That continued commitment to the environment is critical for the community support of all continued or new missions at Pantex. Regarding the stockpile stewardship and management PEIS, I strongly support the choice of Pantex as the preferred alternative for the assembly and disassembly mission. This community is extremely proud that Pantex played an important part in winning the Cold War, and will continue to play a critical role in reducing the size of the nation's nuclear arsenal in the post Cold War period. Keeping this mission at Pantex is not only the right choice for Amarillo, it also makes makes sense from a national perspective because it maintains a contingent production capability and it saves more than 1.5 billion dollars when compared to the cost of transferring the work to the Nevada test site. As long as we are on the subject of cost savings and retention of production capability, the DOE must not let the high explosive fabrication mission be moved from Pantex.

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Pantex employees have successfully performed this mission for more than 40 years, and there is absolutely no reason for this work to be moved. When the weapons complex was organized, it made logical sense to locate high explosive work with assembly and disassembly. It still makes sense. Furthermore, the DOE's own analysis indicates that the cost of transferring high explosive work to New Mexico labs would be fifty million dollars. It is inconceivable that the DOE might seek to justify spending fifty million dollars only to end up with less production capability in a location that has never performed this mission. In terms of storage and disposition activities, I would first like to note my previous comments about the need to protect the environment. I am encouraged by the previous comments about the need to protect the environment. I am encouraged by the outstanding environmental record that Pantex has regarding storage of plutonium over many years. I hope that the DOE will make the right choice and continue the safe storage of surplus plutonium at Pantex. I also hope that the DOE will keep in mind that plutonium from dismantled weapons represents a tremendous investment and may prove to be a valuable asset in civilian use. I urge the DOE to choose Pantex as the site for environmentally sound disposition

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activities. Once again I thank you for the opportunity to comment on the DOE's plan for the future of Pantex. Pantex has been an important part of our regional economy for many years and we support the continuation of environmentally sound operations at the plant. I would also like to thank all the concerned citizens of our community who have made the effort to attend this meeting tonight. Thank you.

MR. LAWSON: Thank you, Ms. Bosch. Is there anyone else, a local official who would like to speak? Please.

MR. REED: I'm Vance Reed with the Amarillo Economic Development Corporation. Many of the things that I have in my statement have already been said, so I don't think it's necessary to reiterate those positions. The two things that naturally that we're concerned about anytime that we try to entice someone to come to Amarillo -- number one is our environment. And we're simply not going to be involved in a situation where things are not environmentally safe. And second of all is jobs. And there's not enough words to say how important Pantex is to our job situation in Amarillo. If you use a multiplier index in the total take on our economy, we're talking about 13,500 (sic) jobs out of the 3,500 job base that is at Pantex. Needless to say,

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HT01-07 (CONTINUED)

HON. DIANNE BOSCH
CITY COMMISSIONER
CITY OF AMARILLO, TEXAS

COMMENTS ON THE STOCKPILE STEWARDSHIP AND MANAGEMENT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT, STORAGE AND DISPOSITION OF FISSILE MATERIALS PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT AND PANTEX SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT

THANK YOU FOR THE CHANCE TO ADDRESS THE DEPARTMENT OF ENERGY IN THIS INTERACTIVE WORKSHOP FORMAT. AS AN AMARILLO CITY COMMISSIONER SINCE 1989, I HAVE WITNESSED COUNTLESS D.O.E. HEARINGS ON PANTEX. THE GIVE-AND-TAKE BETWEEN THE AUDIENCE AND THE D.O.E. OFFICIALS IS VERY INFORMATIVE TO EVERYONE IN ATTENDANCE. THE D.O.E. IS TO BE APPLAUDED FOR THE USE OF AN INTERACTIVE FORMAT, AND SHOULD CONTINUE TO USE IT IN FUTURE HEARINGS.

THE D.O.E. IS ALSO TO BE APPLAUDED FOR THE OPEN MANNER WITH WHICH IT HAS, AND CONTINUES TO, ADDRESS LOCAL ENVIRONMENTAL CONCERNS. WE ARE ALSO THANKFUL THAT GOOD MANAGEMENT AT PANTEX BY THE D.O.E.'S CONTRACTORS, MASON & HANGER AND BATTELLE, HAS PREVENTED PANTEX FROM HAVING ENVIRONMENTAL PROBLEMS OF THE TYPE AND MAGNITUDE FOUND AT OTHER D.O.E. SITES. AS IS EVIDENT BY THE LARGE TURNOUT TONIGHT, THIS COMMUNITY STRONGLY SUPPORTS PANTEX, AND THIS

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SUPPORT COMES IN LARGE MEASURE FROM THE D.O.E.'S COMMITMENT TO OUR LOCAL ENVIRONMENT. THAT CONTINUED COMMITMENT TO THE ENVIRONMENT IS CRITICAL FOR COMMUNITY SUPPORT OF ALL CONTINUED OR NEW MISSIONS AT PANTEX.

REGARDING THE STOCKPILE STEWARD SHIP AND MANAGEMENT PEIS, I STRONGLY SUPPORT THE CHOICE OF PANTEX AS THE PREFERRED ALTERNATIVE FOR THE ASSEMBLY AND DISASSEMBLY MISSION. THIS COMMUNITY IS EXTREMELY PROUD THAT PANTEX PLAYED AN IMPORTANT PART IN WINNING THE COLD WAR, AND WILL CONTINUE TO PLAY A CRITICAL ROLE IN REDUCING THE SIZE OF THE NATION'S NUCLEAR ARSENAL IN THE POST-COLD WAR PERIOD. KEEPING THIS MISSION AT PANTEX IS NOT ONLY THE RIGHT CHOICE FOR AMARILLO, IT ALSO MAKE SENSE FROM A NATIONAL PERSPECTIVE BECAUSE IT MAINTAINS A CONTINGENT PRODUCTION CAPABILITY, AND IT SAVES MORE THAT 1.5 BILLION DOLLARS WHEN COMPARED TO THE COST OF TRANSFERRING THE WORK TO THE NEVADA TEST SITE.

AS LONG AS WE ARE ON THE SUBJECT OF COST SAVINGS AND RETENTION OF PRODUCTION CAPABILITY, THE D.O.E. MUST NOT LET THE HIGH EXPLOSIVE (H.E.) FABRICATION MISSION BE MOVED FROM PANTEX. PANTEX EMPLOYEES HAVE SUCCESSFULLY PERFORMED THIS MISSION FOR MORE THAN FORTY YEARS, AND THERE IS

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IN TERMS OF STORAGE AND DISPOSITION ACTIVITIES, I WOULD FIRST LIKE TO NOTE MY PREVIOUS COMMENTS ABOUT THE NEED TO PROTECT THE ENVIRONMENT. I AM ENCOURAGED BY THE PREVIOUS COMMENTS ABOUT THE NEED TO PROTECT THE ENVIRONMENT. I AM ENCOURAGED BY THE OUTSTANDING ENVIRONMENTAL RECORD THAT PANTEX HAS REGARDING STORAGE OF PLUTONIUM OVER MANY YEARS. I HOPE THAT THE D.O.E. WILL MAKE THE RIGHT CHOICE AND CONTINUE THE SAFE STORAGE OF SURPLUS PLUTONIUM AT PANTEX. I ALSO HOPE THAT THE D.O.E. WILL KEEP IN MIND THAT PLUTONIUM FROM DISMANTLED WEAPONS REPRESENTS A TREMENDOUS INVESTMENT AND MAY PROVE TO BE A VALUABLE ASSET IN CIVILIAN

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USE. I URGE THE D.O.E. TO CHOOSE PANTEX AS THE SITE FOR ENVIRONMENTALLY SOUND DISPOSITION ACTIVITIES.

ONCE AGAIN, THANK YOU FOR THE OPPORTUNITY TO COMMENT ON THE D.O.E.'S PLAN FOR THE FUTURE OF PANTEX. PANTEX HAS BEEN AN IMPORTANT PART OF OUR REGIONAL ECONOMY FOR MANY YEARS, AND WE SUPPORT THE CONTINUATION OF ENVIRONMENTALLY SOUND OPERATIONS AT THE PLANT. I WOULD ALSO LIKE TO THANK ALL THE CONCERNED CITIZENS OF OUR COMMUNITY WHO HAVE MAKE THE EFFORT TO ATTEND THIS MEETING TONIGHT.

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HT01-08

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MR. REED: I'm Vance Reed with the Amarillo Economic Development Corporation. Many of the things that I have in my statement have already been said, so I don't think it's necessary to reiterate those positions. The two things that naturally that we're concerned about anytime that we try to entice someone to come to Amarillo -- number one is our environment. And we're simply not going to be involved in a situation where things are not environmentally safe. And second

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of all is jobs. And there's not enough words to say how important Pantex is to our job situation in Amarillo. If you use a multiplier index in the total take on our economy, we're talking about 13,500 (sic) jobs out of the 3,500 job base that is at Pantex. Needless to say,

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continued

from our standpoint, what's truly important to this area from an economic standpoint, we strongly urge the DOE to do everything they possibly can at the Pantex site. Thank you.

MR. LAWSON: Is there anyone else from a local level who would like to speak? I want to thank each of you for your presentations. I appreciate it and I appreciate your taking your time to come this evening and share your thoughts on this. I'm sure the Department appreciates it, as well. As I announced before, we will soon break to go into three groups. Again, to remind you, the Pantex people interested primarily in Pantex will be in this section. The people in the middle will be stockpile stewardship and management. And the far end will be materials disposition. I would like to ask all of you if you could please indicate how many of you are principally interested in only talking and being in a discussion about one of these topics, and let's say those who are interested in spending their time here talking about the Pantex sitewide: how many hands? I have about a dozen or more. How many for the stockpile stewardship and management? Material disposition? Okay. And how many people would like to split their time among two or more of these? That's the majority of those people. This is

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what I propose that we do. We will break into the three different groups. We will break for ten minutes, just enough time for us to assemble the walls and for you to pick up any materials that you need outside. When we reconvene we'll go through the process as I described. We'll our first break at 8:30, if those people -- if you want to move on to another section, please feel free to do so. We'll take a five-minute break at that time and then we'll break again at five minutes past 9:00. We will reconvene in ten minutes. Thank you very much for your attention.

(Recess.)

Mr Vance Reed
President, Amarillo Economic Development Corporation

Comments on the Stockpile Stewardship & Management PEIS,
the Storage & Disposition of Fissile Materials PEIS, and
the Pantex Site-Wide EIS

Thank you for this opportunity to provide input to the Department of Energy regarding the operation of the Pantex plant. I would like to address two primary issues tonight regarding Pantex's future: 1) the environment, and 2) jobs.

Starting with the environment, I would like to reiterate this community's adamant position that all work performed at Pantex continue to be done in a fashion that protects the environment. While the public has heard a great deal about "contamination" at Pantex, there has been little media attention given to the nature of pollution problems at Pantex. Most contaminants at Pantex are related to solvents and hydrocarbons that are very similar to those that would be found at practically any large manufacturing facility. This community is very reassured by the fact that Pantex has not had contamination problems from radioactive materials, such as occurred at Rocky Flats and Hanford.

The Amarillo Economic Development Corporation views Pantex in much the same manner as we view other large manufacturers in terms of presenting risks to the environment. For instance, if we were recruiting a computer chip manufacturer, we would realize that these plants have hazardous waste streams including arsenic and other heavy metals. The A.E.D.C. would only recruit a company that is committed to full compliance with E.P.A. and state environmental regulations. High tech businesses have created whole new industries and thousands of jobs, while working with very hazardous substances. This shows that protection of the environment and job creation can go hand-in-hand.

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Likewise, we believe that Pantex can be a site where good, high-paying jobs are created in a work environment that includes potentially dangerous materials. When

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measured in terms of total payroll, Pantex is by far the area's largest employer. With 3,500 employees at the plant, a job multiplier of 3.87 shows that Pantex is responsible for a total of over 13,500 jobs in this region. This multiplier was established by Dr. Ray Perryman at Southern Methodist University. The multiplier reflects the fact that the money that Pantex brings into the local economy supports many retail, medical, educational, finance, insurance and real estate jobs. All told, employment related to Pantex represents over 12% of all jobs in the Amarillo metropolitan area. I urge the D.O.E. to correct the socio-economic impact portions of all three EIS documents to accurately reflect the impact of Pantex on our local economy.

Because of the importance of Pantex to our local economy, the A.E.D.C. is very pleased that Pantex has been chosen as the preferred site for continued assembly and disassembly functions. We also believe this decision is in the best economic interests of the nation, as it saves more than 1.5 Billion dollars to American taxpayers. I also urge the D.O.E. to continue the high explosive fabrication mission that is currently performed at Pantex. Again, this not only protects jobs in our region, it saves American taxpayers 50 Million dollars compared with the cost of moving these operations to New Mexico.

For Pantex's future, the D.O.E. should locate storage and disposition missions at Pantex, as long as they can be done in an environmentally safe fashion. I urge the Department to make use of the expertise of the Amarillo National Resource Center for Plutonium. This resource center, which is operated by the University of Texas System, the Texas A&M University System, and the Texas Tech University System, can provide world-class evaluation of disposition options. I believe the Amarillo area will prove to be an outstanding operating environment for these storage and disposition functions that have been fully scientifically evaluated and safely implemented.

Once again, thank you for the opportunity to address you in this workshop tonight!

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HT02-01

DEPARTMENT OF ENERGY

PUBLIC HEARING ON

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STOCKPILE STEWARDSHIP & MANAGEMENT DRAFT PEIS

STORAGE & DISPOSITION DRAFT PEIS

PANTEX DRAFT SITE-WIDE EIS

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FORMAL COMMENT SESSION
APRIL 22, 1996
7:00 P.M.

SONDRA L. CARGLE, CSR, RPR
SONDRA L. CARGLE & ASSOCIATES
CERTIFIED SHORTHAND REPORTERS
4103 W. 49TH ST.
AMARILLO, TEXAS 79109
(806/355-8181)

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format or anything that we hope to do during this public hearing session?

Hearing none, I believe that we'll begin, then. It's about 7:02, so we're almost starting on time. And Ms. Gattis, we'll ask you to come and give us your comments.

MS. GATTIS: Thank you all very much. It's been a long struggle working on this hearing.

My name is Beverly Gattis. I am President of STAND of Amarillo. I would like to preface my remarks with there has been some

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confusion and misunderstanding. It was never the intention of our particular citizens' groups that you all not be able to respond. That's a misunderstanding that I hope we can clarify, and perhaps a rereading of the letters will serve to do that, letters that have been exchanged between the Department and four of the local citizens' groups. That said, I will just go ahead and read a prepared statement.

Representatives of the Department of Energy are here for the next two days to educate the public about its plans for the future. There are voluminous documents which Panhandle citizens

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can read if they choose to do so, and some of us have at least started on that task.

I will confess to a growing sense of anger at how deficient those documents are. The Panhandle stands to be greatly affected by the choices the Department will make about plutonium storage, processing and disposition, yet citizens are given documents which talk only in generalities about operations which can change Pantex into a plutonium processing site not unlike Rocky Flats.

Pantex could become the site which blends plutonium and uranium together to make nuclear fuel. It could be -- it could even be the site for a new experimental nuclear reactor.

About none of this can we get sufficient information from the documents. Technical analyses will be available later. Costs analyses will be available later.

We do not have access to the information necessary to render an informed opinion, and the Department tells us that is how it will be.

For instance, the Department defends the absence of cost information by stating that

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NEPA does not require a federal agency to supply cost analyses in a draft document. To that, I have to tell you, I say, so what. Such information is necessary to the discussion, and so it must be available.

The same applies to technical information. It is not possible that the Department has so little information that it cannot give a clearer description of what the operations for dismantling pits and processing plutonium will involve. And no citizen should be satisfied with being put in a position of guessing.

All in all, the Department is wasting the time and good efforts of Panhandle citizens who care about their region, whether they agree with the operations proposed or disagree.

It is putting on a show of gathering public comment, but it is withholding information which the public needs and deserves. DOE is managing the public, not empowering it.

The decisions which these documents address are far too important for us to allow the Department to go forward in this manner. Whether it is the case that the Department has the

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HT02-01 (CONTINUED)

science for the sake not only of our own region, but for any other site in the nation. Thank you.

MR. MATNEY: Thank you, Ms. Gattis. We'll now move to our next speaker, Jeri Osborne. Jeri.

MS. OSBORNE: I'm Jeri Osborne. My husband, Jim, and I live and farm across Farm to Market 293 on the north side, downwind and downstream from the Pantex site. We raised our family of three children, one nephew, and kept another nephew and a niece a good part of their lives on the farm.

Jim and his brother and sisters were also raised there. His father bought the place in 1927. I've come to speak on health and safety issues, as well as the feasibility of having plutonium, other nuclear materials and other types of hazardous materials and chemicals in our front yard as well as over the area's major water supply and in this very productive and vital agricultural area, major food storage for the nation as well as the world, just for Amarillo's powers that be to possibly create a few more jobs and wealth for themselves.

At this time, there are no known

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Statement of Beverly E.C. Gattis
President, STAND of Amarillo
April 22, 1996

Representatives of the Department of Energy are here for the next two days to educate the public about its plans for the future. There are voluminous documents which Panhandle citizens can read, if they so choose, and some of us have at least started that task. I will confess to a growing sense of anger at how deficient those documents are.

The Panhandle stands to be greatly affected by the choices the DOE will make about plutonium storage, processing and disposition, yet citizens are given documents which only talk in generalities about operations which can change Pantex into a plutonium processing site like Rocky Flats.

Pantex could become the site which blends plutonium and uranium together to make nuclear reactor fuel. It could even be the site for a new, experimental nuclear reactor. About none of this can we get sufficient information.

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Technical analyses will be available later. Cost analyses will be available later. We do not have access to the information necessary to render an informed opinion, and the Department tells us that is how it will be. For instance, DOE defends the absence of cost information by stating that NEPA does not require a federal agency to supply cost analyses in a draft document. To that, I say "So what." Such information is necessary to the discussion and so must be made available.

The same applies to technical information. It is not possible that the Department has so little information that it can not give a clearer description of what the operations for dismantling pits and processing plutonium will involve. And no citizen should be satisfied with being put in the position of guessing.

All in all, the Department is wasting the time and good efforts of Panhandle citizens who care about their region. It is putting on a show of gathering public comment, but it is withholding information which the public needs and deserves. DOE is managing the public, not empowering it.

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The decisions which these documents address are too important for us to allow the Department to go forward in this manner. Whether it is the case that the Department has the missing information yet is not revealing it, or whether the information is not complete, in either instance these draft documents are fundamentally deficient. The public deserves better. The law expects better. And the future must be based on something better.

There is difficult, important work which must be done with plutonium and highly enriched uranium if we are to control the theft of nuclear weapons-useable materials and stop the spread of nuclear weapons. Unfortunately, it is the kind of work which has left trouble and contamination every place it has ever been done.

It is clear that the Department could name Pantex to do some of this processing and disposal work. It is STAND's position that the Panhandle is too valuable to be turned into a plutonium processor, fuel fabricator, nuclear reactor and nuclear waste handling site. But even more, it is STAND's position that no matter where this work is done, this time it must be well planned and executed. STAND will not accept anything less than forthright, complete information and good science for the sake not only of our region, but for the rest of the nation.

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HT02-02

science for the sake not only of our own region, but for any other site in the nation. Thank you.

MR. MATNEY: Thank you, Ms. Gattis. We'll now move to our next speaker, Jeri Osborne. Jeri.

MS. OSBORNE: I'm Jeri Osborne. My husband, Jim, and I live and farm across Farm to Market 293 on the north side, downwind and downstream from the Pantex site. We raised our family of three children, one nephew, and kept another nephew and a niece a good part of their lives on the farm.

Jim and his brother and sisters were also raised there. His father bought the place in 1927. I've come to speak on health and safety issues, as well as the feasibility of having plutonium, other nuclear materials and other types of hazardous materials and chemicals in our front yard as well as over the area's major water supply and in this very productive and vital agricultural area, major food storage for the nation as well as the world, just for Amarillo's powers that be to possibly create a few more jobs and wealth for themselves.

At this time, there are no known

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results of long-term health exposures to the effects of whatever is the present mission of Pantex, let alone future missions that may result from DOE's plan. The technology is just not available at this time to perform many of the proposed missions.

DOE does not know what to do with surplus and weapon-grade plutonium and other nuclear materials. How can they be so sure of the consequences of future missions that may be brought to the site?

Pantex is probably cleaner than other DOE sites, but it is on the Superfund list. It may be safer than other sites, but we can prove that accidents -- at least I hope the incidents that have affected us personally were accidents -- have happened that has endangered our property as well as our personal safety and others in our neighborhood -- in the neighborhood of Pantex.

There have been numerous major fires at the site, three or four within the last two years. We took cold drinks and ice to the firemen on various occasions.

We have had cast steel shrapnel

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chunked at us. We have picked up some 300 to 400 pounds of a naval breech block, one piece weighing 59 pounds. Some of this shrapnel was found some one to -- and a half to two miles from where it was exploded.

We've had tractor tires ruined from it. Through the years, we've had windows broken, pictures knocked off the walls, et cetera.

On October the 4th, 1995, a very large charge of explosives was set off to signal the start of an emergency management drill. This drill broke our house, cracked the slab, rafters, walls, brick shower, plumbing, causing flooding of the basement and other damages resulting in some $30,000 in repairs and replacement of carpets and other floor covering, rebuilding the shower, cracks, et cetera, and these are the known problems. We also must have the house levelled.

This incident was not only very frightening and dangerous, but has caused us much anxiety and inconvenience. Trying to put up family for my mother's death and funeral and having family in for Christmas with a flooded basement, large holes drilled in the living room

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floor and other areas of our house caused a great deal of stress, to say the least.

Too many questions are yet unanswered by the studies that have been conducted. Granted, it may be impossible to anticipate all potential problems that may arise, but there does seem to be a lack of scientific research used for the study.

It may appear that the conclusion has been drawn and figures to support that conclusion were used without any real scientific information. One must question the credibility of those responsible for the documents and the reliability of the studies when such glaring, inaccurate information can be found within the documents.

One example of this is found in Storage and Disposition of Weapons, Usable Fissile Materials Draft Programmatic Environmental Program Statement, Volume 2. Pages 4-796 and 797 clearly show that -- the town of Canyon outside the 80 kilometers radius and located within Deaf Smith County, just north of Castro County.

The population distribution map

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HT02-02 (CONTINUED)

should show Canyon to be just south of Amarillo, in Randall County, perhaps some 40 kilometers from Pantex, at the very most.

We do not see the location of long-term storage of nuclear materials, the possibility of processing, reprocessing, modification of pits, the location of nuclear reactors at Pantex very good ideas, nor do we believe that moving of all the high explosive activities by the complex to Pantex to be in our best interest.

The DOE has sites that are much larger and much further away from population, agricultural areas and major sources of water for its future missions than is Pantex. Thank you.

MR. MATNEY: Thank you, Ms. Osborne.

Our court reporter has asked if you have proposed documents and could leave a copy with us, --

MS. OSBORNE: Yes, I do.

MR. MATNEY: -- she would like to have that. Could we get those now? Thank you.

We'll move to our third speaker. Mr. Jim Osborne.

MR. OSBORNE: I'm Jim Osborne. I

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COMMENTS REGARDING PANTEX HEARINGS

AMARILLO, TEXAS; APRIL 22, 1996 by JERI OSBORNE

I am Jeri Osborne. My husband Jim and I live and farm across FM 293 on the northside, downwind and downstream from the Pantex site. We raised our family of three children, one nephew, and kept another nephew and neice a good part of their lives on the farm. Jim and his brother and sisters were also raised there. His father bought the place in 1927.

HT02-02/1
11.008

I have come to speak on health and safety issues as well as the feasibility of having plutonium, other nuclear materials, and other types of hazardous materials and chemicals in our front yard as well as over the areas major water supply and in this very productive and vital agricultural area -- major food source -- for the nation as well as the world just for Amarillo's "powers that be" to possibly create a few more jobs and wealth for themselves.

At this time, there are no known results of long term health exposures to the effects of whatever is the present mission of Pantex --let alone future missions that may result from DOE's new plan. The technology is just not available at this time to perform any of the proposed missions. DOE does not now know what to do with surplus and weapon grade plutonium and other nuclear materials. How can they be so sure of the consequences of future missions that may be brought to the site?

page 2

Pantex is probably cleaner than other DOE sites, but it is on the superfund list. It may be safer than other sites, but we can prove that accidents -- at least I hope the incidents that have affected us personally were accidents --have happened that has endangered our property as well as our personal safety and others in the neighborhood of Pantex. There have been numerous major fires on the site, three of four within the past two years. We took cold drinks and ice to the firemen on various occasions. We have had cast steel shrapnel chunked at us. We have picked up some 300 to 400 pounds of a naval breech block -- one piece weighing 59 pounds.

HT02-02/2
14.007

Some of this shrapnel was found some one and one-half to two miles from where it was exploded. We have had tractor tires ruined from it.

Through the years, we have had windows broken, pictures knocked off walls, etc. On October 4, 1995, a very large charge of explosive was set off to signal the start of an emergency management drill. This "test" drill broke our house, cracked the slab, rafters, walls, brick, shower, plumbing causing flooding of the basement, and other damages. resulting in some $30,000 in repairs and replacement of carpets and other floor coverings, rebuilding the shower, cracks, etc. We also must have the house leveled. This incident was not only very frightening and dangerous, but has caused us much anxiety and inconvience. Trying to put up family for my mother's death and funeral and having family in for Christmas with a flooded basement, large holes drilled through the living room floor and in other areas of the house causes a great deal of stress to say the least.

page 3

HT02-02/2
14.007
continued

Too many questions are yet unanswered by the studies that have been [illegible]d. Granted, it would be impossible to anticipate all potential problems that may arise, but there does seem to be a lack of scientific research used for the study. It would appear that a conclusion has been drawn and figures to support that conclusion were used without any real scientific information.

One must question the credibility of those responsible for the documents and the realibility of the studies when such glaring inaccurate information can be found within the documents. One example of this is found in Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement, Volume II, Pages 4-796 and 4-797 clearly show the town of Canyon outside the 80 kilometers radius and located within Deaf Smith County just north of Castro County. The population distribution map should show Canyon to be just south of Amarillo in Randall County, perhaps some 40 kilometers from Pantex. at the most.

We do not see the location of long term storage of nuclear materials, the possibility of processing /reprocessing, modification of pits, or the location of nuclear reactors at Pantex very good ideas. Nor do we believe the moving of all the high explosive activities to Pantex in our best interests. The DOE has sites that are much larger and much farther away from population, agricultural areas, and major sources of water for its future missions than is Pantex.

Thank you.

HT02-02 (CONTINUED)

Perhaps a site around the 3000 block of Harmony or the 2700 block of Teckla or in SW Amarillo would suffice. If the city fathers ~~would~~ wouldn't want the activity in their neighborhoods why would they want it for those neighbors to the east of Amarillo where a great deal of those within the trade area live and work to put food on their tables?

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HT02-03

should show Canyon to be just south of Amarillo, in Randall County, perhaps some 40 kilometers from Pantex, at the very most.

We do not see the location of long-term storage of nuclear materials, the possibility of processing, reprocessing, modification of pits, the location of nuclear reactors at Pantex very good ideas, nor do we believe that moving of all the high explosive activities by the complex to Pantex to be in our best interest.

The DOE has sites that are much larger and much further away from population, agricultural areas and major sources of water for its future missions than is Pantex. Thank you.

MR. MATNEY: Thank you, Ms. Osborne.

Our court reporter has asked if you have proposed documents and could leave a copy with us, --

MS. OSBORNE: Yes, I do.

MR. MATNEY: -- she would like to have that. Could we get those now? Thank you.

We'll move to our third speaker. Mr. Jim Osborne.

MR. OSBORNE: I'm Jim Osborne. I

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farm across the road north from Pantex. All I'd like to say is we don't have enough water. Amarillo dried up our domestic well ten days after they started pumping the well across the fence from us in 1965.

Since then, we have lost 125 foot of water from the static level. Most of Amarillo's wells, all located within five miles radius of Pantex, and two of which are within a half mile of the north boundary, won't pump but half as much water as they earlier did.

Pantex wells are pumping only half as much as they used to, and they've replaced four of the five wells since they started.

We don't have enough water for reprocessing. We don't have enough water for nuclear reactors.

According to an enclosure with the water bills from Amarillo a couple of years ago, Amarillo set a new one-day record for pumping water on July the 26th of 1994 for one day's pumping of 92 million gallons.

They have pumped one and a half times their allowable for at least the last six years. They have a variance from the Panhandle

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Groundwater Conservation District if they would develop other sources of water.

Amarillo, Southwestern Public Service Company and the Canadian River Water Authority have been swapping water rights to land they don't have enough water to justify development.

I hear that Amarillo has drilled ten test holes in northeastern Potter County, and the best test they had was 320 gallons a minute. So they didn't develop that field. I've heard ranchers up there say that they couldn't even get good livestock water.

Amarillo's not worried about contamination of the Ogallala aquifer. They're going to dry up their well field here in Carson County north of Pantex before it becomes contaminated.

I understand the City is refurbishing old wells in the field southwest of Amarillo that they'd already pumped almost dry and abandoned 25 years ago. They won't pump much water from those wells, but they are supplementing what they have. They're already talking for water use restrictions in the City this summer.

From where will Pantex import water

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and at what cost for plutonium reprocessing or for cooling nuclear generators?

I understand that a property owner may sue a government entity for devaluing the value of their land more than 25 percent. Our land has certainly been devalued more than that.

If it takes 10 to 15 years to get a reactor into production, and the expected life of that reactor is about 40 years, from where is the water coming and at what cost?

I find a tremendous discrepancy in the groundwater withdrawals stated in Volume II of Storage and Disposition. It's stated that the facility currently is using 836 million liters, which would be about 221 million gallons a year, when Amarillo set a new one-day record for 92 million gallons a year and -- or in one day, in June 26th of 1994.

We just don't have enough water for the DOE projects. Thank you.

MR. MATNEY: Thank you, sir. I believe our next speaker is Marcia Keevan. Miss Marcia Keevan.

MS. KEEVAN: This opportunity to comment on the future of the nuclear weapons

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HT02-003 (CONTINUED)

COMMENTS REGARDING PANTEX HEARINGS

AMARILLO, TEXAS, APRIL 22, 1996 by JIM OSBORNE

I am Jim Osborne and I farm across the road north from Pantex. We don't have enough water.

Amarillo dried up our domestic well ten days after they started pumping a well across the fence from us in 1965. Since then, we have lost 125 feet of water from static level. Most of Amarillo's. wells all located within a five mile radius of Pantex, two of which are within one-half mile of the north boundary, won't pump but one-half what they did earlier.

Pantex's wells are pumping only one-half the water they did at one time.

We don't have enough water for reprocessing. We don't have enough water for nuclear reactors.

According to an enclosure with the water bills a couple of years ago, Amarillo set a new one day record on June 26, 1994, for one day's pumping of 92 million gallons. They have pumped one and one-half times their allowable for at least the last six years. They have a variance from Panhandle Ground Water Conservation District if they would develope other sources of water. Amarillo, Southwestern Public Service and the Canadian River Water Authority have been swapping water rights to land that doesn't have enough water to justify development. I've heard that Amarillo drilled 10 test holes in

page 2

northeastern Potter County and the best test they had was 320 gallons per minute. So they didn't develope that field. I have heard a rancher say he couldn't even get good livestock water in places.

Amarillo is not worried about contamination of the Ogallala aquifer! They are going to dry up their well field here in Carson County north of Pantex before it becomes contaminated.

I understand the city is refurbishing old wells in the field southwest of Amarillo that they already pumped almost dry and abandoned 25 years ago. They won't pump much water from these wells. They are already talking water use restrictions for the city for this summer. They should practice good water conservation anyway.

From where will Pantex import water and at what cost for plutonium processing/reprocessing or for cooling nuclear generators?

I understand that a property owner may sue a government entity or entities for devaluating the land more that 25%. Our land has certainly been devaluated more than that.

If it takes 10 to 15 years to get a reactor into production and the expected life of that reactor is about 40 years, from where is the water coming in at what cost?

I find a tremendous descrepancy in the groundwater withdrawal stated in Volume II of Storage and Disposition. It stated the facility currently use is 836 million liters (221 million galons per year) when Amarillo set a new record for one day's pumping of 92 million gallons in one day, June 26, 1994.

We just don't have enough water for any new DOE projects.

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HT02-04

and at what cost for plutonium reprocessing or for cooling nuclear generators?

I understand that a property owner may sue a government entity for devaluing the value of their land more than 25 percent. Our land has certainly been devalued more than that.

If it takes 10 to 15 years to get a reactor into production, and the expected life of that reactor is about 40 years, from where is the water coming and at what cost?

I find a tremendous discrepancy in the groundwater withdrawals stated in Volume II of Storage and Disposition. It's stated that the facility currently is using 836 million liters, which would be about 221 million gallons a year, when Amarillo set a new one-day record for 92 million gallons a year and -- or in one day, in June 26th of 1994.

We just don't have enough water for the DOE projects. Thank you.

MR. MATNEY: Thank you, sir. I believe our next speaker is Marcia Keevan. Miss Marcia Keevan.

MS. KEEVAN: This opportunity to comment on the future of the nuclear weapons

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complex is a democratic process, and I like democracy. But do we, after four years of solid attempts to end the secrecy surrounding the contaminated facilities of the cold war effort, do we yet have enough information to give you of the DOE our informed consent?

HT02-04/1
23.023

Are all of the important damage reports in the public domain, or are many vital documents concerning soil, air and groundwater contamination still being suppressed?

HT02-04/2
06.037

We cannot fix a problem we are not permitted to face. I call on the DOE, Mason & Hanger, the unions, the DOD, the City of Amarillo and the State of Texas to correct, once and for all, this unethical situation that prohibits documents such as the Zone 12 Groundwater Assessment proposed by Argonne National Lab from being easily available to the general public as well as to our civic leaders.

How can you ask a community to look forward when we are not even permitted an honest peek back in time, when we cannot even view an accurate picture of the present situation?

The contamination history of the Pantex Plant, as well as its implications to our

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present and our future well-being, is not the type of information that should be withheld and played with. We own this contamination. The citizens of America pay the DOE's bills. It is not un-American to expect the government to account for its actions; rather, it is exactly what a democratic government should expect of its citizens.

What a very sad day this is. This is a day when some of our leaders have demonstrated that we aren't civil enough to handle the truth.

Some identify the act of requiring government to account with the act of yelling fire in a crowded theater. Such a comparison is both untrue and un-American.

Are my fellow citizens to become an unruly, riotous lot if we discover that some of our -- in our leadership haven't had our best interests at heart? Are we too immature, after 200 years of democracy, to handle the truth about mistakes that we have allowed our government to make?

Will you, of the DOE, respect our comments and our opinions when you know that we

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are only submitting these based on half-truths and half of the information?

This political infighting must stop. The facts need to see the light of the day and the public needs to hear them.

Some of the hidden information is depressing. Oh, well. Some of the hidden information involves deception. Unfortunate. And some of the hidden information shakes our fragile perceptions of reality, and that's life, folks.

Improving the condition of the human spirit is still a noble pursuit, and any contributions that we can make towards this is well worth the effort.

Do not underestimate our democracy. Our nation fought a long, bitter, cold war. And yet, have we honored the American casualties of that war, the sacrifices made by unknowing men, women and children, even children yet to come?

Failure to recognize such sacrifices made for a long, costly war is unpatriotic. The continuing attempts to try and diminish the damage done by cold war contamination serves only to dishonor the dead and still dying casualties

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HT02-04 (CONTINUED)

in our nation.

Whether we are in or out of uniform, life is life, and lives sacrificed in war deserve recognition and not scorn.

Pantex is directly on a geological fault. This fault has been active during this century. Earthquakes strong enough to crack a farm building have occurred.

HT02-04/3
13.005

Pantex, the Superfund site, is currently operating under no permit with the State of Texas. Records show that Pantex is monitored for some 160 different contaminants.

HT02-04/4
06.021

And why is it being monitored for these contaminants? Because they didn't know it, but they sent it into the groundwater. And I am addressing you as Pantex, but this forum also needs to address the fact that these discharges are only monitored, contaminant by contaminant.

I call on the DOE and the State to give us a broader spectrum. I really don't want a glass of drinking water with 10 to 100 teeny, tiny little contaminants in it that are all below levels and are considered safe. I do not consider that safe.

HT02-04/5
07.002

The use of strontium-90 to test

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HT02-04/5
07.002
continued

containment at the firing sites is an unacceptable, unpleasant fact to me. Please tell me more about this, as well as the other open air experiments conducted at the site.

I'm sorry, I'll hurry up.

HT02-04/6
07.003

DU particles from test explosions at the firing site spread into the air, land and water off site. DU is toxic and radioactive. While I thank you for starting to clean it up, once again, I must say, tell us more.

I closing, I regret that our local business leaders used your hearings to blast the United States President and the Honorable Secretary. I appreciate all efforts to make the very negligent, dangerous energy industry safer and more accountable. Thank you.

MR. MATNEY: Thank you, Ms. Keevan. Do you have a copy for us?

MS. KEEVAN: I'm finishing it.

MR. MATNEY: Okay. Thank you.

Our next speaker is Harriet Martin.

MS. MARTIN: My name is Harriet Martin. Is this working?

MR. MATNEY: That's just for the television.

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Marcia Keevan
Amarillo, Texas

This opportunity to comment on the future of the nuclear weapons complex is a democratic process, and I like democracy. But, do we, after four years of valid attempts to end the secrecy surrounding the contaminated facilities of the Cold War effort, do we yet have enough information to give you of the D.O.E. our informed consent? Are all of the important danger aspects in the public domain, or are many vital documents concerning soil, air, and groundwater contamination still being suppressed?

We can not fix a problem we are not permitted to face. I call on the D.O.E., Mason & Hanger, the unions, the D.O.D., the City of Amarillo and the State of Texas to correct, once and for all, the unethical situation that prohibits documents such as the Zone 12 Groundwater Assessment (which was prepared by Argonne Nat. Lab) from being easily available to the general public as well as to civic leaders.

How can you ask a community to look forward when we are not even permitted an honest peek back in time? When we cannot even view an accurate picture of the present situation? The contamination history of the Pantex Plant, as well as its implications ~~to~~ on our present and future well-being, is not the type of information that should be withheld. We own this contamination. The citizens of America pay the D.O.E.'s bills. It is not "un-American" to expect the government to account for its actions. Rather, it is (accounting) exactly what a democratic government must do.

What a very sad day this is. This is a day in which some of our leaders have (implied) demonstrated that we aren't civil enough to handle the truth. Some identify the act of requiring government to to account with the act of yelling "fire" in a crowded theater. Such a comparison is both untrue and un-American.

Are my fellow citizens to become an unruly, riotous lot if we discover that some in our leadership have not had our best interests at heart? Are we too immature, after 200 years of democracy, to handle the truth about mistakes we have allowed the government to make? Will you, of the D.O.E., respect our comments and opinions knowing that we are submitting these based on only partial truths?

This political in-fighting must stop. The facts need to see the light of day, the public needs to hear them. Some of the hidden information is depressing — OH WELL! Some of the hidden information involves deception — UNFORTUNATE. Some of the hidden info shakes our fragile perceptions of reality — THAT'S LIFE, FOLKS!

Improving the condition of the human spirit is still a noble pursuit, and any contributions we can make towards such is worth it.

HT02-04 (CONTINUED)

Let us not underestimate our democracy. Our nation fought a long, bitter, Cold War, and yet, have we honored the American casualties of that war? The sacrifice made by unknowing men, women, children, and even children yet to come? Failure to recognize such sacrifice made for such a long, costly war is unpatriotic.

The continuing attempts to try to diminish the damage done by Cold War contamination serve only to dishonor the dead and and still dying casualties in our nation. Whether we are in or out of uniform, a life is a life, and lives sacrificed in war deserve recognition, not scorn.

Pantex is directly on a geological fault. This fault has been active during this century. Earthquakes strong enough to crack a farm building have occurred.

Pantex, the Superfund site, is currently operating under no permit with the State of Texas. Records show that Pantex is monitored for some 160 different contaminants. Why?

(next page, first paragraph, then this)

I call on the D.O.E and the State of Texas to establish a standard for multiple contaminants in water rather than measuring contaminant by contaminant. I do not wish to have a glass of drinking-water with 20-100 tiny weeny contaminants, all of which individually fall below "safe" drinking water standards.

Pantex did not know that such contamination would spread to the groundwater.

The use of Strontium-90 to test ~~containment~~ containment at the firing sites is an un-acceptable, unpleasant fact. Please tell us more about this, as well as the other open air experiments conducted at the site. DU particles from the test explosions at the firing sites spread into the air, land, and water on and off site. DU is toxic and radioactive. While I thank-you for starting to clean it up, once again I must say, tell us more!

In closing, I regret that our local business leaders used your hearings to blast our United States President and Honorable Sec of Energy. I appreciate all efforts to make a historically negligent, dangerous industry safer and more ~~accountable~~ accountable.

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HT02-05

containment at the firing sites is an unacceptable, unpleasant fact to me. Please tell me more about this, as well as the other open air experiments conducted at the site.

I'm sorry, I'll hurry up.

DU particles from test explosions at the firing site spread into the air, land and water off site. DU is toxic and radioactive. While I thank you for starting to clean it up, once again, I must say, tell us more.

I closing, I regret that our local business leaders used your hearings to blast the United States President and the Honorable Secretary. I appreciate all efforts to make the very negligent, dangerous energy industry safer and more accountable. Thank you.

MR. MATNEY: Thank you, Ms. Keevan. Do you have a copy for us?

MS. KEEVAN: I'm finishing it.

MR. MATNEY: Okay. Thank you.

Our next speaker is Harriet Martin.

MS. MARTIN: My name is Harriet Martin. Is this working?

MR. MATNEY: That's just for the television.

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MS. MARTIN: Okay. I don't have a prepared statement. I have made statements in the past, and -- but I would like to say that I am a native of Amarillo, and I was a long-time resident of Canyon, a place that I care very much about.

And I recently moved to Ohio, but this doesn't lessen my concern for this area, because I've come back for a visit now and I see, in the midst of this drought, how very fragile everything looks and much care it needs to remain viable and remain in such a condition that it will support people and it will be a pleasant place to live.

And I would like to address my remarks especially to the CEO of the Department of Energy, because I really can't deal with a lot of the details of the documents that are now under consideration.

But to address the big picture, it seems to me that the Pantex Plant, with good intentions, has evolved during the cold war into a place which essentially now is a candidate for processing a great deal of toxic substances in the midst of America's bread basket, America's

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prime agricultural lands, and that this is an evolution which has gone on and has come to this point without a plan.

This was not thought of as a plan in the forties and the fifties, when Pantex originated, and that it has essentially developed into something that's quite inappropriate for our area.

It's quite inappropriate for our delicate soils, our delicate -- our insufficient, perhaps, in the future, water supply.

HT02-05/1
07.001

It's inappropriate for the reasons that winds here and storms here are very strong and tend to have much far -- more far-reaching effect than they do in other parts of the country, and also, because it happens to be located right adjacent to an international air field. And also, it happens to be close to a town of some hundred thousands of inhabitants, and it's -- which is the center for many other small towns which are dependent on it for medical and all sorts of other commercial things.

So, to me, Pantex has become something quite -- which was quite, perhaps, unintentional, but it has become something that

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isn't -- it isn't appropriate any longer for massive processing of very toxic substances, because it's very dangerous now to this area.

And I don't feel that it would be appropriate to set up a lab in one's kitchen, where one concocted all sorts of pesticides or poisons. Any more, I don't feel it's appropriate to have a plant and to enlarge the function of a plant which is dealing with very toxic things which have proven that they can't be contained in the past in the midst of America's prime agricultural area, prime arable land.

This soil here is -- is very good by comparison to many areas of the world. Perhaps it ranks in the very small percentile of such soils.

And to have soils combined with an aquifer which supplies -- which supplies underground water, this is something very rare, very precious. This is something we cannot construct. We cannot make this. We cannot make these soils. We cannot make this underground water.

We can take this plutonium processing to some place where it will not be so

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HT02-05 (CONTINUED)

inappropriate, and hopefully, preserve what is really good about the High Plains. Thank you.

MR. MATHEY: Thank you, Ms. Martin.

We've had some people come in. Let me reiterate the DOE officials that are here to listen to your comments, and then we'll resume with our speakers.

From the Albuquerque office, DOE office, is Patricia O'Guin. Sitting next to her is Bert Stevenson. He is from the Washington, D.C. DOE office, and Steve Chase is here also from Washington, D.C., DOE. Donna Cargle (sic) is our court reporter.

We'll continue, then, with our next speaker, and it is Mr. Jim Murphy.

MR. MURPHY: Before I begin my formal statement, which is actually quite brief, possibly the most brief you'll have this evening, I just want to tell you that I appreciate having this particular format -- this public comment format as a part of these public hearings.

I think there's been some movement away from that the last couple of meetings here, and I think that's regrettable. I think there's a number of people, citizens, for one reason or

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HT02-06

inappropriate, and hopefully, preserve what is really good about the High Plains. Thank you.

MR. MATNEY: Thank you, Ms. Martin.

We've had some people come in. Let me reiterate the DOE officials that are here to listen to your comments, and then we'll resume with our speakers.

From the Albuquerque office, DOE office, is Patricia O'Guin. Sitting next to her is Bert Stevenson. He is from the Washington, D.C. DOE office, and Steve Chase is here also from Washington, D.C., DOE. Donna Cargle (sic) is our court reporter.

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another, maybe comfortability, maybe lack of assertiveness, maybe time factors, that can't come and sit at a half day or an all-day workshop and express themselves comfortably in that kind of a setting, and I think having this as a component of these public hearings allows more individuals, more citizens to be able to come and express themselves on these very critical issues.

This is my rather brief statement.

My name is Jim Murphy, and I'm a federal employee, like yourselves. I've been an Amarillo resident since 1977. I am active in a variety of community organizations and am on a number of community boards, including a local public school board.

I'm here tonight to respectfully express an emphatic no to any expansion or added roles at Pantex that include plutonium processing or nuclear waste storage.

Although such expansion or new missions may have some positive economic benefits for the area, there would be economic risks as well. And at any rate, it is apparently necessary to occasionally reiterate that there are some things that money can't buy and some

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things in life that are more important than economic bottom lines.

I count amongst these things a safe and clean environment for our traditional agricultural and cattle-raising industries and ways of life, a clean aquifer, and a safe and healthy environment for our children and grandchildren.

Plutonium processing and/or nuclear waste storage are hostile and unfriendly to those environments and ways of life and not worth whatever the price may be. The tantalizing apple of prosperity beckons, but when it is the fruit of the plutonium tree, we'd best look elsewhere. I thank y'all.

MR. MATNEY: Thank you, Mr. Murphy.

MR. MURPHY: Thank you, Paul.

MR. MATNEY: Uh-huh. Our next speaker is Tamara Snodgrass.

MS. SNODGRASS: It's Tamara Snodgrass. And I really don't like speaking in public.

I came over today trying to have an open mind, but I realize that after listening to the City, the State, federal elected officials,

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I am Jim Murphy and I have been an Amarillo resident since 1977. I am active in a variety of community organizations and am on a number of boards including a local public school board.

I am here tonight to respectfully express an emphatic "No!" to any expansion or added roles at Pantex that include plutonium processing [illegible] nuclear waste storage. Although such expansion or new [illegible] may have some positive economic benefits for the area, the[illegible]ld be economic risks as well.

At any rate, it is apparently necessary to occasionally reiterate that there are some things that money can't buy and some things in life that are more important than economic bottom lines.

I count amongst these things a safe and clean environment for our traditional agricultural and cattle-raising industries and ways of life, a clean aquifer and a safe and healthy environment for our children and grand children. Plutonium processing and/or nuclear waste storage are hostile and unfriendly to these environments and ways of life and not worth whatever the price may be.

The tantalizing apple of prosperity beckons; but when it is the fruit of the plutonium tree, we best look elsewhere.

Jim Murphy
6711 Columbia Ln.
Amarillo, TX 79109

4-22-96

HT02-07

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Plutonium processing and/or nuclear waste storage are hostile and unfriendly to those environments and ways of life and not worth whatever the price may be. The tantalizing apple of prosperity beckons, but when it is the fruit of the plutonium tree, we'd best look elsewhere. I thank y'all.

MR. MATNEY: Thank you, Mr. Murphy.

MR. MURPHY: Thank you, Paul.

MR. MATNEY: Uh-huh. Our next speaker is Tamará Snodgrass.

MS. SNODGRASS: It's Tamara Snodgrass. And I really don't like speaking in public.

HT02-07/1 23.003

I came over today trying to have an open mind, but I realize after listening to the City, the State, federal elected officials,

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HT02-07/1 23.003 continued

this is a done deal. The most we can hope for is a safe facility. Thank you.

MR. MATNEY: Okay. Thank you. Our next speaker is scheduled at 7:35. I believe that Mr. Seevald is here. We can begin or we can wait a little bit. Would you like to go ahead?

MR. SEEWALD: I defer to you. I'm willing to proceed.

MR. MATNEY: Let's do that. And we certainly don't want to prohibit anybody who's scheduled, but we can be a little ahead, I think. Mr. William Seewald.

MR. SEEWALD: I do have a copy for you.

MR. MATNEY: Okay, thank you.

MR. SEEWALD: Thank you. I really appreciate the opportunity to address you, and I appreciate the fact that you are willing to be here to receive our comments.

Given the time allotted and the amount of information to be covered in these workshops, remarks will certainly have to be brief and abridged.

However, notwithstanding the voluminous issues of great concern, some

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HT02-08

this is a done deal. The most we can hope for is a safe facility. Thank you.

MR. MATHEY: Okay. Thank you. Our next speaker is scheduled at 7:35. I believe that Mr. Seewald is here. We can begin or we can wait a little bit. Would you like to go ahead?

MR. SEEWALD: I defer to you. I'm willing to proceed.

MR. MATHEY: Let's do that. And we certainly don't want to prohibit anybody who's scheduled, but we can be a little ahead, I think. Mr. William Seewald.

MR. SEEWALD: I do have a copy for you.

MR. MATHEY: Okay, thank you.

MR. SEEWALD: Thank you. I really appreciate the opportunity to address you, and I appreciate the fact that you are willing to be here to receive our comments.

Given the time allotted and the amount of information to be covered in these workshops, remarks will certainly have to be brief and abridged.

However, notwithstanding the voluminous issues of great concern, some

29

reference must be made to the process.

Combining these three documents into a single opportunity for a public input, together with the very short amount of time that much of the material has been available does justice neither to the NEPA process itself, nor to the people and agencies that wish to make reasoned responses to these documents.

At least in the case of the Stockpile Stewardship, as well as the Storage and Disposition, the documents are substantive enough to require careful analysis. It is also an unavoidable conclusion that the hearing process envisioned by NEPA has been transformed into a format that can more effectively control the output, that being the workshops.

There is nothing wrong with workshops per se, but they do not meet the government's full responsibility to the public. That any of us are standing here to give testimony is only the result of citizen lobbying and the willingness of individuals to face down any obstacles to get their concerns into the public domain.

One overriding point must be made

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regarding the Stockpile Stewardship & Management document, even though one hopes we look to the cumulative impact of all three.

It is clear that one of the premises compelling much of the decision-making process is the extraordinary attempt by the government to justify the continued operation of all three of its major weapons laboratories, Los Alamos, Sandia and Lawrence Livermore.

The redundant laboratory capacity built during the cold war to spur competition amongst the laboratories can now only be characterized as an obscene abuse of the taxpayer's pocketbook.

That such a political decision gets made in Washington is certain no surprise, but it is incumbent on all of us to demand accountability in these decisions and to refuse to acquiesce in expedient political decisions as well as those that are based on bad science or a disregard for the national resources of the Texas Panhandle.

The Storage and Disposition document, with its potentially momentous effect on our area, is tragically flawed in three areas.

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Number one, it doesn't really live up to the second part of its title. If long-term storage decisions are to be made, it seems absolutely essential that they be informed by at least a fairly concrete sense of the method of disposal, as well as where that might happen, the time frame and a reasonable consideration of the processes themselves.

Secondly, this EIS, as with the others under consideration today, does not make a realistic distinction between strategic and surplus plutonium. The effort to maintain two-thirds of all the plutonium ever produced in the U.S. as strategic evidences a less than serious commitment to disarmament, as well as giving rise to the suspicion that some effort is afoot to generate commerce in plutonium is superseding the security need to immobilize this dangerous substance.

Thirdly, this document sets out options that would obligate plutonium processing, generating all kinds of new nuclear waste streams that have never existed at Pantex before. The document gives little or no consideration at all to the effects of this on Panhandle agriculture.

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HT02-08 (CONTINUED)

Just the threat of contamination from these activities could devastate the marketability of our products.

It furthermore remains unconscionable that the -- that apparently, consideration other than the water needs of domestic and agricultural usage seem to preclude the realistic designation of the Ogallala aquifer as an aquifer eligible for the fullest protection of federal law and policy.

The Site-Wide EIS is an effort brought about by citizen lobbying of the Department of Energy, and it has not really been in the public domain long enough for detailed consideration.

Unfortunately, the substance of the document itself may require much less time than the gravity of the issues warrant. There is, again, no consideration of the most basic industry of the Panhandle, agriculture.

The agreement to evaluate alternative sites for pit storage, specifically, Department of Energy sites, seems to have been an insubstantial one, since the site is not included in the actual EIS for storage.

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If, as implied in the analysis, Manzano mountain becomes ineligible because of the threat such a facility represents to Albuquerque, what are we to make of the government's concern for the residents of the Panhandle?

Sad to say, we hear more about jobs than grave issues relative to safety and the protection of our national re -- natural resources.

But the best way, absolutely, to protect jobs in the Panhandle, whether it's in agriculture or at the Pantex Plant itself, is to keep the plant from becoming the next Rocky Flats. When that happens, the only jobs will be for nuclear waste handlers and the State regulators who can only step in after the damage is actually done but who have no federally-mandated authority over many of the proposed functions being proposed.

On top of the Ogallala aquifer is the wrong place, the wrong place for plutonium storage, nuclear waste facilities or any kind of plutonium processing. Thank you.

MR. MATHEY: Thank you, Mr. Seewald.

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PANTEX WORKSHOPS April 22, 1996
Statement by William H. Seewald

Given the time allotted and the amount of information to be covered in these "work-shops," remarks will have to be brief and abridged. However, notwithstanding the voluminous issues of great concern, some reference must be made to the process.

HT02-08/1
23.001

Combining these three documents into a single opportunity for public input together with the very short amount of time much of the material has been available does justice neither to the NEPA process itself, nor to the people and agencies that wish to make reasoned responses to these documents. At least in the case of the Stockpile Stewardship as well as the Storage and Disposition, the documents are substantive enough to require careful analysis. It is also an unavoidable conclusion that the hearing process envisioned by NEPA has been transformed by DOE into a format they feel they can more effectively control — that being the workshops. There is nothing wrong with workshops per se, but they do not meet the government's full responsibility to the public. That any of us at all are standing here to give testimony is only the result of citizen lobbying and the willingness of individuals to face down any obstacles to get their concerns into the public record.

One overriding point must be made regarding the Stockpile Stewardship and Management document even though one also must look at the cumulative impact of all three. It is clear that one of the significant premises compelling much of the decision-making process is the extraordinary attempt by the government to justify the continued operation of all three of the major DOE weapons laboratories, Los Alamos, Sandia, and Lawrence Livermore. The redundant laboratory capacity built during the cold war to spur competition can now only be characterized as an obscene abuse of the tax-payers pocketbook. That such a political decision gets made in Washington is certainly no surprise, but it is incumbent on all of us to demand accountability in these decisions, to refuse to acquiesce in expedient political decisions as well as those that are based on bad science or a disregard for the natural resources of the Panhandle.

The Storage and Disposition document with its potentially momentous effect on our area is tragically flawed in three important areas. Number one, it doesn't really live up to the second part of its title. If long-term storage decisions are to be made, it seems absolutely essential that they be informed by a least a fairly concrete sense of the method of disposal as well as where that will happen, the time frame, and a reasonable consideration of the processes themselves. Secondly, this EIS, as with the others under consideration today, does not make a realistic distinction between strategic and surplus plutonium. The effort to maintain two thirds of all the plutonium ever produced in the U.S. as "strategic" evidences a less than serious commitment to disarmament as well as giving rise to the suspicion that some effort to generate commerce in plutonium is superseding the security need to immobilize this dangerous substance. Thirdly, this document sets out options that would obligate plutonium processing, generating all kinds of new nuclear waste streams that have never existed at Pantex before. The document gives little or no consideration to the effects on Panhandle agriculture. Just the threat of contamination from these activities could devastate the marketability of our products. It furthermore remains unconscionable that apparently considerations other than the water needs of domestic and agricultural usage seem to preclude the realistic designation of the Ogallala as an aquifer eligible for the fullest protection of federal law and policy.

HT02-08/2
23.002
HT02-08/3
04.001
HT02-08/4
02.001

The Site-Wide EIS, an effort brought about by citizen lobbying of the Department of Energy, has not really been in the public domain long enough for a detailed consideration. Unfortunately, the substance of the document itself may require much less time than the gravity of the issues warrants. There is again no consideration of the most basic industry of the Panhandle, agriculture. The agreement to evaluate alternative storage sites for pits, specifically Department of Defense sites seems to have been an insubstantial one since that site is not included in the actual storage EIS. If, as implied in the analysis, Manzano mountain becomes ineligible because of the the threat such a facility represents to Albuquerque, what are we to make of the government's concern for the residents of the Panhandle?

Sad to say we hear more about jobs than grave issues relative to safety and the protection of natural resources. But the best way absolutely to protect jobs in the Panhandle, whether in agriculture or at the Pantex Plant itself, is to keep the plant from becoming the next Rocky Flats. When that happens the only jobs will be for nuclear waste handlers and the state regulators who can only step in after the damage is actually done but who have no federally mandated authority over many of the processing functions being proposed. On top of the Ogallala Aquifer is the wrong place for long-term storage of plutonium, nuclear waste facilities, or any kind of plutonium processing.

HT02-09

Our next speaker is Tracy Tucker. Is Tracy here? Do you have a substitute?

UNIDENTIFIED SPEAKER: She's not back yet. Doris said that she would take her place if you don't mind.

MR. MATNEY: All right. Is this Doris --

MS. SMITH: Smith.

MR. MATNEY: Okay. Doris.

MS. SMITH: Yes, sir. In a democracy, the voice of the people is important in any decision-making process, and especially now, with the decision regarding how our government will manage the surplus nuclear materials and what forms of disposition are being considered.

At this time, it is vital that all the right questions are asked to protect the natural resources of this area for the future generations of not only the Texas Panhandle and the State of Texas, but also, of the world.

Many issues come into play in this very overarching discussion, not the least among them, the cost to us, the taxpayer, to produce these documents, and then to find them flawed in

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so many ways.

These documents are lacking important information in many areas that make it virtually impossible to even begin the discussion. The overall cost to us, the taxpayer, and my neighbors, for implementing the expensive options that have been characterized in these documents are not prudent or wise.

Why is the Department of Energy so intent on building new research, development and testing facilities, when the entire world is looking to the United States for leadership in the extension of the Nonproliferation Treaty and to a zero threshold for a comprehensive test ban? Instead, the intent seems to be to continue to build and to test.

In the SSM PEIS, the scenario for these options in the downsizing of the nuclear weapons complex alone is expected to exceed 30 billion dollars within a decade. These proposed new facilities are expensive.

In this time of tight budget constraints, we, the grass roots people, should be imploring our congressional leaders to stop all this massive spending on projects which lead

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to a buildup in nuclear weapons. How many weapons do we need before we say, that's enough? How many warheads have we used?

It is time now, with the downsizing, to really actively pursue real downsizing. Do we want to continue to drag our country into further indebtedness by continuing nuclear weapons production?

What is the real reason behind pouring billions of dollars into defense? Are we trying to keep war and war games going in the pretense that this is the way to build peace and to achieve economic development in the rural communities across America?

This is a sunset industry. My friends and neighbors, we all understand this, and this needs to be managed as such.

What will the DOE and, for a matter of fact, all of us, do with the waste that will be generated for at least the next 20 years? There are no licensed facilities to accept the wastes that are now piled up in the facilities throughout the DOE complex. Why generate more than what needs to be generated?

We're now faced with storage and

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disposition of surplus fissile materials. Every option considered has tremendous waste streams attached to it. Where will these wastes go?

It seems quite evident to us that the site that creates the waste keeps the waste. Will that saddle communities across this country with the economic and the environmental problems of hosting waste treatment, storage and processing facilities?

In the PEIS, where were the impacts to the present agricultural economy which has built and sustained this area? Why were the risks to this economic stronghold not assessed? What will happen when we no longer produce food for people? Where is our priority? Are bombs more important than people?

We, in the agriculture area, strive to produce quality, wholesome food for the world population. One farmer feeds in excess of 131 people, yet the industry across the road from us builds bombs to annihilate people. Where is our sense of morality and respect for life?

The rest of my comments, I will just turn in. I imagine that was the time.

MR. MATNEY: Yes, ma'am. 15 seconds.

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HT02-09 (CONTINUED)

You may continue. Might as well finish.

MS. SMITH: The documents fail to address the issue of the location of Pantex over the Ogallala aquifer. Water and agriculture are the real wealth of the Texas Panhandle. Without them, there would be no Texas Panhandle. Food is the most important commodity we produce. It must be protected.

Please do not turn the Texas Panhandle, known for its beef and cereal grain production, into a plutonium waste site. You have created enough of these tragic land problems across the United States. There is no need to create another one.

It is very much like putting poison in your cereal bowl. When this area becomes contaminated, what have we gained? Thank you.

MR. MATNEY: Thank you, Ms. Smith.

Our next speaker is Trish Neusch.

And again, I'll be holding my hand up when you have 15 seconds left, but our intent is not to prohibit you from finishing, but rather, to just let you know that we're trying to hold to around five minutes.

MS. NEUSCH: Good evening. My name

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Comments for PEIS Public Hearing on
Storage and Disposition of Weapons-Usable Fissile Materials
and
Stockpile Stewardship and Management
Amarillo, TX April 22, 1996
Doris Betty Smith

In a Democracy the voice of the people is important in any decision-making policies regarding how our government will manage surplus nuclear materials and what forms of disposition are being considered. At this time it is vital that all the right questions are asked to protect the natural resources of this area for the future generations of not only the Texas Panhandle and the State of Texas, but of the world.

HT02-09/1
23.022

Many issues come into play in this very over-arching discussion. Not the least among them the cost to us the taxpayer to produce these documents and to find them flawed in many ways. These Documents are lacking important information in many areas that make it virtually impossible to even begin the discussion.

The over-all cost to you and me, neighbor, for implementing the expensive options characterized in these documents are not prudent or wise. Why is the Department of Energy so intent on building new Research, Development and Testing facilities when the entire world is looking to the U.S. for leadership in an extension of the Non-Proliferation Treaty, and a zero threshold for a Comprehensive Test Ban. Instead the intent seems to be continue to build and test!

In the SSM-PEIS the scenario for these options, in a downsizing of the nuclear weapons complex, alone is expected to exceed $30 Billion within a decade. These proposed new facilities are expensive! In this time of tight budget constraints, we the grassroots people should be imploring our Congressional leaders to stop all this massive spending on projects which lead to a build up in nuclear weapons. How many weapons do we need before we say, "That's enough?" How many nuclear warheads have we used?

It is time now, with the downsizing, to really actively pursue REAL DOWNSIZING. Do we want to continue to drag our country into further indebtedness by continuing nuclear weapons production? What is the real reason behind pouring dollars into Defense - are we trying to keep war and war games going in the pretense that this is the way to build peace and to achieve economic development in rural communities across America? This is a 'sunset industry', my friends and neighbors, and needs to be managed as such.

HT02-09/2
13.004

What will the DOE and "We" do with all the waste that will be generated for at least the next 20 years? There are no licensed facilities to accept the wastes that are piled up on facilities throughout the DOE Complex at this time - why generate more than needs to be generated.

We are now faced with storage and disposition of surplus fissile materials, every option considered has tremendous waste streams attached to any option. Where will this waste go? It seems quite evident that the site that creates the waste, keeps the waste. Will that saddle communities across this country with the economic and environmental problems of hosting waste treatment, storage and processing facilities?

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In the PEIS's where were the impacts to the present agricultural economy which has built and sustained this area? Why were the risks to this economic stronghold not assessed? What will happen when we no longer produce food for people, where is our priority? Are bombs more important than food? We in agriculture strive to produce quality, wholesome food for the world population -one farmer feeds in excess of 131 people, yet the industry across the road from us builds bombs to annihilate people. Where is our sense of morality and respect for life?

The documents fail to address the issue of the location of Pantex over the Ogallala Aquifer. Water and agriculture are the real wealth of the Texas Panhandle, without them there would be no "Texas Panhandle". Food is the most important commodity we produce - it must be protected.

Not all alternatives for siting the processes for storage and disposition were analyzed - if Manzano Weapons Storage Site at Kirtland Air Force Base has facility that could store 30,00 pits, why was it not further characterized in the other documents?

We say to you DOE, we want no storage of surplus plutonium at Pantex because it is dangerous and will lead to plutonium processing which results in additional waste generation and storage.

No processing of plutonium at Pantex since every plutonium processing facility has created large amounts of contamination which has adversely affected the workers and the public.

No waste disposal facilities at Pantex because we must preserve and protect the Ogallala aquifer.

Historically the plutonium at Pantex has been in pit form, now with these documents all of a the nation's weapons-usable plutonium not in active warheads will be stored at Pantex - plutonium will come to Pantex from Rocky Flats, Colorado; Hanford, Washington; Los Alamos, New Mexico; Savannah River, South Carolina; Nevada Test Site; and the Idaho National Engineering Lab. We find this unacceptable to an agricultural productive area.

No nuclear power reactors at Pantex - there is no need to construct them and the use of MOX fuel in them will not destroy the plutonium - it only creates more plutonium.

Please do not turn the Texas Panhandle, known for its beef and cereal grain production, into a plutonium waste site. You have created enough of these tragic land problems across the United States - the is no need to create another one here. It is very much like putting poison in your cereal bowl! When this area becomes contaminated - what have we gained?

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HT02-010

You may continue. Might as well finish.

MS. SMITH: The documents fail to address the issue of the location of Pantex over the Ogallala aquifer. Water and agriculture are the real wealth of the Texas Panhandle. Without them, there would be no Texas Panhandle. Food is the most important commodity we produce. It must be protected.

Please do not turn the Texas Panhandle, known for its beef and cereal grain production, into a plutonium waste site. You have created enough of these tragic land problems across the United States. There is no need to create another one.

It is very much like putting poison in your cereal bowl. When this area becomes contaminated, what have we gained? Thank you.

MR. MATNEY: Thank you, Ms. Smith.

Our next speaker is Trish Neusch. And again, I'll be holding my hand up when you have 15 seconds left, but our intent is not to prohibit you from finishing, but rather, to just let you know that we're trying to hold to around five minutes.

MS. NEUSCH: Good evening. My name

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is Trish Neusch, and I appreciate the chance to come before you as a concerned citizen and farmer and to be able to have my comments heard.

My husband, Ronnie, and myself have raised our four children on our family farm across from the Pantex Plant. We live directly across the road from the northwest corner of the plant.

I became very concerned recently, while reading the Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS. If you will notice, on page 2-80 of this document, a map displaying the conceptual facility location for the disposition of plutonium at Pantex. I inserted a map with my comments for that purpose.

If you will look in the northwest corner of the Pantex Plant site, there is a proposed site for an evolutionary light water reactor. I don't know what anyone else thinks, but I think -- I think it's a crying shame that any of these options are even being considered, much less actually built in the future in this rich, agricultural, productive area.

There are several of you who feel

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agriculture is not that important or beneficial to this area. I want you to think about that when you sit down to dinner tonight. That light water reactor is a farce. There is not enough water to ever touch being able to run a reactor, much less the cooling or recycling baths necessary for cooling the spent fuel generated from such a facility.

And I don't know about you, but I don't look forward to a reactor in my front yard. The document states several different places that there would be no impact to the water in the area, and I have news for you. If they start these processes across the road from my farm, it has been proven that our wells will be sucked dry.

And on page 4-714 of the document, they mention the minimal site impact over the six-year construction period. Transmission lines would be constructed and upgraded.

And I beg your pardon, but we had a fight recently with Pantex and Southwestern Public Service over the construction of a regular power line in front of our farm and down our fence line. They finally moved it at a cost of

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what they said was $8,000 to DOE and lots of headaches and sleepless nights on our part.

If they try to put these huge transmission lines in across from our house, you haven't seen anything yet. We haven't begun to fight.

My advice to the DOE is to think through these things well. This isn't near as friendly a site as you would be made to believe from listening to our so-called City leaders. Thank you.

MR. MATNEY: Thank you, Ms. Neusch.

We're still running quite a bit ahead of time now. Is Jan Sanders here? Jan Sanders?

Let's take a little stretch break, if we could, for about three or four minutes, and we'll wait for Mrs. Sanders. She is supposed to speak at 7:50.

(Recess.

MR. MATNEY: Jan, we're ready for you to speak.

MS. SANDERS: Okay. How do you do it? Do I look at you? Do I look at them?

MR. MATNEY: You can stand anywhere you'd like, if you'd like to stand at the podium,

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HT02-010 CONTINUED)

My name is Trish Neusch. I appreciate the chance as a concerned citizen and [illegible] to be able to give my comment here. My husband Ronnie and myself [illegible] raise our four children on our family farm [illegible] from the Pantex Plant. We live directly across the road from the northeast corner of the Pantex Plant.

I became very concerned recently while reading the Storage & Disposition of Weapons-Usable Fissile Materials Draft PEIS (S&D PEIS). If you will notice on page 2-80 of the document a map displaying the Conceptual Facility Location for the disposition of plutonium at Pantex. If you will look in the northwest corner of the Pantex Plant site there is a proposed site for an Evolutionary Light Water Reactor (ELWR). I don't know what anyone else thinks, but I think it's a crying shame that any of these options are even being considered, much less actually built in the future in this rich agricultural productive area. While there are several of you who feel agriculture is not that important or beneficial to the area, I want you to think about that when you sit down to dinner tonight.

The ELWR is a joke. There is not enough water to even [illegible] to be able to run a reactor much less the cooling (recycling) water necessary for cooling the spent fuel generated from such a plant. And I don't know about you, but I don't look forward to a [illegible]. The document states several different places that there would be no impact to the water in the area. I have news for you. If they start this process across the road from my farm, it has been proven that our wells will be sucked dry.

On page 4-714 of the document they mention the minimal site impact over the 6 year construction period. Fiber-optic lines would be constructed & upgraded. I tell you, pardon, but we had a recent problem with Pantex and Southwestern Public Service over the construction of regular power lines in front of our farm and down our fenceline. They finally moved them at a cost of $8000 to DOE & lots of headaches and sleepless nights on our part. If they try to put those huge transmission lines in across from our house, you haven't seen anything yet. We haven't begun to fight.

My advice to the DOE is to think through things well. This isn't near as friendly a site as you would be made to believe from listening to our so called city leaders.

Thank you,
[illegible]
335-9723
RR 2 Box [illegible]
Panhandle, TX

Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS TRISH NEUSCH

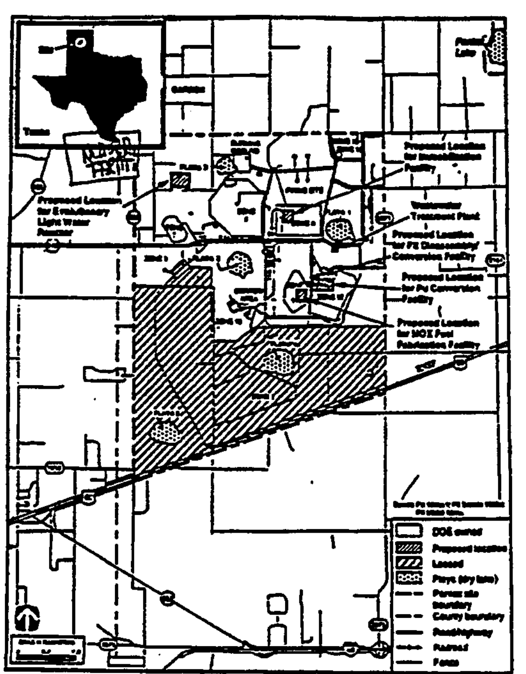

Figure 2.4-4. Conceptual Facility Location for the Disposition of Plutonium at Pantex Plant.

2-80

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HT02-11

what they said was $8,000 to DOE and lots of headaches and sleepless nights on our part.

If they try to put these huge transmission lines in across from our house, you haven't seen anything yet. We haven't begun to fight.

My advice to the DOE is to think through these things well. This isn't near as friendly a site as you would be made to believe from listening to our so-called City leaders. Thank you.

MR. MATHEY: Thank you, Ms. Neusch.

We're still running quite a bit ahead of time now. Is Jan Sanders here? Jan Sanders?

Let's take a little stretch break, if we could, for about three or four minutes, and we'll wait for Mrs. Sanders. She is supposed to speak at 7:50.

(Recess.

MR. MATHEY: Jan, we're ready for you to speak.

MS. SANDERS: Okay. How do you do it? Do I look at you? Do I look at them?

MR. MATHEY: You can stand anywhere you'd like, if you'd like to stand at the podium,

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and our comments are lasting about five minutes. When you get to where you have 15 minutes -- or 15 seconds left, I'll just raise my hand.

MS. SANDERS: Okay. I probably won't use the whole time.

I'm Jan Sanders. I live in Dallas, Texas. I'm the Chair of Peace Action Texas. We are affiliated with the National Peace Action, which is the largest grass roots peace organization in the country.

We work with other peace organizations around the world. We are a NGO at the United Nations. I'm proud to be a part of the peace movement of the world, and it is that part of why I'm here.

I do not feel like the basic issue that underlies all of these complex issues has been addressed; and that is, what kind of country do we want to be? What kind of security do we want to provide for ourselves and future generations?

I think it is an issue of morals. And that's a favorite of today, is it not, to try to decide how we're going to conduct ourselves in an international environment. Do we want to have

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the capability of destroying the planet?

I asked the question in the big room in there, what was the level of the stockpile of stewardship? And the answer was fuzzy, but it was 3,500 nuclear warheads plus some that were a matter of national secrecy. And I also understand that it takes about a hundred to bring about nuclear winter.

So, I think the fundamental question has not been asked about stockpile stewardship. And for what? For the destruction of the world?

I, recently, in this past year -- and I have, all of a sudden, a very splitting headache, and I might ask to speak later, to conclude my remarks, but I'll see how I do.

A young woman from Japan, a young peace activist, some 20 years old, who traveled with pictures of Nagasaki and Hiroshima around the world. Also, pictures of Japanese atrocities in Japan -- in China, going to areas where Japan brought their military machine of oppression down on others, building reconciliation, talking for peace. And it is that connection in the world that I think that this country, at some point, has got to address.

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We're approaching it gingerly. We have a nuclear testing moratorium in place. We have signed and are a party to the extension of the Nonproliferation Treaty. And, indeed, the draft documents make a mockery of our signature to a Nonproliferation Treaty that mandates us to work toward total disarmament of nuclear weapons.

And I am -- how we expect ourselves, as a free democratic society, to not live up in -- to the spirit of that obligation, how could we expect others around the world if we're not willing to lead?

I feel like our plans that are under discussion undermine the Nonproliferation Treaty. I think they undermine our efforts to a comprehensive test ban.

We're discussing a comprehensive test ban involving the nations of the world. We're right on the brink of something very historic and exciting, but the U.S. is playing King's X, that we're going to have a subcritical testing. That's a euphemism for continued nuclear bomb development, even though we possess thousands of nuclear warheads, enough to destroy the world and any enemy that might come along.

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HT02-11 (CONTINUED)

So the fundamental moral questions and issues that are at stake have not really been addressed.

And I made my trip up here -- and by the way, I'd like to conclude with the fact that to say that you wanted citizen input into this process and put forth pieces of documents that are 3500 pages long, telephone book size -- well, Dallas telephone book size, and then to combine them into three parallel, concurrent, overlapping discussions, is a mockerous -- a mockery of asking for citizen input.

I called the DOE and asked for advisement on making my plane reservations to come up here. And it was -- kind of got to be a joke by the time we were done, because even the staff cannot defend this.

I thought -- I was told that everything was going to be done by noon tomorrow, and now I get here and there's more in the afternoon. I might have made my arrangements in a different manner if I had known that possibility, and others in Dallas might have done also.

So thank you for this opportunity. I

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plan to augment it with things in writing.

MR. MATNEY: Thank you, Ms. Sanders.

We've had some new people come in in the last few minutes, and let me very quickly, before we get to our next speaker, reidentify our DOE officials who are here.

Patricia O'Guin is here from the Albuquerque office, Bert Stevenson is here from the Washington office, and Steve Chase is also here from the Washington office.

Our next speaker is Anna Marie Harkey. Anna Marie Harkey. Is Ms. Harkey here?

UNIDENTIFIED SPEAKER: She was supposed to speak.

MS. SANDERS: I know her room number, so I'll go check. But you might want to go to the next one.

MR. MATNEY: All right. Is Jerry Stein here? Jerry Stein?

Okay. Is Tracy Tucker here?

Okay, no Tracy. Tracy was a scratch earlier, and we'll try to squeeze her in somewhere if she shows.

Well, I hate to get too far ahead, so let's wait and see if one of our speakers show

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HT2-12

up.

Mavis Belisle is here? Mavis, would you like to speak now?

MS. BELISLE: Sure.

MR. MATNEY: Our speaker is Mavis Belisle.

MS. BELISLE: My name is Mavis Belisle, and I'm Director of the Peace Farm. I live directly across the highway from the southern boundary of the Pantex Plant.

It's my intent this evening to speak briefly to each of the Programmatic Environmental Impact Statements and to reserve comments on the Pantex Site-Wide EIS until a later meeting in June.

These documents are being addressed in this community as an economic and a jobs issue. While the local economy is undeniably important, both of these PEIS drafts deal with issues that have national and even international implications.

Those implications involve national and international security issues, they involve decisions about nuclear waste that we've been unable to make for more than 50 years, and they

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involve introducing new technologies with a wide range of health, safety and environmental risks, many of which are actually unknown. They deserve to be considered in that light, read thoughtfully and carefully, and addressed with more than pep rallies.

The Stockpile Stewardship & Management PEIS does not adequately make a case for development of more than 2.6 billion dollars in new capital costs and two billion dollars in development of a new super computer.

The reliability of the U.S. nuclear weapons arsenal has been tested over and over and over again.

The French just recently completed a series of tests designed, in their own explanation, to allow them to continue nuclear weapons development without underground testing by simulated tests and by computer models. No reasonable person -- and that means probably no third-world person -- country will look at the SSM PEIS proposals and believe that they have any purpose other than new nuclear weapons development.

The storage and disposition options

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provide us no good choices; reasonably so, because there are none.

The emphasis on the spent fuel standard may leave us with a false sense of security. Virtually every country which has developed nuclear weapons has done so from spent nuclear fuel. It may provide some level of security from theft by terrorists, but the nuclear nations of the world themselves hold hostage each other and every nonnuclear nation.

We have, for more than 50 years, been unable to resolve the issue of what is to be done with spent nuclear fuel. Producing more of it, or materials equally as toxic, is more problem and not solution. Thank you.

MR. MATNEY: Thank you, Ms. Belisle.

Is Anna Marie Harkey here?

MS. HARKEY: Yes, I am. Sorry.

MR. MATNEY: Anna Marie.

MS. HARKEY: I'm Anna Marie Harkey from Dallas. I realize that I'm not of this community, but the issues being discussed are vital and of concern not only here, but in our whole state, our country and the whole world.

I wish to address what is, for me,

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It is my intent this evening to speak briefly to each of the Programmatic Environmental Impact Statements, and reserve comments on the Pantex Site-Wide EIS until the June public meeting.

These documents are being addressed in this community as an economic and jobs issue. While the local economy is undeniably important, both of these PEIS drafts deal with issues that have national and international implications, ~~[illegible]~~ ~~deserve to be considered in that light~~ Those implications involve national and international security; the involve decisions about nuclear waste that we have been unable to make decisions about for more than 50 years; and they involve introducing new technologies with a wide range of health, ~~and~~ safety and environmental risks. They deserve to be considered in that light, read thoughtfully and carefully, and addressed with more than pep rallies about jobs.

The Stockpile Stewardship and Management PEIS, does not ~~[illegible]~~ adequately make a case for development of of more than $2.6 billion in new capital cost and $2 billion in development of a ~~[illegible]~~ new super computer. The reliability of US nuclear weapons has been tested over and over again.

The French just recently completed a series of tests designed to allow them to continue nuclear weapons development by simulated tests and computer models. No reasonable person can look at

HT02-12 (CONTINUED)

the proposed new facilities [illegible] and believe they have any purpose other than continued weapons development.

The storage and disposition options provide us no good choices; reasonably so, because there are none. The emphasis on the spent fuel standard may leave us with a false sense of security – virtually every country which has developed nuclear weapons has done so from spent nuclear fuel. It may ~~[illegible]~~ provide some level of security from theft by terrorists, but the nuclear nations of the world themselves hold hostage each other and the non-nuclear nations – We have for more than 50 years been unable to resolve the issue of what is to be done with spent nuclear fuel – producing more of it, or other materials equally as toxic, is more problem, not solution –

B. Marie Belisle
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335-1715

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HT02-13

provide us no good choices; reasonably so, because there are none.

The emphasis on the spent fuel standard may leave us with a false sense of security. Virtually every country which has developed nuclear weapons has done so from spent nuclear fuel. It may provide some level of security from theft by terrorists, but the nuclear nations of the world themselves hold hostage each other and every nonnuclear nation.

We have, for more than 50 years, been unable to resolve the issue of what is to be done with spent nuclear fuel. Producing more of it, or materials equally as toxic, is more problem and not solution. Thank you.

MR. MATNEY: Thank you, Ms. Belisle.

Is Anna Marie Harkey here?

MS. HARKEY: Yes, I am. Sorry.

MR. MATNEY: Anna Marie.

MS. HARKEY: I'm Anna Marie Harkey from Dallas. I realize that I'm not of this community, but the issues being discussed are vital and of concern not only here, but in our whole state, our country and the whole world.

I wish to address what is, for me,

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the basic issue underlying the Stockpile Stewardship & Management proposal. This issue which I'm going to address and which, for me, is basic, and I am not hearing addressed in these sessions, is a moral one. That is the possession, and therefore, the implied threat to use nuclear weapons of massive human and planetary destruction.

The DOE PEIS proposal for the stockpile makes a mockery of our national integrity: one, to be signers of the recent Nonproliferation Treaty; and second, as leaders in the Geneva discussions for a comprehensive test ban.

The costly expansion of nuclear weapons stockpiling in the proposal without any security justification is particularly alarming in light of the proposed cuts that will affect the lives of all children, including mine and my grandchildren, and the elderly of this country. Thank you.

MR. MATNEY: Thank you, Ms. Harkey. Would you like to leave your prepared text with us?

MS. HARKEY: Yeah. I'll have to make

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a copy of it.

MR. MATNEY: Okay. If you will do that and then get it back to us. You want to keep it?

MS. HARKEY: Okay. Maybe I should do that.

MR. STEVENSON: We have a copy machine right out there for that express purpose.

MR. MATNEY: There is a copy machine. It is located directly across from the registration desk in the lobby.

MS. HARKEY: Okay. I'll do that and I'll bring it back.

MR. MATNEY: Just go ask for some assistance.

MS. HARVEY: Thanks.

MR. MATNEY: Is Jerry Stein here? No Jerry Stein.

Is Tracy Tocker here? Okay. We're getting a little ahead of ourselves, but is Rita Calvert here? Rita, would you like to speak now?

MS. CALVERT: Thank you. I have a bit of a cough, but I'll try to -- my name is Rita Calvert. I'm the Director of the Dallas Peace Center.

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Issues of vital interest & concern for our state, our country, our world

Introduction —

I wish to address what is for me, the basic issue underlying the Stockpile Steward-ship and Management Proposal.

This ~~basic~~ issue - which is not being addressed in these sessions - is a moral one of the possession & therefore the threat - to use nuclear weapons of massive human and planetary destruction.

The DOE-PEIS proposal for the stockpile makes a mockery of our national integrity
1) To be signers of the recent non-proliferation treaty - and
2) As leaders in the Geneva discussions for a comprehensive test ban.

The costly expansion of nuclear weapon stockpiling in the proposal without any security justification, is particularly alarming in light of proposed cuts that will affect the lives of children - including mine and my grandchildren - and the elderly of this country.

Thank you -
Anna Marie Harkey
6335 Mimosa Lane, Dallas, TX 75230
- 214/363-[illegible]

HT02-14

a copy of it.

MR. MATNEY: Okay. If you will do that and then get it back to us. You want to keep it?

MS. HARKEY: Okay. Maybe I should do that.

MR. STEVENSON: We have a copy machine right out there for that express purpose.

MR. MATNEY: There is a copy machine. It is located directly across from the registration desk in the lobby.

MS. HARKEY: Okay. I'll do that and I'll bring it back.

MR. MATNEY: Just go ask for some assistance.

MS. HARVEY: Thanks.

MR. MATNEY: Is Jerry Stein here? No Jerry Stein.

Is Tracy Tucker here? Okay. We're getting a little ahead of ourselves, but is Rita Calvert here? Rita, would you like to speak now?

MS. CALVERT: Thank you. I have a bit of a cough, but I'll try to -- my name is Rita Calvert. I'm the Director of the Dallas Peace Center.

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I want to talk a little bit about the cost of the nuclear movement by reading some excerpts from an article that I had published in this magazine, Synthesis and Regeneration. And it's about my brother, Dr. Malcomb Stuart. This is kind of personal, but that's the way it is.

Mike was a quiet, sensitive older brother with a wacky sense of humor. He was a whiz at math and science, and he -- each year when we would ask him what he wanted for Christmas, he would reply with a wry smile, just a little peace and quiet.

He wasn't an egghead, though. He ran track, played terrific boogie-woogie and jazz piano, and he could -- he was also voted the best looking in his senior class. But he always had an underlying seriousness and a willingness to listen to his little sister.

He received his doctorate in nuclear physics in 1955 from the University of Iowa and then went to work directly for Westinghouse at the Atomic Division of Medicine in Pittsburgh.

We never really knew what he was working on because it was classified, but we

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found out later that he had been one of the senior scientists on the first atomic submarine, the USS Nautilus, and had worked with Admiral Rickover.

As the Vietnam war was ending, after he had worked there about 17 years, he decided he wanted to get out of the military use of nuclear power, and he went to work in Connecticut for Combustion Engineering, which was designing nuclear power plants at the time. He was in charge of the containment or safety of this operation.

After about five years, he became increasingly worried about the safety of the reactors, the construction and the fact that there could be a nuclear accident. So he asked to be loaned to the Electrical Research Institute in Palo Alto, California to be a consultant for a couple of years to work on alternate energy.

Well, he sold his house in Connecticut and moved. And about a month later, they diagnosed carcinoma of the lung. He continued to work for the eight months that he was there, and then on June the 2nd in 1979, he died.

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Since the time of writing this article, I've been asked by a lot of people as to whether my brother could have been exposed to excessive radiation in his work. Now that I know more about the issue, I'm sure of it.

He worked with atomic energy from 1951 to '79, and it was not exactly a time in history when we knew all of the dangers.

Three years after his death, his first wife, Sharon, developed leukemia and died within six months.

His youngest daughter, Holly, gave birth to a two and a half-pound child. His second daughter developed a fibroid tumor when she was pregnant, and the third daughter was childless for about 20 years, when she finally became pregnant at the age of 42.

But these events began to fit a pattern. Mack was a heavy smoker. He suffered from asthma and was probably very susceptible to lung irritation. But he was also exposed to who knows how much radiation for 20 years.

He made many trips to White Sands, New Mexico and doubtless many other nuclear installations. He suffered episodes of thyroid

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HT02-14 (CONTINUED)

and testicular inflammation, which destroyed those organs in the sixties.

But I have every reason to believe that he, and probably his whole family, have been exposed to the radiation and have had these as a combination of the tobacco and radiation.

In the last 17 years since he has been gone, I've tried to be there for his four children as well as mine, but I often wonder what he and his wife would have contributed to the world if they could have lived.

I know he was on his path from the military to the peaceful use, and finally, to the alternative use. He was one of the main people who worked in it, so I know that he knew the dangers, even though he didn't know it was to him.

So, when Fumiko Amano, who was a survivor of Hiroshima and a peace educator, came to my office at the Dallas Peace Center, we both mourned the loss of our brothers to the nuclear bombs.

And I just want to know, when will we listen to our scientists that are crying out and when will we destroy these weapons of destruction

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and learn to rely on nonviolent means of conflict resolution?

I feel that President Eisenhower was prophetic when he said, the world in arms is not spending money alone; it's spending the sweat of its laborers, the genius of its scientists and the hopes of its children. And for me, the price is too high. Thank you.

MR. MATNEY: Thank you, Ms. Calvert.

Ms. Calvert, do you have any written comments you'd like to submit?

MS. CALVERT: Not really, but I can make a copy of this.

MR. MATNEY: If you'd like to. There is a copy machine out in the lobby. Thank you.

Is Jerry Stein here?

UNIDENTIFIED SPEAKER: I don't see him.

MR. MATNEY: Is Tracy Tucker here?

UNIDENTIFIED SPEAKER: I haven't seen her either.

MR. MATNEY: Okay. Mr. Hancock, would you like to speak now?

MR. HANCOCK: Sure.

MR. MATNEY: Our speaker is Don

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"Just a Little Peace and Quiet" for Mac Stuart, All-American Physicist

[illegible]

[illegible]

Postscript

[illegible]

Call your Congressperson and both Senators today to ask that they oppose the trucking of nuclear waste from Maine and Vermont to dump on Sierra Blanca, Texas, upstream from Big Bend, 16 miles from the Rio Grande (or Bravo, as the Mexicans call it). Tell them to vote "No" on HR 558 and S. 419, the Texas Compact Bill, which we defeated in September, but which saw flurries of activity from proponents (including Texas Governor George Bush) in December and again in March. Also tell them to vote against the transfer of land in Ward Valley to California to build a nuclear dump near indigenous land, endangering non-human and human species. (H.R. 2334 and S. 1596) See back cover and inside back cover for more information

HT02-15

Hancock.

MR. HANCOCK: Good evening. I'm Don Hancock from Southwest Research and Information Center in Albuquerque.

HT02-15/1
23.018

I'll reiterate what some other people have already told you, that trying to deal with three documents, actually in less than 30 days that people have had all three of them together to compare, is clearly not an adequate amount of time. And one must conclude either the Department of Energy is in a very big hurry, and therefore, they won't give an adequate time for public comment or that they don't understand the difficulty of dealing with three documents like this.

HT02-15/2
23.019

The second thing, a number of people had expected that this format would also include time for DOE officials to respond on the record, and I continue to believe that that should be the case. Even though I know that it isn't, my suggestion is when we go back into the bigger room at the end, when we've been told there will be summaries of things, that there be a time for questions.

And a specific question that I would

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like to have answered in the larger room is what is in the classified appendix for the Disposition Programmatic Environmental Impact Statement is referred to on pages 4-771, 4-777 and 4-781 regarding the -- a variety of transportation-related information being in the classified appendix.

The classified appendix is not included in the index to the document, so I'm sure there may be some other places it's mentioned, but we need to have more adequate information than what's in it.

I've asked Mr. Stevenson's colleague, Dave Nolton, several times about this already, but I still don't have an answer yet, so I'd like it to be answered on the record tonight.

I'm going to confine my remarks tonight to the Disposition Programmatic Environmental Impact Statement because of the short amount of time. And there are several things that can be said quite quickly and directly about the document.

It is clearly an inadequate document. It doesn't meet the minimum requirements of the National Environmental Policy Act to discuss all

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reasonable alternatives. It includes no Department of Defense facilities. It includes no discussion of immobilization under international inspection or control that are reasonable alternatives that should and, in fact, must be included in this kind of document.

Regarding Pantex, it's clearly a totally inadequate document, because it does not understand and discuss the fact that Pantex is really not a suitable site for, really, any of the missions -- any of the alternative missions that are discussed in the document.

It's a small site. It's the smallest of the sites. It's the one that has neighbors and productive agricultural neighbors in close proximity. You've already heard from several of those folks tonight. As far as this document is concerned, those folks don't exist, and that's ridiculous and inappropriate, even for a programmatic document.

The water resources of the site are not adequate. The impacts of discharges -- wastewater discharges, whether treated as the document says that they would be, or not, on the playas, the perched aquifer, which are already

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contaminated, and underlying aquifers are not discussed.

The facility has no ability, no facilities to handle the low-level waste, the transuranic waste, the high-level waste or spent fuel that would be associated with many of these activities -- proposed activities, including all of the disposition options. It has no trained personnel and facilities to deal with those wastes as well. In fact, it never has dealt with those kinds of impacts on facilities.

Even on the storage options, the document is totally deficient in analyzing the environmental impacts because, among many examples, one very obvious one is it clearly has decided -- DOE has clearly decided on the basis of this document that long-term pit storage in Zone 4 is unsafe, but the document doesn't -- it doesn't provide any information on what's -- what -- why that's the case.

Instead, it assumes there would need to be new plutonium -- both strategic and surplus plutonium storage facilities built in Zone 12. The document, in fact, needs to deal with those issues.

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HT02-15 (CONTINUED)

It also assumes -- while it specifically states it is to discuss issues from 2005 on, it assumes that the existing environmental permits will be in effect in 2005. And as Betty Hollowell, who is here, the attorney for the Pantex Plant, and other people can testify, what sure things will be in permits ten years from now are not sure things.

So, again, for all these reasons and many more, this is a totally inadequate document dealing with the very serious issues of long-term storage and disposition of plutonium and highly enriched uranium. Thank you.

MR. MATNEY: Thank you, Mr. Hancock. And I would remind you, on your question on the classified appendix, there is a question and answer session scheduled tonight in the ballroom at 10:30.

MR. HANCOCK: I've already told the facilitator that I have about an hour's worth of questions, but I doubt there will be time for all of them.

MR. MATNEY: Mr. Hancock, do you have a written copy of your statements?

MR. HANCOCK: No, I certainly don't.

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Nobody else could probably read the notes either.

MR. MATNEY: Is Jerry Stein here? Still looking for Jerry Stein. Jerry's not here.

How about Tracy Tucker? Did she ever show? No Tracy.

Well, I'll tell you what. We have a little break built in. Is Paula Breeding here?

MS. BREEDING: Yes, I am.

MR. MATNEY: Ms. Breeding, are you ready to speak?

MS. BREEDING: That's fine.

MR. MATNEY: We'll take you, and then we'll check if our other speakers are here. If not, we'll take a little five-minute break. We've built a break into this session. So our speaker now is Paula Breeding.

MS. BREEDING: My name is Paula Breeding. I was born and raised in Amarillo. I am a convenor of the Board of Directors of the Peace Farm. I don't live by Pantex, but I do own land across from Pantex.

I am considered an environmentalist. Some people try to dismiss us as being tree-huggers. Well, I've never hugged a tree in my life. I am very concerned about the water in

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HT02-16

Nobody else could probably read the notes either.

MR. MATNEY: Is Jerry Stein here? Still looking for Jerry Stein. Jerry's not here.

How about Tracy Tucker? Did she ever show? No Tracy.

Well, I'll tell you what. We have a little break built in. Is Paula Breeding here?

MS. BREEDING: Yes, I am.

MR. MATNEY: Ms. Breeding, are you ready to speak?

MS. BREEDING: That's fine.

MR. MATNEY: We'll take you, and then we'll check if our other speakers are here. If not, we'll take a little five-minute break. We've built a break into this session. So our speaker now is Paula Breeding.

MS. BREEDING: My name is Paula Breeding. I was born and raised in Amarillo. I am a convenor of the Board of Directors of the Peace Farm. I don't live by Pantex, but I do own land across from Pantex.

I am considered an environmentalist. Some people try to dismiss us as being tree-huggers. Well, I've never hugged a tree in my life. I am very concerned about the water in

63

our area. It looks like our City fathers would be, since they are pumping our water that we drink from underneath Pantex and it can hurt them as much as anyone. However, they bragged about drinking water at Rocky Flats, so I guess we can't expect much from them.

I don't want plutonium stored here. However, we are doing it now, and I expect Pantex to be the dumping ground for plutonium. I am not an NMBE person. I don't want it here, but I don't think someone else should have the problem.

HT02-16/1 16.016 | It is too dangerous to transport as well.

We are asking for disaster if plutonium processing comes to Pantex. We will be another Rocky Flats, and probably worse.

There was an editorial in the paper today by a Pantex employee. He said, in part: In the event that Pantex is chosen to do new types of work and a different mission, the work force will decide whether to proceed or not. All the approval from DOE, the labs, Congress and the President himself will not persuade Pantexans to do something we think should not be done.

I guess that is one of the most naive statements I have ever heard. This might happen

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on private business, but I don't think an employee can tell DOE what to do. By the time he finds out how things are and how dangerous they are, it will be much too late. He will also find out that he can't make as much money as he does as Pantex.

I hope we can find some way to dispose of plutonium that is not hazardous to our land, water and air. If we do, then I guess miracles do happen. Thank you for your attention.

MR. MATNEY: Thank you, Ms. Breeding.

Before we take our break, is Jerry Stein now here? Still no Jerry.

How about Tracy? Any Tracy Tucker? No Tracy.

UNIDENTIFIED SPEAKER: What time period are you up to now?

MR. MATNEY: We are actually going to take a little break now. And when we resume, our 8:35 speaker is next up, unless one of the others shows.

Let me remind you, if any of you are in the room and would like to comment, if you would go out to the registration desk and

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HT02-17

closest to me is from the Washington, D.C. DOE office, as is Bert Stevenson, also DOE in Washington.

Let's see if we have any of our speakers who have arrived from earlier. Is Jerry Stein? No Jerry Stein.

How about Tracy Tucker?

Okay. That being the case, we're ready for Tom Patterson. Tom.

MR. PATTERSON: Here?

MR. MATNEY: Yes.

MR. PATTERSON: I'm Tom Patterson. I'm President of the Amarillo Chamber of Commerce. Let me read a statement, and then I will make a short comment.

First, regarding the Stockpile Stewardship Management PEIS, I support the selection of Pantex for weapons assembly and disassembly functions. I strongly favor the continuation of high explosive functions at Pantex and oppose any plan to move these functions to the national laboratories.

Since Pantex is the most cost efficient, cost effective DOE facility and enjoys the strongest local support, I can also support

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other -- additional of other environmentally sound stewardship and management functions at Pantex.

And then my comments on the Fissile Material Storage and Disposition PEIS. I believe that Pantex should be chosen as the location for fissile material storage and disposition functions. Pantex already stores surplus plutonium and the needed safety and security capabilities of the cost effective -- cost-effectively accommodate an expanding role.

Fair budgetory -- budget -- fair budgetary comparisons, strong local support and national security concerns should lead DOE to choose Pantex for new fissile material storage and disposition functions that are conducted in a safe environmentally sound function.

We will forward some 6,000 plus of these signed statements to DOE in the mail tomorrow to address both of the -- addressed both of these PEIS's.

This community continues to be overwhelmingly supportive of the role that Pantex has played in the past, and we look forward to new missions, expanded missions that are

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environmentally sound and environmentally secure -- safe and secure for Pantex.

I think that any reasonably-thinking person would come to this conclusion that we are looking for new missions, new employment at the Pantex Plant.

Certainly, these decisions must be made on a community-wide basis, community-involved basis, and not in the -- on scientifically sound documentation and not in the midst of a lot of hysteria and excited threats on either side.

We appreciate this ability -- chance to bring you this input. Thank you.

MR. MATNEY: Thank you, Mr. Patterson. Tom, do you have any prepared comments you'd like to --

MR. PATTERSON: I'll give you a copy.

MR. MATNEY: Okay. Thank you. We're -- we have a substitution speaker, Mr. Bill O'Brien. Bill.

MR. O'BRIEN: My name's Bill O'Brien, and if -- if I could, I'll just hand you a prepared statement and not -- I'll not bother to read it and then just make a comment.

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HT02-18

environmentally sound and environmentally secure -- safe and secure for Pantex.

I think that any reasonably-thinking person would come to this conclusion that we are looking for new missions, new employment at the Pantex Plant.

Certainly, these decisions must be made on a community-wide basis, community-involved basis, and not in the -- on scientifically sound documentation and not in the midst of a lot of hysteria and excited threats on either side.

We appreciate this ability -- chance to bring you this input. Thank you.

MR. MATNEY: Thank you, Mr. Patterson. Tom, do you have any prepared comments you'd like to --

MR. PATTERSON: I'll give you a copy.

MR. MATNEY: Okay. Thank you. We're -- we have a substitution speaker, Mr. Bill O'Brien. Bill.

MR. O'BRIEN: My name's Bill O'Brien, and if -- if I could, I'll just hand you a prepared statement and not -- I'll not bother to read it and then just make a comment.

MR. MATNEY: Thank you.

MR. O'BRIEN: I send the DOE quite a bit of information, and so I think I'd just like to make a couple of statements. And what Tommy Patterson had to say just made me think of something, so I thought, well, I won't even mention my statement.

When I got involved in the Pantex controversy, which was in 1991, it seemed like the whole issue was characterized by people that were for Pantex and people that were against Pantex.

You just heard Tommy saying, in about five minutes, about seven or eight times, that there is wholehearted support for Pantex. And I think there probably is wholehearted support for Pantex, but in the five years that we've had the Pantex issue out there in front of the people, there has been a lot of education take place, and there are a lot of people today that know a lot more about Pantex and about the missions that are taking place out there.

What that's meant for the issue is that no longer do you have people that are for Pantex and against Pantex. Now you have people

that are more sophisticated that are breaking down the different missions and looking at the different jobs that are taking place out there, and they're supportive, for the most part, of most of the work that's done out there.

Some of the proposed work that we're hearing talk about now, they're opposed to. If they bring plutonium reprocessing to Pantex, there's going to be a big battle in this community. Popular support, business support is against it. The MOX fuel idea, if it involves plutonium reprocessing, is going to have a hard time going anywhere.

The reasons for that are fairly simple. It doesn't make sense to target a mission for a geographic area of the country where the mission doesn't meet the area. This is an agricultural area, and we don't want to threaten an agricultural area by doing something dumb.

Now, doing something dumb, we know that new technologies will be available. We know that whatever they do will be done better than it was done in the past. But all you have to do is look to examples that you see every day in cases

like the mad cow's disease.

Here's a scandal that has knocked the U.S. beef market by ten percent. Never been a case of mad cow's disease in the United States, yet, today, but the cattle market here in this country has gone down ten percent just on the perception that people think, well, maybe there's a mad cow's disease in this country and maybe the beef in this country's tainted.

In the same way that if you have a nasty job like plutonium reprocessing take place in this area, you're going to eventually run the risk, because it's high risk business, of having an accident.

And even though it's contained, it's going to scare people, it's going to run them off these agricultural products, and it's going to threaten the area. And for that reason, I think it would be a big mistake. Thank you very much.

MR. MATNEY: Thank you, Mr. O'Brien. Is Gene Huff here?

Jerry Stein? Still looking for Jerry.

UNIDENTIFIED SPEAKER: We promise he really does exist.

HT02-18 (CONTINUED)

Operation Commonsense

April 22, 1996
DOE Hearing

THE LESSONS OF HISTORY

Five years ago the business community rallied for an event that was to hail a revival for the business fortunes of the Texas Panhandle. Hundreds of supporters and advocates of an enlarged Pantex paraded to the Civic Center, where boosters promised the crowd an expanded Pantex plant and 10,000 to 15,000 new jobs.

Local newspapers heralded the event as a spearhead for an economic renaissance and noted the unqualified and total support from the community. As details of the expanded operations were disclosed, a more sober appraisal revealed that some of the missions might be less than desirable and others far too risky for reasonable people, concerned with the area's long term best interest, to consider. Now after five years we know that not only did 10,000 jobs never materialize, no new jobs materialized and in fact Pantex has announced a cut back in jobs beginning in 1996. Wisely, the community decided not to tie its future to Pantex and now our economy is reponding nicely and there is every reason to believe this economic progress will continue.

Today this community is a better more informed community. Despite hundred of thousands of dollars spent by the city on a public relations campaign intended to scare residents into unconditional support for Pantex, citizens have developed a more cautionary approach, recognizing the important differences and distinctions in various missions considered for the plant. The often repeated scare tactics warning that Pantex is closing and Amarillo will quickly be a ghost town fall are no longer working and reasonable people have decided that some work at Pantex is fine and other work, like plutonium reprocessing, is unacceptable.

The day is gone when issues surrounding Pantex fit neatly into simplistic categories of "for Pantex or against it". Most of us support Pantex. The issues today surrounding future missions at Pantex are multi-layered issues often requiring technical, scientific and public policy inputs. While generally the local community supports disassembly and interim storage, the public is more ambivalent towards longer term storage and high explosive burning, and a clear majority are flat against plutonium reprocessing.

Plutonium processing has a long and troubled history in this country. The Scientific American Magazine, in the current month's issue, reports that Hanford Washington, only one site where processing took place, has spent $9 billion dollars thus far on cleanup and will spend one billion dollars per year for the next 40 years on additional cleanup work. The job currently employs 14,000 workers and is the largest civilian project in our country's history with cleanup representing more than one third of the DOE budget. Whether it is Rocky Flats

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Internet Address. whe@lto.com

[illegible]
[illegible]
[illegible]

or Hanford the story is always the same – total contamination of the sites and surrounding areas including damage to people, water, air and land. DOE call these areas "national sacrifice areas". We don't want to become a national sacrifice area.

The message here is simple. People are not prepared to sign off on a "anything goes" mentality. We are certainly not ready to be the national guinea pig for untested plutonium reprocessing technologies that have contaminated every site in the country and now require billions of dollars a year to restore and will continue to do so over the next few decades. We are not ready to sacrifice our quality of life, our agricultural assets, and our safety for a short term economic boost.

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HT02-19

MR. MATHEY: How about Tracy? Is Tracy here? No Tracy. Okay.

How about Anne Reid? Anne is scheduled at 8:55, so I'm sure she'll be here.

Danny Detten? Danny, would you like to speak now or do you want to wait a little while?

MR. DETTEN: If you'll let me recopy it later, I'll do it.

MR. MATHEY: Sure. Will do.

Our speaker is Danny Detten.

MR. DETTEN: Good evening. As Paul said, my name is Danny Detten, and I'm a neighbor to Pantex, having lived all 52 years of my life there.

My wife, Bernice, and I have four children and nine grandchildren, three of whom chose to live and farm and ranch around the north and east side of Pantex.

We are all very opposed to the processing and storage of plutonium. Water is more important than oil or gold to the Texas Panhandle. Agriculture and the cattle industry are far more important than Pantex.

So why are we even considering

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storage and processing plutonium? We are told if we support it, that it will protect some jobs and keep Pantex from being phased out completely.

In the real world, if a product is not needed, it normally isn't produced. Our water supply needs to be protected, and by -- storing and processing plutonium over the Ogallala aquifer is ridiculous.

We first supported Pantex out of patriotism, and to some extent, even the final assembly of nuclear warheads, because of patriotism. But people, patriotism works both ways. And Amarillo and DOE, you better wake up and start supporting us.

Our family has been here approximately 90 years at this location, and I assure you, it was not Pantex that made this area what it is today, but it sure may destroy its future. Thank you very much.

MR. MATHEY: Thank you, Mr. Detten.

Anna Reid? Gene Huff?

Okay. We'll be in a short recess, then, until our next speakers show up. Has anybody registered late to speak in the room? Okay. We'll just be in a short recess, then.

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My Name is Danny Detten and I'm a neighbor to Pantex having lived all 52 years of my life there. My wife Bernice and I have four children and 9 Grandchildren three of our children chose to live, farm and ranch around the north and east side of Pantex. We are all very opposed to the processing & storage of plutonium.

Water is more important than oil or gold to the Texas Panhandle. agriculture & the cattle industry are far more important than Pantex. So why are we even considering storage & processing plutonium we are told if we support it, This will protect some jobs & keep Pantex from being phased out completely. in the real world if a product is not needed it normally isn't produced.

Our water supply needs to be protected and by storing & processing plutonium over the Ogallala aquifer is ridiculous.

We first supported Pantex out of patriotism and to some extent the final assembly of nuclear warheads because of patriotism but people patriotism works both ways Amarillo & DOE. you better wake up and start supporting us.

Our family has been here approximately 90 years at this location & I assure you it was not Pantex that made this area what it is today but it sure may destroy its future.

thank you
Danny Detten

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HT02-20

(Recess.

MR. MATHEY: Ladies and gentlemen, let's be back in session. We have two more speakers.

We'll be back in session now. And since our speakers were not here during the introduction, let me just once again reidentify our DOE officials who are here. They're here as hearing officers, not to engage in dialog, but to simply listen and take your statements.

Bert Stevenson, the gentleman in the middle, is from the Washington office of DOE. Patricia O'Guin, on the far right, is from the Albuquerque DOE office, and Steve Chase is from the Washington, D.C. office.

And our next speaker is Gene Huff. Mr. Huff.

MR. HUFF: Thank you, sir. I'd like to point out, first of all, that the risk associated with the sort of tasks that we're talking about here -- and I might add, parenthetically, those tasks have got to be accomplished somewhere -- but those risks boil down in the last analysis, I think, to being a function of the work ethic and the dedication and

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the carefulness of the work force at the chosen site, the place you choose to do these things.

There's ample evidence that the work force in and around Pantex and in and around Amarillo has been very thoroughly and adequately tested and found to be outstanding in every respect. And I -- I give to you, as a source of that, some personal comments I have heard from the very highest levels at the Pentagon in the U.S. Army Aviation Logistics Offices in charge of procurement of helicopters.

When the Bell Helicopter plant here in Amarillo was closed because of internal corporate decisions on the part of Bell Helicopter, the Army was really dissatisfied and extremely unhappy, because they had found over the years that their very best product and the highest level of productivity was found right here at the Amarillo plant of Bell Helicopter. It exceeded that of any other production plant in the United States.

If you like, afterwards, I could give you the names of these individuals I was fortunate enough to know at that time. They found that this -- this plant's production was

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consistently superior in quality. They had less -- a smaller number of rejects of helicopters here than at any other plant they had and less work stoppages or problems with the work force here. Their productivity was greater per worker here than at any other place.

Admittedly, these are general concerns, but as I said before, these things have got to be done somewhere, and it matters not to me whether I live in Amarillo or Houston or Washington or where. The decision ought to be made based on where can they best be done for the interests of this country.

I've got friends and associates all over the country, and I would feel better knowing that these activities were being conducted right here in my own backyard by people who live and work here in Amarillo than I would if they were conducted anywhere else in this country. And I think if you'll check with most of the people in Amarillo, they're going to feel the same way.

Now, a comment or two -- random comments about those who oppose the location of these activities at Amarillo.

It has been my observation that many,

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if not most of those who oppose the location of these activities at Pantex, would just as vociferously oppose those very same activities if we were talking about locating them in Antarctica.

The opponents appear to have no factual basis upon which to support their fears of any of these particular catastrophes that they -- they continually call to our attention. To the contrary, it seems to me that they really oppose all things nuclear.

By and large, the fears expressed by these people are totally irrelevant to any activity I have ever heard proposed for the Pantex Plant.

An example, I think, would be this fear of permanent and irrevocable contamination of the Ogallala aquifer. I think that's absolutely absurd from any activity that has been proposed for Pantex, and I think it illustrates a difficulty on the part of these people that they're unable to distinguish the difference between a petroleum refinery and a retail hardware store that sells sewing machine oil in two-ounce tin cans. Thank you.

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HT02-20 (CONTINUED)

[illegible]
Name: [illegible]
[illegible] Teckla
City: [illegible] State: TX Zip Code: [illegible]

MY COMMENT(S) ON THE PANTEX PLANT DRAFT ENVIRONMENTAL IMPACT STATEMENT IS/ARE:

The degree of risk associated with these tasks which must be done somewhere — and which we must carry [illegible] at Pantex — is ultimately a function of the work ethic, pride and dedication of the workforce available at the location selected. [illegible] [illegible] [illegible] in any respect.

U.S. Army [illegible] [illegible] [illegible] the Army's [illegible] Amarillo plant's production was consistently superior in quality and in operational [illegible] to any other plant in the U.S. producing [illegible] for the U.S. Army at that time.

[illegible] about those who oppose the location of activities at Pantex: (OVER)

(USE BACK OF PAGE IF NECESSARY)

Comments can be faxed to the SWEIS Faxline (1-800-[illegible]), telephoned in on the SWEIS Hotline (1-800-[illegible]), mailed in to DOE care of: Ms. Nanette D. Founds, US Department of Energy, Albuquerque Operations Office, PO Box 5400, Albuquerque, NM 87185-5400; or sent via the Internet to [illegible]. Deadline is July 12, 1996.

(1) Most of those who oppose the Pantex location would just as vociferously oppose these activities if located in another location.
(2) the opponents appear to have no factual basis to support their fears of particular occurrences — to the contrary, they appear to oppose all things nuclear.
(3) by and large the fears expressed by the opponents of Pantex are totally irrelevant to any operations proposed. Seemingly they are unable to distinguish between an oil refinery and the hardware store selling sewing machine oil in 2 oz. tins.

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HT02-21

MR. MATNEY: Thank you, Mr. Huff. Our next speaker is Anne Reid.

Mr. Huff, do you have any comments you'd like to leave with us, a prepared statement? Thank you.

MS. REID: Thank you. Appreciate it.

MR. MATNEY: Anne Reid.

MS. REID: Thank you for the opportunity to express my opinion. My name is Anne Ansley Reid. I'm a life-long resident of Amarillo.

My Great-Grandfather Ansley chose to bring his family to this area over a hundred years ago, before Amarillo existed. My parents, Thad and Margaret Ansley, who are now 89 and 88, chose Amarillo as the place to live and raise their family.

As small business owners in Amarillo, my parents instilled very high, strong work ethics and community awareness and pride in my brother and I.

As a young housewife and mother, I chose to raise my family in Amarillo and instilled the same values in my three children. Each of my three children have married and chosen

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to raise my seven grandchildren in the same manner and live in Amarillo.

Ever since the inception of Pantex, my parents and I have been constantly aware of the purpose and programs at Pantex. Never has there been a time when any one of these generations of my family have feared for their safety because of Pantex and its activity.

The overwhelming majority of Amarillo citizens have supported Pantex from the beginning until the present day. Pantex is great for our country. We need it through war and we need it to assure peace.

Amarillo is the best place for Pantex and its functions. Historically, as Mr. Huff said, the people of this area have very high work ethics, moral values, national and community pride.

HT02-21/1
23.020

Everyone who works at Pantex is there by their own choice. Why, now, should the opinions of such a small group receive so much focus?

Having Pantex in Amarillo is good for the welfare of our families, friends and neighbors, locally, nationally and worldwide.

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Thank you.

MR. MATNEY: Thank you, Ms. Reid. Would you like to leave your written comments with us?

MS. REID: I might rewrite them and leave them with you, if that's all right.

MR. MATNEY: Okay. That's fine. This might be a good time to remind everyone that there are other methods of entering your comments into the record for the DOE other than speaking at a public hearing.

If you have registered and you've been given materials with deadlines, you can fax your comments to the DOE. You can call toll free and record a message, which will be transcribed and entered into the record, or you can mail your comments.

The deadline for submission of comments regarding Stockpile Stewardship & Management is May the 7th. The deadline regarding the Storage and Disposition of Weapons is also May the 7th, and the deadline for comments regarding the Pantex Site issue is July the 12th. And all of those addresses and fax numbers -- you can even Internet them -- they are

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located in the materials that you were given.

Let's see now if we have some of our other speakers. Is Jerry Stein here?

UNIDENTIFIED SPEAKER: We're going to tell you when he comes.

MR. MATNEY: I don't know who Jerry is. And Tracy, too, right?

UNIDENTIFIED SPEAKER: Yeah.

MR. MATNEY: We have heard from all of the speakers, other than those two speakers, who have signed up to speak, but our DOE officials will remain here. We will all stay here until 9:45, so if we get some latecomers in.

So we'll be in brief recess, but as soon as another speaker comes in, we'll reconvene. Okay.

(Recess.

MR. MATNEY: We need to reconvene for a speaker. We'll reconvene at this point. We have an additional speaker, Mr. L. O'Brien Thompson.

And Mr. Thompson, so that you'll know who you'll be speaking to, this is Patricia O'Guin from Albuquerque DOE. Sitting next to her is Bert Stevenson from Washington, D.C. DOE, and

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HT02-22

next to him is Steve Chase from Washington, D.C. DOE.

And you'll have five minutes to deliver your remarks, and you may begin anytime you'd like. Mr. L. O'Brien Thompson.

MR. THOMPSON: Thank you, Dr. Matney.

I was on my way out the door and ran into Dr. Matney here, and I mentioned one little subject that I think is on my heart about all of our hearings.

And I've been to several of these over the past few years. I've heard all the talk about the economic impact and so forth, the environment, the damage to the Ogallala and so forth.

I spent 44 years with the petroleum industry. I was chief chemist at a refinery for 25 years. I was the environmentalist, I guess you would call, for 10 or 15 years, primarily concerned about the conservation of the quality of air and water, particularly the Ogallala.

And I don't want to get too much into that particular area of it, but I would say this, that so many of our concerns about the Ogallala does not quite sound -- we can pump out of the

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Ogallala at a very -- rate that makes the table kind of like a saucer.

You have an inflow of the water, and the outflow of water is not going to be damaged at your other places. And those are real facts that have been determined.

HT02-22/1 24.001

I'd like to address my remaining moment to another area. When we think of Pantex as people, 3500 people, most of whom are very highly qualified, having a real appreciation for the quality of life for their families, here in Amarillo, we have excellent educational facilities from kindergarten all the way through to graduate level.

We have excellent cultural facilities, symphony, art, opera and so forth. We have excellent climate. We're just about the right size for people who want to really become an integral part of a good community to raise their families.

And of several different sessions that I have heard over the last few years, I don't recall having anybody express any concern about the fact that those 3500 people who work at Pantex, whomever they may be, need to have a

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HT02-22/1 24.001 continued

place to live and work in a place where they have a high quality of life.

And I think that is something that DOE needs to remember after they've considered all the technical aspects, all the hard, cold facts, that we've got to recognize that those 3500 people have an excellent place in which to live and do their work and raise their families. Thank you, Dr. Matney.

MR. MATNEY: Thank you, Mr. Thompson.

I don't see any new speakers, so we've got about 15 more minutes. We'll stay here until then and we'll be in recess.

(Recess.

MR. MATNEY: We'll reconvene. And our speaker is Louise Daniel.

MS. DANIEL: My name's Louise Daniel. I live at 3805 Overlook in Amarillo. I will prepare a -- some written comments later.

I waited to speak because I don't have any written comments, and I would really prefer to have those before I do.

I guess I just want to say that the thing that concerns me most, and that's bringing any plutonium processing to Amarillo.

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HT02-23

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And I think that is something that DOE needs to remember after they've considered all the technical aspects, all the hard, cold facts, that we've got to recognize that those 3500 people have an excellent place in which to live and do their work and raise their families. Thank you, Dr. Matney.

MR. MATNEY: Thank you, Mr. Thompson.

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I guess I just want to say that the thing that concerns me most, and that's bringing any plutonium processing to Amarillo.

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I understand about the importance of jobs at Pantex, the importance to our community. I've come to have more sympathy for that view than I did in the beginning, but I'm still extremely reluctant to see any kind of plutonium processing come.

I've understood that there are new processes which are safer than the old ones. I've heard some explanations of those things, but I still have some really vital questions about whether or not we need to take that risk.

And until we can be absolutely sure that the Department of Energy won't cause the kinds of environmental disasters that have happened at places like Rocky Flats and Hanford. I would be really opposed to seeing any mission of that type come to the plant. Thank you.

MR. MATNEY: Okay. Thank you, Ms. Daniel.

Anybody else that would like to speak? No. Okay. We'll be in a recess, then.

(Recess.

MR. MATNEY: We'll reconvene briefly only to adjourn. And we thank all of you for your interest and for your comments, and we thank

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HT03

DOE PUBLIC HEARING ON
STOCKPILE STEWARDSHIP PEIS
STORAGE & DISPOSITION PEIS
PANTEX SIDE-WIDE EIS

STOCKPILE STEWARDSHIP AND MANAGEMENT
BREAKOUT SESSION
APRIL 22, 1996
7:00 P.M.

KAROLYN FARMER, CSR, RPR
SONDRA L. CARGLE & ASSOCIATES
Certified Shorthand Reporters
4103 W. 49th Street
Amarillo, Texas 79109
806/355-8181

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Portions of the transcripts unrelated to this EIS have been omitted.

of the information I've heard. Any comments on that would be appreciated.

MR. WHITEMAN: Others could perhaps give better numbers than me. But the increase is due to the overall increased level of activity at the Pantex Plant during that time period, and also because some of the traditional functions at Pantex are taking a lot more people, you know, with the kind of safety board oversight and so on that goes on in operations there.

HT03/1 11.001

UNIDENTIFIED SPEAKER: Yes, there is one confusion factor, looking at all three PEIS's, and that is they use different multiplications for the number of direct jobs versus the impact in the community.

MR. ROSE: I can speak on the programmatics versus the site-wides. And generally in a site-wide analysis you'll have a more detailed analysis because that's your only site. Again, we're looking at eight different sites. And when we do a multiplier effect between direct and indirect jobs, it's a very generic analysis in that, you know, we do high explosives fabrication. The Bureau of Economic Analysis has different multipliers for, say, a fabrication type mission. Now, the Pantex site-wide probably breaks down the fabrication mission by -- and we might have fifty people doing direct jobs and that may create a hundred

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indirects. That's what we did in the programmatic. The site-wide may break down fifty people by saying ten are press people, ten are secretarial support, and thirty people are actual fabricators. And then the Bureau of Economic Analysis actually has a different multiplier for the different craft or different job categories. So, you know, one person can create three jobs, but this one other person only creates one. Again, it's just a level of detail.

MR. LAWSON: Anyone else with a question of cumulative impacts, cost impacts to the region? Any comments you would like to make? It's now about five minutes past 9:00. What I would suggest before we take on some new agenda items, this is a good time for a break.

(Recess.)

MR. LAWSON: I see a few familiar faces. This session is on stockpile stewardship and management. For those of you who have not been here earlier this evening, we have covered five issues that were raised earlier in the evening by folks in this session. I'm going to open it up for other issues that you would like to address. The issues that we talked about earlier were the question of if the stockpile stewardship and management plan were implemented, what could be the

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HT03 (CONTINUED)

effect -- possibly the negative effect on the United States deterrent capability, should we be attacked, or some sort of a crisis. We also talked about if there is a transfer of facilities, particularly the high explosive facilities, what happens when -- at the end of the stockpile life. We were talking about the possible extension of that life through upgrades and so forth. A third major area was the question of the criteria that DOE used for selecting among the different options and coming up with its preferences, and particularly how they were identified in the FEIS and applied. And there were a whole range of those different criteria that were considered. One of them was costs, and we talked about costs in particular. Earl had introduced some graphs in the first session which talked about -- which addressed the question of the comparison of costs, the net present value of cumulative costs of having facilities stay at Pantex or move to Nevada or to move to the different facilities. We used that as a jumping-off point for talking about how the comparison of costs were addressed. And the final issue that we dealt with was the cumulative economic impact in trying to -- well, we discussed why the Pantex site-wide economic assumptions were done differently than from the programmatics, primary because of the question of scale. But we also

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wanted to clarify questions about what would be the indirect effect on jobs in the region and what was the size of the region that was considered, so that we're not just talking about the direct employees, but also the indirect people, people who would be affected by -- indirectly by the number of jobs here at Pantex. So we can pick up on any of those issues, if you would like, if there's anyone here who is new or has been here before and has another issue that you would like to see addressed, I'd like to ask you to identify it so we can put it on the board and we can deal with it.

UNIDENTIFIED SPEAKER: Just continuing on the net present value cost comparison the high explosives were to the labs.

MR. LAWSON: We can continue. Okay. Yes, sir.

UNIDENTIFIED SPEAKER: I would like to find out when two plus two is not equal to four, like what is an overriding criteria that might trump all the criterias we've heard tonight? Maybe politics, political will of the administration, political will of someone in the agency. NEPA only requires the agency to give lip service or follow the procedures of NEPA. It does not bar the government from going forward with the project.

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HT05

DEPARTMENT OF ENERGY

PUBLIC HEARING ON

* * * * *

STOCKPILE STEWARDSHIP & MANAGEMENT DRAFT PEIS

STORAGE & DISPOSITION DRAFT PEIS

PANTEX DRAFT SITE-WIDE EIS

* * * * *

PANTEX DRAFT SITE-WIDE EIS

BREAKOUT SESSION

APRIL 22, 1996

8:00 P.M.

MARY A. WINGO, CSR, RPR

SONDRA L. CARGLE & ASSOCIATES
CERTIFIED SHORTHAND REPORTERS
4103 W. 49TH ST.
AMARILLO, TEXAS 79109
(806/355-8181)

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Portions of the transcripts unrelated to this EIS have been omitted.

is also my understanding that recently there has been -- it's been very dry around here also. So there are many fields around Pantex, too, that also might contribute to that that wouldn't be in those models.

MR. PARHAM: Okay. Let me follow up on that one. Any other questions on ambient air quality or issues about nature, other comments? I was going to say, on the water issue, I could bring you plenty from Dallas today.

UNIDENTIFIED SPEAKER: I wanted to clarify what you said. The exceedances were in which category?

MR. PANKETH: PM10.

MR. PARHAM: Okay. So you had had a question as a follow-up, the exceedances. And you said?

MR. PANKETH: PM10.

MS. FOUNDS: Sir, is there any other feedback or that I could get also from you? Do you perceive that there's a problem with that?

MR. PANKETH: No. My perception of it also was that those exceedances happened because of the -- some construction activity or storage of dirt near the monitoring locations.

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But I wanted to make that clear to people who are reading this report. And they have seen the monitoring report and they'll say, well, how can this be true? You know, so I just wanted to make that issue.

UNIDENTIFIED SPEAKER: I wanted to follow up on the comment that was made. As you probably are aware, TNRCC has standardized the modeling year meteorological data which is to be used in environmental analysis. And the particular model year that was selected for meteorological data was the 1988 year. And that standardized all the environmental analysis in Texas.

And so the meteorology for that year does not necessarily correspond with meteorology of the monitoring stations, which are much more recent. And also it would not pick up PM10 dust blowing from off-site as well.

MR. PARHAM: Okay. Thank you. Any additional follow-up to that? Any further clarification questions on that? Okay. More questions or comments?

MR. JOE STANG: I'm Joe Stang. The 12,000 pits that are currently in existence,

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HT05 (CONTINUED)

what would be the additional employees if you went to the 20,000 pits? Or would there be any additional employees?

MS. FOUNDS: At this time, you're not looking at a great deal of employment associated with those additional pits, because it's primarily security, and we already have that security for the Zone 4 where these pits are located at.

And the monitoring for that is not necessarily labor intensive. You go in, you monitor, based upon the criteria that the laboratories have established. And that's a sampling type of thing to make sure that you are maintaining the integrity of those storage containers, et cetera.

So we're not showing a great, you know, employment because of the additional 20,000 pits there, nor are we showing a lot of increased employment at an alternate site because of the pits, particularly if they already have their security forces in place.

MR. PARHAM: Okay. Thanks. Any other questions on employment related to pit storage? Additional questions on employment in

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general?

UNIDENTIFIED SPEAKER: Just a comment. That would be different, would it not, for the stockpile -- or for the Storage and Disposition EIS, that is, if Pantex were selected as a site for the long-term storage as opposed to the interim storage and treatment center? Were you asking that question?

UNIDENTIFIED SPEAKER: Yes. That's the interest I had.

MS. FOUNDS: Right. That would be different as their alternatives of how they're going to come and store the plutonium and whether or not -- how they build the facility, et cetera, and do those other missions that are associated with that disposition activity.

I'm sorry. I'm speaking strictly for the site-wide and the 20,000 pits.

MR. PARHAM: Okay. Thanks. And that needs to be noted for the crosscutting issues too. Additional comments? If you're in the back room there, we sort of closed that off to you. There's plenty of seats down here if you want to come in too. Can you hear back there? Okay.

Any additional comments on those

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questions, general comments or additional questions? A lot of people here. Nan is anxious.

MS. FOUNDS: You know, I studied for this, guys.

MR. PARHAM: I see a hand come up.

UNIDENTIFIED SPEAKER: I'd just like to follow up on the question about the cost associated with moving the 12,000 pits to another facility. My understanding is, with the controls that are out in Pantex and the way that the monitoring is occurring and the possible technologies that are being used to monitoring the pits, I think that would be a substantial cost if that would go to a different facility, yet you indicated that that would not be an increase in cost.

MS. FOUNDS: In terms of relocating it, I was talking to employments over here. We have not done an in-depth cost analysis of the transportation. I can only sort of talk to that generally.

But I'm assuming what you're referring to is, first of all, you have to transport those pits to the other sites. There may be some modification to those facilities in

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order to assure that we take into account the safeguard and security requirements necessary to protect those components. You would have to do -- to factor that in to the overall cost. But, at this time, we have not done that detailed cost study.

And, as I will reiterate, Pantex is currently the preferred alternative to continue to look at those things. But the same criteria would be applicable to the pits at another site. They're applicable at Pantex. And that would have to be done.

MR. PARHAM: Thank you. Any additional questions on cost associated with transport? I just want to mention, I think, Donna, we have until July 12th; is that right?

MS. BERGMAN: Right. July 12th.

MR. PARHAM: Yeah, July 12th. I just want to mention the fact, since this is recently published, that you have an opportunity until July 12th to get your comments. And so I know there's a lot of people that probably haven't had a chance to see the material in detail. So we want to get a chance here to continue to discuss that and answer your questions now. Additional

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HT05 (CONTINUED)

questions or comments, anyone?

UNIDENTIFIED SPEAKER: If you'll pardon my ignorance, you might explain some of your terminology. What is a preferred alternative? If we're an alternative, that implies to me we're in second place, even though we may be the highest second place.

MS. FOUNDS: Basically -- and this is my understanding to me -- but is the Department goes through and says that it needs to take an action and it develops a proposal to do that. At the time that it develops a preferred, it is basically saying is that there are no environmental impacts that would seriously prevent you from implementing that proposed action.

It doesn't mean that another one couldn't be selected. But, at this time, this is what we consider to be our preferred action. I will turn it over to some other NEPA experts for more clarification here too.

MR. PARHAM: State your name.

MR. JARMAN: I'm Cliff Jarman. I work with Tetra Tech in preparing the EIS. Basically, the law requires to look at alternatives to anything that the government is

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proposing to do. The government, in this case, is proposing to leave those pits, over the interim term, at Pantex until whatever decision is made in the storage and disposition.

They might decide to -- whatever they -- a permanent solution. And this is to keep them here until that permanent solution. Whether that is to implement it at Pantex or not is in the subject of that EIS.

The alternatives we looked at to keeping them here was the four other sites. So those are alternatives. But just the terminology, as you mentioned, under the law, all the actions are alternatives. But the proposed action, in this case, leaving them here, is also DOE preferred action. That's the one that they are favoring. That's the one that they would like to do.

MS. FOUNDS: But we will consider any of the comments that are put forth at this time to update the document and to have a bearing on that decision.

MR. PARHAM: Thank you. Thanks for answering that. Additional questions or comments? Anyone want to make a comment for the

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record? We've got notetakers and a court reporter here to do that.

MR. WILLIAMS: I'm C.E. Williams, General Manager of the Panhandle Groundwater District. And my two or three questions are on the groundwater. On Page 413 it's stated, and I quote, that the City of Amarillo has pledged 5,526 million liters of water, or 1.6 million gallons per year as a potential part of the Pantex expansion.

HT05/1 06.003

And my questions are are the disposition issues considered expansion missions and where is the City of Amarillo planning to withdraw that amount of water from. And, if it were to come from Carson County, where we already experience significant groundwater declines, it would mean that, if this total amount was used, would mean a 23 percent increase in groundwater withdrawals from that area.

HT05/2 06.004

I know the City has extensive groundwater rights. My main question is whether and what criteria and how long is the pledge good for and those kind of things.

HT05/3 06.005

MS. FOUNDS: What I'm going to do is answer, to the extent that I know. And then

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I'm going to turn it over to one of our other technical experts.

The first is that, yes, I believe that what it is is we are looking at those disposition technologies as the expansion of that. And clarify for me, Cliff, if that also included the tritium, because we had been considering that at one time also.

MR. JARMAN: When this document was started and we were looking at other ongoing operations that could affect the plant, there was a decision that had not been made yet as to where to put the new tritium supply technology. That decision has been made by DOE, and it will go in at Savannah River.

As part of that looking at it, when they came to Pantex, one of the, say, marks against using the Pantex Plant was the availability of water. The City, at that time, made a proposal saying, if that was the only problem, that they could make available this water in the terms of treated waste water. Since it would only be used for cooling purposes for the reactor, it wouldn't have to be potable water. And that was worked into the analysis.

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HT05 (CONTINUED)

When the decision was made to do the tritium supply at Savannah River, this wasn't taken out because it is still -- the offer is kind of still out there. If this became a critical issue for another mission coming to the Pantex Plant, the City wanted it known that they still might do this so that it wouldn't be the critical factor in the decision.

HT05/4
06.006

MR. WILLIAMS: So it's an ongoing offer?

MR. JARMAN: Until the City says no.

MR. PARHAM: That question again, so people can hear it? Ongoing -- sorry?

MR. WILLIAMS: Ongoing offer.

MR. PARHAM: So it's an ongoing offer?

HT05/4
06.006
continued

MR. WILLIAMS: So there's no time frames?

MR. JARMAN: It was just an -- it wasn't a solid technical offer, in terms of blueprints, time frames. If the City were to not be in favor of a particular issue, I'm sure they would withdraw the offer. We have not received word that they have yet.

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If they receive that word through this comment period, then that particular part of assessing the impacts would be taken out and it wouldn't be in the final EIS.

MR. PARHAM: Did we get your questions answered?

HT05/5
06.007

MR. WILLIAMS: Well, I have one other one. And I think it's more possibly a typographical error or something. But, in reading on Page 478, it was going into the agricultural uses in Carson County. And they had stated in that that there was 8,550 acres of irrigated agriculture in Carson County.

And a check with the Farm Service Agency, which is a federal regulatory agency, on the amount of acres in 1995 was 63,500 acres. Your withdrawal figure seems to be somewhat within range, but your acres are quite a bit off.

It's not probably a cutting issue. It's just something that I happened to see.

MS. FOUNDS: Okay. If I could make sure that we get the reference that you're using. And we will check against the references that we were using as part of the census data, et cetera. And then we will look at both of those

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things and have a clarification for you as part of the response to your question.

MR. PARHAM: Did we get it down there too?

MS. FOUNDS: I want to make sure that we've got it down there correctly.

MR. PARHAM: Right.

MS. FOUNDS: And it was the irrigated acres in Carson County?

MR. WILLIAMS: Yeah. They're substantially wrong.

MS. FOUNDS: And what was the reference that you were using?

HT05/5
06.007
continued

MR. WILLIAMS: It's the Farm Service Agency, what used to be ASCS. It's the government's regulatory agency for the Federal Farm Program. And they keep it down to the 10th of acres, so I know that they're correct.

MS. FOUNDS: Okay. So we will cross-reference with our data base.

MR. PARHAM: Okay. Thank you. Additional comments or questions? I know we're going to be running into another session here shortly. We'll be repeating two more.

MR. PANKETH: On the aircraft

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accidents, in the 1993 environmental assessment, the aircraft accident was considered an incredible event, ten to the minus seven. In this EIS, it changed to ten to the minus four to ten to the minus five. What has changed?

MS. FOUNDS: There are several things that have changed, part of which is we have some data bases that are operating now. As part of this EIS, there is a RAMS, which is a radar aircraft monitoring station, that was implemented in the FAA tower that goes out and can literally -- it gets the flight pattern for the various types of aircraft that are out there. So there is additional data that we are getting and applying.

The second thing that changed was the model. It used to be a Solomon model that was used almost exclusively as part of the DOE standard that's being developed. What happened then is they took a look at that model and then went out and looked at National Transportation aircraft crash incidents throughout the whole country to come up with, if you're flying an airplane off the end of a runway, what is -- you know, where would you crash. And then also we went back through and looked at the crash rates.

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HT05 (CONTINUED)

So those are the types of things that change that went into this EIS, as opposed to the EA that was done before. And we are working off of a draft aircraft crash standards the Department is developing. And it is still somewhat evolutionary at this time. So I wanted to point out those too. I also have a colleague who wishes to clarify a bit more too.

MR. JARMAN: Also, that can be -- models and data can -- I get lost in them too. A change between the EA and the EIS that we can all relate to is the EA was looking specifically at those magazine storing pits. The EIS looks at any place on the site where an accident could happen that would disperse plutonium. So there are a lot more facilities that are -- and so the odds are greater that it would get one of the greater number of facilities.

MR. PARHAM: Thanks. I'm going to ask the back room there. I keep looking back there. Okay. To keep on time and not get in trouble with the guy in the next room, I want to just repeat that we'll be repeating this session again momentarily, almost, with a five-minute break. And then we'll be doing it again once

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after that, so you get a chance to come back in. But we know you'll also want to head to the other sessions.

I guess, Nan, one thing we wanted to check, as far as people picking up copies of the document, is that available here?

MS. FOUNDS: Yes. There are copies that are available here. There is also a 1-800 number that you can call in order to get copies if you would like. And you can call that hotline to leave further comments. And you can E-mail us too in order to give us comments. So with that, we can go.

MR. PARHAM: Another question?

MS. FOUNDS: I think a clarification.

UNIDENTIFIED SPEAKER: We also have copies of the briefing that Nan gave right here in the box if anybody wants to carry a copy of the briefing with them.

MR. PARHAM: Okay. Any additional comments, questions? Please join us again if you'd like to. We'll repeat here in a few moments. And I appreciate your involvement.

(Recess.

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resource areas that we looked at. We looked at all of these areas in terms of assessing what the operations are and developing the impacts for the site in these various resource areas.

So, at this time, I'd like to turn it over to Jim and we can open it up for comments.

MR. PARHAM: Okay. Thanks, Nan. And I won't stand in front of you here. First off, I'd like to -- if there are any clarifying questions on the presentation or questions in general. Also, those of you who would like to make comments, we're more than happy to go ahead and get that started. And we have folks taking notes so we make sure to get it down.

So questions, comments? Got a lot of questions last group. Comments? None? Back room? I'm going to the back room now, back to the Bob Uecker seats. Any questions back there?

MS. FOUNDS: Please don't be shy. As I told the other group, I studied for this. So I can see whether I get an A, B or C out of this.

UNIDENTIFIED SPEAKER: Or a paycheck.

MS. FOUNDS: That's probably the most important one.

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MR. PARHAM: Comments or questions?

MS. FOUNDS: Do I get a bonus?

MR. PARHAM: I wanted to mention -- while you're thinking about that, you may want to come up and look at these, you know, for a little bit here. We can also look at these and then come back with some questions if we needed to.

One thing I wanted to mention is that, Nan, the comment period closes on July 12th.

MS. FOUNDS: On July 12th. I believe that we have a -- did it go outside? I want to make sure the people know that there are various ways to comment. Of course, this is one of those ways.

We have a 1-800 number where you can call in and there will either be a person who will answer the phone or, off-hours, et cetera, there -- those conversations can be taped and your comments can be taken that way.

They will be transferred to us to include in a comment response document. We also have an E-mail address where comments can be received that way. Or you can also mail and fax.

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HT05 (CONTINUED)

And I believe all of those things, all of those different ways, are outlined in the poster that's outside this room.

MR. PARHAM: We have copies of that EIS here too.

MS. FOUNDS: Right. And there are copies of the EIS here also, if you need to pick one of those up. Sir?

HT05/6 15.001

UNIDENTIFIED SPEAKER: Let me ask one quick question on the airplane accident scenario. Was that scenario based on the flight paths now? Or did you take into effect that the flight paths could be changing when they get a new radar system out there at the Amarillo airport?

MS. FOUNDS: In the document -- okay. The current model that we used doesn't account for that shift. In the document, we do give a prospective that shifting that -- the runways over, or the approaches over -- excuse me -- would decrease the risk by up to 62 percent. And we are looking at the implementation of that DOE standard very specifically to the Pantex Plant and how that would change, given those changes in the approach patterns. That is not in the numbers that I gave you.

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HT05/6 15.001 continued

UNIDENTIFIED SPEAKER: Will that show up in the final analysis, the final draft?

MS. FOUNDS: We are working with the Department's aircraft crash standards and giving them feedback on that. It will somewhat depend upon how that final DOE standard comes out.

UNIDENTIFIED SPEAKER: Thank you.

MR. PARHAM: Okay. Other questions? I think there's a sign-up sheet moving around too. It may be here. So, please, if you get a chance to sign up for this session, we'd appreciate it. Additional comments or questions?

HT05/7 15.002

UNIDENTIFIED SPEAKER: Just a further comment on the aircraft crash scenario. I've heard that Delta no longer flies into Amarillo and that American Airlines has down-sized the aircraft that they're using. Does this have an impact on the numbers that you have provided? Is it being considered in future iterations of the model or what?

MS. FOUNDS: Basically, what we are going to, there is part of the standard -- it has, essentially, two components of it. One is it analyzes the fact that Pantex is near the airport, so we call it a near-airport analysis. And part

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of that standard says, okay, how many operations are coming in and going out of that airport. Those types of numbers would be reflected in the FAA data that we get back that then go into the model, those kinds of trends. Brett, did you have anything to clarify on that?

MR. SIMPKINS: No. My name is Brett Simpkins. I work with Tetra Tech. Cecil just called me into the room. He said someone asked a question regarding probabilities of the aircraft crash across the different documents. And I came in to answer that question. But I didn't hear it.

MS. FOUNDS: Right. Yes. I want to make sure. There are differences between the documents too. And, in the stockpile stewardship, they are showing a low probability number. That's because, right now, essentially, Pantex is using most of the facilities. They're using Zone 4; they're using Zone 12. In a stockpile stewardship one, they will not be using Zone 4. So that reduces the probabilities because the area contributes -- if you're using a larger area, there's more area to hit. So, therefore, if you're downsizing, those become less.

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And, in our scenarios, we look at, you know, the accident and, say, plutonium dispersal that could happen in any one of those -- those buildings that use -- that contain plutonium in weapon form, pit form, those types of things.

MR. PARHAM: Okay. Did that take care of your question? Other comments or questions for Nan at this point?

MS. FOUNDS: Are there any other aspects of it that you would like to see in a response back to you that I haven't covered?

MR. PARHAM: We know that some folks have not had a chance to get through the material yet. And so it may not -- it may be a little premature for some. But here's your chance. So, at this point, if you do have some concerns up front that Nan and Donna will take those at this point. So any other comments or questions at this point?

HT05/8 01.006

UNIDENTIFIED SPEAKER: From an environmental standpoint, what changes when you go from 12,000 pits to 20,000 pits?

MS. FOUNDS: Not much. There may be a little bit of increase in some of the waste streams, et cetera, just because of the numbers

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HT05 (CONTINUED)

that go along with that. I mean, I'm talking about just the storage and the continued storage.

There is always the fact that you're dismantling those weapons and you accumulate -- you're continuing to do those operations. So you have, you know, waste management that you continue to do. And so it's really given in the document as a per year type thing. And we also look at the 2,000, 1,000 and 500 level.

But, once you have those pits and they're in the container and you're storing them out, there isn't a lot of difference, in terms of environmental impact, to the site to continue that storage mission.

Is that what you're talking about, the storage mission?

UNIDENTIFIED SPEAKER: Yeah, I guess that's the question. You seem to have made a fairly substantial deal out of going from 12,000 to 20,000. And I wondered if there was anything more to it than what you've just said. What should those of us concerned about the environment worry about going up to 20,000 pits?

HT05/8
01.006
continued

MS. FOUNDS: Well, again, as I

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said, there's the dismantlement aspect, continuing those operations, which is, essentially, continuing what we're doing for a longer period of time, because, you know, you're not going to stop at 12,000. Or, in the alternative case, you would continue that and ship those things off site.

But, in terms of the sheer storage aspect, once they're in there, you do the monitoring, you know, you pull them out for surveillance and things like that, but there is not a great deal of further environmental impact, so to speak, to continue to store those in those pits. But we did cap that at 12,000 to look at what the impacts were of that continued storage mission and then to assess and make sure that we were covering all aspects of the Pantex mission and present those impacts as part of the site-wide and look at cumulative aspects of it in this site-wide document, dismantlement and storage.

UNIDENTIFIED SPEAKER: With the first reconfiguration EIS proposal six or seven years ago, there was one EIS which covered the reconfiguration of the nuclear weapons complex. I'd like to know what the Department's rationale is for dividing among a number of EIS's what

HT05/9
23.016

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essentially is one overall decision, which is what to do with the nuclear weapons complex as a whole.

Obviously, your Site-Wide EIS is a part only of the decision about what to do with pits now and in the future. Why is it that the Department has elected to split up the EIS process and to do fragmented segments?

HT05/9
23.016
continued

MS. FOUNDS: Well, I would give you one clarifying thing before I begin is that I was not around, per se, during reconfiguration. But what the Department does is it has different aspects too of how it manages programs. So they felt that, for instance, the nuclear weapons was sort of an entity unto itself with certain goals and certain proposed actions that could be sort of encased and put in a document, the Stockpile Stewardship and Management PEIS. Then it had more, you know, strategic milestones and things like that that were better documented and decided on in that program rather than taking the whole Department in sort of one shot.

They also have, you know, like I said, what they call the programmatic ones which make mission decisions for each site. And that is what stockpile stewardship does, mission sites

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that -- mission citings at locations that are for the nuclear weapons.

Then you have the disposition and storage, which actually it is more the contained package, in terms of being able to present that to the public and say, okay, once we have the excess and the surplus and things like that, we're trying to store these things and then dispose of it. That seems to be one more consistent package, than trying to group these things all together. Those are programmatic.

Site-wides are there to help look at cumulative impacts, because you have a lot -- you might have several different things, such as our construction projects. And there may be past construction projects that were not under EA's or CX's. And so you look at that cumulative impact as part of the site-wide. And that's why -- I'm trying to explain the structure of programmatic, site-wide -- and then you might have additional project EIS's if you think there is a significant impact posed by those things and you do an EIS for those things.

So that's sort of the structure that way. And I will also refer to my colleague

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HT05 (CONTINUED)

over here, who is Gary Palmer, who works in EP as one of the -- NEPA --

MR. PARHAM: Gary, before -- do you have an additional question?

HT05/10 23.017

UNIDENTIFIED SPEAKER: But I'd like my comment to go to the fact that what you have really done is made it impossible for the public to comment upon the overall program. You have no real programmatic environmental impact statement about which the public is instructed, educated and about which they can comment. And I seriously question whether the law really has been complied with.

MR. PARHAM: We'll take that as a comment. Gary, you have a little bit of follow-up -- of clarification? We only have a couple of minutes left in this session.

MR. PALMER: My name is Gary Palmer. I'm with the program office, defensive programs, that sponsors, basically, the operation at Pantex and is conducting the stockpile stewardship and management programmatic EIS, which, of course, is being discussed in the next room.

You referred to historically,

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basically, back to the reconfiguration process. Back at the time that reconfiguration was considered, the building of nuclear weapons was a very active process. And the reconfigured nuclear weapons complex was being built to construct weapons, not to disassemble them.

Then came the end of the Cold War. And, for we in the program office, it's been a constant change of what our mission is since then. And each of the restatements that we've gone through, basically, in the Federal Register notices that we put out about each of the environmental type statements, tried to present that logic of the moment, that snapshot that we took that says, here's why we're doing it.

But the problem was basically very slippery-sloped that took our mission from constructing nuclear weapons to simply disassembling them and storing them and storing the remnants. So we've seen a tremendous change programmatically in what our program is.

The best place you can look at this, incidentally, is in the testimony that was given by previous assistant secretaries and secretaries as to what the mission is. And then

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the mission that the current secretary, Secretary O'Leary, the current assistant secretary, Dr. Reis, see is they started this programmatic EIS about a year ago in answer to the very claims that we don't know what our program is anymore. And so Dr. Reis set out a program plan, which is available, that stated what we think our mission is for the future now that things have, in a sense, stabilized.

So we're very sensitive to the argument that you've brought up, but we think it's logical. And the logic flow actually is in the introduction to the Stockpile Stewardship and Management EIS. So I don't disagree with you; you've made a good point, but the reason for it is basically what's happened in the history in the last 10 years.

We think it reflects realistically in the Stockpile Stewardship and Management what our current programmatic mission is and the evaluation of that program.

MR. PARHAM: Okay. Thank you. Any additional comments? We're going to have another session. We'll repeat this again here in a couple of minutes. Other comments or questions

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for Nan?

Okay. We'd like to thank you for this session. And I appreciate it. You can come on back or the other two sessions will go. And, if I keep on schedule here, we should be starting in just a couple of minutes again. Thank you.

(Recess.

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HT05 (CONTINUED)

get some questions of a similar nature. And I just wanted to point out if that helps wet your appetite for questions or clarifying questions or comments.

So, without further ado, I have the microphone up here and I'd like to bring it out to some of you who'd like to provide some comments or questions for us.

HT05/11 14.008

UNIDENTIFIED SPEAKER: Yes. Could you speak more toward the latent cancer fatality issue that you put up here and discuss what is the most likely outcome?

MS. FOUNDS: Well, essentially, what that is -- and maybe I can put that back up there -- is that, as part of the human health analysis, you do consequences of receiving this exposure. There is -- and I will turn this over to my experts in a few minutes -- but there is what is called the BEIR 5 reports that look at, if you get an exposure, what is the probability that you would develop a cancer from having received those exposures.

Now, remember that there is a 20 percent chance of that group, 50 years later, contracting cancer. So, of that 330, 60 of them

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are expected to die of cancer. So what you're doing is comparing that .13. So, essentially, what you're looking at is 60.13 cancers in that group. When you start getting into decimals, what it really means is that if you had many events like this, only a very few would come up with an additional latent cancer. So you might say that the expected outcome is no additional fatal cancers.

HT05/11 14.008 continued

UNIDENTIFIED SPEAKER: If that's the actual expected -- if that's the actual expected outcome, why isn't that put into your statement as the most important --

MS. FOUNDS: Well, that is in terms of how we look at that .13 latent -- excess latent cancers.

HT05/11 14.008 continued

UNIDENTIFIED SPEAKER: But, in other parts of the document, you indicate that the most likely outcome is zero cancers.

MS. FOUNDS: Well --

UNIDENTIFIED SPEAKER: And these statistics, if I might be permitted to make my statement --

MS. FOUNDS: Right. What I'm trying to do is -- you know, what it is is that,

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if you repeated this event many, many, many times, you don't really get a .13, right? There very seldom is there 60.13 deaths. If you had that and did it many times, there might be one of those events that come up positive.

So when you average it over all of those events, then you get a .13. And, at this point, I will also turn it over to our health experts if you need an additional explanation on that.

MR. PARHAM: Did we have somebody over here?

UNIDENTIFIED SPEAKER: I was going to ask if the gentleman had finished his question.

MR. PARHAM: I don't -- that's why I wanted to get back to you. I think you have a statement to make, actually.

HT05/11 14.008 *continued*

UNIDENTIFIED SPEAKER: Well, I'm saying is you explain this in two different ways in your document. In this shorter version that you've put here in the narrative summary, you appear to attach some greater certitude to potential cancer risks than you do in the other sections, especially in the appendix, where you indicate that the most likely outcome is zero

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HT05/11 14.008 continued

cancers.

And I'm saying, for purposes of explaining this to the community, the more appropriate explanation would be to indicate that the most likely outcome is zero cancers.

MS. FOUNDS: Okay. I'm sorry. Could I also get you maybe later to come up and point out those sections in the EIS also?

UNIDENTIFIED SPEAKER: Certainly. Yes.

MR. PARHAM: Okay. Thanks for the follow up. Did you want to add anything?

UNIDENTIFIED SPEAKER: I think that's been resolved.

MR. PARHAM: Other questions or comments?

HT05/12 14.009

UNIDENTIFIED SPEAKER: Under the statement he was referring to, it said shipment of pits to an alternative site would increase radioactive exposure of the Pantex Plant by 113. Why would it increase if the pits are shipped to an alternative site?

MS. FOUNDS: Because they are doing more handling of the containers that the pits are in. They have to take them out of

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HT05 (CONTINUED)

storage and, essentially, put them on the SST's that will be transporting them off site. So you have to account for that additional exposure.

HT05/13 14.010

UNIDENTIFIED SPEAKER: In follow up to her question, what is the underlying base assumption of man-rem or person-rem exposure that you have ascribed to ongoing site work at the 500, 1,000 and 2,000 levels such that you would be able to extrapolate from these numbers exactly what is the base amount that you say they're going to get, irrespective of the number of weapons that they're working?

I mean, I've tried to deconvolute your calculations and I can't do it.

MS. FOUNDS: Okay. Well, one of the things was that we were looking at base line data and records that the Pantex Plant has for determining what individuals have. We are also looking at some of the limits and the profiles, how many weapons will be handled, those types of things, to come up to the 1,000 -- or the 2,000, 1,000 and 500 level.

HT05/13 14.010 continued

UNIDENTIFIED SPEAKER: As the person who supplied that data from the Pantex Plant, I'm not able to follow your calculations,

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HT05/13 14.010 continued

nor do I see them stated anywhere in the documents.

MS. FOUNDS: Okay. One of the things I can do is to have you get together with our experts. Are you saying that we have this base line, the historical records from Pantex, and you do not know where the 330 person-rem?

HT05/13 14.010 continued

UNIDENTIFIED SPEAKER: I cannot extrapolate where there's a base of what they used to build up on some of these numbers when they compared from site to site. There are some assumptions that were made that are not stated when they made the calculation on what might happen, especially when you start looking at making movements to alternative sites.

MS. FOUNDS: Okay. So that's what you're identifying is how that does correspond to what you're doing at the other sites and then you have that base line dose. So what we are doing is, essentially, saying that you have this process at the Pantex site for loading them. At the alternate site, you would have a converse process, so to speak, for unloading them. It's, essentially, the same for Pantex as it is for those alternate sites.

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Jim, do you want to --

MR. JESSEN: Yeah. My name is Jim Jessen and I work with Tetra Tech. You know, if Gary wants to sit down with any of us, we can go step by step and explain the process to him.

MS. FOUNDS: Can you go through it in summary?

MR. JESSEN: Do you want to do the total thing?

MR. PARHAM: As I say, as far as timing goes here, the question -- do you feel comfortable -- would you like to get together after this and go through it in more detail or do you want to get it on the record here?

UNIDENTIFIED SPEAKER: No. My position is that it should be in the document, not that I should get a personal explanation, but it should be available for public review.

MS. FOUNDS: Okay. So you want to know the process that leads to --

HT05/13 14.010 continued

UNIDENTIFIED SPEAKER: I want some additional information on the assumptions that were made in reaching these calculations, such that someone reviewing it, not having the opportunity to speak to Jim, could also see if

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HT05/13 14.010 continued

their pencil-whipping of the data would be the same as his.

MS. FOUNDS: Okay.

MR. PARHAM: Great. That's good. I think that was a nice, productive discuss-working through that one. I appreciate that. And thank you. Other questions or comments? We have several minutes left and we want to make sure that we get everybody covered in this session. Any other questions or comments?

Anyone -- I always ask this question. Anyone back in the back room there? No?

Just to reiterate again, as far as getting opportunities to comment, let's just go back over that one more time on where people can get copies of the -- we do have the EIS here; is that right?

MS. FOUNDS: Yes. We also -- we have the EIS here. And, if you wish to obtain copies and you don't pick one up tonight, there is a 1-800 number that can be called to request a document. The same number can be used to make comments. There will either be a person answering for the phone that can record your comments or an

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HT05 (CONTINUED)

answering machine will pick up and you can just leave your comments. They will be forwarded to us. And you can be included as part of the comment response document.

You can fax us comments and you can also E-mail comments. And all of those methods, the numbers and E-mail addresses, are on the poster that is outside of this room. And I believe it's right back here. So there are various ways to comment, then, after you have a chance also to look at the document in greater detail.

MR. PARHAM: Okay. Thanks, Nan. One more chance to have questions or comments. What we're going to do, after this session, is we'll be reconvening in the room next door and maybe breaking up in a larger session, as far as the room size, if it's needed. And we'll be summarizing these three sessions and each of those parts of those sessions and then having a few summary comments at that point.

But, again, any additional comments or questions for Nan or Donna at this point?

MS. FOUNDS: And I would like to

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point out that our comment period does close July 12th. So we have that amount of time to get comments back.

MR. PARHAM: I'd like to thank you. And I look forward to seeing you in the next room in a few minutes. And if you have additional questions, you would like to have further dialogue, you guys will be here for a few minutes in this room before we move over? Thank you.

(Recess.

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HT06

DEPARTMENT OF ENERGY

PUBLIC HEARING ON

* * * * *

STOCKPILE STEWARDSHIP & MANAGEMENT DRAFT PEIS

STORAGE & DISPOSITION DRAFT PEIS

PANTEX DRAFT SITE-WIDE EIS

* * * * *

CLOSING SESSION

APRIL 22, 1996

10:00 P.M.

BRENDA ROHRS, CSR, RPR

SONDRA L. CARGLE & ASSOCIATES
CERTIFIED SHORTHAND REPORTERS
4103 W. 49th ST.
AMARILLO, TEXAS 79109
(806/355-8181)

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Portions of the transcripts unrelated to this EIS have been omitted.

we go.

MR. HANCOCK: I've got several questions, but since some other people may have some as well, I'll just do a few right now.

HT06/1
23.021

The first question is for all of the DOE and DOE contractor folks in the room, how many of them have completely read all three of the EIS's? I see three, four, five, six, seven, eight hands, I think.

The point I would make is these folks, out of all the DOE and contractor folks in the room, these folks have had a lot longer to look at all three of these documents than the public have, and so you're putting the public in a very difficult position in terms of dealing with all these documents.

MR. LAWSON: Just a minute. We'll have a chance for other comments. We can only take them down one at a time, so if you have some other comments to make after he gets through, you'll have an opportunity.

Please continue.

MR. HANCOCK: Thank you. The point was made in this -- in the summary discussion that the cost data on the disposition PEIS is

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going to be available in June or July. That was what I heard; is that correct?

MR. RUDY: Yes.

MR. HANCOCK: So, that's after the end of the public comment period ends on May the 7th. So, my question would be: How are the public -- how -- once the public gets that cost information, how are people supposed to comment on it and how will that be considered? How would those comments be considered outside of the comment period?

MR. LAWSON: Okay. Would someone like to answer that?

MR. RUDY: Yeah. Do you want me to do that now or a little bit later? It's up to you.

MR. LAWSON: No, why don't you do that now in answer to the question.

MR. RUDY: Okay. In the quickest answer, there are no preferred alternatives in the disposition document, and the record of decision will be the end of this year.

But under the National Environmental Policy Act, more particularly to the point, economic analyses, cost analyses, are not a

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HT06 (CONTINUED)

MR. HANCOCK: And also input, throughputs, and outputs of those facilities?

MR. CYGELMAN: Yes. That's right. There will be some process we'll diagram in there.

MR. HANCOCK: I guess I'd only comment, going back to Greg's earlier comment, about how the cost information is not included.

It's very hard to analyze environmental impacts without the kind of more detailed information that seems to me would be helpful.

MR. LAWSON: The gentleman in the back of the room has something to add maybe to that point or to the point just prior, please.

MR. HUFF: This is really a bit more general than that. Over the many months of this affair, it's apparent to me perhaps that many of the people who oppose these activities would oppose them even if they were proposed for Antarctica.

Along those lines, I'd like to inquire, since this seems to have become sort of a debate, who is this gentleman and where is he from and what is his interest in this whole

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affair, please.

MR. LAWSON: Well, I'd just like to make a comment that he's certainly welcome to say who he is and who he represents.

It is the department's policy that has been given to the facilitators that for some of the people, they prefer not to give their name or affiliation, and that is respected.

However, if other people would like to give their names and organizations, they're certainly welcome to do so.

But I don't feel it's in my power to force anybody to give that kind of information. So, it's up to you, if you'd like to say who you are, that's fine.

MR. HANCOCK: I did introduce myself on other occasions, but I didn't know in the question period that that was important, but I'm Don Hancock from Southwest Research & Information Center in Albuquerque.

And I'd also like to know the name and affiliation of the person who asked me the question.

MR. HUFF: My name is Gene Huff. I'm an attorney from Amarillo, Texas. And I'm not

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aware of any interest at all that the Southwest Institute in Albuquerque could have in this matter. Thank you.

MR. LAWSON: Okay. I'd just make a point here that people have been tremendously respectful tonight, and I don't want to lose sight of that.

There's no need for us to make comments about why one person is here or is not here.

This is a national issue that we're dealing with, and people can come from wherever they want to come to make a presentation, and it's not up to individuals to identify whether it's in somebody else's interest to be here.

Is there anybody else who would like to make a comment or ask a question about issues? Yes, please, ma'am.

MS. SANDERS: I'm Jan Sanders. I'm from Dallas, Texas, and I do consider this a national and international issue.

My question has to do with the disposition of the plutonium surplus and whether the DOE, in the consideration of the options, considered the waste generated from the MOX fuel

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HT07

DEPARTMENT OF ENERGY

PUBLIC HEARING ON

* * * * *

STOCKPILE STEWARDSHIP & MANAGEMENT DRAFT PEIS

STORAGE & DISPOSITION DRAFT PEIS

PANTEX DRAFT SITE-WIDE EIS

* * * * *

APRIL 23, 1996

8:30 A.M.

SONDRA L. CARGLE, CSR, RPR

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Rocky Flats material is in various forms. There are some pits at Rocky Flats, there are some plutonium metal at Rocky Flats, and there's also oxides at Rocky Flats. So, when I indicated that we were looking at moving Rocky Flats material, either all or part of it, if, in fact, all of it was proposed to be moved at Pantex, it would be pits, it would be metals and it would be oxides.

UNIDENTIFIED SPEAKER: Could I just follow up a little bit? I didn't understand -- or to understand. I just want to follow up and get the distinction, then, that the storage of up to 20,000 pits, those pits are what I'm going to call sealed, but you're talking about material that won't be sealed or will be packaged in some other fashion?

HT07/1
02.005

MR. CYGELMAN: Is this on?

With regard to the specific question, the Department currently is in the process of repackaging materials at Rocky Flats. In the process of repackaging material, those materials would be pulled into what we would consider to be sealed containers that would be equivalent to the form the pits are in right now.

There might be, in fact, two

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containers, and that container would be put into what we call the equivalent of a pressure containment vessel for long-term storage. And those -- the materials from Rocky Flats would be appearing at a site, which could be Pantex, in a sealed, high-integrity container.

MS. WILDESEN: Okay, great. Other questions? Yes, ma'am.

UNIDENTIFIED SPEAKER: I would like to be directed to the presidential paper, Executive Order that relates to the allocation of strategic nuclear stockpile. In other words, the document that names the 5,000 that was referred to.

My first question was to get a handle on the size of the stockpile, and so the 3,500 plus security information. Now then, we're talking about 5,000 set asides here for stockpiling. And so I think maybe if I could actually see the Executive Order, I'd have more clarity. So if you'd refer me to that document.

MR. CYGELMAN: As I mentioned, the 5,000 is a nominal number.

UNIDENTIFIED SPEAKER: Is what?

MR. CYGELMAN: A nominal number.

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HT07 (CONTINUED)

Comments omitted from intervening pages here do not concern this EIS.

hearts, and I want to make sure that you have plenty of time to ask questions and to understand how each of the three studies are dealing with this important issue of employment, what relationships there are between those studies with respect to this issue.

And at this point, I'd like to open it up to questions or comments that you have about employment. This gentleman over here, please. I would ask you to stand and we'll bring you a microphone.

UNIDENTIFIED SPEAKER: It appears that there's already excess pits at Pantex. We talked about 9,000, approximately. And it also appears that the Stockpile Stewardship & Management PEIS only talks about the storage of strategic materials. Also, Andre, I think, said his storage doesn't start until 2005. There seems to be a gap where we have excess materials stored and no one seeming to have ownership of them.

MR. LAWSON: Could either one of you clarify this? Earl?

MR. WHITEMAN: Who was asking? Okay. Yes. There -- Andre's storage options relative

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to long-term storage don't kick in for some period of years, but you're right, there is an intermediate term in the next five years where a DOE office will need to take over ownership for storage of excess plutonium, and those that are pits at Pantex would be additive to the curve I showed there in terms of some additional employment associated with that.

MR. LAWSON: Now just to clarify, where do they show up? Do they show up in one or the other of the EIS's?

MR. WHITEMAN: That would be reflected in total in the programmatic documents, eventually, that you would see from Andre.

UNIDENTIFIED SPEAKER: So Andre's documents are going to reflect something starting now?

MR. WHITEMAN: No. One of the issues DOE is still working internally is as we begin to implement storage and disposition, then a program office will be established to actually manage that and take over the funding of that responsibility.

So, that would be -- I would assume Greg and Andre will be putting together that sort

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of a program that shows them transitioning over the ownership of that. Greg, can you help me with that?

MR. RUDY: Yeah, let me just have ten seconds, I guess.

MR. ROSE: The Site-Wide owns this, the interim that he's talking about.

MR. RUDY: It's a question of employment. The bottom line is the inventory is going to be owned, controlled and safely and securely managed by the Department of Energy within -- you know, from today forward into the long term.

If a decision is made to build something new, a new consolidated storage facility, Andre's point is it takes a period of time to build that facility and physically transition into it, but a pit doesn't know if it's a surplus pit or a strategic reserve pit. And, in fact, a strategic reserve pit today may become a surplus pit tomorrow or years down the road.

So the Department has an integrated view of the continued safe and secure storage of that material and to be able to accommodate

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HT07 (CONTINUED)

differences in characterization or classification of the material from surplus to strategic reserve.

UNIDENTIFIED SPEAKER: My question kind of related to the employment. In other words, if Earl has only talked about the number of people required to maintain safety surveillance on 3,500 or 5,000 units and there are actually 9,000 now, then there appears to be a gap in the number of people that are going to be required to provide that safe storage in the next five years.

MR. RUDY: The increase in the amount, it's not directly arithmetic, because if there's just, as an example, 5,000, eight or nine or 10,000 pits, the additional thousand or two, depending on the zone and the area it's stored, may not necessarily equate to that much additional employment. It can be, perhaps, accommodated within a given parameter, within the given, you know, work force that is managing it.

MR. LAWSON: Anyone else have a question?

MR. WHITEMAN: But let me comment again. The gentleman's comment is correct. That

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Comments omitted from intervening pages here do not concern this EIS.

testing. We've had experience in the past with high explosives, that they didn't perform in the full scale tests underground in Nevada the way we thought they would.

And so, that -- that's going to require an awful lot of assessment and analysis and testing of high explosives on the part of the laboratories to understand and certify, yes, those -- that will still perform as a replacement part. So, --

MR. LAWSON: Another question in the back, over here, please?

HT07/2 11.011

UNIDENTIFIED SPEAKER: One of the reasons that employment increased at Pantex by about a thousand people was not so much for the increased work in dismantlement, but to invoke a safety culture at Pantex. A lot of these safety infrastructure programs are independent of the number of units you're doing. Whether you have one weapon or a thousand, you still need your conduct of operations, you still need your safety analysis, you still need your safety question determination, et cetera. And none of the numbers I've seen seem to take that into account that you have a base line infrastructure that you

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HT07/2 11.011 continued

can't go below without losing the safety culture. I'd like you to respond to that.

MR. WHITEMAN: Well, they're your numbers in terms of what the Pantex Plant has said are required to meet all of the safety requirements of the future for the workload that we have for the future, so we didn't invent the numbers. These are the numbers that Pantex has determined are required for the level of work, doing it with the modern safety culture.

HT07/3 11.012

UNIDENTIFIED SPEAKER: My response to that is that it was looked at with -- without looking at the plant as a total. We were asked -- the way the questions were asked, for the specific operations, we gave the numbers, but no one asked the questions about what it would take to maintain your overall safety infrastructure. I believe that's true.

MR. WHITEMAN: That's not true. I mean, we're not going to keep a few safety people here at Pantex as we move the whole weapon operation to Nevada. I mean, it's obviously --. the numbers are what does it take to fully operate the plant, and that was the way it was characterized from Pantex. So those are in

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HT07 (CONTINUED)

there.

UNIDENTIFIED SPEAKER: I would disagree, but maybe we need to --

MR. WHITEMAN: Well, you need to talk to your own management, then, if you disagree, because they're the ones that provided the numbers.

MR. LAWSON: I think I saw a hand here, and there's another one here. Let's go here first, please.

UNIDENTIFIED SPEAKER: I am the management of Pantex, and I think there is -- clearly, there were a number of assumptions that were used to put together the numbers in the Stockpile Stewardship & Management PEIS, and the disagreement comes on those assumptions.

The numbers that we provided were, indeed, our numbers, and they were based on the assumptions that were given to us. Those assumptions do not necessarily represent the real world, as we see it, in terms of all of the requirements that are being imposed upon us, as well as those which represent what we need to do to maintain the infrastructure, and that's where the disagreement comes in.

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Comments omitted from intervening pages here do not concern this EIS.

Let me -- in terms of the other wastes, you have, currently, low-level wastes. Again, there would be a quantity of low-level wastes generated. Depending on the disposition option, probably a little bit more than what you're doing today.

In terms of hazardous wastes, as part of the processes, we would be using cleaning solutions, for example, and lubricants. In general, depending on the disposition option, the amount that would be generated by any one of the disposition options would be less than the amount of hazardous waste that's currently generated at Pantex.

MR. PARHAM: Thanks, Andre. We'd like to open it up to questions now. I apologize. We are going to go a little bit long, but specifically, people wanted to get some of these things addressed and we wanted to make sure we get to them. I think M.J.'s got a microphone there, so, Nan, you want to come up, too? We'll be ready to go. Do we have some questions? Yes, sir.

UNIDENTIFIED SPEAKER: Yes. I had a question about the radiological impacts. On

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storage, you indicated radiological impacts would be negligible. On disposition, you said they would be within standards. Could you explain to me in concrete terms how you made a judgment between what the difference was from negligible to within standards?

MR. CYGELMAN: Yes. The normal standard right now for workers is five rems per year. The Department has a goal of not exceeding 500 millirems per year. We're looking, in the area of storage, probably not exceeding something like -- to the workers, probably close to maybe a hundred millirems per year.

With regard to the disposition options, it's a little trickier. It's a question of how much you can actually reduce as part of the process. We are trying to automate it as much as possible, but it's quite possible, in some cases, we could be reaching the Department's goal of 500 millirems per year, but we would not be reaching the standard goal of five rems per year.

MR. PARHAM: Okay. Followup to that?

UNIDENTIFIED SPEAKER: From a radiation biology perspective, could not one

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HT07 (CONTINUED)

conclude that exposures 500 millirem per year and less are also not put in the category of negligible?

MR. CYGELMAN: Could you repeat the question?

UNIDENTIFIED SPEAKER: I'm not aware of any radiobiological basis to reach the conclusion that if someone received 500 millirem or greater in a calendar year, that I would now move away from the term negligible, which is apparently the criteria that you have used.

MR. CYGELMAN: I'm not sure I used negligible in 500 millirem per year, but I would agree that 500 millirem -- I wouldn't consider 500 millirem per year negligible, okay? If that's your point. I said I would not -- I would say 500 millirem per year, I would not consider that to be negligible. I would consider negligible dose rates about several millirems per year.

MR. PARHAM: Do you have one?

UNIDENTIFIED SPEAKER: Can you reference a standard or other criteria that DOE has put out that allows you to reach such a judgment?

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MR. CYGELMAN: I'm using a standard that, under the basis of normal background radiation, which people are getting normally, without doing any work, that the radiation level is, in fact, in the order of about 300, 400, 500 millirems per year, depending on your location.

So, the actual radiation exposure to a worker is a pretty small percentage of what you're normally getting.

MR. PARHAM: Okay. Thank you. We'll come back to you if we get a chance here. We had other questions, though, I think. Right here. Okay.

UNIDENTIFIED SPEAKER: Yes. I'd like to ask Nan if she could comment on the comparison of the result of the aircraft risk calculation for Pantex with, for example, the risk that's calculated at a nuclear reactor site proximate to an airport where there is dry storage of nuclear fuel, such as Cincinnati or Toledo, where the aircraft density is much higher.

MS. FOUNDS: I have not done a comparison, for instance, of how this risk compares to an aircraft crash. We haven't looked at what the NRC is reporting, for instance, for

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any of the reactors that you were citing.

I can go out to some of my technical experts and see if they're willing to stand up, but since they're not, what I could do is provide that back. No one jumped up. But anyway, what we could do in the comment response is give you back that information.

I may be actually overstepping my bounds here, but we did prepare one slide that went to a -- it's in the very, very back, I believe -- that sort of did a risk comparison of, not what you were talking about, but in other risks that are used.

And I use this slide with some trepidation, but, for instance, this is a risk slide in terms of, you're looking over here at a scale that goes from, like, one chance in a hundred of -- that's the scale there -- of dying from a disease in an entire year in the United States.

And, for instance, if you look on this scale, there are motor vehicle accidents, et cetera, that are looked at in terms of the probability of an average individual dying, for instance, from these particular aircraft accident

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scenarios, et cetera, and here is the aircraft crash scenario.

This is all radiological accidents at Pantex, summed together, and here is the aircraft crash release. And if you notice, those are -- tend to be orders of magnitude less than what is seen for these other types of accident scenarios.

MR. PARHAM: Okay. Thanks, Nan. Nan, are these available? I know it's hard for some people to see these. Are these available for people to look at after this session or available for people to look --

MS. FOUNDS: Yes, they are.

MR. PARHAM: Okay. That's good. Okay. Additional questions?

UNIDENTIFIED SPEAKER: Just a followup on that graph. I couldn't -- I've got really bad eyesight. I couldn't see the bottom number in terms of the actual probability that you're using for that graph concerning the aircraft crash scenario.

MS. FOUNDS: This one down here?

UNIDENTIFIED SPEAKER: Yeah. I just can't read it from here.

MS. FOUNDS: Okay. This number is

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HT07 (CONTINUED)

1.8 times ten to the minus 11 in terms of the risk that combines the probability that the accident will happen with the probability of getting a latent cancer fatality for an average individual in the United States -- well, for an average individual in this region of influence.

UNIDENTIFIED SPEAKER: Getting back to Tom's question, were there other risk assessments done for not only nuclear reactor facilities, but maybe defense sites where --

MS. FOUNDS: No, we don't do a comparison to, like, what it is at a -- you know, how does this compare against a -- a reactor someplace -- as an aircraft crashed into a nuclear reactor. It's not in the document.

UNIDENTIFIED SPEAKER: The last followup is you cited a DOE crash analysis study that you'd gotten from -- or theoretical study. Did you not use -- why did you not use FAA studies on that, or are there FAA studies on those situations?

MS. FOUNDS: Well, what the Department has been doing is developing a -- a DOE aircraft crash standard for utilization within the Department, and it does go out and

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look at National Transportation Safety Board accidents and look at those statistics and then say, okay, if, for instance, you have an aircraft and it did crash, where would it crash out.

And it uses those kinds of statistics for that near-airport analysis. And as part of this, we also do look, for instance, at what the crash rates are for different categories of aircraft and those types of things. And those -- that information is all developed from those data sources that I said, which were the FAA operations data, the RAMS data, et cetera. So that is the model that we're -- that we're using.

I'm not aware, and I couldn't tell you for sure -- and I do have experts that can tell us a little bit more about that standard -- but there isn't, you know, a model that can just be picked up and used from the industry, so to speak. Let me --

MR. PARHAM: Okay. We had a question over here. Question here?

UNIDENTIFIED SPEAKER: Yes. Man, on the charts that you had, you listed increased impacts.

MS. FOUNDS: Uh-huh.

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UNIDENTIFIED SPEAKER: NEPA requires us to look at significant impacts. Have you made an attempt to show what significant impacts are, and can you identify on that increased impacts which of those are really significant?

MS. FOUNDS: Well, in terms of that, when you do an EIS, you're kind of assuming that you have the probability of having significant impacts. What I was showing in this one is, for instance, if we had an impact over the base line -- okay? -- as part of the NEPA process, we're usually comparing this against standards, and we give numbers, for instance, that state what the impacts are.

For instance, in the air quality, we give concentration levels and compare those to the effects screening criteria. And I did try to highlight, you know, the results, but for the most part -- and I'm generalizing right at the moment -- we did not see impacts above those -- you know, the health standards that are established in -- you know, from the TNRCC and things like that for the State of Texas.

UNIDENTIFIED SPEAKER: So, in essence, you're saying that there are no

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significant impacts.

MS. FOUNDS: In essence, that's what I'm saying. But I -- I want to be able to allow the public to look at what the impact values are and to look at what those comparison criteria also are.

HT07/4
23.015

UNIDENTIFIED SPEAKER: I'm -- I would just add that I think that because the CEQ guidelines say that you are to identify what the significant impacts are, that if there are no significant impacts, you should state that in the EIS.

MS. FOUNDS: We'll take that into consideration.

MR. PARHAM: Additional questions? Okay. Thanks.

UNIDENTIFIED SPEAKER: Thank you. It's my understanding that -- it's my understanding that the standard is a draft standard at this point in time and that there are some efforts underway to improve the aircraft -- the aircraft -- the airport -- airport facilities to reduce aircraft at Pantex. That's supposed to be --

MS. FOUNDS: Sir, I think I know what

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HT07 (CONTINUED)

you're trying to say if I could go -- if you want me to --

UNIDENTIFIED SPEAKER: Yeah, that's supposed to be updated in the final EIS. Is there something you propose to present that information to the local citizens, the updates on that?

MS. FOUNDS: What is happening right now is that DOE standards is being evolved, and as it evolves, we you know, plug the data in and see what the results of that are, and we also comment back to headquarters as to what the impact of that stand -- of, you know, the changes to -- in that standard are against this particular document.

And we are going to come back for a technical discussion in June to outline in greater detail and to have the ability to respond to specific questions on the DOE standard, the data that was used and how that is -- how the impacts would either stay the same or change based upon the model changing.

And when you talk about -- there are efforts underway to shift those -- that back-course approach and to move it so that aircraft

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would essentially be a moving-away from the picture that I showed at the beginning, where that back-course approach would actually bisect if you continue it on out.

There have been several steps taken by the FAA to route traffic around Pantex, to not have them overfly that area at all, and to shift those approaches, the back-course approach, away from the Pantex Plant.

And currently, we don't take credit for that in the numbers that I was citing, but we do sort of have a relative risk reduction cited in the EIS, that that risk would come down, like, 62 percent, but that's based more on an evaluation of what the Soloman model had been telling us before. And we need to use this new model in a valid approach as to how -- how this shifting will actually reduce that risk.

MR. PARHAM: Okay. And you'll be covering some of these same subjects in today's breakout sessions. You can talk about --

MS. FOUNDS: Yes. We can continue to talk about these subjects at that time.

MR. PARHAM: Aircraft safety crash came up yesterday quite a bit. Other questions

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Comments omitted from intervening pages here do not concern this EIS.

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HT08

DOE PUBLIC HEARING ON
STOCKPILE STEWARDSHIP PEIS
STORAGE & DISPOSITION PEIS
PANTEX SIDE-WIDE EIS

STOCKPILE STEWARDSHIP AND MANAGEMENT

APRIL 23, 1996
1:00 P.M.

KAROLYN FARMER, CSR, RPR
SONDRA L. CARGLE & ASSOCIATES
Certified Shorthand Reporters
4103 W. 49th Street
Amarillo, Texas 79109
806/355-8181

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STOCKPILE STEWARDSHIP AND MANAGEMENT

MR. LAWSON: Are there any questions you have about information that was given out in just the last half hour? So you have an opportunity to ask questions. Is there anybody who has a question they would like to ask? Yes, ma'am. If I could -- if we could get a microphone to you. It's important that we all use microphones so the court reporters can get accurately what your questions are.

UNIDENTIFIED SPEAKER: It's a statement I would like to make.

MR. LAWSON: Speak as loudly as you can.

UNIDENTIFIED SPEAKER: Go slow on the -- on your proposals. That's Number 1. With our present President, we will not know from one day to the next what he is going to do. France is testing. China is testing, and et cetera. It is foolish to be thinking of reducing the stockpile as it seems to be proposed. Number 3, the environmental damage that you may see will affect this area. No consideration is given to all the chemicals that is poisoning the human body by allowing the chemical companies to put all of their chemicals into food supplies which will harm all humanity in the United States. A, which is worse, quote, the pollutants

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that go out by Pantex that affect the local population, or, B, all the chemicals that go into our food supplies

HT08/1
11.004

affecting the whole nation? Four, it will hurt the economy of this city to have another payroll eliminated. The main four plans under proposal are these. Already gone are the Air Force base, the Helicopter plant, the helium plant, and Pantex. What next? Cutting the payroll of this city further, I am against wholeheartedly.

MR. LAWSON: Thank you very much for your comments. We appreciate it. I would like to focus on questions about this presentation. We'll have plenty of time to get into other issues and comments later on. Is there anyone else who has a question they would like to raise at this point? Okay. Why don't we take, at the most, a ten-minute break. A five-minute break would be great.

(Recess.)

MR. LAWSON: Let me go over the ground rules for this session. If it goes fairly quickly, we'll just run one right after the other with a small break in between the three sessions to change court reporter and to get the slides ready for the next presentation. We're going to take each of the three programs separately and in order, starting with stockpile

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stewardship and management. And each of the presenters who presented to you before will speak for, I suspect, three or four minutes, and give you some background material that wasn't presented before that will give you some more information.

(Presentation by Mr. Whiteman)

MR. LAWSON: Are there any questions regarding the stockpile stewardship management program? We have a question over on the far left.

UNIDENTIFIED SPEAKER: I guess my question is somewhat seeing if we could reach some sort of a summary statement. We heard before lunch one of the DOE responders say that it would appear that we could do the storage and disposition type work at Pantex Plant and be protective of the environment. My question is related to the area that is also of interest, which is public health. In your judgment, and based on the analysis that you've done, could you conclude that all of the work that is proposed for Pantex Plant could be done in a way to protect the public health?

MR. WHITEMAN: I can only speak today to the stockpile stewardship and management missions that we're talking about. And I can tell you that the mission we're planning for relative to public health and public safety, the mission anticipated for the Pantex Plant is

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HT08 (CONTINUED)

the mission that it has had for the last 40 years, other than it's one that's not nearly as large in the future because of the work load and stockpile we're being asked to support is much smaller. So certainly from an environment safety, health, public impact standpoint, whatever you perceive that to be today, it would be less in the future for the stockpile stewardship and management program.

MR. LAWSON: That's also a question that you may want to ask each of the individual programmers when they come up. Is there anyone else who has a question? Yes. Right up here, please.

MR. JUBA: Bob Juba with the Amarillo Economic Development Corporation. I want to preface my comment with a statement I made last night. Pantex is the area's largest basic employer, those being employers which derive their income or revenue from outside the Panhandle of Texas. AEC believes that all the jobs at the plant are very important, whether they're related to the security mission, the assembly and disassembly mission, the administrative positions, whatever, high explosives. The FY '97 budget as proposed by the administration calls for -- will lead to a reduction in force at the plant, an immediate reduction in force, if that budget is approved as it stands right now. The

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Preferred Alternatives Report, a supplement to this PEIS, reveals that Pantex but not Y-12 or Kansas City, the other production plants, will undergo this immediate decrease in budget. If the work load hasn't decreased, as you've made that statement earlier, we're still taking apart and disassembling the same amount of weapons. If that work load is constant and the other production facilities which are also being downsized in place are not suffering budget cuts, why is Pantex suffering those budget cuts in FY '97? I guess the question is: Is the PEIS driving the budget policy, or are those independent of each other?

MR. WHITEMAN: Okay. First, I don't think -- you shouldn't assume anything relative to other plants at this point in time. However, as we try to -- as the Department of Energy tries to manage all of its facilities within the budgets that we have appropriated, our Number 1 priority is to accomplish the mission and the work that's assigned to us. And we try, to the best of our ability, to allocate budget resources to sure that we accomplish that work. Regardless of what the budget level is at Pantex for this coming year, whether it's greater or less than the current budget, you can feel confident it will be one that we judge to be adequate to perform the work that's necessary to be

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performed. And if it's not adequate to perform the work, we will be working to make sure we fix that. But that is not something -- that's a near term programmatic management action that's not tied to any particular PEIS action. However, we are stewards of the taxpayers' money as we try to perform our overall mission. And as we perform our mission, we make sure we get the work done at the lowest possible price at all of our sites.

MR. LAWSON: Any other questions or comments regarding stockpile stewardship and management? Yes, sir, in the center aisle, please.

HT08/2
17.001

UNIDENTIFIED SPEAKER: Executive Order 12898, Federal actions to address environmental justice in minority populations and low income populations. President Clinton's February 11th, 1994 memorandum for the heads of all departments and agencies requires an analysis of environmental effects on low income and minority populations to include human health, social, and economic effects. Why does the draft of all three documents analyze only the human health effects of the proposed actions and not the social and the economic effects as required by the executive order?

MR. WHITEMAN: You will find in the PEIS for stewardship and management both an analysis of socioeconomic effects, but also an analysis of

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environmental justice. So I'm not sure of the context of your point.

HT08/3
17.002

UNIDENTIFIED SPEAKER: The socioeconomic is a little bit different than the executive order covering what we just talked about, the environmental justice in minority populations. And an analysis of the social and the economic have to go along with the health effects in the environmental justice analysis, not just the health effects.

MR. WHITEMAN: Okay. We'll take your comment under consideration. I think we've done that, but we'll take your comment and look in and make sure that we have.

MR. LAWSON: Okay. Yes, sir, over here on the left.

UNIDENTIFIED SPEAKER: I guess, Earl, I'd like to follow up on Bob's question, which in particular was triggered by your comment not to make any assumptions about the other plants. The data in here on Pages 33, 36, and 39 are the projections of annual cost at Kansas City and Y-12, as well as Pantex, including the HE at Pantex. Yet for the succeeding four years at both Y-12 and Kansas City, the annual cost is flecked. For each of the succeeding four years at Pantex, there's a decrease. That seems to question logic. And it

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HT08 (CONTINUED)

furthermore suggests that although the Pantex offering in terms of definition of costs against the stockpile management were designed within the assumptions, and those assumptions were laid forth to provide common basis of comparison across site to site, that those have now been translated into a budget planning document. And that's not what the NEPA process is.

MR. WHITEMAN: A couple of comments. First of all, the numbers in the charts there are reflective of the world and the work load as it existed about a year ago. And they're still valid for the comparison purposes at that time, but it is a dynamic situation. Work loads go up and down at various sites. But again, I would caution you all to not fall in the trap of comparing yourself one site to another. You need to focus on the Pantex Plant's mission. The reason I say that, for example, the Kansas City plant, in the same time period the Pantex Plant has grown in employment by 1,100 people, the Kansas City people has had layoffs of nearly 5,000 people. That's reflective of the government trying to put the money where the work was and not being tied to some historical precedent of level of funding. We have a job to perform. At various times some plants go up and some plants go down relative to that work level. But the people at Kansas City were not

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real happy as they were laying off 5,000 people while Amarillo was hiring 1,100. But that was the right thing to do because that's where the work load was. That's why my comment earlier, you shouldn't fall in the trap of comparing one plant versus another, because the work load is very different at each plant. And I think we're doing the right job for the government in not just saying everybody gets cut the same amount or everybody increases the same amount, but instead trying to put the money where the work is.

MR. LAWSON: Thank you. The gentleman right in front.

MR. JUBA: Then if we do that, we just look at Pantex and don't look at Kansas City and Y-12, as Tom mentioned, you've got declining budgets in each of the four successive years. Is there a declining amount of work? When you look at Kansas City and the work that they performed, it's obvious when you aren't building new weapons you don't need as many nonnuclear components. When you're disassembling weapons, you need more people at the disassembly site. Those things are very logical and orderly. But when you've got a steady demand placed upon employees and management to disassemble a certain amount of weapons and you look at declining budgets at the same time, that doesn't quite

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fit in.

MR. WHITEMAN: I'm not going to stand here and try to defend day-to-day management decisions in managing our program. But I would remind you that the Kansas City plant's work load, that you don't know about, by the way, has increased 250 percent in the last two years. And the money is reflective. They're not growing a lot, but their work has gone up by 250 percent. The Pantex Plant's work load in that period is relatively flat.

MR. LAWSON: Follow-up point? Other questions or comments regarding stockpile stewardship and management? Yes, in the center here.

UNIDENTIFIED SPEAKER: The enduring stockpile was built from the late Seventies to the early Nineties. That's approximately a twelve-year period. Assuming that the stockpile has approximately 8400 weapons in it and that the life of a weapon is approximately 30 years, that means that sometime in the year 2008 we would have to replace the stockpile at a rate of about 700 units a year. Yet we're sizing the complex to handle approximately 300 units per year. What are we doing to bridge this apparent disconnect in stockpile maintenance in the future?

MR. WHITEMAN: Well, I don't think there's a

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disconnect. I think we have -- you've made a set of assumptions that may not be true. But we've done the best we can with people from here, from all of the other sites, in forecasting what we think is the work load of the future, trying to understand how we would level that out in order to balance the work load to try to avoid large peaks and extreme valleys in the work load. And also I would remind you the 300 a year capacity, this is a single shift, so we do have more inherent capacity than that in our operations. I think they're consistent. We've done an awful lot of analysis on what is the right capacity, and we believe the 300 a year is about right.

MR. LAWSON: Anyone else have a comment or question to raise? Okay. Thank you. Of course, before we're through today, if you have another question for Earl, you can ask that. Let's just take a minute so that we can make switches in court reporter.

(Recess.)

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HT10

DEPARTMENT OF ENERGY

PUBLIC HEARING ON

* * * * *

STOCKPILE STEWARDSHIP & MANAGEMENT DRAFT PEIS

STORAGE & DISPOSITION DRAFT PEIS

PANTEX DRAFT SITE-WIDE EIS

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CLOSING SESSION

APRIL 23, 1996

3:00 P.M.

KARY A. WINGO, CSR, RPR

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it and we plan to do something about it to correct it. That's all I can say. Fortunately, it's a draft. So that's one of the reasons we're meeting with the public. We understand your concern and we will correct it.

MR. LAWSON: We're on a roll. All you have to do is say recess and there you go.

UNIDENTIFIED SPEAKER: You didn't want to recess anyhow.

MR. LAWSON: No, I didn't, actually.

HT10/1
21.001

UNIDENTIFIED SPEAKER: My comment and question revolves around the term cumulative impact. As defined in the Council on Environmental Quality Guidelines, cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency, federal or nonfederal, or person undertakes such other action. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time. That's the comment.

HT10/2
11.002

The question is why is there no

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HT10/2
11.002
continued

cumulative impact analysis in the socioeconomic impact analysis of past actions, like the cancellation in 1988 of the DOE program of a mine geologic repository for spent nuclear fuel and high-level radioactive waste in Deaf Smith County? That particular action was an action that caused a great economic disaster here in the Panhandle region. And right now we are just barely coming out of that, or just towards the end of coming out of that particular recovery from that particular action.

HT10/3
11.003

And then the more recent announcement of closure of the US Department of Interior's Bureau of Mines Helium Operation. Those are not addressed anywhere under cumulative impacts.

MR. LAWSON: All right. Thank you for your comment. And the question -- is there one of the gentlemen who would like to respond?

MR. RUDY: That's just something we'll have to consider. I don't know where you stop drawing the circles under that definition of how far back you go, over to how many agencies. And past decisions in the socioeconomic area have not received the focus that environmental

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decisions near-term, past and proposed have for air, water, et cetera. So that's an area we'll take a look at. And I appreciate the comment, but, again, it's an expanded consideration which hasn't come up before.

UNIDENTIFIED SPEAKER: It's a thorny issue. And I think perhaps you can address the question to the Council.

MR. RUDY: The CEQ?

UNIDENTIFIED SPEAKER: Yes.

MR. RUDY: Thank you. That's a tough one. Thank you.

MR. LAWSON: Okay. Anyone else? Okay. So why don't I announce a recess again and give you two more minutes and more questions will come. We will go into recess at this point. We will be staying around here for just a couple more hours. So, if you change your mind, want to have something to say, or somebody else is coming in, we'll make a general announcement in this area or around here that we're going back into session. So if you want to stick around, stay fairly close.

If you choose not to stay around, I want to tell you at this point that we really

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HT11

U.S. DEPARTMENT OF ENERGY
PUBLIC MEETING
STATE OF NEVADA

In the Matter of Pantex Sites)

REPORTER'S TRANSCRIPT OF PROCEEDINGS
Taken on Thursday, April 25, 1996
At 3:00 p.m. And 6:00 p.m. Sessions
At Community College, Cheyenne Campus
Room 1422
Las Vegas, Nevada

Reported by: Janie L. Olsen, RPR, CCR No. 406.

Albuquerque, the Savannah River site near Aiken or Augusta, Georgia --

UNIDENTIFIED SPEAKER: South Carolina --

DOE PANEL: But it's near Aiken, South Carolina, Augusta, Georgia. And then obviously the fourth one being here at home and Pantex being the preferred alternative.

UNIDENTIFIED SPEAKER: And Pantex is in Northern Texas.

DOE PANEL: Texas, Amarillo, Texas, It's about 17 miles east.

Yes. Do we have another question?

UNIDENTIFIED SPEAKER: On the comparative dose data up there, is there a reason why Hanford has NA on the comparative dose data?

DOE PANEL: That was on the one for the 20,000. We're at -- Hanford cannot take all 20,000. The structure that we looked at out there was the FMEF building, and it could house 8,000. So on the slide where there was 8,000 you saw --

UNIDENTIFIED SPEAKER: You didn't show any of that.

DOE PANEL: Didn't I?

UNIDENTIFIED SPEAKER: No. They all compared the data that I -- all I saw was Hanford was

NA.

DOE PANEL: I'm sorry. I thought that was in here either that or it got stuck together and that's why I didn't show it. I think it got stuck together, I'm sorry.

But you do have this one because for 8,000 pits you have those comparisons. It's just not considered for all 20,000 because it didn't have the capacity.

UNIDENTIFIED SPEAKER: I'm afraid I'm still a little ignorant on the stuff about plutonium. I was curious, I don't want to know what the half life is, radioactive half life, what I'd like to know is how many years is this considered to be actually hazardous waste?

HT11/1
14.003

DOE PANEL: It's not considered waste at this time. We're looking at --

UNIDENTIFIED SPEAKER: Hazardous product or whatever.

DOE PANEL: Right. So, I mean, in terms of this, I think I'm a little higher than half life, the half life is approximately 24,000 years. So -- but it is also sort of a toxic substance too. So throughout that entire time you would be considering it to be hazardous material.

HT11/2
14.004

UNIDENTIFIED SPEAKER: Well, if the half life is 24,000 years, wouldn't the actual hazard be much longer than that?

DOE PANEL: Yes. Because you're looking at those together.

UNIDENTIFIED SPEAKER: Right. And you don't have that number?

DOE PANEL: I don't have that number.

DOE PANEL: Ten half lives is the commonly accepted --

UNIDENTIFIED SPEAKER: Ten?

DOE PANEL: Right. Ten half lives is common, but I don't have the number off the top of my head for you.

Any other questions?

I will also -- as I said, we have a display over here, and it goes through the different, you know, radiation points, et cetera.

HT11/3
14.005

UNIDENTIFIED SPEAKER: What was the consideration of the maximally exposed individual at six point --

THE REPORTER: Can you speak up. I can hardly hear you.

UNIDENTIFIED SPEAKER: I'm sorry. Maximally exposed individual at 6.6 rem which I assume

HT11 (CONTINUED)

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HT11/3 14.005 continued

is the forklift driver or whoever punctures this thing. if you go all the way down -- we go all the way down completely from that to the public exposure, at what distance were we planning this --

DOE PANEL: Well --

UNIDENTIFIED SPEAKER: -- public exposure would not be safe 100 milligrams per year, and I was wondering how we went from one number to the other just like that?

DOE PANEL: Well, because the public is considered those people who are off-site and Nevada Test Site is 17 miles across, for instance. So what you're doing is looking at something that is -- you're not -- the ability is not there to disburse this high level plutonium mechanism other than just the puncture-type thing. We are also looking at a fairly conservative accident scenario in terms of it puncturing and then actually getting out and just, you know, contaminating the immediate area. So you don't have any mechanism by which you really want to disburse this up and take it off-site. So that's why that --

UNIDENTIFIED SPEAKER: 17 miles was the number I was looking for.

DOE PANEL: Yes.

UNIDENTIFIED SPEAKER: Also, I believe

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the 6 rem you're referring to was the worker; it wasn't a member of the public.

UNIDENTIFIED SPEAKER: Actually, that's what I said. 6.6 rem maximally exposed individual I assumed to be the forklift driver who punctured the --

UNIDENTIFIED SPEAKER: Correct.

DOE PANEL: And you also considered the maximum exposed off-site worker but that would be somebody at the Nevada Test Site,

HT11/4 14.006

UNIDENTIFIED SPEAKER: And that person is really the person hanging around for 24 hours a day?

DOE PANEL: Yes. That's right.

HT11/5 16.001

UNIDENTIFIED SPEAKER: What would be the route that you would transport this to the test site?

DOE PANEL: There would be several routes that the department uses to get material here, and right off the top of my head I don't have the specific route, but we did look at those. And obviously we wouldn't be telling people when we were shipping those --

UNIDENTIFIED SPEAKER: Correct.

DOE PANEL: But the one thing I do know they would be precluded from, as I said, driving over the dam. We did not analyze that when --

HT11/6 16.002

UNIDENTIFIED SPEAKER: What about -- what about the freeway system?

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DOE PANEL: Yes. We would be using the interstate transport.

HT11/7 16.003

UNIDENTIFIED SPEAKER: Are these the transport system routes --

DOE PANEL: I'm sorry --

UNIDENTIFIED SPEAKER: -- highway route control monitors. Would they be managed so that they would fall into that category?

DOE PANEL: The department --

UNIDENTIFIED SPEAKER: The amount that falls into a highway route control finding --

DOE PANEL: I'm not --

UNIDENTIFIED SPEAKER: -- they can be managed such that they do not fall into the highway route control formula. If they fall into that category we have lots of notifications for things like that. In fact, you have truck drivers in that situation that would not be allowed to leave their vehicles --

DOE PANEL: We would be shipping these with the -- with our SSTs. These are the vehicles that actually are used to transport weapons and things like that. The same mechanism would be used to transport these things. So you know you have drivers that are federal marshals and escort vehicles and all of those types of things in order to transport these things.

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HT11/8 16.004

UNIDENTIFIED SPEAKER: And then you would then be briefed on this if they were expecting to be highway routes. So my assumption is that they are not at this point expecting to load anything from highway routes in quantity. That doesn't have anything to do to federal marshals; that has to do with notification of states and --

DOE PANEL: But those are -- SSTs are the TSD, Transportation Safety Division, who manages those things have -- are working with states all the time in terms of what would happen if there was an accident, et cetera. So they would just simply do the same thing if we were going to ship the pits, and we have shipped pits in the past before between our -- and have an emergency system set up in cases of emergency to contact state, federal, and local officials.

UNIDENTIFIED SPEAKER: There would certainly be no notification though because the shipments' timing is classified --

DOE PANEL: Yes.

UNIDENTIFIED SPEAKER: -- within the state that it happened?

DOE PANEL: Yes.

UNIDENTIFIED SPEAKER: So the state -- to be in the state which means you have to have a specific

HT11 (CONTINUED)

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route even if it is classified --

DOE PANEL: Yes.

UNIDENTIFIED SPEAKER: -- it still would have to be notified, the states have to be notified?

DOE PANEL: Right. And the Transportation Safety Division does that all the time.

UNIDENTIFIED SPEAKER: How many pits per SST?

DOE PANEL: How many pits per SST. Somewhere between 20 to 25 is what we're saying. So it would take a while to ship these things, approximately six years to ship all 20,000.

UNIDENTIFIED SPEAKER: At six years what's the approximate -- is that how many a week? How many a month?

DOE PANEL: Let's see if I can remember. We have different scenarios, but I think it was like one shipment a week.

Brett, do you remember what those are?

DOE PANEL: The schedules are classified.

DOE PANEL: I think we're --

UNIDENTIFIED SPEAKER: I would just want an idea of how long --

DOE PANEL: Plus if you figure the number of pits, 20,000 and six years it's easy --

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UNIDENTIFIED SPEAKER: That's what --

DOE PANEL: And a convoy can have multiple trucks in it.

UNIDENTIFIED SPEAKER: Okay.

DOE PANEL: Do we have other questions?

We do have for those who came in late, we do have a display area next door that you might be interested in concerning the AS and the AT400A packages that we would encourage you to look at. We also have copies of the draft EIS here if you want a copy.

I do want to point out that our actual comment period closes July 12th, and if you will notice the posterboard out here there are various mechanisms by which you can give additional comments to us. We have a hot line. You can fax it to us, you can mail it to us, and you can E-mail it to us. So any one of those mechanisms. Please feel free to --

DOE PANEL: All comments have equal weight, whether they're made here or from one of those other mechanisms.

HT11/9 23.004
UNIDENTIFIED SPEAKER: You don't happen to have a Web site where we can access more information about --

DOE PANEL: Not a Web but an internet.

HT11/10 23.005
UNIDENTIFIED SPEAKER: You have an

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HT11/10 23.005 continued
internet address? Is that classified?

DOE PANEL: No. It's on the form.

UNIDENTIFIED SPEAKER: I didn't mean to be -- I'm new to all this.

DOE PANEL: Actually, Tracy, don't we have some form pages also.

DOE PANEL: There is generic information at the Department of Energy but I don't have that.

DOE PANEL: I know there is one at Pantex dot com that you can find for the plant, just general information about Pantex.

DOE PANEL: There is a published address book.

DOE PANEL: But more generic information.

HT11/11 23.006
UNIDENTIFIED SPEAKER: What I wonder is if I have any other questions is there an area I can tap in and find frequently asked questions?

DOE PANEL: The same way that you send in comments, and I'll give you that address after this.

DOE PANEL: And we have phone numbers where you can call our offices and ask questions.

Evening session of the public meeting. Start time 6:00.

DOE PANEL: We'd like to open up for questions and comments at this point. Does anyone have

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any questions?

HT11/12 16.005
UNIDENTIFIED SPEAKER: How many shipments would come to the test site for the 8,000 versus the 20,000 container of pits?

DOE PANEL: I keep having to do this in my head; I can never remember. But there are about 20 to 25 pits to be shipped at a time, and so, therefore, it would be roughly a thousand shipments or, you know, so to speak.

HT11/13 16.006
UNIDENTIFIED SPEAKER: And that would be over how long, what time period is that?

DOE PANEL: Generally we're looking at a six-year time period.,

UNIDENTIFIED SPEAKER: Where would the pits be coming from?

DOE PANEL: From the Pantex plant and that's near Amarillo, Texas.

UNIDENTIFIED SPEAKER: And do you -- before they get to Pantex how many places do they come from to transport?

DOE PANEL: Well, they come from the various DOD sites, from the depots and then from where they're staged at, et cetera.

HT11/14 16.007
UNIDENTIFIED SPEAKER: And if there were an accident along the route, do you -- are you looking

HT11 (CONTINUED)

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HT11/14 16.007 continued

at ways -- do you have any emergency response ideas, or are you looking at that as --

DOE PANEL: As part of that is an operational aspect and not as much an impact aspect, but they would be shipped in what are called the safe, secure transports, and that is managed by our transportation safety division or safeguard division. And they because they transport weapons and other materials, do have those emergency response plans in place with state and local governments and things like that and do actually carry out exercises as simulated, you know, accidents from -- as required to make sure that they can meet their emergency response objectives.

UNIDENTIFIED SPEAKER: I've got lots of questions if there's nobody else.

DOE PANEL: Please feel free.

UNIDENTIFIED SPEAKER: I haven't looked at the AIS yet, but have you looked at -- you've looked at specific transportation routes through Nevada?

DOE PANEL: They were evaluated, yes, specific routes because we needed to do that in order to look at what the exposures would be and what the accident analysis would tell us. And so we used the 1990 census data. The EIS does not give you what the -- absolutely the specific routes we'd be using. We have

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summarized that in the document.

HT11/15 16.008

UNIDENTIFIED SPEAKER: And you'd be using common carriers or contract carriers?

DOE PANEL: They're called safe, secure trailers, and they're run out of the Albuquerque office, and they are DOE employees that run that and then the drivers of the truck, et cetera, are actually federal marshals, et cetera, and they have escort vehicles, et cetera, that go with them. And they are set up normally to transport the nuclear weapons to DOD sites, et cetera, but we have used them to transport pits in the past.

UNIDENTIFIED SPEAKER: So currently at Pantex right now there's the maximum of 12,000 pits is already on-site.

DOE PANEL: No. There are currently about 9,000 pits. They are continuing the dismantlement process out there. And it was when we started the EIS, it was generally assumed that 2,000 dismantlements a year would take place, and so by 1997 we would have the 12,000 pits at Pantex. But nominally we're not getting to the 2,000 so they're -- right at the moment there's between 8- and 9,000 at the Pantax plant.

UNIDENTIFIED SPEAKER: So we're looking at another year and a half before you reach maximum

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capacity basically?

DOE PANEL: Nominally.

DOE PANEL: Not capacity, the authorized limit.

DOE PANEL: Right. It will take until about the year 2,000 to reach the 20,000 pits, 2004 nominally.

UNIDENTIFIED SPEAKER: Depends on how many they're dismantling?

DOE PANEL: Correct.

UNIDENTIFIED SPEAKER: I'm interested on how many pits can be held at the other sites. You said 8,000 at Hanford?

DOE PANEL: Yes.

UNIDENTIFIED SPEAKER: How about Kirtland?

DOE PANEL: All of the other ones can hold up to 20,000. At the Savannah River site we're looking at the K reactor. They had some assembly bays that are now empty, essentially, and are seismically qualified warehouses, if you will.

HT11/16 01.001

UNIDENTIFIED SPEAKER: And the Kirtland Air Force Base that's in the Manzano Mountains where they already have how many stored?

DOE PANEL: At -- they don't have any

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HT11/16 01.001 continued

pits stored.

UNIDENTIFIED SPEAKER: Plutonium pits --

DOE PANEL: Right. It was considered an excess area by the DOD not too long ago, but we do not have any pits stored there.

UNIDENTIFIED SPEAKER: In the Manzano Mountains?

DOE PANEL: The DOE does not.

UNIDENTIFIED SPEAKER: Because I've been told otherwise that there was a lot of pits stored in the Manzano Mountains.

DOE PANEL: Okay. I'll have to check on that.

UNIDENTIFIED SPEAKER: Are the pits considered high level waste or low level waste?

DOE PANEL: They're not considered a waste. They are reserve material.

UNIDENTIFIED SPEAKER: Reserve for --

DOE PANEL: They're reserved -- excuse me?

UNIDENTIFIED SPEAKER: Reserve for?

DOE PANEL: Reserved for the nuclear weapons complex at this time.

UNIDENTIFIED SPEAKER: So they could be -- they're going to be stored completely so that they

HT11 (CONTINUED)

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can be reassembled if --

DOE PANEL: They are going to be stored right now in that form and could potentially, you know, go back into a weapon, but there's the storage and disposition PEIS, and there's also the stop pile search and management PEIS. Stop pile search and management is going to look at what they need for a strategic reserve, and then storage and disposition will look to see how much may be declared excess in the future.

UNIDENTIFIED SPEAKER: So all --

DOE PANEL: This is interim storage.

DOE PANEL: This is interim storage until those other decisions can be made.

UNIDENTIFIED SPEAKER: And what's the time, I guess -- well, the completion of those different EIS's would be --

DOE PANEL: Supposed to be August for the stockpile storage and then December for the other one, for the disposition of other one; that's what they're saying.

UNIDENTIFIED SPEAKER: So if we -- when we reach 20,000 pits dismantled -- or the pits, what is that in relationship to the treaty figures or what we're supposed to --

DOE PANEL: I believe that is enough so

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we would meet our start two goals. Now, remember the start two actually talks to delivery systems and things like -- but because we are bringing them back and disassembling that's roughly the equivalent.

UNIDENTIFIED SPEAKER: Has there been any looks at disassembling the weapons themselves on-site rather than transporting them to Pantex for disassembling?

DOE PANEL: Not in our document. Now, the stock pile search and management looked at where it might relocate those assembly and disassembly missions to, for instance, to Nevada Test Site, but right at the moment Pantex is the preferred alternative for that document. So it would continue assembly and disassembly at Pantex.

UNIDENTIFIED SPEAKER: So the technology is not currently available to dismantle the weapons at their various sites around the country --

DOE PANEL: Never has been.

DOE PANEL: I mean at DOD sites?

UNIDENTIFIED SPEAKER: Yeah.

DOE PANEL: No. The DOE has always been the organization agency which produced, if you will, the weapons for the DOD to use. There could be like on-site maintenance that they might do that was fairly simple,

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but DOD has never maintained the capability to really do the disassembling and assembling missions.

UNIDENTIFIED SPEAKER: How many tests have been done in the P tunnel at NTS?

DOE PANEL: That I'm going to have to refer to our site representatives here.

DOE PANEL: I really don't know the exact number, but those basically have been tested for the defense nuclear agency.

HT11/17 01.002

UNIDENTIFIED SPEAKER: So starting in the P tunnel would that mean that you'd be opening it up where those tests happened and taking the pits into the assembly --

DOE PANEL: Those main tunnels back in there are open so to speak, and so you could just take them down there. The -- it's where the test actually occurred are --

UNIDENTIFIED SPEAKER: Sealed.

DOE PANEL: -- sealed.

HT11/17 01.002 continued

UNIDENTIFIED SPEAKER: How far away from the actual tests are they stored from the sealed area?

DOE PANEL: I'd have to look -- I'd have to look at maps to see where they were actually placed.

DOE PANEL: I mean, sealed is enough that there's no radiation leak into the area.

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UNIDENTIFIED SPEAKER: And there's been studies done -- there's been studies about radiation leaking out of the seal?

DOE PANEL: The tunnels have been used and there's been workers in there. So there are surveys done.

HT11/18 01.003

UNIDENTIFIED SPEAKER: How about the device assembly facility, what kind of place is that where the other pits are?

DOE PANEL: It's basically a multi-structure facility. You have an assembly cell similar to what you have in Pantex. There are some, what we call, assembly base, some of which are -- some of the assembly base that are Pantex. You've got some high base structures which are like an assembly bay only they're about twice the length. You've got some staging bunkers where you would stage material and administrative facilities plus there's other support facilities there, some spare generators and boilers.

HT11/19 11.005

UNIDENTIFIED SPEAKER: Well, one concern that I'd like to state is in your risk assessment, basing that on 1990 census figures I think is grossly -- because Las Vegas itself has changed so much in the past six years, I think that -- I don't know what the -- what the growth rate has been, but I think that the 1990

HT11 (CONTINUED)

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HT11/19 11.005 continued

census figures probably aren't -- aren't the -- what?

DOE PANEL: The ones to use?

UNIDENTIFIED SPEAKER: Correct.

DOE PANEL: Well, almost every city can test their city's numbers, but basically that provides us a common basis for analysis throughout the EIS bearing in mind that what's true today is going to be different next year and so forth. So that's typically used to provide a common baseline.

UNIDENTIFIED SPEAKER: Well, again, I'd like to just state it as a concern.

DOE PANEL: Understand, and we'll take that under consideration.

HT11/20 16.009

UNIDENTIFIED SPEAKER: The other thing is during the risk assessment for transportation, was this the thousand shipments over a six year period, was there any cumulative studies done on how that might impact with other shipments of waste proposed and currently planned through Nevada in terms of a cumulative impact risk assessment?

DOE PANEL: Well, there wasn't, no, a cumulative because we don't know, for instance, all of the things coming to the Nevada Test Site. But let me turn this over to Ellen for just a moment.

DOE PANEL: In our final EIS we're

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looking at that cumulative impact in our risk assessment because we at the site have a better feeling for what comes into the site not only in the way of waste or these potential materials but all the other programs out there that are proposing actions for the NTS as part of our expanded use alternative. We've looked at that whole picture to make sure that that analysis is done. So we have done that. That will be in our final EIS.

Right now in our draft we have noted as comments from the public as well as internal comments that we did not really provide enough information to the public on the movement of the defense materials. Everyone here was very focused on waste and so the defense materials kind of fell to the background, but the final we're going to be bringing that out more and explaining that a little better.

HT11/21 16.010

UNIDENTIFIED SPEAKER: What would you say are the amount of shipments at this time per week into the Nevada Test Site, the waste?

DOE PANEL: I'd have to look it up in the document right now.

HT11/21 16.010 continued

UNIDENTIFIED SPEAKER: Do you have an approximate?

DOE PANEL: No, I don't. I don't know that it's steady every week. We could probably come up

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with an average and I'm sure that's what it would consist of is the average.

DOE PANEL: Last year the average was 19 a week, my understanding based on a figure of 960 shipments through Clark County at least.

DOE PANEL: Yeah. I've heard that it's gone down a bit since last year. That's -- it could go back up again. So 19 is probably a good number.

UNIDENTIFIED SPEAKER: And can you tell me where, or you might know this anyway, is where the shipments come from currently?

DOE PANEL: The shipments to the test site? Within our EIS we've identified all of the generators that are approved to ship waste to the Nevada Test Site. Those are already DOE facilities within the complex nationwide. Fernald right now, I think, is shipping some of their restoration waste and the majority of the waste that comes to the test site is exactly that. It's the resulting parts and pieces from decommissioning activities or restoration activities at other sites where they'll scoop up the dirt, box it up in DOT approved containers and ship it via common carrier.

UNIDENTIFIED SPEAKER: Do you have like a list or something of places where it's coming from?

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DOE PANEL: Yes, I do. I can provide you with that. If I can get your name after the meeting --

DOE PANEL: She asked to get a list of where it's coming from?

UNIDENTIFIED SPEAKER: Because I know that some is coming from Rocky Flats.

DOE PANEL: We were receiving waste from Rocky Flats. I don't know if we're actually receiving any right now. Various facilities will come in with different waste streams through time. Maybe they're cleaning up some dirt over here. This year or next year they're decontaminating, decommissioning a facility. So every time a new waste treatment comes forward it has to be characterized, audited, and approved before they can actually consider shipping.

HT11/22 13.001

UNIDENTIFIED SPEAKER: Is there -- are currently any waste by-products involved that result from the disassembling process?

DOE PANEL: From the disassembling process, yes.

HT11/23 13.002

UNIDENTIFIED SPEAKER: Any nuclear waste by-products or radioactive waste?

DOE PANEL: Yes. There is low-level mixed waste and hazardous waste that are a result of the disassembly activities.

HT11 (CONTINUED)

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HT11/23 13.002 continued

UNIDENTIFIED SPEAKER: And is that waste studied in this EIS?

DOE PANEL: We have looked at that and have looked at it as part of the waste management activities at the Pantex site.

DOE PANEL: And the Pantex waste streams that are generated that come to the Nevada Test Site are discussed in our EIS. I think mostly you're sending us gloves and DEs and basic things that people in the lab or in the facilities are using in the handling or whatever you guys do; that's the waste that comes to us from Pantex, and we discuss that in EIS.

HT11/24 13.003

UNIDENTIFIED SPEAKER: So are most of the by-products stored on-site at Pantex?

DOE PANEL: Yes.

DOE PANEL: We do have a waste management system that does talk about our low-level mixed waste and, in fact, one of those facilities that I showed was a hazardous waste treatment processing facility so that we can meet the land disposable requirements -- restrictions. Thank you.

DOE PANEL: Does anyone else -- would anyone else like to ask any questions?

UNIDENTIFIED SPEAKER: So for the -- what is keeping -- right now what is keeping Pantex from

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going ahead and getting the okay to store the 20,000 pits?

DOE PANEL: What it was was in 1994 they did an environmental assessment, and as part of that assessment they looked at storing 20,000 pits there. What happened at the time is we got public feedback back that said we really want you to look at the storage of components in much greater detail than you do in the EA. So the secretary committed to the governor of the State of Texas that we would do that based upon a nominal 2,000 weapon dismantlement a year, and he said okay we can do an EIS in three years. They set a limit at 12,000 pits.

UNIDENTIFIED SPEAKER: And so that was based on the -- the 12,000 pits you decided not to go above that based upon the radiation level differences or?

DOE PANEL: No. It was a commitment to sort of the state holders in that area that we would look at this in greater detail than what you might do in an EA. One of the other sort of public feedback that we got from scoping is they wanted us to look at more sites, DOD sites, that might be capable of storing these pits. So because of that we set the limit at 12,000 based upon -- okay, we had about 6,000 pits already.

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Then 2,000 pits a year, takes three years to do an EIS, the limit was set at 12,000.

UNIDENTIFIED SPEAKER: Has there been any look at long-term storage, you know, if we decide to not use the material any more and to --

DOE PANEL: That is being looked at as part of the storage unit on disposition problematic EIS. So they're going to look at long-term storage and the disposition of both plutonium and highly enriched uranium. That's where it is. Ours was really an interim document until these other ones could make decisions on them, and at the time it was considered that we needed that interim decision. But now the rods for those will either be before ours or in conjunction with us so there's a coordinated decision-making process on the storage of this material.

UNIDENTIFIED SPEAKER: When -- what is the length of time people deciding on where they're going to go? I mean, like, are there pits being waited to be stored somewhere, or, you know, what's the time that this has to be figured out by?

DOE PANEL: Well, in general, essentially for the Pantex plant, it's before we reach 12,000 pits there, and sort of a time period otherwise we will have to shut down the dismantlement process at Pantex.

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HT11/25 22.001

UNIDENTIFIED SPEAKER: How many pits are ready to be stored right now that aren't -- that want to be decommissioned so that they can be stored somewhere? How many weapons are ready to be dismantled?

DOE PANEL: There's nothing waiting. They're automatically being stored at Pantex because they're still allowed to store 3,000 more before they'll be cut off. So nothing is waiting. It's all being automatically being put into bunkers at Pantex.

UNIDENTIFIED SPEAKER: Have there been any accidents from the transportation to Pantex from the DOD sites?

DOE PANEL: No. Actually, the TSD has a very good safety record. It's something like 75 million miles without any disbursal accidents.

UNIDENTIFIED SPEAKER: Can I ask specifically about the outreach to Las Vegas. I just found out about this this morning in the newspaper so I had no prior knowledge that this was going to happen. What kind of outreach has gone on in Las Vegas?

DOE PANEL: Well, we have a mailing list from the Nevada Test Site that we used primarily to mail out to elected officials, local state holders, interest groups, things like that. Are you involved in any of those?

HT11 (CONTINUED)

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DOE PANEL: We also had the federal register notice that went out. We did place ad copies in, I believe, the Sunday paper, and we also had a press release that went out too and was distributed to the community. So those are the type of outreaches that we have done.

UNIDENTIFIED SPEAKER: I think I'm on the DC -- I moved here from DC, so I was at the original SSM hearing in DC, but I never -- I went to the past two DOE EIS -- NTS EIS meetings.

DOE PANEL: Did you get on the mailing list through that?

UNIDENTIFIED SPEAKER: Yeah, but I haven't received anything yet.

DOE PANEL: By registering tonight you'll be part of ours.

DOE PANEL: You know, I will have to say that we didn't do -- have a mailing go out, but I have received in my office yesterday about 20 returns because of addresses or people not being at those particular addresses. So we're looking at that.

DOE PANEL: The mailing list included all people who have attended the scoping meeting that was held here almost two years ago now and also any people that have since that time expressed an interest in

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getting a copy of the documents, almost 7,000 people.

UNIDENTIFIED SPEAKER: Nationwide?

DOE PANEL: I'm sorry?

UNIDENTIFIED SPEAKER: 7,000 nationwide.

DOE PANEL: Basically five sites. Nationwide, yes, but essentially the responses came from these particular sites that were being looked at.

UNIDENTIFIED SPEAKER: Is there something that has a list of DOD sites that are decommissioning weapons, where they're located?

DOE PANEL: No. Those -- that's essentially classified information. But what it is is the Pantex receives everything. There isn't any other place that does assembly, disassembly, but from where those weapons are coming from that's classified information.

HT11/26 06.001

UNIDENTIFIED SPEAKER: Can you talk at all about water usage and where for the dismantlement of the 20,000 pits at Pantex?

DOE PANEL: Yes, I can. I don't remember right at the moment where the water usage is but --

DOE PANEL: It's in the water quality section.

DOE PANEL: Yeah, it's in the water quality section, and right after this we can look it up

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for you.

DOE PANEL: Section 4.5.

DOE PANEL: There's a table in there that it has it up at the top.

UNIDENTIFIED SPEAKER: That would be in volume one?

DOE PANEL: Yes.

UNIDENTIFIED SPEAKER: 4.5?

DOE PANEL: Yes. Some people have these sections memorized.

DOE PANEL: It's 4.6.

DOE PANEL: That's not a page number; that's a section number.

DOE PANEL: 4-79.

UNIDENTIFIED SPEAKER: So has -- this was addressed at the local hearing in Amarillo, water usage?

DOE PANEL: Yes. We just had the joint public hearings for the stock pile and management, the storage and disposition, and Pantex site --

UNIDENTIFIED SPEAKER: All three of those or --

DOE PANEL: -- at Pantex, all three at the same time Monday and Tuesday of this week and water usage is an issue there.

HT11/27 06.002

UNIDENTIFIED SPEAKER: But the Pantex

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HT11/27 06.002 continued

plant feels that there is enough water to disassemble the entire 20,000?

DOE PANEL: Yes. Now water usage is always an issue because it's an agricultural region and looking at draw down of the overall, but Pantex is not a huge percentage of the water usage in that area. Agriculture is the major water usage there.

Do you have any other questions?

Maybe what we can do is break for about ten minutes or so and again take some of you over to our display area and show you a little more of the videotapes, et cetera.

(Short break.)

DOE PANEL: We're going to get started again if you have any more --

UNIDENTIFIED SPEAKER: No. Was there another prepared --

DOE PANEL: No. Just a little break because we knew you were looking at the documents. Just wanted to give you an opportunity to gather your thoughts in case you had some more questions or comments.

(7:30 p.m. Session.)

HT11/28 01.004

UNIDENTIFIED SPEAKER: What's the difference between continuing the current mission and no

HT11 (CONTINUED)

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HT11/28 01.004 continued

action?

DOE PANEL: They're very similar except the no action says that once you get to 12,000 pits you shut down the dismantlement operations out there because you cannot store any more than that, and you could not transport them away from the site because that's the alternative. So that's really what is looked at in no action.

UNIDENTIFIED SPEAKER: What routes do you -- how many containers would be on a particular vehicle on a truck?

DOE PANEL: We have evaluated nominal of 20 to 25 containers on an SST.

HT11/29 16.011

UNIDENTIFIED SPEAKER: And is this legal -- are they legal weight?

DOE PANEL: It's my understanding that they are over-the-road requirements.

HT11/30 16.012

UNIDENTIFIED SPEAKER: What routes would you use?

DOE PANEL: I can't tell you right at the moment exactly which routes they are, but we've summarized them in the document, and one thing I can tell you is they would not go over the dam, so to speak, but we can get that information for you sort of which routes would be used.

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UNIDENTIFIED SPEAKER: Do you have a copy of the -- your handouts?

DOE PANEL: Yes. We have a copy of our handouts. We also have copies of the EIS. Would you like more than one?

HT11/31 16.013

UNIDENTIFIED SPEAKER: Yes, I do.

My name is Russell Dibartolo, and it's D-i-b-a-r-t-o-l-o. I'm with the Clark County, Nevada Department of Comprehensive Planning, Nuclear Waste Division. And my particular area has to do with impact assessment and review of Department of Energy impact assessments or impact -- environmental impact statement activities.

One of the major things that we have found with a number of Department of Energy EIS's or environmental assessments is that we feel that they unrealistically limit their regions of influence that are studied. If you studied, for instance, the Nevada Test Site within a 50 mile radius you are leaving out with regard to any potential impacts or risks over a million people or two-thirds of the population of the State of Nevada when you're dealing with shipments to the Nevada Test Site.

So one of the major requests we would have of you, the individuals preparing this particular

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HT11/31 16.013 continued

EIS and others within the DOE complex, is that you take a very good look at the space between the sites. The areas between the sites in this case is the Clark County metropolitan area also known as the Las Vegas valley metropolitan area.

We're primarily concerned with the routing of this material. There are certain areas in Clark County that we know of that are very high in accident rates. We know that there are a number of areas in Clark County where there's construction anticipated on major -- on the interstate and U.S. highways. This construction program to last about ten years. We know there's a high correlation between construction, congestion, and accidents, and we would like you to take that into account.

HT11/32 11.006

We also, depending upon the number of shipments and nature of the shipments, we also are concerned here with perceptions of risk and possible consequences of that on the tourism industry. This is how -- this is the mainstay of Nevada economy, and if there were to be an incident or accidents on the interstate, especially near The Strip, this could have various severe consequences, economic consequences.

HT11/33 17.003

With regard to environmental justice, if you're shipping by -- through the interstate, or if you

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HT11/33 17.003 continued

happen to use rail, both the interstate and the rail go along about the same route, more than 38 percent of the minority population of Clark County lives within half mile of either of those routes. And so the impacts or risks might be a little bit higher since -- let me back up. 38 percent of the population along the railroad and the interstate is minority or low income. In Clark County the minority, low-income percentage is 11. So there's a substantial difference between the minority, low-income population along the routes and the general minority, low-income population of Clark County.

HT11/34 23.007

What we -- and the reason I'm here now is that we have -- we were surprised by this meeting. Maybe there were -- maybe there was public information or scheduling announcement that we missed, but we would like to have the Department of Energy no matter whether it's Pantex or has to do with the people that are doing NTS, EIS or any of the EIS's where Nevada Test Site is involved, we would like to have a mechanism set up whereby Department of Energy representatives and representatives of local governments that may be affected like Clark County can meet so that we can have a briefing so that we can prepare ourselves for statements which in many cases might be statements of support given that certain mitigation measures are taken

HT11 (CONTINUED)

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HT11/34
23.007
continued

or at least addressed.

And at this point I'd like to request a meeting among the management of Clark County, probably the Director of Comprehensive Planning, County Manager,

HT11/35
23.008

and so on and representatives of Pantex to give us more detailed information. And I would like to also to request in your institutional program that there be periodic updates with identified state holders or units of local government that are affected.

DOE PANEL: Yes. I think that that can be arranged. I know that there's a request to meet with the PEC, the State's advisory board, and we would be doing that in June time frame so we would be more than happy to come and meet with you at that time.

MR. DIBARTOLO: You should also know that the Nevada Test Site has established for their EIS process a transportation advisory group, and within that group is a smaller subgroup or team that's called a protocol working group. This particular working group

HT11/36
16.014

has already provided recommendations and census recommendations among a number of local governments and other interested individuals or groups that have already been sent to the Department of Energy prior to the comment deadline.

They are already working and addressing

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this, and this particular protocol working group or transportation advisory group has turned out to be a very good vehicle for our interactions. That's the route that we're -- it's Frank DiSanza who is head of that program. It's D-i-S-a-n-z-a. He works with DOE Nevada, and he has -- they have staff and brought together that group. That group meets on an as-needed basis, generally once every two months. The transportation advisory group meets usually about once every quarter, and that's been going on for probably a little bit more than a year.

HT11/36
16.014
continued

And it came up for shipments such as this. There were shipments that were planned to come in through North Las Vegas. North Las Vegas by accident heard about them. Turns out that they were just a very few shipments going to the test site cutting across Craig Road, which is a convenient way to get from -- if you're going south on I-15 and you go north on U.S. 95; it's a very good cut-off.

North Las Vegas officials became very concerned about that, and I was working at the university then as a consultant and was brought in to help facilitate meetings. And from that and from the need that was seen for that we developed this transportation advisory group, and it has worked very

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HT11/36
16.014
continued

well.

DOE PANEL: We would be very happy to maintain contact with them, and the first step would be to make sure that they get a copy of our EIS for review and continue that interaction.

MR. DIBARTOLO: What is the -- is there a comment deadline on this?

DOE PANEL: July 12th.

MR. DIBARTOLO: That meets my statement.

DOE PANEL: Did you have any other responses, and we'll give you our EIS also?

So other than identifying the different transportation routes I think that was possibly one of the major considerations that you had, and, of course, at the moment the Pantex plant is the preferred alternative to our document.

MR. DIBARTOLO: And the other major concern is the ongoing -- the initial interaction and the ongoing mechanism for ongoing communication, that clear communication makes things a lot easier on both

HT11/37
23.009

sides.

The person that you might address any correspondence to with regard to establishing a meeting with Clark County is Richard Holmes, H-o-l-m-e-s. He's the director of the Department of Comprehensive Planning

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HT11/37
23.009
continued

for Clark County. His telephone number is area code 702, 455-5175.

DOE PANEL: Okay. Thank you very much. We do appreciate it.

MR. DIBARTOLO: Thank you for the presentation.

(Thereupon the proceedings were adjourned at 8:45 p.m.)

* * * * *

ATTEST: Full, true and accurate transcript of proceedings.

Janie L. Olsen, RPR, CCR No. 406

HT12

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENTS

PUBLIC MEETING

HELD AT THE NORTH AUGUSTA COMMUNITY CENTER

NORTH AUGUSTA, SOUTH CAROLINA

ON APRIL 30, 1996

ACCURATE REPORTING
P.O. Box 2567
Augusta, Georgia 30903-2567
(706) 731-9565
MORNING SESSION
PLENARY SESSION
QUESTION AND ANSWER SESSION

Portions of the transcripts unrelated to this EIS have been omitted.

more would be stored there until we looked at some alternate sites. So it was an agreement that was made between the state of Texas and Secretary O'Leary. Does that answer your questions?

PUBLIC CITIZEN: That's part of it, yeah.

MS. BERGMAN: Okay.

PUBLIC CITIZEN: The other part is are the pits surplus on -- on the other EIS?

MR. RUDY: Right. On that part really interestingly enough from an environmental perspective as well as perhaps from a technical schedule of cost prospective, a pit is a pit.

PUBLIC CITIZEN: Yes --

MR. RUDY: A pit doesn't know if it is a surplus pit or a chief reserve pit. And in fact a surplus -- a chief reserve pit today might become a surplus pit down the road. So what the Department is doing in the document that I described is we're looking at storage, an option storing all pits. So it's really a quantity issue. We happen to know at this time what a breakdown would be of how many of those make up 38 tons that are therefore surplus.

But we're accommodating the footprint, an engineering design, which could address all of the plutonium whether it is surplus today or whether it's

surplus tomorrow. So we're trying to plan ahead and be irrespective of a designation. The only place that surplus versus nonsurplus really comes to play is in the area of disposition precluding its reuse in nuclear weapons. The materials which would be held for national defense purposes would not go through the disposition pipeline, only the surplus materials would. Is that okay? Is that --

PUBLIC CITIZEN: We would have a blue one that's -- we would have blue one that's surplus and a red one that's not surplus stored contiguously?

MR. RUDY: Well, you might -- there's one aspect of this design that's pretty important. And when I talked about -- I may have gone too fast on the storage part, you know, safe, secure, cost-effective and inspectable. Because one of the things that, you know, this nation wants to do that has become the offer with Russia and the world community is international inspection, verification of the surplus quantities so that once -- there's surplus in Russia and surplus here, those materials don't find their way back into the weapons pipeline.

So there would need to be verification and with that the facilities would need to be designed to accommodate international atomic energy agency, i.e., EA inspection. And in fact, the material forms may need to

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be changed or some technology applied because we would not be -- wanting to release weapons design information, the shapes and sizes of these components. It's very sensitive information.

And so what we want is to verify with other nations that, yes, this is surplus and it stays here. We have to work on technologies. We can accommodate that without the release of classified information. So they literally won't necessarily be stored in the same rack one above the other, but certainly contiguous in the same facility.

MR. LAWSON: Greg, I think we have a question up front here, please.

PUBLIC CITIZEN: Yes. The other day last week there was a shipment of uranium that was stopped up the Savannah -- in Savannah by the Port Authority and I was wondering how come this shipment was authorized to come up the river without anybody being aware of it? It just happened the Coast Guards stopped the ship because one of the containers seemed like it had been damaged. And now it's sitting at the Port Authority in Savannah.

MR. CHAPUT: I'm Ernie Chaput from the Department here. That -- I just know a little bit about that shipment. I believe that was a shipment in commercial commerce, it was not a Department of Energy

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shipment. I believe it was depleted uranium oxide. And while I don't know the details on that, it was being shipped to a fuel fabricator or a -- somebody involved in the fuel cycle. Jim, do you have any more detail on that?

UNIDENTIFIED SPEAKER: Yeah. I'll be happy to talk with the gentleman off-line. I don't think it's pertinent to the discussion here.

MR. LAWSON: Yes, sir.

PUBLIC CITIZEN: Someone sneaked a little word in there that I wondering if there's more implication there when they mentioned commercial fuel, and plutonium and commercial fuel. Is DOE finally recognizing that that commercial fuel is going to belong to them?

MR. LAWSON: Don't all jump up at once.

MR. RUDY: You mean would --

[Audience members laugh and several participants speak at one time.]

MR. RUDY: -- fuel belong to the United States Government? Right now the U.S. Government is under the Nuclear Waste Policy Act outside of the Weapons Program and outside of the weapons materials talked about today. The Nuclear Waste Policy Act mandates a process with the United States Government has to find and characterize a geological repository to be able to accept that fuel. And there's all kinds of debates and lawsuits and things that

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I'm not prepared and probably shouldn't be giving my comments on regarding the commercial spent fuel.

But, yes, if the reactor option was chosen for the disposition of the weapons material and then there was mixed oxide fuel, plutonium and uranium, that would certainly be part of a decision and negotiate arrangements on responsibility ownership for that spent fuel. Certainly, no matter who owns it on paper, it would need to be safely and securely stored, maintained in a reactor core and then in the storage pool. The arrangement on how long it stays in a pool, where it goes, who owns, who transports, all of those details, yes, it would need to be negotiated and understood.

The document we're here to talk about today is at programmatic, a higher level, just -- we term, in the ball park, just in Yellow Stone Park, not Fenway yet. We're just a big park right now called technology option. Then later on after that decision, we walk through that gate, then we have to get into those specific kind of details.

MR. LAWSON: There's a question in the back over here, please.

PUBLIC CITIZEN: You mentioned the collaboration with the Russians developing the technologies for doing the various options for the disposal of plutonium. Are

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those only limited to the three in the EIS or do they include [unintelligible]?

MR. RUDY: Okay. They principally would fall in those three categories, reactors. But the Russians are also looking at from their perspective different kinds of reactors. They are analyzing fast reactors which we don't use and don't intend to in this country. And they may also be analyzing other reactor types. But principally they would fall in the three basic groups.

MR. LAWSON: Are there any other clarifying questions? Yes, please.

PUBLIC CITIZEN: I've got two quick ones. Will there be an attempt in order to help regular public citizens understand the language between these three Programmatic EISs? Will there be an attempt to produce a simplified document that, in fact, does that, shows the relationship very clearly between these three documents?

And then secondly, on your next steps I notice that there is only one allotted period for public comment and that ends May 7th and July 12th. After the Final PEIS comes out, will there be another opportunity for the public to come back and make public comment on?

MR. LAWSON: Good question. Actually two questions. The first being is there any plans for a relatively short or simplified document which would

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explain the relationship among these three programs and perhaps others? Is that what you said? I'm not sure --

PUBLIC CITIZEN: Yes, that's what I said.

MR. LAWSON: And the other question is to do with the allotted period for possible public review, has that been extended in any way?

MR. WHITEMAN: Let's see. Where was the question? Okay. First of all, I would refer to you, all of the documents, there is a short summary document that is [unintelligible] PEIS. Within that summary document there is a section that describes the relationship among all of these and how the decisions are related. So I think that would answer your question regarding that. We would plan on issuing the Record of Decision in draft form as we issue the final PEIS. And of course, you know, that will be out in 30 days before a final decision.

UNIDENTIFIED SPEAKER: No, we'll wait 30 days after the final --

MR. WHITEMAN: Right, before issuing the Record of Decision.

UNIDENTIFIED SPEAKER: Right. We don't issue drafts records --

MR. WHITEMAN: Right. Okay. I'm sorry. Yes, that's right.

PUBLIC CITIZEN: So 30 days after the final PEIS

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will be a time when the public can come back and review that final draft and make its final recommendations or comments --

MR. WHITEMAN: Yes.

PUBLIC CITIZEN: -- which will then be still integrated into the process of making the final decisions?

MR. WHITEMAN: Well, I think the way the process is set up it requires us to wait at least 30 days after issuing a final PEIS before making a Record of Decision. It was set up just so that there would be time for people to look at the final PEIS before the final decision was made.

MR. LAWSON: Does that also answer your second question about the extended period?

PUBLIC CITIZEN: [Indicates affirmatively.]

MR. LAWSON: A question over here, please.

PUBLIC CITIZEN: This whole exercise is done under the mandate NEPA. I keep hearing how different documents are going to become [unintelligible] comment periods and so forth. NEPA very clearly mandates, among other things that should be addressed in a PEIS are economics and impact on future generations. And I think I heard, before I was cut off at last Thursday's forum, that information on these would be forthcoming before a final EIS was published. How does that match with NEPA when you

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having a public hearing on the PEIS that's inconclusive?

MR. LAWSON: Would somebody be willing to explain why the information supposedly on economics and impact on future generations is being developed but it hasn't been included in the documents that we're now in the public review and comment process on?

MR. RUDY: Yeah, I think I can take that. And I appreciate -- it was last Thursday's session that comment came up, and I thank you for bringing it back up. We discussed -- you asked at that time should you bring it up then or now, and I said both. That's pretty important because I'm sure many of the people in this room today are not -- did not have the opportunity to join the Citizens Advisory Board session last week, Thursday.

Let me real quickly -- and I'll just take less than a minute -- use this as a background and then go into some things specific. The National Environmental Policy Act, for all of the good things it does and all of the tortuous process things it does, helps make sure that from an environmental perspective decisions which would have a significant impact on the environment are thoroughly analyzed. NEPA, the law itself in fact, has a section in it which says you do not want to and you should not have costs and financial issues associated with the costs of some of these options overriding or controlling the

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decision.

For example, you don't want to make a bad environmental choice simply because it's real cheap and very inexpensive compared to some other options. Likewise, you do not want to be over influenced under NEPA and fail to choose a very good or benign environmental option simply because it's just very expensive and we don't want to spend a lot of money.

So what NEPA does is it specifically mandates the focus on the environmental issues. And Donna showed that slide, the two columns of all the various things which are analyzed from an environmental perspective including social economic impacts, air and water, et cetera. And in the breakout sessions, or if we decide to stay here as a group, we'll go through some of that. But certainly the Department understands that you don't make decisions on NEPA alone. NEPA is a key ingredient to that, but there are many other things that have to factor into a decision: technical assessments, how well somebody does the job.

In the area I'm talking about in plutonium disposition, the Spent Fuel Standard, for example, these various technical options, do they reach it in a better, more sound, more assured way? Technically speaking are any of these options more resilient, more robust? How

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about the schedule? When we look at some of these options, how fast could you get on with the job, reducing global danger? You may have a technology which works but it might take you 50 years to prove it out to deploy it versus the technology which you may have closer to home in which you could get on with this job and complete the mission in a much shorter period, in 10 or 20 years.

That area here of technical scheduled costs and policy considerations -- in fact, let me talk about policy considerations for a quick second. Reactor options, mixed oxide fuel options. There is typically a policy debate where some feel that use of weapons plutonium and mixed oxide fuel, even though you would burn it in a reactor, may not match with this government's policies on reprocessing. Some people draw [unintelligible], understandably you can see it this way, that if you would use this material in reactor fuel you may be down that slippery slope of crossing that line condoning other nation's use of plutonium, the plutonium [unintelligible] and perhaps this government should not step over that line. Now, that's a policy debate, a policy consideration which is not an environmental consideration but it is very important to eventually making a decision on which technology, or technologies, we might deploy.

In this area here and, in fact, in the

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environmental -- just by way of a very quick summary, and this wasn't planned to be part of the formal presentation but I thought it was -- it was a helpful summary a little bit last week. There's a lot of considerations and there's no weights to these but, you know, the purpose and need in storage and disposition is really nonproliferation. If you have to boil it down and say, why am I worried about this? Sure for costs and safety, environment, all of those things. But you don't have to choose one of those over the other. It's really nonproliferation, making sure that these materials from the end of the Cold War don't go back into weapons production. Reciprocity with Russia, the policy considerations like I talked about at the beginning to the plutonium [unintelligible] is it good or bad, does it match, you know, what our nation would like to do in the years ahead? Technical issues, is it viable? Do you have existing capability?

One of the things that we look in making that Record of Decision is being practical. If, for example, immobilization was chosen as one of the options or part of it and if we were able to take advantage of the investment that we've already made in Defense Waste Processing Facility and we could use that can in canister concept and get on with it fairly quickly and fairly cheaply, that's a

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consideration which will be pretty important to us. And likewise, cost and schedule and then environmental safety and health, the NEPA things.

So those things are all being taken into account. The Department will under Storage and Disposition by the end of this June/middle of July, by the time they distribute it, be releasing the cost assessments for the various options. We're finalizing the cost assessment of the various MOX versions, the various vitrification versions. And they're rather complex but we're attempting to verify and validate those costs and then summarize them to the public. And we'll make those documents available. Those will be available this summer. A Record of Decision comes at the end of the year.

So there are several months' time where these documents are going to be available to the public to understand and review and provide input. NEPA provides a certain mandate, start and stop time for public comments on environmental. There is nothing which precludes -- and in fact one of the things the Secretary of Energy expressed when she came on board -- there is nothing which precludes, and, in fact, she wants public involvement and information, communicate with the Department up to the Record of Decision. And don't just look at communicating under the NEPA schedule, the NEPA clock. That's only part

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of it. In fact, there's a lot more opportunity to understand and to work with the Department in that decision-making process outside of NEPA.

MR. LAWSON: You have got a question? Yeah, go ahead.

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PUBLIC CITIZEN: First of all, I -- if I suggested it, I didn't mean to, that cost should drive the decision, but I think NEPA itself mandates that they be considered. If you've got two that are close together in environmental protection you better know what they cost and maybe -- you mentioned proliferation, which is the reason for all of this exercise. Timing, timing is not mentioned here. It might directly -- it could have an impact on the decision and the costs.

And further you -- I don't think you mentioned in your response anything about the impact on future generations and conservation of nonrenewable resources like fossil fuel which it would bring [unintelligible], nuclear power is what I'm hearing. And certainly one direction that this exercise could end up in would pretty well be the [unintelligible] of nuclear power. If we do that, then France and England and Russia and China and all the rest of them cut back on fossil fuels. [unintelligible] 50 or 100 years from now. And [unintelligible] but [unintelligible] got to talk about

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HT12 (CONTINUED)

future generations is to talk about to some of these alternatives.

When I look back at some of the -- the DOE programs, Yucca Mountain, even close to home, DWPF, they don't always follow the schedules. If we have technology that's available today, that might not be [unintelligible] and it's not even addressed here. I'm looking for a complete environmental assessment that's not [unintelligible] and radiation releases and so forth, the total environmental picture including as NEPA mentions repeatedly, impact on future generations and conservation of nonrenewable resources.

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MR. RUDY: I think the best I can offer you is the assurance that from an environmental perspective which includes impact on future generations current and future, the environmental document analysis being done is intended to address those issues under the various options. And when it comes --

PUBLIC CITIZEN: Future generations, I don't see those two words in those four documents. I may have missed it. I don't know.

MR. RUDY: Well, we'll take a look at it, bu it it's certainly inherent as we analyze materials with half-lives of several thousands of years. That's clearly the driver that we have and the understanding that we have

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going in to that analysis.

PUBLIC CITIZEN: Okay. Reprocess spent fuel. [unintelligible] half-life of Plutonium 239, the reprocessing itself removes enough plutonium from that waste you're going to put in the ground somewhere, but the natural decay would take over 150,000 years. Until we [unintelligible] reprocessing [unintelligible] 150,000 years if you're looking at long-term.

MR. RUDY: But what this document was intended to do was take the [unintelligible] up to the form of the spent fuel standard but then not to go beyond that. It doesn't preclude or prejudice future decisions on that spent fuel, but brings it to the spent fuel standard whether in the form of glass, a geologic bore hole, which is it's hard to get at spent fuel several kilometers deep in steel, or the form of spent fuel itself. It brings it up to that point, again, under the purpose and need to preclude the reuse of that material in weapons.

If in future generations decisions are made to reprocess or recycle that material, that would be a separate issue way down the road beyond this focus on precluding the reuse of that weapons material --

PUBLIC CITIZEN: Mr. Facilitator.

MR. LAWSON: Yes.

PUBLIC CITIZEN: I think this could go on for

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some time. Is there something better in the breakout session later on [unintelligible]?

MR. LAWSON: Well, I would say that we pursue it a little bit later. But I do, I want to thank you for your comment and assure you and other people who have made similar comments that while you may not get the answer that you would like in a situation -- by making a comment not only will you try -- they try to answer it here but they also will try to respond in writing in the comment response document, the points that you've made, so.

MR. RUDY: And also we'll take that into consideration. I mean, as we move towards these decisions, understanding these public issues and feelings, it's helping us, you know, to be on the ground here listening to people back and forth. So there's a way -- I can't measure that for you, but there's a way that I can assure you we understand and appreciate that input.

MR. LAWSON: Before we get to specific comments, I want to have time for that --

PUBLIC CITIZEN: This is a procedural question.

MR. LAWSON: Okay.

PUBLIC CITIZEN: Regarding the breakout sessions, as I look around I've seen some of these folks in many other public meetings and I know that they have some things to say. Are the breakout sessions going to be

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-- are they going to allow enough time for people's comments or is it going to be kind of a classroom school for you-all to tell us about these three projects?

MR. LAWSON: Actually --

PUBLIC CITIZEN: I would recommend the former actually. And I don't know what kind of setup you-all have, but to make sure that we have enough time for people to make comments. And [unintelligible] if we even started right now, because I've been to a lot of these meetings where it gets down to about 10 minutes and then you say, well, submit it in writing, thank you very much for coming.

MR. LAWSON: The intent of having the three breakouts is to maybe make a maximum of three times as much opportunity for somebody to speak than they would have if they were just in one group. And so there would be short presentations, hopefully with a minute or two at the beginning of each one so that you would be back into the flow and the understanding of what program you're talking about at that time. But the rest of it's going to be facilitated discussion. The facilitators, all of us, are principally interested in what your comments are, the issues that you want to raise, and that there is a good dialogue or comment period for all of you.

I thought I saw a hand back here. Yes, sir.

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PUBLIC CITIZEN: I would like to make a comment if I could. My name is Al Lodge [phonetically spelled]. I grew up in Savannah, Georgia and lived there for many years. I have lived in several places and as I was relocating to Augusta mostly for my family reasons and for professional reasons I wanted to check out the Savannah River Site more clearly. And I guess my message is to the Department of Energy and that is that I did a considerable amount of homework talking to lots of people and spending some in-depth time with scientists as well as potential neighbors about the Savannah River Site because so much of what I have heard was negative information, negative environmental information, negative about the number of [unintelligible] related to the site.

Well, I was given some reassurance. And what I have found to be the case since coming to Augusta seven years ago is that, in fact, much of the negative information heard was without basis and fact. And that friends and now neighbors and many others that have worked at the site for many years, really have a deep abiding interest in making certain that first of all it is safe, secondly it is secure and simultaneously that it is environmentally sound. It looks like the Department of Energy is appropriately wrestling with some major issues regarding the future, not just at the Savannah River Site

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but the whole complex.

From what I have gathered the most supportive community of any of the areas within the site is in this one, the Augusta-Aiken region for the site. It looks to me like with your various considerations of environmentally sound and safe disposal options as well as those for remanufacturing, the Savannah River Site is the logical place. Logical from -- in every way.

Lots of folks not just in this immediate area but in Savannah, Beaufort, Charleston, the greater area.. are interested in environmentally sound policies and practices and procedures. And it looks to me like from the safety standpoint and from an environmental consideration, the Savannah River Site is the logical place for the storage and reprocessing of plutonium if we're looking to make certain that things are environmental safe.

There's a different issue as well in our area, and that is for many years the Savannah River Site has been the largest employer. And largest employer also means that it has employed a wide variety, a true diversity of our work force, of our population in this community. And with the downsizing that has taken place there have been some negative residual effects. All the folks that have lost their jobs and/or potential jobs here

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at the site has taken its toll.

So from an economic development and pure job standpoint, I encourage the Department of Energy to look favorably at all of the options to consolidate processes in to the Savannah River Site and use the existing very intellectually capable work force as well as the physical infrastructure that has been built up here over time and take full advantage of that. It's'a receptive community. We welcome you. Thank you.

MR. LAWSON: Thank you for your comment. Yes, ma'am.

PUBLIC CITIZEN: I have a question about the three PEISs in terms of the environmental justice considerations. Could you -- maybe you went over this in your explanation but because we seem to be moving toward breaking down into three separate groups, could the three presenters explain a little bit of what went into that particular analysis? What did you look at when you were looking at this whole question of environmental justice considerations?

MR. LAWSON: Okay. Very good. Who wants to go first?

MR. RUDY: If I can just take it, I guess, from an overview perspective. First and foremost we took a look at the potential environmental impacts associated

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with normal as well as off-normal for accident scenarios under the various options for storage and disposition. Once that was technically done to be able to determine the quantity disposed, the material types of dispersion, the mediums of dispersion, et cetera, an overlay on that, an understanding of the populations for any given site, Savannah River Site, Pantex Site, Oak Ridge.

So consistently across the board, understanding of the demographics of a region, understanding the wind patterns and the applying the potential accident scenarios to that could be able to determine if in fact from any of these options there would a disproportionately high or adverse impacts on certain areas around the site. So that's generically the approach that we took and technically the approach across all of our community sites.

MR. LAWSON: Does anybody want to add anything?

UNIDENTIFIED SPEAKER: No, I -- Stockpile Stewardship demands that, you know, we follow the -- essentially the same approach. And in [unintelligible] sites, we had eight sites in the weapons complex, there's a section, it's the 11th section [unintelligible] the environmental resources where we discuss environmental justice and actual disproportionate impacts.

Let me just add, the Department has really

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wrestled with the whole question of environmental justice and it doesn't have a comprehensive guidance yet on how to do it, so there may be some differences between the documents but each one lays out its methodology and how it went about it. But it's essentially what Mr. Rudy said.

MR. LAWSON: Ms. Bergman?

MS. BERGMAN: Yeah, I -- let me show you real quick. I've got an overhead on it. We've got a section, this -- environmental justice and human health are the two we looked at in depth in the Pantex Site-Wide EIS. And the work that would need to be done in order to store the pits at the Savannah River -- at the assembly area of P Reactor is all internal to that structure. It would all be internal modifications to make it safe for the storage of the pits.

And so the conclusion that we reached within the analysis of the environmental justice is that there would not -- we would not be expected to experience any disproportionate higher adverse human health or environmental effects. And that is discussed in detail within that section of the EIS and we can discuss it further as we breakout into our workshops.

MR. LAWSON: I just want to do a survey. Are there any other questions before we get involved in other comments? There's a question in the front row, please.

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Here.

PUBLIC CITIZEN: Yes.

MR. LAWSON: Just one second and we'll get a microphone so we can hear you.

PUBLIC CITIZEN: Plutonium Storage and Disposition PEIS, as far as the MOX fuel is concerned, in converting the plutonium metal to the powder form as a part of that process, what is the criticality and explosive factor of the powder as compared to the metal form of the plutonium?

MR. RUDY: The explosive factor, what you're [unintelligible] saying, it isn't an explosion issue of powder and oxide, plutonium oxide. You would -- the concern would be the [unintelligible] exposed air. So what the document analyzes -- and it might help if I just give a very quick overview. There is a technology which warrants Livermore and Los Alamos National Lab [unintelligible] to convert a weapons plutonium pit, a metal sphere, to cut in half a near zero waste band so that there's no metal pieces or shards, and then in the presence of hydrogen in a furnace so you control the quantity of material is very important, so that at any given time there's only a certain amount of the material. And in the presence of hydrogen and with heat, the plutonium would what they call hy-dry, it would flake off.

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It just -- you can actually see it flake almost like snow from the -- the half of a pit and would fall into a crucible, in an oven, which would then be heated and would become a metal hockey puck.

Another part of that process is at a later stay you have in a controlled glovebox in earth environment where you control the quantity of material and the environment that it's in to avoid exposure to air and other accident scenarios to convert that to a powder by adding oxygen.

PUBLIC CITIZEN: And the powder is an airborne powder with plutonium --

MR. RUDY: Oh, no, this would not be airborne. In fact, it would be in a sealed contained glovebox in an earth gas, an environment where it would not be exposed to the air.

PUBLIC CITIZEN: Is that sometime, the powder, an airborne form of pow- -- plutonium powder?

MR. RUDY: It would be through the glovebox system in a can and then when it is mixed it would be mixed in a -- it would not be in the exposed --

PUBLIC CITIZEN: No, that's not my question. The question is: At sometime in the process does this powder have the capability of being airborne as opposed to a powder that has a metal that is so heavy that it can't

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be airborne?

MR. RUDY: In an accident scenario --

PUBLIC CITIZEN: Right.

MR. RUDY: -- potential dispersion. Andre works on our system for that. If there's anything you want to add in particular --

MR. CYGELMAN: Your question is specifically with regard to the size of the plutonium oxide that's formed.

PUBLIC CITIZEN: Right.

MR. CYGELMAN: In general, the material that is of most concern to human population is below 10 microns. And I believe some of the oxide that would be formed within this glovebox could be about 10 microns.

PUBLIC CITIZEN: And it's contained --

MR. CYGELMAN: It is contained --

PUBLIC CITIZEN: -- but in an accident scenario it would dispersed?

MR. CYGELMAN: In an accident scenario there is a potential for it to be dispersed, yes. And there would be particles within the 10 micron range.

PUBLIC CITIZEN: That's -- okay.

MR. LAWSON: And by the way before we go any further, I failed to introduce some of the technical experts who are here. Andre Cygelman who just spoke is

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with the Storage and Disposition. I'll point to Jay Rows [phonetically spelled] who spoke earlier has been document manager for the Stockpile Stewardship Management Program. And Nanette Founds is also here from Pantex Site Wide. Are there any other questions before I take comments?

All right. Are there any folks who would like to make comments before we take our break and then come back a detailed discussion in whatever form? Yes, sir.

PUBLIC CITIZEN: My name is Sam Gore. I'm only a concerned citizen. I do not work at SRS, nor do I have any financial or any other gain from SRS. My comment or concerns address two issues. First is the preservation of a core of U.S. intellectual and technical competence in nuclear weapons to continue the high level of competence this area, Georgia and South Carolina have in safety and reliability. Since I retired nine years ago I have watched the Army be reduced in size to a point where the American people are beginning to question what happened to the high level of competence we've had in our Army in the past. I am fearful with the continued that -- I am fearful that SRS without a continued needed mission, SRS will begin to lose the high level that currently exists in Georgia and South Carolina and our competence and reliability in this area.

My second issue I wish to comment on has to do

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with all of the sites under consideration. Today at SRS we have a good future use plan. I am concerned that all of the other sites might not have a similar plan. Our SRS future use plan is an effort to -- to maintain the largest national wildlife research area in America. I hope the undeveloped areas of at all of the sites have that same protection for their wildlife. With SRS's future uses plan, all future development is restricted to only areas that have had prior development. No undisturbed areas are to be developed.

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I wish that DOE would make this a DOE-wide policy. I know how developers prefer to build on undeveloped land and are reluctant to take land previously used and reclaim it for new development. Future development on all DOE sites start the trend in America to build new on old abandoned sites.

In closing I hope DOE quickly discards the deep bore hole alternative as discussed in their Storage and Disposition PEIS. Thank you for this opportunity.

MR. LAWSON: Thank you very much. Is there anyone else who would like to make a comment before we take a vote and then go to a break. Yes, sir.

PUBLIC CITIZEN: My name is Wayne Rogers. I have been a resident of this area for, I guess, 28 years now working on both sides of the river. And I have never

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had any direct association with SRS before. I'm currently Director of Planning for the Lower Savannah Council of Governments and in that capacity I've had the opportunity to work more directly in recent years with some of the SRS programs.

But speaking as a citizen and having been here 28 years I think that the facility at some point in time has touched everyone's life whether it's through employment directly or indirectly, and they have been good neighbors. It's been, we feel -- or I feel and I think all my friends do, well-run, very conscientiously managed and we feel that it's even more so at this point in time and this is no reflection on what's come to pass. I think it's just the legislation, the regulations, and so forth that have occurred.

But having worked with various federal programs and state programs we -- I feel that the utilization of existing facilities out there, the maintenance of the core, the experience and technologies and the manpower -- and womanpower, if you will -- that we have in this community, it's been an integral part of our community. We feel that going forward -- the analyses that have been quickly made, have been made in a very conscientious and straightforward manner. I think that the things that are going on here now and have gone on the last few years in

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an effort to inform the public, not only locally but nationally, are prime examples of that. And as a local person I think it's very important for us to have a better understanding of what -- what is going on with the facility and what its potential is.

And I think that we would like to see the recommendations implemented. We would like to see the SRS facility utilized for the programs are outlined in these three statements. We feel that the facilities are there, the land area is there, the expertise is there and that it is not only in the best interest of the community on the economic side, but nationally. And we appreciate the opportunity of having -- to be able to comment in this regard.

MR. LAWSON: Thank you, sir. Is there anyone else who like to make a comment? Yes, sir. Right up in the front here, Jim.

PUBLIC CITIZEN: My name is [unintelligible] Mohammed from Savannah, Georgia. One on my main concerns is that if plutonium can turn into, like, powder or dust form -- it states here in the Storage and Disposition of Weapons-Usable Fissile Material summary is that the African-American community, or you-all consider low income or minority, would be disproportionately affected if there was an outbreak.

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HT12 (CONTINUED)

My concern is that I would not like to see -- I would like to see Savannah River Site close down or consolidated -- the plutonium and highly enriched uranium be consolidated at one site further -- a long way away from Savannah River Site. My concern once again is that if there was an outbreak or any kind of release, the low-income community will be the ones that will be affected. And that's one of my main concerns.

MR. LAWSON: Very good. Well, thank you for your comment. That's great. Yes, in the back someone, please.

HT12/4 17.008

PUBLIC CITIZEN: And so, based on that, I have a comment that I am going to make later, but I think that it's really important particularly under the NEPA regulations and in effort by the Department of Energy to really bring the public more into this discussion that at some point we look at what is the weakness of our outreach strategy that does not allow us to bring more -- a diverse group of people from this area to these kinds of meetings.

Because based on what the gentleman just said -- and I just saw that in the summary that it does, in fact, state that a disproportionate burden would be borne by minorities as it's defined here and low-income people in this area -- then they should be in greater numbers at this table to, one, learn what is at stake, what are the

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HT12/4 17.008 continued

potential dangers, what are the benefits, et cetera, et cetera, but also to be here to raise their own questions and concerns and then be prepared to help make recommendations that will be factored into the final decision.

Because we can point to the successes of the plant, the positive role that it has played in this community, the fact that it is one of the largest employers, but there may be some other things that those regular citizens need to say that may in some way shape the final decision on these particular three EISs that's needed.

MR. LAWSON: Good point and thank you. Anyone else with a comment? Yes. Well, actually a couple hands in the back. First, we'll come to you, sir.

PUBLIC CITIZEN: One thing, I've been sitting here listening to this, about the Barnwell plant that was closed by President Carter, why can't we reopen that and do what's necessary to process a lot of these fuel rods and radioactive material?

MR. LAWSON: Okay. The question is, the Barnwell facility in South Carolina, why can't that be opened?

MR. RUDY: I'll -- I'll address that, I guess. Again, the Barnwell facility would be for reprocessing of

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the spent fuel. And in terms of the Spent Fuel Standard, the issue here is to take it to a spent fuel form. There -- when we're talking about the surplus plutonium it is versus the amount of spent fuel that already exists commercially in this country, let alone the world. This is an extremely small percentage.

So this document does not envision reaching out all the way to reprocessing and then eventually recycling material. It takes it to the point where it is changed from a weapons shape and useable form into a spent fuel standard. Future decisions aren't precluded or prejudiced regarding that.

PUBLIC CITIZEN: I understand that but we have five reactors over here sitting full of spent fuel, been sitting there for five years. I think it's time we started looking at that, too.

MR. RUDY: I can just take that comment, but I understand that. What we're attempting to do is get on with the job of (unintelligible) without stopping work on those areas which have been going on, you're right, for several years, but -- to make progress in this area.

MR. LAWSON: Okay. This gentleman -- oh, no, I'm sorry. I called on your first here and then --

PUBLIC CITIZEN: I want to respond to that --

MR. LAWSON: All right.

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PUBLIC CITIZEN: My name is Chris Noah. I'm the Land Use Coordinator at SRS for Westinghouse, but I'm here on my own time speaking for myself. And I've got a little presentation but I believe I'll save it for one of the breakout sessions. You don't have enough time right now. However, some of the things that were said require one slide just if I may --

MR. LAWSON: Excuse me. Will it brief?

PUBLIC CITIZEN: It will be very brief, yes.

HT12/5 04.004

This has to do with the future use of SRS. And what I want to stress is -- and by the way, I just wrote a book on environmental uses of the Savannah River Site, or I'm writing, finishing up. So I've done a little research, it's just not off of the top of the head sort of thing. But what I want you all to keep in mind is that if we look at a primary use which is industrial, the -- it can be nuclear or non-nuclear, you can do a lot of things using the land use concept and multiple use, okay? You've got the primary use right here which would be the project that you all are talking about now. And as you go out from this primary area the protection increases.

So at least it's self-explanatory and I can explain it later. But I just want people to get that idea as we talk, that: Imagine 310 square miles and then the center is where most of your activity, your industrial

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HT12 (CONTINUED)

activity occurs, and then as you go outwards you can do all sorts of things, all sorts of environmental things.

MR. LAWSON: Okay. I would just ask you and anyone else who has visuals or a written statement to leave a copy of it with us so that we can -- it can be included in the record. Yes, sir, you had a question regarding a previous speaker --

PUBLIC CITIZEN: A response, somewhat.

MR. LAWSON: Please, go ahead.

PUBLIC CITIZEN: Some 15 years ago I was retired from Allied Signal and prior to that I had been vice-president at the Barnwell plant. I haven't talked to anybody at Allied for ten years about that plant. In the previous [unintelligible]. But when Mr. Carter shut that down, to me that was a prostitution or complete avoidance in the NEPA process. There was a NEPA activity going on, so called [unintelligible] generic environmental [unintelligible] of mixed oxide fuel. It was underway. It had been extended from the [unintelligible] environmental to the question of MOX. He eventually got that off, issued an executive order, and by [unintelligible] NEPA Congress mandated that before any major -- any major action affecting the environment should be subjected to NEPA review. He ignored that, by-passed it. A couple of weeks ago [unintelligible]. But anyway,

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as far as -- and I'm, as I said, I'm not speaking for Allied Signal, but if I had an investment in any company and they offered at this time to get into the nuclear fuel cycle making MOX fuel, reprocessing spent fuel, I would argue completely against it. Once the federal government can by the signature of one man tear down something like $250 million in private investment and just throw it away, no Record of Decision. They did this before.

I was earlier involved in the [unintelligible] process in the mid '60s. A private venture, we put about a million dollars into it. We thought we were doing well. It was an R&D thing, extremely highly classified. It was highly classified and, you know, it was all private. And that was cutoff. And their reason: If we continued to pursue this it might encourage other countries.

I talked to Europeans after that and their conclusion was you guys must have had something going or they wouldn't have shut you down. And so they all started work on it and now it's a very popular way of enriching uranium. It's all over the world. To cut off reprocessing in this country to influence other countries, you can see how successful that's been. And it's the only valid reason that I've -- it's the only reason I've really heard put forward to it, is to discourage others by setting a good example. It didn't work before, it's not

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going to work this way. I don't like [unintelligible] version.

And incidentally, don't taken any of my comments as being against the people from DOE. To me they're marching to the beat of a drummer who is the President, they work for the President, they do what he tells them to do.

It's amazing -- I've been doing -- working -- attending a lot of the Citizens Advisory Board meetings lately, talking to people from the site who have contacted to DOE contractors at various sites. If you get them by themselves out in the hall at some of the meetings, at lunch or something like that, most of them share my positions the only way to get rid of plutonium properly is to burn it and recover what's left and burn it and go on down the road.

So I'm not saying this critical of anybody in DOE from the top to the bottom, I'm [unintelligible]. You mentioned Barnwell, and it touches a -- yeah, a nerve.

MR. LAWSON: All right. I appreciate your comment and I would encourage people to try to keep your comments focused as much as possible on these documents. We certainly don't want to limit your comments, but -- yes, sir, we have another comment here and then I would like to take a survey of how you would like to go --

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continue on with the rest of the day.

HT12/6
14.069

PUBLIC CITIZEN: Yes. According to your summary report there was a calculation of potential risks of -- the citizens of Savannah are within the range of the site for getting cancer over a estimate of 50 years. Was there -- did you-all calculate the -- not only the potential release of radiation coming from the Savannah River Site, but did you-all calculate the other plants that's releasing other types of chemicals and other types of radiation or other forms of radiation in combined with that which is coming from the Savannah River Site?

Because if you haven't and you only estimated the potential risk of cancer coming from the Savannah River Site, then there may be a greater risk of low-income people getting the repercussion of what we economically are trying to benefit from the Savannah River Site.

MR. LAWSON: It's a question of cumulative impacts. Do you -- Andre Cygelman.

MR. CYGELMAN: I believe that it represents a cumulative impact, what would be projected to be operating plus what would be --

PUBLIC CITIZEN: I mean, that's not -- that's not clear. You're not exactly sure.

MR. CYGELMAN: Okay. Then we'll have to make it clearer.

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HT12 (CONTINUED)

MR. LAMSON: Now, I would just -- Andre, I think -- you were talking about non -- sources that were non-DOE; is that correct?

PUBLIC CITIZEN: Right. Well -- yes, sir. combined.

MR. LAMSON: Right.

PUBLIC CITIZEN: Combined with --

MR. CYGELMAN: We would only be looking at what was from Savannah River, not anything outside the Savannah River area --

PUBLIC CITIZEN: Well, that's not -- well, my opinion, that is not fair to the citizens of Savannah because now you're only projecting what Savannah River Site, this is supposed to be a total -- this is supposed to be a total sum of -- assessment of what's going to -- a health assessment, what's going to take place.

HT12/7 14.070

So not only should it be calculated, the radiation that's going to be released from the Savannah River Site, but what is -- what is the total impact because say, for instance, we may have a better chance if the Savannah River Site was closed down, you know, instead of adding what radiation or what contamination would be released from the Savannah River Site, we may have a better chance of having a longer life span if we would close the plant down. So if there was a total calculation

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HT12/7 14.070 continued

along with all the other plants along with Savannah River Site, then I think there would need to be more input in the study as far as health -- as health is concerned. Do

MR. CYGELMAN: I understand your comment. I'll have to take it up with our [unintelligible].

MR. LAMSON: All right. Thank you. Anyone else with a comment now that can't wait -- yes, ma'am, please.

PUBLIC CITIZEN: I just find it ironic -- I understand under the Stockpile Stewardship and Management PEIS there's discussion about upgrading the pit production at Los Alamos and under the Storage and Disposition of Weapons-Usable Fissile Materials we're worried about what we're going to do with all these pits that we've got. It just seems kind of strange, we're going to make some more and we don't know what to do with these we've got.

MR. LAMSON: Okay.

MR. RUDY: I'll just -- I'll try to link here with Earl. What Earl's document is talking about is making the new pits to maintain the stockpile, the nation's national defense nuclear deterrent. A pit is not a pit. There's different types and forms and ways that you would make pits for special types of weapons design. Because the President under a national security policy has stated we will maintain the nation's nuclear deterrent.

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Comments omitted from intervening pages here do not concern this EIS.

deal with that before we go on to some other issue.

Do you want to restate your concern here so we can --

HT12/8 14.071

PUBLIC CITIZEN: My concern is birth defects toward our children, the future children. I've read in the past how different radiations has affect births, pregnancies of mothers and I would like to know the same situation in this area.

MR. LAMSON: Okay. Earl or Jay, any thoughts on that?

MR. ROWS: Yeah, I mean, I can talk about it. I mean, it's true that radiation can, you know, cause cancers, can cause birth defects. And I would just point your attention to -- I hate to just throw you to a document but appendix E of our document discusses all the human health effects from radiation, okay. So that's where we discuss it, and the way we set up the EIS is we're trying to make decisions on -- for a given mission of where to site, you know, the mission, i.e., you know, the one thing that's considered at Savannah River is producing plutonium components. The other site we're looking at is Los Alamos out in New Mexico. And we essentially have to compare that site against this site as to -- from an environmental impact, what are the environmental impacts of doing that mission at Los Alamos,

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HT12 (CONTINUED)

what are the environmental impacts of doing it here at Savannah River. So, again, we look across the whole gambit of environmental impact, you know, how it's going to effect water, how it's going to effect air, and we also look at what the radiation effects are going to be. And the data is in the EIS, I can sit here and tell you numbers and things like that.

PUBLIC CITIZEN: No, I don't want that.

MR. ROWS: But that was our approach and it's for the general population producing plutonium components is a very, very low-risk mission. There's not a lot of radioactivity emitted when you do that mission. So essentially we don't see in our analysis any effects to the population from this.

MR. WHITEMAN: Yes.

MR. ROWS: And I can cite you numbers.

MR. WHITEMAN: Let me comment. My wife and I have two grandchildren in elementary school and the third may go very soon, and it scares us to death what our kids are -- you know, are seeing these days in the schools. You know the drug problems, I'm sure what you see every day, the violence. You know, it scares me to death to see what those poor boys are going through. Believe me the last thing I'm concerned about with those boys growing up is anything, like, related to radiation. And we certainly

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live in New Mexico at a very high elevation so the radiation levels from the sun are much higher than here in Augusta. But believe me those radiation levels are not what I'm concerned about with those boys. I'm concerned about what you see in the schools as well.

PUBLIC CITIZEN: I have a broad spectrum of all of that but right now we're dealing with this aspect of it and this is why -- where my concern lies because we also had an outburst, I think it was Cumela (phonetically spelled) in Savannah, the explosion in Savannah. They're telling everyone, well, there was no harmful effect. I really don't believe that. I really don't believe it. Whether it's minute or what, I don't believe it was none. And this is what they're trying to stay like. I think what you're trying to tell me there now, it's such a small scale of effect from this wherein the crimes in school, the drugs and so forth. But I think enough different companies, like we have Cumela in Savannah. We have Union Bag in Savannah now. We have Savannah River Site, all of this putting pollutants in the air, I still think it's a concern in reference to our children.

Another thing is you said you live in Mexico in the high elevation. They have a tendency to always put it in the low income areas, also. This is with children that don't -- they don't practice prevention, health

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prevention, no how. So all of these pollutants in the air is a downfall for them in that way, also. So out of all of that this is just adding another stringent toward the downfall of the youth today and I don't think we need anymore.

PUBLIC CITIZEN: We have friends in Los Alamos, too, and we're concerned about them.

PUBLIC CITIZEN: Yeah.

PUBLIC CITIZEN: And they live on a reservations. And it's a dump in their yard.

PUBLIC CITIZEN: Okay. This --

PUBLIC CITIZEN: So you can't say they're not affected at all.

HT12/9
17.009

PUBLIC CITIZEN: Could I just piggy back on that? I'm just curious is there additional government policies that certain demographic groups as being less valuable, more expendable, whatever the term may be in, you know, humane terms, as opposed to other populaces with regard to institutions like SRS?

MR. WHITEMAN: No.

PUBLIC CITIZEN: Two things, Barry. I'd like to -- I'd like to go back and give you my sentiments on the note you read a minute ago that our concern is jobs only. It's not. My judgment, it's not jobs. I want a viable, technical facility that is capable of moving into whatever

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Comments omitted from intervening pages here do not concern this EIS.

HT12 (CONTINUED)

for destruction.

MR. LAWSON: So your concern is two points. One is the weapons being here and then second for the weapons that are being dismantled, whatever may be remaining from the weapons being here, both of these?

PUBLIC CITIZEN: Right. Right. And all that is out of control. I mean -- I mean, why -- you know, if it wasn't -- if it had been checked from the beginning seem like -- everybody said, well, okay, well, let have a ball with -- with making all these weapons, for what? Who was we going to kill with them? We have intention of killing a bunch of people or everybody live on the same planet.

And everybody live on the same planet so where -- what was in the minds of the people who designed this plan for weapons of destruction. You know, I mean, destruction of the world, so now we have it. I mean, we're storing that. We're going to destroy the world with just storing it, destroy the rest of the population, destroy the water supply, everything. We're storing it.

This is what this impact statement is about. This is what -- where we're at right now in this day and time. I mean, from a scientific point of view we find ourselves sort of stuck.

MR. LAWSON: Yeah. So let me translate this so that we can address this. Maybe you ought to talk about

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what the source of the decision for having nuclear weapons is in the first place, and then second, what the options are for either storing the weapons here or what to do with this stuff that is taken from dismantlement.

HT12/10 22.011

PUBLIC CITIZEN: Right. Right. And -- well, I mean, not to go on, but everything seems to deal with policy. I mean, if we had some type of impact on the policy making from the beginning then now -- it seems as if now y'all are backtracking and want some type of input from the community, when we don't really -- y'all did it behind our backs all the time and now you expect us to think y'all not going to continue to do this behind our backs, I don't know. I'm sort of stuck on, why is it like that.

HT12/11 22.012

PUBLIC CITIZEN: You know, that's my concern as well. I was discussing with Sister (unintelligible) and (unintelligible) earlier and they already made that decision. What's our input, how do we know this is going to count. You already did what you wanted to do without asking for permission, you're going to continue doing that but this part is just really a bunch of bull crap, we're just here.

So how we know what's going to be the outcome and is the true outcome. If we say right now we don't want no more -- we don't want to deal with this anymore,

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HT12/11 22.012 continued

is it going to take place, are you going to ship it somewhere else that's not going to happen where we don't want it to happen. Or it's already voted that this is going to -- hey, you're just here we already voted where it's going to go.

MR. LAWSON: Okay.

PUBLIC CITIZEN: So I guess a over-arching question would be, is there a -- does the Department of Energy have a preferred site and is that site SRS?

MR. WHITEMAN: Yeah, we do have a preferred site for plutonium fabrication and it's not at SRS.

PUBLIC CITIZEN: Okay.

MR. WHITEMAN: We did not plan to add anything to SRS as a result of this EIS.

PUBLIC CITIZEN: May I ask what is that preferred site?

MR. WHITEMAN: Excuse me.

PUBLIC CITIZEN: May I ask what is that preferred site?

MR. WHITEMAN: Los Alamos.

PUBLIC CITIZEN: Los Alamos.

PUBLIC CITIZEN: And that's covered in the EIS?

PUBLIC CITIZEN: Would that actually be consolidated where it was -- at the facility will be upgraded to store plutonium and high rich uranium. I

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mean, is that one of the sites where --

MR. WHITEMAN: Let me refer you back to here. We plan to have some missions at all eight of these sites. In the case of Los Alamos this is -- the pit is a plutonium fabrication, we have planned to add there. Savannah River Site, the tritium facilities that are there will continue but we don't plan to either add or subtract any new missions from Savannah River. So the various missions associated with the U.S. nuclear weapons program are spread among these eight sites, and we don't plan to -- generally we don't plan to move any from one site to another as part of this. We're generally shrinking and reducing the size of what we have at those eight sites.

PUBLIC CITIZEN: Is there -- is there an effective way in which we as citizens can aggressively approach in trying to actually close down Savannah River Site and help you all focus on a particular site like, such as Los Alamos, where we can just totally do away with the Savannah River Site. Because we -- we're finding out through you alls research that African-American or low income people are the ones that's going to be accepting all the waste, you know. So what we want to do to protect our children and protect our families we want to do away with the total site.

Because even when I called the -- I called the

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HT12 (CONTINUED)

national wildlife, the state national wildlife, and from not only the Savannah River Site but other plants that exist along the Savannah River, that actually destroy the natural habitat along the river. And if we allow these facilities, such as Savannah River Site, to continue to exist then we won't have anything, you know. And I mean, you'll get on a plane and go back to Mexico, everybody else will go their own way, and everybody else here we have to go back to our home town, you see. So -- to a nuclear dump in a sense.

MR. WHITEMAN: This particular PEIS, I -- because we're not looking at either adding or subtracting any missions from Savannah River, if you're concern is one of wanting to close Savannah River, I'm not sure there's a vehicle for addressing that through this PEIS. I think it's something -- certainly we're responding in the Department of Energy to policy guidance laws coming from our elected officials. And I think you're probably -- your best way to deal with that is through your elected officials, through your [unintelligible].

PUBLIC CITIZEN: Let me ask this: This brochure that came out that said the Department of Energy is interested in your comments. You all are familiar with this?

MR. WHITEMAN: Uh-huh [yes].

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PUBLIC CITIZEN: It's a one-pager, we actually have it just [unintelligible].

MR. WHITEMAN: I haven't seen that but I'm sure it came out as a result of this.

PUBLIC CITIZEN: Right. And on that -- and so I'm going to ask a practical question. At the bottom of each description of the PEIS it says, DOE is considering the Savannah River Site as one of the alternative locations for the long-term storage of materials for plutonium pit fabrication activities for the relocation of interim storage of plutonium pits from Pantex. Is this same kind of document being circulated at the other sites and the same thing reads, DOE is considering Los Alamos as one of the alternative on across the board so that this is --

MR. WHITEMAN: Yes.

PUBLIC CITIZEN: Because I tell you why you're probably hearing some of our questions framed in the way that it is is because we took this paper to mean that Savannah River Site was the preferred site. And so it's a little bit misleading, perhaps you can just put in parenthesis and there are seven other sites that are being considered as well, so that the citizens in this area don't get confused that they are being -- they're the number one choice and that while the PEIS is saying that

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seven other sites are being looked at, that we are, in fact, the preferred choice.

MR. WHITEMAN: When we were here last summer for the scoping meeting on this, we identified all of the alternative sites, at that time, we were considering. And as it turns out we didn't change any of those, alter them from last summer till now. But, yeah, of the things that you mentioned there, you know, the pit fabrication is the one that's being considered as a part of this PEIS and that's the one that we've already made a declaration or the secretary of energy did about six weeks ago, that our intent or our preferred action was to do that at Los Alamos. The others that you mentioned there in terms of interim storage and long-term storage plutonium are being addressed in the other two meeting rooms here. And in those cases they have not yet made a preferred alternative selection. So those -- for those missions, that I don't know where that will be -- who knows where that will be made. Savannah River is still a potential for those others.

PUBLIC CITIZEN: Yeah, that's why we were trying to get a sense of the integration of the three activities, you know, the Pantex, the stockpile and stewardship and the disposition.

MR. WHITEMAN: Well, it would -- yeah, I think

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that's why it's helpful having the three together because there is some overlap issues seen in that.

PUBLIC CITIZEN: Yes.

MR. WHITEMAN: The decisions relative to Savannah River, DOE -- relative for this PEIS -- DOE has made it's public declaration of its intent and that is to not add or subtract any missions from Savannah River. On the Pantex EIS, DOE has also indicated its intent and that is to keep those pits and the interim storage there at Pantex, not to relocate them here. For the long-term storage and disposition that's in the meeting room next door, DOE has not made any decisions there. And so -- and that won't occur until sometime in the next year.

PUBLIC CITIZEN: But --

MR. WHITEMAN: But those are the -- that's the one where there are potential decisions that would relate to Savannah River that have not been made yet.

PUBLIC CITIZEN: So the draft EIS would not have the DOE's preferred site and --

MR. WHITEMAN: Well, the --

PUBLIC CITIZEN: -- alternative decisions?

MR. WHITEMAN: The draft does not. The -- you -- DOE -- the way these EISs work, if you know what you plan to do you should tell people. But if you're not sure well, you, you know, you keep studying it. Well, in

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HT12 (CONTINUED)

the case of this FEIS, we determined, based on all the studies we had done or what we wanted to do, and so we told people. For the storage and disposition one next door they're still studying the matter and there's no declaration of what do we want to do. And so --

PUBLIC CITIZEN: Well, there will have to be another one after the decision is made, once it is.

MR. WHITEMAN: Well, the final FEIS that will come out this fall, at that point we have to say what we would intend to do.

PUBLIC CITIZEN: And then you have to do another EIS to say --

MR. WHITEMAN: No.

PUBLIC CITIZEN: -- what are the consequences of doing that action at the site you want to do it at.

MR. WHITEMAN: No. That would contain all of that information.

PUBLIC CITIZEN: The final FEIS?

MR. WHITEMAN: Yes. Yeah. But -- so, anyway, for two of the three DOE has made it's declaration of what it plans to do because, you know, we knew so we told people. And in those cases there was no change of new or subtract or add to Savannah River. The third one that is still up in the air and it could involve new commissions here.

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HT12/12 23.029

PUBLIC CITIZEN: May I ask a policy question?

MR. WHITEMAN: Yeah.

HT12/12 23.029 continued

PUBLIC CITIZEN: By what process do you waive strategic concerns against potential negative impact to local populations?

MR. WHITEMAN: Well, that's -- that's what this EIS is trying to do. I mean, that -- that's the vehicle the government has for addressing these sorts of things.

HT12/12 23.029 continued

PUBLIC CITIZEN: I was just wondering was any particular formula, equation, process?

MR. WHITEMAN: Well, there's a -- for every area that gets looked at in an EIS, whether it's water, air, socioeconomic impacts, there's a standard way of doing that that has developed in this country over the last 30 years so that there are people who are professionals that work in those particular areas and that becomes sort of the standard format.

HT12/13 23.030

PUBLIC CITIZEN: But are you all working with any type of independent entity that's not in total opposition to DOE but, just in case -- you did a case study, let's say for instance, cancer. And have you ever brought -- have you -- are you all bringing out -- bringing in outside resources to say well, this is not what I'm -- this is not what we're finding.

PUBLIC CITIZEN: Independent peer reviews.

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PUBLIC CITIZEN: Right.

PUBLIC CITIZEN: Of a sort.

PUBLIC CITIZEN: Right. So it just won't be coming -- just from strictly DOE because we've been -- we've been --

MR. WHITEMAN: Well, the way we've dealt with that typically over the last decade or so, well, sometimes with sites going back 25 years, we generally tried to deal with an organization that people in the community can trust, and because, you know, I know, it's hard whether you live in Texas or New Mexico or South Carolina to trust somebody coming in from Washington saying, well, I'm from the government, you know, you should trust me.

So we try to get somebody that -- some organization that people at the local level can trust to be an independent body to overview those sorts of things. In the case -- I know in New Mexico, you know, we -- we fund the State of New Mexico's environment and health organizations. We do that sort of work for us as well as the Environmental Protection Agency.

I suspect here in South Carolina that the State of South Carolina and perhaps Georgia, as well, are funded to provide an independent view of the air monitoring, water monitoring and, you know, all those effects around here. I know the Center for Disease Control in Atlanta

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has been contracted to do independent health effects studies around our sites.

So we've -- it's hard to find, you know, an organization that everyone believes is truly independent because there will always be somebody say, well, you may trust them but I don't, you know, so -- but we've hired every group that we think are credible people that can come in and look at how we're doing --

HT12/13 23.030 continued

PUBLIC CITIZEN: Well, now, see, that's where the problem may be at because you all hired them, you know. I mean, we had, like, say, for instance, Citizens for Environmental Justice based on the fact that they're -- we're raising some very serious questions then you all should be able to fund us with money for us to be able to go out and find out own independent study -- own independent researchers, the individual that will research our problem for us. And then we could sit at a round table and then y'all -- you-alls side and our side can sit down and see can we come up with an answer, you know.

But just for you all to appoint us someone or say, well, I got this person here you can call him and he'll help you out. Man, that's not going to work because that's no different than you all sending out doing the independent research yourself.

MR. LAWSON: We have two other people who want

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HT12 (CONTINUED)

to put their oar in the water on this -- there in the back there.

PUBLIC CITIZEN: Well, I think it's worth noting that the preferred selections that are announced are not always the ones that are final choices, and that they're not even always alternatives that were in the first draft. That there is input from this -- these meetings and as an independent that makes it through the process and it gets looked at and sometimes selected, they get rewritten or there are supplements that are issued.

PUBLIC CITIZEN: Can you give us an example of --

PUBLIC CITIZEN: Some of the spent nuclear fuel in the basins, in the disassembly basins here in the recent record of decision for that, there was an additional month that -- or so longer maybe that was added and there were new alternatives that were not in the original document.

PUBLIC CITIZEN: And if there -- if you all say, for instance, you all decided to use Savannah River Site, what can we do as citizens to say that we don't want that? If you -- in the record of decision and we -- we'll -- and we don't agree as citizens with that, what proper step do we need to take to say that we're not -- what proper step do we need to take to reverse that decision?

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PUBLIC CITIZEN: May I interrupt here? Are you familiar with this citizens group that was formed recently with Savannah River? They've had meetings down in Savannah that a number of you people that are members of it, are you familiar with that group?

PUBLIC CITIZEN: The Citizens Advisory Board?

PUBLIC CITIZEN: Yeah.

PUBLIC CITIZEN: Yes, we're familiar with that.

PUBLIC CITIZEN: Okay. Are you participating in that?

PUBLIC CITIZEN: Yes, we do.

MR. LAWSON: Are you suggesting this is one place to make --

PUBLIC CITIZEN: This is the place for the citizens to have a voice. Now, they've been -- I'm not a member of it. They have been able to change DOE's mind on some of the things they did. I read the minutes of the meetings, I've attended very few of them. But they meet sometimes in Savannah, sometimes in Barnwell, sometimes here, but that's your opportunity to participate at a very influential level. Now, they're your neighbors.

MR. WHITEMAN: Yeah. Let me comment if I could. The question you raised is a dilemma in a democracy, you know, of how do you -- I think it's very valuable for government organizations, whether they're DOE or whatever,

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to stand up to and talk and answer questions and make sure that the people who live in the communities that are affected by the government's actions understand and have an opportunity to provide feedback. The dilemma then is of where -- you will never find everyone in a community that agrees.

I mean, there will always be somebody that said, well, I'm against that action, you know, I don't like you to build the dam or I want you to build that dam and you're not going to or I want you to do this. I think it's incumbent on the government as much as we can to make sure that we communicate our intent that we listen to people and understand their concerns and factor those into the information that we provide to the people who are elected to make decisions for the government.

But at some point, you know -- and that's why we're here is to make sure that we understand what are the concerns and issues and questions the people that live around Savannah River might have.

But you should understand as well this is a democracy and the -- we have elected officials for us that ultimately make those decisions, you know, I don't. I work for the Department of Energy. I'm responsible for making sure that I provide sound advice and judgment, you know, as -- for the things I am responsible for and that

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that advice and judgment gets relayed to people who will then make the decisions.

But we do live in a democracy, I mean, it's -- I think it's one that allows people to provide their point of view but it doesn't always mean that every point of view is the one that the government will follow.

PUBLIC CITIZEN: Well, I think I've got a follow- up question. Excuse me, sister, and I'm -- I just -- two things. One is that a more narrow question is, is there a way to challenge the rod, not to necessarily change it although it may get changed in your process but his specific question is what is the procedure to challenge a rod if you feel that that decision is against your community.

HT12/14
23.031

MR. WHITEMAN: Yeah. Jay, can you answer that? Yeah, there is a --

MR. ROWS: Yeah.

PUBLIC CITIZEN: This is a more answer to --

MR. WHITEMAN: Yeah, and there is a process for doing that and Jay --

MR. ROWS: Essentially when the NEPA was written, you know, the legislature set up an avenue by which -- and it's really through the administrative procedure that I -- which NEPA falls under, it's kind of complicated, but essentially when the decision makes -- or

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HT12 (CONTINUED)

when the government makes a decision on a NEPA document, a record of decision, any potentially effected citizen can challenge that and just file a lawsuit that DOE violated the NEPA act, and --

MR. WHITEMAN: So the --

MR. ROWS: We get sued. I don't want to say regularly, but Department does get sued and --

MR. WHITEMAN: And we win some and lose some.

MR. ROWS: We win some, we lose some.

MR. LAWSON: By this -- short of that though, isn't there -- when the final EIS comes out there's 30-day period in which, before the decision is made, extra written pressure or whatever could be --

MR. ROWS: Oh, sure. I mean, that's why we have a wait period between the final and the official record of decision is so that people can weigh in on what's in the final EIS and that may sway the decision maker in our case that's the secretary of energy and then she'll make her decision. But once the record of decision is made, really your only practical recourse to change that is through the legal course.

MR. LAWSON: I just wanted to get back to this lady's point over here, that just because something is preferred doesn't necessarily mean it will be accepted. And so that if you need -- you shouldn't just say, well,

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he said it was the preferred and then all of a sudden that gets changed; if you have feelings about the preference whether you agree with the preference or you don't, it's important to weigh in in what your point of view is. Because I mean --

MR. WHITEMAN: Well, I think you should take the preferred alternative as an indication that, you know, the government didn't wait until the last minute and say, here's what we plan to do. It's based on everything we knew at this point, the consensus was, this was the decision that was most likely to be made and therefore we should tell people that. I mean, it's not the final decision but it certainly does -- the best knowledge you know today.

MR. LAWSON: Excuse me, this woman over here has been quite patient.

PUBLIC CITIZEN: Yes, she has.

PUBLIC CITIZEN: I was just wondering, I think that these information sessions are great and I hope that you take into account what people say but I must say your own graphics would indicate that you don't because this arrow for public information and involvement just goes off to nowhere.

(Laughter).

And I really wonder is that the real

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Comments omitted from intervening pages here do not concern this EIS.

PANTEX SITE-WIDE EIS

QUESTION AND ANSWER SESSION

- - - - -

HT12/15
12.005

PUBLIC CITIZEN: What is the intent of the hole, the square?

MS. FOUNDS: The square, oh. That is, if you will look at this partly, you have these -- and they unload them, but that hole is where the beams or the -- let me try this again. This is a little bit different in that the actual mockup is such that when you have the automated guided vehicle, there's a boom that goes into that hole there. And this forklift can (unintelligible) either swing this boom and swing it around and place it -- these things on here. So that's really what that is for. It's sort of a guide to place it and it's also where the boom goes in terms of up there.

PUBLIC SPEAKER: Thank you. The example didn't look like that though.

MS. FOUNDS: Yeah, it doesn't, but our video tapes do show the automated vehicle and how that boom works.

HT12/16
14.072

PUBLIC SPEAKER: I assume that's gama. The worker at what distance for that 6 rem?

MS. FOUNDS: The worker -- the uninvolved worker's considered to be at about a hundred meters.

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HT12 (CONTINUED)

That's an uninvolved worker. What you're doing right here is looking at the exposure based upon how operations are currently performed at the Pantex Site to get an overall dose to people handling it, because there are people that are going to be in contact, you know, with the containers themselves, putting them on pallets, forklifts, et cetera, to handle them to get them placed into storage. So that's what this corresponds to, whereas this corresponds to noninvolved workers, people are involved with the operation itself, and then starting to be members of the public with this one being if a person was actually at the fence line, what would that exposure be. So you're getting the worse possible of all the public.

PUBLIC SPEAKER: I guess a forklift puncture --

MS. FOUNDS: Uh-huh [yes].

PUBLIC SPEAKER: -- a forklift driver is maybe six feet away from the plutonium.

MS. FOUNDS: Uh-huh [yes].

PUBLIC SPEAKER: Now, he's going to be 6 rem at that distance?

MS. FOUNDS: I think that that's correct because you're -- remember that --

UNIDENTIFIED SPEAKER: Yeah, this is alpha.

MS. FOUNDS: Yeah. You're talking about the material itself getting out.

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PUBLIC SPEAKER: That's the whole pit getting out?

MS. FOUNDS: It was a portion of it because we took a fairly conservative case in terms of how much of the material. You have to remember that there are like balls and we were actually, you know, in the scenario looking as if it could actually almost be pressurized and get some portion of that out and then a smaller portion of it being the 10 micron range, for instance, that could actually be inhaled.

UNIDENTIFIED SPEAKER: That's not an instantaneous dose, either.

MS. FOUNDS: Right.

UNIDENTIFIED SPEAKER: That's over a fifty year period assuming that he inhaled part of the dose and would have resided there over that long period of time.

PUBLIC SPEAKER: That's not very realistic, is it?

UNIDENTIFIED SPEAKER: It's not very realistic that it would happen, but it potentially could happen.

PUBLIC SPEAKER: Yeah. The sky might fall too, though.

MS. FOUNDS: Well, actually these -- well, as I said, this is a dominant one with the exposures associated with, but the probability of that accident happening I

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think is like one times ten minus a fifth, somewhere around in that. So it is an improbable one and the document goes in and looks at it as a risk perspective, which is both the consequences plus the probability of it actually happens. The document does look through that. Sir?

HT12/17
12.006

PUBLIC SPEAKER: Isn't the newer method of staging, it doesn't have a forklift rider on the forklift?

UNIDENTIFIED SPEAKER: There is a point that it does.

MS. FOUNDS: But there are points at which you do use the forklifts but, again, if you go and look at the videos it shows you of the things being placed, there's a boom and there are censors on the front of this boom that would stop its travel, for instance, if it was hitting up against a canister. And those 18400A's they're, what, three-quarter inch stainless steel is the inner container and a quarter inch stainless steel is the outer container. And I think Kevin can show you the mockup of one of those 18400A's. Did I get the dimensions on it right?

UNIDENTIFIED SPEAKER: Yes, but they're backwards. The inner one is the quarter inch -- yeah.

MS. FOUNDS: Okay, and then there's three-quarter inch on the other one, okay.

PUBLIC SPEAKER: I have a question. I missed --

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HT12/18
12.007

I've apparently misunderstood what you said. You said when I load these things I'm going to put them in a Type A container.

MS. FOUNDS: Type B.

HT12/18
12.007
continued

PUBLIC SPEAKER: Type B container, okay, fine. Now, you never said I'm going to take them out of that Type B container.

MS. FOUNDS: Uh-huh [yes].

HT12/18
12.007
continued

PUBLIC SPEAKER: So I'm assuming they're stored in a Type E container which is suitable for drop for 30 feet --

MS. FOUNDS: Yes.

HT12/18
12.007
continued

PUBLIC SPEAKER: -- or puncture and so forth.

MS. FOUNDS: Uh-huh [yes].

HT12/18
12.007
continued

PUBLIC SPEAKER: How in the world is a forklift going to ram a hole through it?

MS. FOUNDS: It's a very conservative estimate, sir.

PUBLIC SPEAKER: I just -- Bob, I agree with you.

MS. FOUNDS: We try to ban the accident scenarios and as you can see the consequences are not great and we are looking at the probabilities of those accidents, and they're not large for this particular type of an operation.

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HT12 (CONTINUED)

PUBLIC SPEAKER: But, anyway, to pick up the 6 rem and say that's what they're going to be exposed to --

UNIDENTIFIED SPEAKER: Less accident.

PUBLIC SPEAKER: And it's utterly ridiculous.

MS. FOUNDS: Well, I think, as I said, we go through and we analyze these things. We analyze them as conservative --

PUBLIC SPEAKER: Yeah, and that's the game that's been played with these EIS's and you're not going to change it and I'm not going to change it, but somehow we've got to put a little realism in these things.

UNIDENTIFIED SPEAKER: But that is real. In other words, that is the most credible type of action that could occur. And the probability of that accident, as Nan said, is very small but we have to report what the probability is and should it occur, what are the consequences, and that's all in this report.

PUBLIC SPEAKER: Has it ever occurred?

UNIDENTIFIED SPEAKER: Not that I'm aware of.

HT12/19 12.008 PUBLIC SPEAKER: Okay, how many forklift operations has occurred?

MS. FOUNDS: But the probability is, is that what we're saying, like the ten and the minus fifth is that it would not -- it would occur like once in a hundred thousand years. So, therefore, the probability of it

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happening within fifty years is, you know, not having seen that would be consistent without probability.

UNIDENTIFIED SPEAKER: Well, and we'll take the comment and see if there's some opportunity to phrase it differently in the EIS so that it puts a dose of reality in --

UNIDENTIFIED SPEAKER: We're going to get it both on the board, too, so we'll bring that up in summary.

UNIDENTIFIED SPEAKER: Let me get one more side. We've got about ten minutes.

MS. FOUNDS: Okay, so these are the -- again going back to --

PUBLIC SPEAKER: Let me ask a question. You know all those things are in the EIS, we can look at them, right?

MS. FOUNDS: Uh-huh [yes].

UNIDENTIFIED SPEAKER: I guess I misunderstood your words. Back in the beginning you said that our preferred alternative is continued operation. I don't find the preferred alternative in here. There's a proposed alternative.

MS. FOUNDS: That is -- it is a proposed, but it is also the Department saying that it is the preferred alternative. And it is not in there though.

PUBLIC SPEAKER: Where have they done that?

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UNIDENTIFIED SPEAKER: It was in the Federal Register Notice, correct?

MS. FOUNDS: Yes.

UNIDENTIFIED SPEAKER: Just to clarify that again and make sure everybody -- I don't know -- so the preferred alternative is the proposed alternative and that's been in the Federal Register Notice as recently?

UNIDENTIFIED SPEAKER: When we issued the EIS we put the Federal Register Notice --

UNIDENTIFIED SPEAKER: At the same time, okay.

HT12/20 03.003 PUBLIC SPEAKER: Does Pantex conduct a peuter storage operation in facilities that are considered to be nuclear facilities, rated nuclear facilities and, you know, that conform to the DOE orders for nuclear facilities 6431A, for instance?

MS. FOUNDS: Yeah, there's a lot of debate about whether or not the storage facilities are a nuclear facility, but the do conform to the SARs for instance that are out there and we have --

HT12/21 14.073 PUBLIC SPEAKER: You have done SARs on those facilities?

MS. FOUNDS: Uh-huh [yes]. On the Zone 4 area there are SARs. And they went through an operational readiness review in order to be able to store out in those facilities. And for the past, I don't know, thirty or

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forty years, we have been using those -- the similar magazines for weapons storage.

PUBLIC SPEAKER: Plutonium vulnerability assessment.

MS. FOUNDS: Excuse me?

HT12/22 14.074 PUBLIC SPEAKER: You can fix -- familiar with plutonium vulnerability assessment done in November of '94? It says that operations of storage activities are continuing with a -- on the basis of a bio instead of approved safety analysis reports.

MS. FOUNDS: Actually, I mean the whole Department is going through a process of upgrading to what are called 5480 DOT 23 SARS and all of the sites have bios. They all went through and did an assessment and put up bios as we all upgrade to those DOT 23 SARS. The Zone 4 happens to have a SAR that was approved recently.

UNIDENTIFIED SPEAKER: It was approved in December '92 and they are currently going through and update the DOT 23 Standard, which I believe is on schedule to be completed by the end of this year.

PUBLIC SPEAKER: Can you put that in English? You're talking to the public now. That's what this meeting's suppose to be. Upgrading to the SARS something or other.

MS. FOUNDS: There are certain requirements in

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HT12 (CONTINUED)

looking at -- in any facility. You go through very much like this EIS. You look at the hazards. Obviously there are hazardous material out there. There's plutonium in what is called the Zone 4. I don't have any of those U-graphs that showed Zone 4 with us, do I?

UNIDENTIFIED SPEAKER: Uh-uh (no).

MS. FOUNDS: And obviously, as I said, the hazard out there is the plutonium and the possibility of dispersing that plutonium. From normal handling accidents there's not much of a risk of dispersing it. The greatest threat out there is the fact we also have weapons out there and you might have an aircraft impact into those weapons magazines or into those pit magazines and creating a possible dispersal accident. So what happens in a SAR is you go through and you analyze all those different scenarios, how credible they are, what the probability of an accident is, and then the consequences from those things. Very much like what we're doing here in looking at a transportation accident because that's what we would be doing to transport the pits here, and then what, you know, you're storing the pits out here, how likely is an earthquake, you know, that would potentially disperse some of the plutonium in this area.

PUBLIC SPEAKER: I was surprised we only had a few minutes to discuss, if we're moving on to the others,

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and I've got a lot of comments that I'd like to make. I guess I'm going to have to put them in writing.

MS. FOUNDS: Please, go --

UNIDENTIFIED SPEAKER: Just keep moving on. Keep going.

UNIDENTIFIED SPEAKER: You're welcome to stay.

PUBLIC SPEAKER: Are you going to -- if I stay you're going to have to hear me.

PUBLIC SPEAKER: I've got a few more I want to throw in too, Chris.

UNIDENTIFIED SPEAKER: No, we -- we've got time now. We're going to just continue on. If you feel --

UNIDENTIFIED SPEAKER: Let's just take comments, that's it.

UNIDENTIFIED SPEAKER: Yeah, just keep going.

PUBLIC SPEAKER: I'm surprised as the Westinghouse Land-Use Coordinator that I didn't know that P-Area was proposed, okay. It's probably a good idea but I chair something called the Land-Use Technical Committee and nobody came to me and said, golly, gee, we would like to put this somewhere, okay. That's the first thing.

MS. FOUNDS: Well, we have a site point of contact.

UNIDENTIFIED SPEAKER: It's also in NEVA.

PUBLIC SPEAKER: I know and I should be talking

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to that person and they'll kill me 'cause I'm here as a private citizen now but --

MS. FOUNDS: No, that's fine. I was just going to say we have been interacting with the Site.

HT12/23 23.032

PUBLIC SPEAKER: The other thing is on your evaluation list I had a question about why you didn't discuss things in detail and why you did. For instance, the facilities in infrastructure at SRS are excellent, okay.

MS. FOUNDS: Right.

HT12/23 23.032 continued

PUBLIC SPEAKER: But it says it's not discussed in detail.

MS. FOUNDS: Well --

HT12/5 04.004 continued

PUBLIC SPEAKER: Are you all aware of this Land-Use Baseline Report that was put out?

MS. FOUNDS: Uh-uh (no).

PUBLIC SPEAKER: Well, I want to submit that for you all to look at and read, okay. It tells -- it's a synopsis of what the attributes of the Site are. Also, it talks about things like you were talking about with the fault line and you said it's not in a fault area. It's near a fault area, but it's capable versus noncapable and that's something you have to look at, but here it says you didn't discuss in detail. One thing is the positive, the Site doesn't have a wind -- a consistent wind

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(unintelligible), okay, so if there is an accident it's not going to head over or down to Savannah or it's not going to go over to Evans, Georgia or whatever, okay, because it's not predictable.

MS. FOUNDS: Right.

PUBLIC SPEAKER: Intrasite transportation, the railroad, one advantage of P-Area is that it's right next to a railroad classification yard, if you're using railroads. I don't know if you --

MS. FOUNDS: We're not.

HT12/24 17.010

PUBLIC SPEAKER: Okay. And then I had another question about the list, how come environmental justice is broken out and it's not included under cultural resources or socioeconomic resources? And having taught NEPA, we normally would put it under there and not have it by itself. And I noticed it was discussed in detail -- there are only two things discussed in detail and the rest is not. And that might be my --

MS. FOUNDS: Let me go back. One of the reasons that we selected Savannah River is because it had those assembly areas. They were sizemically qualified, those types of things. There was a large warehouse. You could have almost picked up the Pantex operation and put them in P-Reactor. So when I say we didn't discuss them in detail, we evaluated them but there was no need to discuss

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HT12 (CONTINUED)

them in a great deal of detail because the facilities --

PUBLIC SPEAKER: Well, this is misleading that way, then.

MS. FOUNDS: -- you know, and okay. But in terms of that we do not evaluate them in a great detail, but in the document each one of those areas is addressed. For instance, we're putting it in the P-reactor. Those are fine facilities. You would not have to modify them so, therefore, there's not a great deal of action necessary in order to consider them, you know, you don't have to construct, et cetera.

UNIDENTIFIED SPEAKER: And there's a chapter devoted just to Savannah River to discuss all of those areas. But then we come to a conclusion, too, that there's no environmental impact and that's why we don't go into the detail. We don't need --

PUBLIC SPEAKER: Okay, but what I'm saying, this is misleading.

UNIDENTIFIED SPEAKER: Okay, thank you for pointing that out. We appreciate that.

PUBLIC SPEAKER: And, Rick, I'm sorry. Go ahead. I had my two minutes.

HT12/25 14.075

PUBLIC SPEAKER: I think that also the other vulnerability noted for Pantex was that the -- Pantex is the only site, the only major plutonium site that is

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HT12/25 14.075 continued

identified as having a single barrier plutonium with environmental public. Now, you know, that's a fact. Read the book.

UNIDENTIFIED SPEAKER: What do you mean?

HT12/26 01.018

PUBLIC SPEAKER: I'm curious what's being done to upgrade and correct that before you talk about putting more there. Also, I have the general comment that storage at Pantex is like a lot of other DOE programs that really is only interim action. It really doesn't lead to anything. These pits, you know, eventually are either going to be in the strategic reserves, stockpile management program or the disposition program, and really you're a lot better off with bringing them, you know -- my particular bias, of course, is bringing them to Savannah River where you get this energy of feeding into other programs because Pantex is not an operating plutonium site. Well, you just say, well, we don't really have nuclear facilities, we really don't have plutonium facilities. To do these other missions you need those. So my general comment is that you ought to look at putting them at a functional plutonium site, which there really only happens to be one. Also, another subject is there tritium involved in any of these pits? I don't see any discussion of health impacts related to tritium.

UNIDENTIFIED SPEAKER: No, it's part of the

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disassembly, the reservoirs are taken off and shipped back to Savannah River. And we are just considering in ours the impacts of Pantex of continuing to ship that back to the Savannah River Site. Did you want me to try to answer some of your questions?

PUBLIC SPEAKER: Well, most of them are related to the aspect of nuclear facilities, plutonium sites, and in particular the vulnerabilities that are noted and if you'd like to address those, go ahead.

UNIDENTIFIED SPEAKER: Well, going back to the one -- well, let me start out with when you're talking more like a long-term storage, we're looking at it for an interim basis for the next five to ten years while you make those decisions for the PEISs as to long-term storage and those things. So basically, you know, operations are to store them until these other decisions can be made. That's one point I wanted to make. When you talk about vulnerabilities at the site, actually the pit is encased in metal. That's one barrier. The container is a second barrier. And then you have the structures that they're in that are containment but do preclude some of the accidents or some of the consequences out at the Pantex Site. So it is possible to go ahead and store those pits at Pantex. But you're right in terms of there is no processing out at the Pantex Site.

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HT12/27 12.009

PUBLIC SPEAKER: That's, you know, the structures are ventilated, the atmosphere --

UNIDENTIFIED SPEAKER: And that's -- they are not in containment.

PUBLIC SPEAKER: And, in fact, they're [unintelligible] out in here that the storage container, you know, is not sealed so it's not a containment barrier either.

UNIDENTIFIED SPEAKER: Wait a minute. The storage container is not sealed?

PUBLIC SPEAKER: ALR8s being unsealed the ALR8 container does not --

UNIDENTIFIED SPEAKER: They're sealed containers. And the other point is that regardless of which option we're going to the AT400-A, which have the pit which is flat, the inner vessel which is welded, and then you have the outer canister. So actually that's layers of containment there and that's what we're going to in terms of the AT400-A.

HT12/28 23.033

PUBLIC SPEAKER: What I'm hearing Rick say to you is that he's reading another DOE document that's not badly out of date and it's different than what your EIS is saying and what you're telling us here. And in order to go forward from here you need to take that document and to make a review against your EIS, correct and modify as

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HT12 (CONTINUED)

HT12/28 23.033 continued

necessary. Isn't that what you're saying, Rick?

PUBLIC SPEAKER: I think that's certainly appropriate.

UNIDENTIFIED SPEAKER: We will look at those documents, but we're also very familiar with how the operations are at the Pantex plant.

PUBLIC SPEAKER: But not how plutonium is stored. The new 3011 for example --

UNIDENTIFIED SPEAKER: But I have gone out and I watched how they take the weapon apart, where they put it in there. We have this --

UNIDENTIFIED SPEAKER: We have this and we'll visit the issue.

PUBLIC SPEAKER: May I make a couple of comments?

UNIDENTIFIED SPEAKER: Certainly.

PUBLIC SPEAKER: I think these are comments.

HT12/29 14.076

Basically on page 533, you're talking about the worker at Savannah River health consequence and which you show on your chart up there at four ten and a minus three as the maximum exposed individuals. But you say the probability of a cancer from all causes to the general public is estimated to be twenty percent which implies that six of the thirty workers are going to develop cancer. Now, that doesn't sound like an insignificant consequence to me.

HT12/29 14.076 continued

That sounds like a significant consequence.

UNIDENTIFIED SPEAKER: But that's -- what that is is saying that twenty people in the United States, regardless of what they're doing, will over their lifetime once that group, all of them, not twenty percent of them, will have died from cancer.

HT12/29 14.076 continued

UNIDENTIFIED SPEAKER: That's from natural cause. Let me comment that the paragraph is unclear. That's what I'm saying, okay. The paragraph is unclear. I know what it means -- what it should mean.

UNIDENTIFIED SPEAKER: Do you have the page number for that?

PUBLIC SPEAKER: Yes, it's on page 533.

UNIDENTIFIED SPEAKER: Thank you.

HT12/30 17.011

PUBLIC SPEAKER: Another comment is you claim here and also in the document of the Savannah River section fully evaluates environmental justice. And I read the two or three pages on environmental justice and there are a lot of facts, there are no conclusions, okay, and -- now, your companion EIS over here, the stockpile maintenance -- stewardship, makes all kinds of erroneous conclusions on environmental justice, okay. But you don't make none. And yet you claim you --

PUBLIC SPEAKER: At least they weren't erroneous.

PUBLIC SPEAKER: Yes, you completely analyzed

HT12/31 15.042

them. The third comment is the comment that a large fraction of the accident analysis is directed towards airplane accidents -- airplane crash dispersing material. And you go through that at Savannah River which is very improbable and low consequence should it happen, and you consider that a bounding accident. I question whether it is in fact a bounding accident for a Class I facility like the P-Area reactor. I don't know that you've analyzed the bounding accidents.

UNIDENTIFIED SPEAKER: The bounding accident was a forklift accident.

PUBLIC SPEAKER: Okay, now then you're coming to

HT12/32 23.034

my next point. It is the conservatism that you put in the bounding accidents are way too conservative. They need to have some credibility even though they are bounding accidents. You can't just assume like the safety analysis does everything is the worse, NEPA doesn't allow that. NEPA says that you will develop reasonable but bounding accidents and I concluded from reading it before Bob raised the question here earlier in the day that the accidents were not reasonable. They were bounding, certainly. You know, I could have said that the guys consume each of the whole -- or inhale the pit and, therefore, that's bounding, but that's certainly not the

HT12/32 23.034 continued

intent of a NEPA process. I find -- the last point that I want to make is probably the more important one to Savannah River and that is that the process for establishing the program for Pantex should be considered to be totally moved to Savannah River Site or should be evaluated as part of the Environmental Impact Statement, not to move 8,000 or 20,000 pits for interim storage to Savannah River Site.

UNIDENTIFIED SPEAKER: When you say the entire program, what do you mean by that?

PUBLIC SPEAKER: The pit operation --

UNIDENTIFIED SPEAKER: Assembly, disassembly operations.

PUBLIC SPEAKER: Assembly, disassembly.

UNIDENTIFIED SPEAKER: That's being considered in the Stockpile Stewardship EIS. We do not --

PUBLIC SPEAKER: I've not seen that as an option.

UNIDENTIFIED SPEAKER: Right, but that's considered within that EIS whether it should be -- that mission should be moved or not.

UNIDENTIFIED SPEAKER: There is a section that talks about the relocation of operations other than storage. When they did that initial analysis of alternatives they concluded that there was only one

HT12 (CONTINUED)

possible place that they could relocate the operations at a reasonable investment and that was for Nevada. That was analyzed but it is not a preferred alternative.

PUBLIC SPEAKER: It doesn't matter where --

PUBLIC SPEAKER: Is this [unintelligible] that it's going to have to take place anyway?

UNIDENTIFIED SPEAKER: Just a second. Let's finish up with this question.

UNIDENTIFIED SPEAKER: We will take your comment and also give it to the Stockpile Stewardship.

PUBLIC SPEAKER: Thank you. I'm going to make the Stockpile Stewardship --

PUBLIC SPEAKER: You don't have to.

UNIDENTIFIED SPEAKER: I assumed so but, anyway, that will be a crosscutting issue.

UNIDENTIFIED SPEAKER: And before we get to your question I just wanted to check and see because we're not -- I might get in trouble with Mr. Barry in a few minutes but we want to continue this.

PUBLIC SPEAKER: I'd like to --

UNIDENTIFIED SPEAKER: Yeah, and we have -- how many people do we have still wanting to provide comments? I just want to get a feeling so I can tell him how long it's going to take? More comments, okay. I just -- good, let's keep going. Go ahead. Thanks.

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HT12/33
14.077

PUBLIC SPEAKER: Work chart is totally confusing to me. And how a dose rate of one rem per year at one meter at the surface of the trailer, why does that [unintelligible] affect the human dose based on geography?

UNIDENTIFIED SPEAKER: This is, again, looking at the shipment of 20,000 pits. So this is looking cumulative dose over however long it's going to take us, okay, in order to ship those pits, those the public would be getting for Savannah River a 3 person rem. The entire public. That's an additive dose.

PUBLIC SPEAKER: That's the transportation dose?

UNIDENTIFIED SPEAKER: Yes.

HT12/34
14.078

PUBLIC SPEAKER: All right, now, what's the natural radiation dose?

UNIDENTIFIED SPEAKER: Background radiation for people it's like a --

UNIDENTIFIED SPEAKER: We have that in the document.

UNIDENTIFIED SPEAKER: -- I believe a milligram.

PUBLIC SPEAKER: From the radon that you're getting sitting here in this room?

UNIDENTIFIED SPEAKER: That's correct.

HT12/35
14.079

PUBLIC SPEAKER: Now, I submit Pantex has a much higher background radiation than Savannah River. Now, you do not say we ought to move it to Savannah River in order

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14.079
continued

to get -- decrease the number of people at Pantex, did you? Get the people out of that god-awful place.

UNIDENTIFIED SPEAKER: Are you saying that this meeting -- you're saying that there is a dose at Pantex that you would average out, for instance, from having those containers at Pantex versus at the Savannah River Site, is that what you're saying because of the background radiation?

PUBLIC SPEAKER: No, I'm saying we ought to decrease the population at Pantex --

PUBLIC SPEAKER: Move over to Savannah River, huh?

PUBLIC SPEAKER: Yeah.

PUBLIC SPEAKER: Sounds good to me.

PUBLIC SPEAKER: I agree. Put that down. Put a double check mark.

UNIDENTIFIED SPEAKER: Moving people from Pantex to Savannah River, right? Okay, we'll get that down --

PUBLIC SPEAKER: Take away the jobs at Pantex and we'll reduce cancers, right.

[Several participants speak at one time.]

UNIDENTIFIED SPEAKER: We won't put the word deplete.

PUBLIC SPEAKER: Talking about aircraft accidents --

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UNIDENTIFIED SPEAKER: But, again, you can also see here when we talk about the risks this is what we're looking at, too --

PUBLIC SPEAKER: Sunday I had occasion to go from Wichita Falls back here and that ASA plane could cause no damage whatsoever to any facility.

MS. FOUNDS: We do look at those things when evaluating an aircraft crash and one of the reasons we don't do it in detail for Savannah River is because, you're right, there isn't a lot of air traffic around Savannah River Site. So, again, you go through a screening process and because you don't have a lot of air -- a number of aircraft operations, you can, therefore, eliminate that as a very credible accident at the Savannah River Site.

UNIDENTIFIED SPEAKER: Okay, Nan, while we take just a second and get some more questions, this comment period goes to July 12th and there are copies of this available for people who have not yet seen it, right?

MS. FOUNDS: That's correct. They are in the exhibit hall. You can just go in and pick those up.

PUBLIC SPEAKER: There are copies of the record -- are the Deferred Action Notification in there?

UNIDENTIFIED SPEAKER: In our document?

PUBLIC SPEAKER: No, somebody --

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MS. FOUNDS: But it's the Federal Register Notice. It's the Federal Register Notice and we can get that to you.

UNIDENTIFIED SPEAKER: Okay, so we need to get you a copy. If we can, make sure before we break up we get you a copy of the Federal Register Notice so. Okay, there's several people who want -- so, Donna, we'll need to get those name before we get out of here. Let's get your names and make sure we get you on a list to get that Federal Register. I think we have cards available to do that.

UNIDENTIFIED SPEAKER: Yeah, if you put it on a card, we'll make sure and mail a copy to you.

UNIDENTIFIED SPEAKER: Okay, now, moving on. Any other comments? Yes.

HT12/36 13.008

PUBLIC SPEAKER: I have a comment. It's a crosscutting issue, it should be brought up in each one. I'm past chair of something called the CSRA Planners Group which means that -- you know what CSRA stands for? The people in the area have a problem with DOE coming in saying that -- what am I trying to say? The State of South Carolina is concerned with any new project coming into the area if Yucca Mountain doesn't come about. And that really has to be addressed strongly. And I've heard it from folks in the governor's office and folks in the

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HT12/36 13.008 continued

area around here that before we can have any of these, that issue should be solved at the policy level, like somebody -- you were talking the policy I think --

UNIDENTIFIED SPEAKER: Of state's concern of moving additional operations here with South Carolina?

PUBLIC SPEAKER: Without their feeling that they will be a dumping ground.

UNIDENTIFIED SPEAKER: Okay.

PUBLIC SPEAKER: And that Yucca Mountain should be the dumping ground or whatever, but it's -- the issue is let's not have it stop here, and each one of these projects should be looking at the waste issue and even DWPF is not suppose to have its glass containers stay here. So that's something that has to be stressed somewhere as a crosscutting issue. I know it's not unfamiliar with you-all.

UNIDENTIFIED SPEAKER: But across all three or what -- across many, more than the three, okay. Okay, thank you. Other comments, questions, concerns? Anybody want to make a statement on the record?

PUBLIC SPEAKER: How do the people at Pantex feel about this?

MS. FOUNDS: Well, there is a large group -- we -- let me go back to our scoping.

UNIDENTIFIED SPEAKER: You want Bob Juba

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(phonetic) to answer?

UNIDENTIFIED SPEAKER: Yeah, I can do that but -- okay, what is it?

UNIDENTIFIED SPEAKER: Yeah, Bob.

UNIDENTIFIED SPEAKER: The people at Amarillo and the Panhandle are very supportive of the operations at Pantex. Plutonium's been at Pantex for over forty years and, you know, weapons were a pit form. Support is unanimous among local elected officials, state elected officials, federal elected officials. Public opinion polling places Pantex is supported around 80 percent, so overall the support for those continued operations is there.

UNIDENTIFIED SPEAKER: Thank you, Bob.

PUBLIC SPEAKER: I have one other -- it's a question. I don't know the answer to it, but I found nothing in the EIS that addressed the aging of a pit relative to what happens as a pit goes from 35 to 50 years. You talk about a ten-year window, even the ten-year window is not clearly described in my way of thinking in the EIS.

PUBLIC SPEAKER: And in specific, related to that, when you look at the impacts of releases and pit failures, are you taking into account the aging of pit stockpile increasing the probability or the frequency of

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failures?

PUBLIC SPEAKER: You know, that's basically where I'm going. You know, but the question -- I've heard it stated and certainly it is a case based on experience that the pits are good at peace. You know, you can store the material in there. Certainly our experience today, that's been the case. What are we estimating to take place in those units as they continue to age that would influence or cause increased frequency or increased consequence of damage? Oxidation or growth, grain growth or --

MS. FOUNDS: Okay, but one of the things is, of course, those things are sealed containers, so you're trying to not expose it so that you don't have, as you call, the growth and things like that. They were part of the vulnerabilities in that study that we done. But there is a surveillance program that is established by the laboratories to look at these aging effects and to pull containers out, open them up, look at the pit, you know, ship them back to Los Alamos for some testing and things like that. So there is an active evaluation program and it is described as part of the Pantex piece of this document that that surveillance activities are going to continue.

PUBLIC SPEAKER: That certainly has been the

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HT12 (CONTINUED)

case in the past when we talk about them as part of the war reserve. They are no longer, some of them, from the answer that I got to my question this morning which was surplus and which were not. They're going to be stored brother and sister right there beside each other. I doubt that the 2A program that's been set up for the weapons is going to continue to look at surplus materials as thoroughly as they're currently looking at those things they might reuse.

UNIDENTIFIED SPEAKER: Sandia is actually setting up a program by which they are going to -- and have certain milestones, et cetera, to polling those, doing a random sample of them in order to evaluate the effects of having those storage. And so there is a QA program in place for that -- will be in place for that material.

PUBLIC SPEAKER: I hope that you will in your final EIS talk to this issue, talk to and commit to whatever happens if Sandia's work finds that they are deteriorating, what do you do?

UNIDENTIFIED SPEAKER: Thanks, that's a good point.

PUBLIC SPEAKER: I have some comments that I'd like that are more crosscutting --

UNIDENTIFIED SPEAKER: Okay.

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PUBLIC SPEAKER: But rather than jump around from room to room, I'd like to make them here, if that's -- is that okay?

UNIDENTIFIED SPEAKER: Sure.

UNIDENTIFIED SPEAKER: Yeah, that's fine and we'll share the ones you --

UNIDENTIFIED SPEAKER: We'll get them to everybody. We'll share them in the session when we get a chance.

PUBLIC SPEAKER: I'm not here to give a class. I'm not going to use all these but I thought I would -- and Lee has heard some of this with future environmental uses and all that so he can go onto the next one.

UNIDENTIFIED SPEAKER: Are you going to leave us a set of these?

PUBLIC SPEAKER: Yeah.

UNIDENTIFIED SPEAKER: Okay, great.

PUBLIC SPEAKER: This is a modified presentation that I gave the federal planners of the American Planning Association, and I'm the immediate past chair of the Federal Planners Division. Two weeks ago we got all the federal planners together from the Navy, the Army, DOE wasn't there as much as we would like, but anyway we had a few of the folks and we looked at future uses, that was just one of them. So I'm not going to go through the

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whole thing. What I want to do is if you-all will skip past the situation, this is the main point I want to make, okay, that environmental uses -- since this is a NEPA, National Environmental Policy Act, we can expand environmental uses on federal facilities. And now I'm talking more specifically to SRS without affecting current missions.

It's my view that we can take all three of these missions and not hurt any of the environmental uses, and I'll get to that. However, you're going to need thoughtful planning. You just don't throw these things in there as you all know. And I showed a little version of this somehow, let's see. This is the way environmental planning, this is from NOSS in 1987, this is how environmental planning used to be where you protected a core of the environment, okay. And then as you went out the use intensity increased. And then as you go into the -- I call it the target, okay, as you go into the target, protection increases. And that's a pretty basic way of doing environmental -- or doing planning, excuse me.

However, at federal facilities, I haven't been to Pantex so I don't know, but I've been to Hanford, Oak Ridge, Los Alamos, a lot of the labs. But let's look a the bigger ones like Hanford, SRS and Oak Ridge. You've

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got -- imagine on this map that is in that baseline report and say this is the Savannah River Site. Obviously, it's not a circle, it's got the little tail down here, but the major industrial area and say P-reactors right over here, right on the edge of it, okay. That's where you-all are thinking of putting your uses. What you can do is have that but also on the outskirts, the first buffer zone, the first part of this target, you can have types of recreation, research. This goes with this National Environmental Research Park concept that Dr. Fiori's looking at, the NERP concept you can have here. You can even have some sort of forestry or forest management. We can even have red-cockaded woodpeckers which we have onsite. Our big issue, we've got several other threatened endangered species but, anyway, in that area. Then as you go to this final one, and out here it's just farmland, okay. We've got one little town of Jackson over here and Barnwell's over here, but most of it's farmland. You can have more active environmental activities happening. Even public education. We have five or six thousand people that come to the Site per year. That can be -- my contention is, again, that it can be increased. And I just mentioned basically what the environmental uses can be, a lot of technology demonstration. Even associated with these projects that are coming we can demonstrate

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ways of reclaiming environmental -- or reclaiming land back to "clean level". Natural resource land, but again I mention these, too.

PUBLIC SPEAKER: I had a question about the --

PUBLIC SPEAKER: Yeah, sure.

PUBLIC SPEAKER: -- the previous slide.

PUBLIC SPEAKER: Oh, yes.

PUBLIC SPEAKER: I was -- I didn't quite understand what that was saying. My view of the way the land is used is that the closer you get to the core nuclear facilities and the nuclear materials the protection increases. I've always felt that way. And that arrow shows that it's just the opposite. And I would be concerned if people might get the impression that --

PUBLIC SPEAKER: That's a good point.

PUBLIC SPEAKER: -- that the protection is good.

PUBLIC SPEAKER: Different kind of protection, environmental protection, okay. The protection that you're talking about is --

PUBLIC SPEAKER: All environmental protection.

PUBLIC SPEAKER: -- safety security.

PUBLIC SPEAKER: Okay. I see.

PUBLIC SPEAKER: I'm talking about multiple environmental uses, but, yeah, I didn't mean to make it like Wackenhut is stronger out here and not here. That's

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our protective guard.

PUBLIC SPEAKER: Chris, help me get to where you're trying to get to relative to these EISs.

PUBLIC SPEAKER: What I'm saying is that Savannah River --

UNIDENTIFIED SPEAKER: I hear what you're saying in terms of the program, but that's --

HT12/37 04.005

PUBLIC SPEAKER: Savannah River can take these projects and it won't affect the environment, okay. As a matter of fact, if you use a careful planning you can take these projects, put them in the core, we've got 310 square miles, put them in the core and even increase environmental activities in these four or five areas. Does that help?

UNIDENTIFIED SPEAKER: Yeah, the message I think is --

PUBLIC SPEAKER: That's about -- I'm sorry, that --

PUBLIC SPEAKER: -- is Savannah River has the capacity to do those.

PUBLIC SPEAKER: Let's develop it.

PUBLIC SPEAKER: That point is great for me 'cause I --

PUBLIC SPEAKER: Yeah, I'm sorry, yeah. You know -- these come from the Citizen's Advisory Board.

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Land-Use Technical Committee, my research and a group for Environmental Justice, the Environmental Advisory Committee which is a group of scholars that advises the Site. So what I did was I took them and thought it was smart to get it into the record at least that we're saying the boundaries should not change. That doesn't matter too much to what you-all were talking about. However, this is what I'm talking about here is that we should have -- we should keep the Site industrial. This goes back again to what Lee's question was, and this is why that we may need it for future projects. SRS is unique and we can go into that, but it -- and I don't want to get into Pantex versus SRS. But it has a lot of unique characteristics. I won't get into that. I mentioned this, I mentioned this, I mentioned that and that. So it's basically, this is the bottom line on recommendations.

PUBLIC SPEAKER: I have a question on that one, too.

PUBLIC SPEAKER: Yes, sir.

PUBLIC SPEAKER: Natural Resources Management. What are the opportunities for public involvement in the way the resources are -- the natural resources out there currently are being managed?

PUBLIC SPEAKER: You mean how do they --

PUBLIC SPEAKER: I get the impression that the

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timber industry is out there well represented. What's the representation vehicle for the public right now?

PUBLIC SPEAKER: On the public, it has something to do -- Natural Resource Management means cutting trees, yes, but it also means setting up red-cockaded woodpecker colonies. We started -- when I started this particular job, four years ago we had fifty birds. Now we've got eighty-some and we want to get to 450 birds.

UNIDENTIFIED SPEAKER: Chris, I think the issue is I think that you do have other federal agencies like the Forest Service, the Official Lawn Service actively participating in Natural Resources Management at Savannah River.

PUBLIC SPEAKER: Yes. South Carolina D&R manages the hunting out there --

UNIDENTIFIED SPEAKER: So you can get involved.

PUBLIC SPEAKER: Yeah, you can hunt. You can't fish because of possible contamination. Is that the sort of thing you mean? I mean --

PUBLIC SPEAKER: No, my question I think was slightly different. What are the -- I don't see similar discussion opportunities for those issues with the public. I know that perhaps with the Citizens Advisory Board you're saying that there is some of that, but largely it just seems that the timber industry is very well-

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represented in terms of how that land will be used. It's quite a resource.

PUBLIC SPEAKER: Well, there's a lot of research there but if the average Joe or Jane that wants to come in there, they can come in and hunt. They can -- we're trying to open that up so they can come in and look at the endangered species and the cultural resources and that sort of thing, the archaeological resources there that are -- what happened in 1950 is the Site just stopped being seven communities and there are all sorts of resources there and have been built -- the forrest land's been built up and the cultural resources weren't destroyed. But as far as public access to those avenues, we're trying to increase them.

PUBLIC SPEAKER: What's your guess as to when things may open up?

PUBLIC SPEAKER: I'd say in the next three to five years I think they'll open up. And talking to these other federal planners that's the -- those are the trends to open up these sites. And, finally, federal facilities but SRS -- too often we talk about these things as liabilities. We call them waste sites, they're contaminated and, yes, some parts of them are, but 310 square miles of Savannah River Site or 562 miles at Hanford are not contaminated. So we should see them as

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environmental assets, not just economic assets.

UNIDENTIFIED SPEAKER: And that's all sites?

PUBLIC SPEAKER: Yes.

UNIDENTIFIED SPEAKER: Okay, thank you, sir. I appreciate that. And thanks to everybody for being flexible in these abbreviated sessions but I wanted to go ahead, and any other comments or questions at this point? The one session I know has broken sometime ago. The other one is, I think, winding down next door. You're more than welcome to stay for this session. Nan, you had a couple --

MS. FOUNDS: I just wanted to make sure. You can give us additional comments, also. There is faxes, we have a fax number out there. We also have a hotline if you have additional comments that you'd like to make --

PUBLIC SPEAKER: We can call from here, right?

MS. FOUNDS: -- after reading these. We also have an E-mail address so if you happen be able to E-mail them that way, and did I miss out on any of the --

UNIDENTIFIED SPEAKER: Well, we've got phones that they can actually call in.

PUBLIC SPEAKER: You'll allow me to write you a letter, won't you?

MS. FOUNDS: That's right. You can write -- well, that's okay, too.

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PUBLIC SPEAKER: That's one of those options.

MS. FOUNDS: I would sincerely like to thank everybody for participating. This has been a good discussion. Thank you.

UNIDENTIFIED SPEAKER: I appreciate it and come back and join us again. Thanks.

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Comments omitted from intervening pages here do not concern this EIS.

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highlights. I was hoping to make it three or four, but I couldn't have done that. Any other comments regarding that? You're very observant, by the way. Now, I know there's at least one comment to be made.

PUBLIC CITIZEN: Basically this is a very brief comment. We are from Savannah, Georgia, representing the concerns of our citizens. There are two things that we want to bring to the attention. And we've already mentioned one, and that is there really needs to be beyond an outreach effort to minority communities to bring them into this process that is leaning toward decisions that they will have to live with for some time to come. Outreach in the forms of radio announcements, TV advertisements, brochures and the like are not enough because they're simply announcements. And then you in your busy schedule as an African American working and trying to be an active part of your community trying to make decisions, can you take the time off to come to this meeting that starts at eight o'clock in the morning. Other reasons why we do not have more people with us that should have been here this morning is because we could not get them professional leave to attend this meeting. If they were going to take a day off of their jobs, they would have been penalized not only monetarily, but they were going to be written up by their supervisor because it

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was deemed that this was not an important part of life, nor was it related to any part of their jobs.

So it is incumbent upon the Department of Energy at the Savannah River Site to try to think through ways of going beyond the cursory outreach at this, to bring particularly downstream communities and rural communities into the roundtable discussions that are going on in the name of public involvement. Beyond just talking to them there also has to be a strategic effort that is launched that will begin to train these communities in the information, because it's not enough for us to come to the table and politely nod. We want to be able to contribute substantively. In order to do that we have got to build a base of understanding amongst not only the "minority populations" which I hope they'll move from using that term to perhaps people of color or effected communities because it's not only affecting African-American communities, it's also affecting low-income communities.

We also want to see the analysis take into consideration the exposure of low-income or affected communities to not only what the operations are at the Savannah River, but those industrial entities that's also exposing those communities to chemical hazards. To be able to assess if there is a result or an impact from those combined exposure to exposed to what's going on from

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SRS, exposed from what's going on at Piedmont or [unintelligible] because that's very important to us.

We do not want to come to another meeting where there isn't a substantial representation if it's held in North Augusta or Augusta without the black community being here because we feel that you cannot continue to make these decisions without our input and still live up to the requirements of NEPA. And in addition to that, we have read the NEPA regulation and our understanding is that it calls for the involvement of local elected officials, which is a component to us that's very important, and we have not been able to somehow register that with the Georgia side. I don't know about the South Carolina side. And we feel that it's very important. So to the extent that DOE and SRS can begin to filter this information to our city councils and our county commissioners and encourage them to be involved, it will be very helpful to us, because there seems to be a disjuncture between the citizens of Georgia and the government that's running Georgia and its relationship to DOE because the Site does not sit in Georgia, it's in South Carolina. But there are two things that are a consideration for us: it's, one, that the waterways from Savannah River Site end up in Georgia, and the other one is that so much of our work population works at the plant and they have to come home

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to the families, and so there is that intimate relationship there. So we hope that these things will be noted in the comments.

And finally, it is almost a disservice to us who are just regular people to ask us to wade through 1875 pages of the Disposition and Storage EIS and then 1465 pages of the Stewardship Stockpile and then 1233 pages of the Pantex. That is just horrendous because you must take into consideration that in a lot of these communities the reading level is at third grade standard. And so if we have to go through all of this, it's really cumbersome, let alone just outright difficult. And so we've got to find ways to get this information into the heads of laypeople where they can understand it, interpret it and translate it, and then be ready to give an intelligent response as well as to raise the kinds of questions that will help us to understand the whole picture, because right now we're neutral people. We're not pro this or anti that. We know that we're pro help and we know that people must have jobs, but we don't want the two just oppose against each other. And then we want the facts not only from DOE but reputable, independent scientists that we can trust and rely on as well.

MR. LAWSON: Thank you very much. We appreciate that. Is there anyone else that has a comment that

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anybody can make or questions to ask? Any DOE people have anything that you'd like to add? Okay, this person over here.

PUBLIC CITIZEN: My name is Arthur Smith and I'm from Augusta. I live in this area and I'm also from the impacted area called Hyde Park. But I also have been working hand in hand with Dr. McLane and the organization Citizens for Environmental Justice. And I just wanted to put another pin in that point about people coming out and start inputting at these meetings, because it's important to us, too. And there's got to be another way to get word out to them because like Dr. McLane was saying, we feel with our heart but we've got to live with the situation once it's here. But we all need to be at the table together, you know. We don't want the situation to be where it was when Savannah River Site was built. We understand the urgency then to make the nuclear bomb and now we have to deal with what we have here.

I just want to say that we are interested, but like Dr. McLanie said, a lot of my friends wouldn't come because of the work situation. More will be here at six o'clock. But you need to get another word put out to let them know there's other people, because we are people, all of us, and we want input from people with color. Thank you.

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SPEAKER: Thank you. Anyone else? There's a comment up here.

PUBLIC CITIZEN: I don't know how many SRS employees are here, whether it's DOE, Westinghouse or some of the other contractors and subcontractors. But as I said earlier, I took my day off to come here as a private citizen and speak. And I happen to be living in Georgia. I agree with Mildred where she says that let's concern ourselves with Georgia. Thirty/forty percent of the people that work at SRS are Georgia citizens. But there's another unrepresented group here as well and I think that's employees that work at Savannah River Site. And, for instance, we were told -- you said you found out a week ago. There were --

PUBLIC CITIZEN: Well, not quite --

PUBLIC CITIZEN: There were ads in the paper. We got an E-mail yesterday that said if you'd like to come to this, come at six o'clock or come on your own time. And I think over the last 45/50 years the employees, and a lot of them are retired in this audience as well, have put out an awful lot of work and sweat and blood and it would be good if we, since we're being all-inclusive here, to maybe bring them in. Have DOE find some ways to bring in their own employees and contractor employees and say, look, this affects you. I know you've got bowling and I

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know you've got your jobs and I know that you've got church work and that sort of thing, but this really does affect you. And maybe even to the point of having meetings on the Site like when Secretary O'Leary came when they had selective people talk with her. This affects them more than Secretary O'Leary coming to the Site. There's future uses and future missions and environmental problems and health problems. And I think it would be a disservice not to include all the employees, because the outside world sees SRS employees as SRS people. They don't know whether you're DOE. They don't know whether you work for Brown & Root or Westinghouse or whatever. So I think while they're including everybody here, let's think of the employees as well.

MR. LAWSON: Thank you very much. Any other comments? Well, let me just add a few things in closing. First of all, from my own perspective and certainly from the Department, we all appreciate your taking the time off you did today to come and making your comments and giving the input that you have. I think we can safely say that with all notetakers and court reporters it has been duly noted. As I indicated before, all these comments become the basis for a public response document which will respond to all the comments that have been made and all the meetings that have been held. Second, I would like to

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remind you that there is a meeting as you -- nice transition -- there is a meeting this evening between 6:00 and 10:00 or 11:00 in which you're invited to come back. The program will be basically the same. Whether we break into small groups or large groups will all be determined by the amount and the size of the people -- the group of people, not the size of the people, the number of people who are here.

And I also just want to remind you again that the comment period is coming to a close on Material Disposition and Stockpile Stewardship. Those comments should be in by the 7th. The other, Pantex, goes until July 12th. And there are other ways, there's the phone, fax, electronically mailed. You can write them down and send them by mail or phone or whatever you want to do, whatever is most convenient to you. And I hope that you take advantage of that.

By the way, is there anything else -- there are feedback forms that if you haven't filled out, if you would fill those out before you leave that would be good. And those written comment forms are also there in case you have some written comments you want to send in after this meeting. Yes, sir.

PUBLIC CITIZEN: Based on the amount of comments coming from a particular area, let's say for instance from

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HT12 (CONTINUED)

Savannah --

MR. LAWSON: Yes.

PUBLIC CITIZEN: -- if we were to rally up a 100,000 votes -- I mean a hundred thousand people to actually call in and write that we are in -- that we oppose any type of new facility being constructed on the Savannah River Site or anything -- as a matter of fact, I'm in favor of opposing the whole site and I believe consolidate it at another site.

MR. LAWSON: Right.

PUBLIC CITIZEN: But if there was, say for instance, a 100,000 people from Savannah called in at the DOE Department or faxed the information in, how effective is that going to be for ROD or the Record of Decision?

SPEAKER: Well, I can't answer that. I'd say that somebody -- you'd get somebody's attention if you had 100,000 of them --

[Several participants speak at one time.]

MR. RUDY: No, I think if you could get that many the phone lines would be certainly busy. But the Secretary would understand as the ultimate decision maker, she'll understand not only the comments from this session but from all the other sites that we have. In fact, that's a part of her decision process, to get briefed from us on what we hear, what we learn, what the extent of

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these comments are and what the people feel. So the Secretary would be exposed and have an appreciation of that. So if there were lots of calls and lots of letters and lots of faxes, she would see that.

PUBLIC CITIZEN: Well, I hope they ain't quoting it like that paper that -- I don't see it. There was a -- what was that paper she had where --

MR. LAWSON: Oh, the advertisement for this one?

PUBLIC CITIZEN: Well, all the arrows pointing from the one for the public should be straight down to the bottom and everything for the Record of Decision is coming from DOE. You know what I'm saying? So I mean that's the reason why I made that -- I asked the question that I asked.

MR. LAWSON: Very good point. And another question or comment?

PUBLIC CITIZEN: The gentleman that just spoke, I resent his statement about transferring everything to some other area. I would like you to briefly state what his position on it.

MR. LAWSON: Well, that's up to him. If he'd like to, that's fine.

PUBLIC CITIZEN: Okay, that's all right. That's all right.

MR. LAWSON: The gentleman was asking you if you

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have a preferred site that you would like to see stuff go to. It's up to you to answer if you'd like; if you don't want, that's fine.

PUBLIC CITIZEN: Well, according to the Summary, I would think that Oak Ridge would be one of the preferred spots. I mean if the decision was being made -- was made by [unintelligible] Pantex, but not here at Savannah River Site. Maybe because low income people or people of color are definitely at risk and that is one of the main reasons why I'm here. Now, if there was any other community like such as native Americans, then this audience would be full of native Americans, okay. So because they are not at risk at this particular point in time, then I'm here because I have a daughter and I have a family. And you-all stated in here that people from low income are definitely at risk. It's nothing that we said. This is what you-all said. So that's the reason why I said let's move Savannah River Site to Pantex or Oak Ridge or the West or anyplace else besides here.

PUBLIC CITIZEN: Let me just put a little tidbit on that and that is that we do not want to fall into the syndrome of not in my backyard but in yours. So what we've got to consider is what is going to be the impact if it's in anybody's backyard and how do we make it in such a way that we minimize the risk to the workers, their

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families and the communities because I know if I call up Juan Montez [phonetically spelled] out at Los Alamos and tell him that we in Savannah are going to send it over there, I know the people who run the [unintelligible] festival and who live near Oak Ridge, and we're talking about [unintelligible] they're going to say, well, how did you do that.

So I understand the point because we're looking at how it's written up in the summary documents and how you've analyzed the impact when you say, okay, there will be an adverse effect -- a disproportionate impact on low income and minority populations. But the humanitarian that I am, if it's going to kill rich, white folks, I'm opposed to that, too. So we've got to figure out how do we deal with this in such a way that we minimize the risk to human beings and our health and environment.

MR. LAWSON: Okay. Thank you very much for that comment, and thank you all. And I appreciate it very much. We will reconvene another session at six o'clock. Thank you again for coming.

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HT12 (CONTINUED)

Comments omitted from intervening pages here do not concern this EIS.

PANTEX SITE-WIDE EIS

QUESTION AND ANSWER SESSION

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MR. LAWSON: Okay. That was a quick analysis. Is there -- are there any questions or comments that folks would like to make? Back on the left-hand side.

PUBLIC CITIZEN: A quick question. I just want to make sure that I'm clear and everybody else is clear. The pits that are discussed in this EIS, are those strategic reserve or is there a mix between strategic reserve and surplus or what?

MS. FOUNDS: Right at the moment these are the ones that are coming from the dismantlement operations and they're not divided into strategic reserves or surplus. Right at the moment we're considering that all the same material.

MR. LAWSON: Anyone else? Yes, right over here.

PUBLIC CITIZEN: Could you explain again the basis for the current limitation of the 8,000, I gather it was, pits that you're allowed to store? Is that a state limitation or DOE imposed or?

MS. FOUNDS: That was DOE imposed. We had done an environmental assessment for the storage at the Pantex Site through citizen participation. They wanted us to look at that in greater detail in terms of -- you know, they wanted us to look at effects on the aquifers out there, et cetera. So it was a negotiated position. And we have about 6,000 in storage at the time. There were about -- at a rate of 2,000 dismantlements a year nominally, and it would take us about three years to do an EIS. So that was how the 12,000 was arrived at. It wasn't because there was, you know, a jump or anything else in terms of accidental risks.

MR. LAWSON: Any questions or comments? Anything further? Okay. Let's now move on to Storage and Disposition.

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HT13

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U.S. DEPARTMENT OF ENERGY

COMMENTS ON SWEIS FOR
CONTINUED OPERATION
OF PANTEX PLANT AND
ASSOCIATED STORAGE OF
NUCLEAR WEAPONS COMPONENTS

PUBLIC HEARING
ON THE
ENVIRONMENTAL IMPACT STATEMENT
ALBUQUERQUE CONVENTION CENTER
ENCHANTMENT ROOM
ALBUQUERQUE, NEW MEXICO

May 7, 1996
3:00 PM

KATHY TOWNSEND COURT REPORTERS (505) 243-5018
1005 LUNA CIRCLE, NW, ALBUQUERQUE, NM 87102

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approached Kirtland and said this was something that they were looking at and were proposing, the sitewide EIS and the process that goes along with it. I was nominated by the base to be the base spokesman.

What we have done so far is per the direction of the Department of the Air Force and delegating that down to Air Force Material Command, which is our headquarters in Dayton, Ohio, they said that we are authorized to participate in the study, i.e., answer the questions the Department of Energy has concerning capabilities, good points, bad points, et cetera, at Kirtland Air Force Base and how they apply to the needs of the Department of Energy.

Do you have a question for me?

UNIDENTIFIED SPEAKER: Were there other Department of Defense sites that were assessed in this EIS?

MS. FOUNDS: No, there were no other Department of Defense sites that were assessed in terms of the EIS.

UNIDENTIFIED SPEAKER: Is there a reason for that?

MS. FOUNDS: We went through a selection process, and as part of that, we sent our selection process over to the Department of Defense, they

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evaluated that and recommended essentially two sites to us, that being Seneca Army Depot and also Kirtland Air Force Base. The Air Force responded that they would become a cooperating agency, and at the time, Seneca was going through part of the process. As part of that process, they were selected for closure and are in the process of disposing of the base.

The Department of Energy could not say that they would absolutely use that site. We needed to do this EIS because of that, and we responded that there were other sites that we had that would fulfill the missions for this particular -- for the storage and as such did not consider Seneca Army Depot as part of that. In our EIS, it does go through, and it explains the process that we used.

UNIDENTIFIED SPEAKER: I have a number of questions that I hope the major can answer or maybe Nan, and it relates to part of chapter 5 of the document, which is the basic environmental analysis about Kirtland. Let me just go through a few things, and any time anybody else wants to jump in and ask a lot of questions, please feel free. I don't necessarily need to monopolize time.

HT13/1/2
01.007

I guess I want to understand a couple of things. The document talks about the 120-odd bunkers

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HT13/1/2
01.007
continued

and, then it talks about the 41 that are actually in the mountain, and on 555, it says that more than 30 of these 41 magazines have a minimum overburden of 9 meters, and 6 pages later, it says 35, so I just first want to get some clarification about the bunkers that we are talking about.

How many are there, and is the position -- and Nan may be able to answer this as well as the major, is the position that if storage happened at Manzano, only the bunkers with at least the minimum 9-meter overburden would be used?

MS. FOUNDS: Yes, I believe that that is the overburden that we considered for the accident analysis, so we are really looking at putting those within that area.

HT13/1/2
01.007
continued

UNIDENTIFIED SPEAKER: So how many of the 41 actually meet that standard?

MS. FOUNDS: I believe it is 35, but I can check on that. Cliff, can you --

MR. JARMAN: I'd have to check.

MS. FOUNDS: It was my understanding that it was 35.

UNIDENTIFIED SPEAKER: In my reading of the documents, I am unclear.

MS. FOUNDS: We will take that and look at

HT13 (CONTINUED)

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those.

HT13/3
03.001

UNIDENTIFIED SPEAKER: The document also says that construction began June, '47, and became operational in April of '50, so that would essentially say that the bunkers we are talking about are more than 45 years old. My specific question is what is the design life of those bunkers?

MS. POUNDS: What we did was, and I can let you answer this question, but we looked at that in terms of looking at the designs of the facilities, and we felt that it was adequate for the storage of those facilities. There may have to be some upgrades that go along with that and inspections of those facilities prior to becoming operational for this activity.

MR. MARTIN: Just to amplify a little bit what Nan said, when they came to us with questions, what we did was we identified to them that these bunkers are not -- they are 45-plus years old. Some are perfect. There are some upgrades, some rework that is going to have to be done. As far as an absolute, this is the design of them, and I have seen nothing to indicate that.

UNIDENTIFIED SPEAKER: I have a question

HT13/4
05.021

related to Don's question. In the EIS, it doesn't show that there are the three faults that go through

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HT13/4
05.021
continued

this stupid mountain, and yet, it is well documented on many geologic reports that there are three major faults that go through the Manzano weapons storage facility.

My question, as is Don's, is if these facilities are 45 years old, they obviously were not built with the current technological skills that go along with earthquake-type design. To me, that is a major concern. Also, my concern is -- I love it. You guys always put the stuff on the east side of the mountain so it goes to the Manzanos. We really object to that heartily, you guys. Put it in Four Hills.

UNIDENTIFIED SPEAKER: Were you going to add some more?

MS. POUNDS: Go ahead.

HT13/5
03.002

UNIDENTIFIED SPEAKER: I guess that the design question is an important one. I think from a variety of standpoints, so my request would be that we get some more detailed design and engineering analysis of the bunkers in terms of design life, design capability. The major had said some of them need to be upgraded. It seems to me we need to have more specific information on those things.

I didn't see any references in the document that give me that kind of detail, so if I have missed

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HT13/5
03.002
continued

it, I'd like somebody to tell me if there is a document that describes it. I'd like to know what it is. If there isn't a document that describes it, I'd like to know how that information is going to be presented.

MS. POUNDS: We can certainly look at the additional information or information that we think we could get ahold of. The one thing I'd like to point out is that the AT-400 is a fairly substantial container, it is a certified shipping container, and that is what these pits would be put in. When you talk about an earthquake environment, the earthquake probabilities and things like that are still fairly low for this area, and I will let Cliff go over that in greater detail.

The other thing is that if you have an earthquake out there, and you have the mountain come down, essentially, you have a very nice sealed area and probably would not have a release of plutonium under those kinds of conditions.

UNIDENTIFIED SPEAKER: Have any cost estimates been done on the required rework?

MS. POUNDS: No, they have not, and that has been identified that we need to be doing some cost estimates, but it has not been done at this point.

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HT13/6
01.008

UNIDENTIFIED SPEAKER: I am interested in knowing, since there are 41 identified bunkers in the mountain, and 20 or so, up to 25 could be used if all 20,000 pits would come, what is the present and continuing mission for the other nearby bunkers? What would be in them? What would happen to them? What effect does storing pits have on those bunkers? What might be in the other bunkers that could affect the mountain and the pit storage?

MR. MARTIN: The bunkers -- all different types of bunkers at Manzano are currently being used by a number of different groups. For example, the Department of Energy, Sandia National Laboratories has some bunkers. We have some bunkers that are under the control of Phillips Laboratory. We have some, as I recall, that are Los Alamos National Laboratory's. There are numbers of people who are using the bunkers right now who are using them where their presence is allowed.

One of the things that we identified in the process was the issue of compatibility. If a decision is made that pits are going to, in fact, be stored at Manzano, we need to look at the relocation of the current tenants. We need to look at what they have got in there, and there are any number of things, and

HT13 (CONTINUED)

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there are some operational activities that are going on there right now by Phillips Laboratory.

You would have to actually talk to Phillips Laboratory for that type of information, but it is a real concern about where would the current tenants go to? What are their actual requirements? There also are concerns about what sort of buffer zones would be required from the bunkers and so forth, and those are all questions that are going to have to be answered in the future.

HT13/6
01.008
continued

UNIDENTIFIED SPEAKER: Are they going to be answered in the context of between now and the time of the final EIS?

MS. FOUNDS: In terms of that, that would have to be if the Department decides to relocate these things to the Kirtland Air Force Base, then the negotiations would have to begin, and memorandums would have to be written in order to co-locate these with other activities that are on the mountain. That would be worked out once the decision at headquarters was decided that we wanted to place it in the Manzano Mountains. There are a lot of operational concerns that would have to be worked out at that time.

UNIDENTIFIED SPEAKER: Since you brought up the memorandum of understanding or agreement, let me

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ask a couple of questions about it. The document doesn't seem to make clear whether if Manzano was used, they would be under DOD or DOE control.

MS. FOUNDS: They would be under DOE control.

UNIDENTIFIED SPEAKER: So the memorandum of agreement would be between DOE and who?

MS. FOUNDS: DOD.

UNIDENTIFIED SPEAKER: DOD or the Air Force?

MS. FOUNDS: It would have to be through DOD, and it would also have to be with the Air Force Material Command. They are actually the cooperating agency in this action, the Air Force Material Command, because they are the ones that possess the base or own title to it or whatever you wish to call that, so it would have to be through the DOD and through the Air Force Material Command.

If there is anyone else who wants to ask a question, please raise your hand, and we will be happy to turn the floor over to you and then turn back to Mr. Hancock.

UNIDENTIFIED SPEAKER: Let me ask a couple more questions, then there may be a natural break for folks to come in. I'd be very interested, and Ann has already mentioned the earthquake issue. Another thing

HT13/7
06.038

13

HT13/7
06.038
continued

is the water and the springs in the mountain. Dry as it seems all around here, particularly when we don't have any rain, there is actually water in the mountain. There is an intriguing sentence on page 5-59 in the document that says some magazines show evidence of water intrusion.

I am interested in knowing to what extent the water intrusion affects any of the 41 in the mountain and how many of the ones that potentially -- well, let's start with that. How many of the 41 are affected by water intrusion?

MS. FOUNDS: When we were looking at records, there were several as to activities in each of the bunkers. There were two identified of all the bunkers that had some water in them, and it was Phillips Laboratory's, and they own it for their purposes, so there were only at that time identified that there were two.

We went through several of the bunkers in terms of looking at them for part of our evaluation criteria, and the ones that we went through were in good shape, but again, to make these things operational, we would have to look at some of those criteria.

HT13/8
06.039

UNIDENTIFIED SPEAKER: Do you know what the

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HT13/8
06.039
continued

causes of the water intrusion in the two were? Is it water source? Is it flaws, engineering flaws, or cracks in the facility, or why is it and how is it that the water came in? The obvious follow-up is how do you know that there won't be similar problems in any or all of the other 39?

MS. FOUNDS: Again, it was sort of my understanding that this was from some rain events, and it could have been either around the doors out there and things like that, but anyway, this would have to be considered before they were made operational and certified for operation.

UNIDENTIFIED SPEAKER: Let me ask the specific question, has there been any study of what the cause of the water intrusion in the two was?

MS. FOUNDS: No, there has not that I know of.

HT13/9
22.003

UNIDENTIFIED SPEAKER: I guess I have probably one more on this subject, and then I will let some other folks in. One of the issues that a lot of us are concerned about when it comes to pits, wherever they are, is the availability of not only local and state inspection of these facilities but international inspection.

A lot of concern about pits both here and in

HT13 (CONTINUED)

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HT13/9
22.003
continued

Russia and in other places is folks want to know how they are handled to make sure they are not being misused, reused, put back in because these are, after all, supposed to be surplus pits that are not supposed to be for weapons anymore.

MS. FOUNDS: They are supposed to be what pits?

HT13/10
22.004

UNIDENTIFIED SPEAKER: Surplus pits. Pantex is a CERCLA site, but Sandia isn't yet. The question though is how would international inspection be accommodated at the Manzano site, that is both at presidential directive in terms of the nonproliferation policy, and it is also something the rest of us are interested in, so I am interested in knowing how the access and accessibility of the site would be for international inspection.

MS. FOUNDS: In terms of that, at Pantex, the pits themselves are not inspectable, and that is something that the storage PEIS is really looking at in the long term. We did not look at that for the near term because, of course, you are going to have to meet certain criteria for the inspectability of that material at that time, but we did not look at that as part of the interim storage process.

HT13/11
22.005

UNIDENTIFIED SPEAKER: So you don't know

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HT13/11
22.005
continued

among the five sites which you have shown if there are advantages or disadvantages from an international inspection standpoint?

MS. FOUNDS: As I said, again, that was not something we evaluated as part of the site selection process. We are doing this for interim storage, and the pits are not inspectable, if I could say in that time period, so it is really the long-term storage and ultimate disposition that is looking at those in those kinds of issues.

HT13/12
22.006

UNIDENTIFIED SPEAKER: Just to be clear, the pits, for whatever interim period of time they are at whatever facility they are, need to be inspectable. That doesn't necessarily mean that somebody can come in and physically look at the pits. There are ways that pits can be inspected without physically being able to require to divulge the shapes and those kinds of things.

So as an affirmative statement, and one of the many flaws in this document, from my standpoint, is the fact that it doesn't evaluate that issue, does not set up at any and all of the possible sites

HT13/13
22.007

inspection criteria as a serious flaw, and I would also argue that the policy of the United States set by the president is that surplus materials, these are

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HT13/13
22.007
continued

surplus --

MS. FOUNDS: These are not yet surplus. They are not considered that at this time.

HT13/13
22.007
continued

UNIDENTIFIED SPEAKER: We will get to that one -- are supposed to be subject to international inspection.

MS. FOUNDS: I do want to make the point that they are not surplus and are not considered that this time. That is something that will be taken up as part of the stockpile stewardship and management and the storage and disposition. These are considered materials that are part of the Department's needs and have not been declared surplus at this point.

Also, just to -- as part of the selection criteria, again, just going back, that was not part of our selection criteria, but we will take your comment as part of the record.

HT13/14
23.024

UNIDENTIFIED SPEAKER: Just to clarify, I think it is legitimate to have varying selection criteria that go into less detail, but part of what an Environmental Impact Statement is required to do by law is to also evaluate the environmental impacts, so you could use potentially certain criteria to select the sites, but once you have selected them, whether it is Manzano, Nevada, Pantex, et cetera, you need to

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HT13/14
23.024
continued

look at the environmental consequences.

Part of the consequences, both environmental because inspection is going to be important from not only an international, but frankly from a national confidential standpoint, is the availability and the accessibility and how inspection could work.

On the face of it, it seems to me, knowing something about all the five sites which you are looking at, that there are differing ways, at some sites, it would be easier to have international inspection, and some would be more difficult, and I think that should be analyzed.

MS. FOUNDS: We will take that as a comment.

MS. BERGMAN: Do we have other people who would like to ask any questions or comments?

UNIDENTIFIED SPEAKER: I just have a clarifying question. What is the maximum number of years that would be considered interim?

MS. FOUNDS: Our EIS has said that we are looking at a ten-year period at the Pantex site. Interim really means until decisions can be made in the storage and disposition PEIS, so at this time, I don't have a cutoff date for what interim would be, but those are the documents that would decide for long-term storage. The ROD for storage and

HT13 (CONTINUED)

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disposition is scheduled to be out again until the December time frame and for the stockpile stewardship in the August time frame.

UNIDENTIFIED SPEAKER: If these pits become declared as surplus and therefore not valuable and would need to be eliminated, would there be -- I want to be sure that they are not going to end up -- that Manzano Mountain is not going to end up as a nuclear waste dump. We don't need it in Albuquerque.

MS. FOUNDS: Again, there is a storage and disposition programmatic EIS that is considering ways to dispose of the plutonium, and they have various options in there that include vitrification and several other things. They consider consolidation of the material at sites other than the Kirtland Air Force Base. It is being considered on an interim basis. Those other decisions would take over for long-term storage disposition.

MS. BERGMAN: Let me clarify that. Kirtland is not being considered for long-term storage or disposition. It is not a site that is being considered. It is only being considered for interim, so that was ruled out as a long-term storage and disposition site.

HT13/15 02.006

UNIDENTIFIED SPEAKER: Is there a reason why

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HT13/15 02.006 continued

it is only being looked at as interim and not long term, or why is it suitable for one and not the other?

MS. BERGMAN: In the long term, they were also looking at other materials besides plutonium pits. It is my understanding that they did not feel that those bunkers at Manzano were suitable for those other materials, so therefore, it was not considered.

Do we have any other questions?

UNIDENTIFIED SPEAKER: I have lots more.

MS. BERGMAN: I know you do, but I want to give other people a chance.

MS. FOUNDS: We could take about a five-minute break, and I would like to point out our displays in the back, and we can certainly show you various videos on the stage right -- I'm sorry, the TV has acted up on us, but we can do that and explain some of the process.

MS. BERGMAN: Would anyone like to take a break or keep going?

UNIDENTIFIED SPEAKER: Before you do that, I am not objecting to taking a break, but I want Nan to clarify a statement that she made. She said the AT-400 was certified, and I don't believe it is. I believe you are intending to do it, and intending to

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put it in operation, but it is not yet in operation.

MS. FOUNDS: It is not yet certified, but it is on track for being certified, and it has passed the drop tests and the crush tests and things like that, so it is in the process of being certified.

HT13/16 16.017

UNIDENTIFIED SPEAKER: Last, to clarify, who is doing the certification?

MS. FOUNDS: The technical answer for this thing is DOE is doing the certification for this thing, but the tests are being conducted at the Sandia facilities, et cetera, and they were the design agency for the container itself.

UNIDENTIFIED SPEAKER: That testing that is being done on this new container, does that include another wonderful 90-minute burn test where 15,000 gallons of JP-4 burn and go over the east mountain area and pollute our skies, or are they small enough to fit in SMURF?

MS. FOUNDS: I will let -- it is my understanding that those tests have already been conducted, so therefore, if you haven't noticed anything, no, they are not thousands upon thousands of gallons, but it is a burn test where they are also subjected to a fire after the crush and drop test, and then they are subjected to a fire also. The container

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itself is a fairly small scale.

As I said, I wish we could show you the video tapes, but we can't do that, but maybe what we can do is send those tapes to the Citizens Advisory Board and have them viewed at that time.

MS. BERGMAN: Any objection to a five-minute break? We will take five minutes.

(Recess taken and reconvened.)

MS. BERGMAN: I'd like to ask first if there is anyone who has any questions before we turn the floor back over to Mr. Hancock.

HT13/17 31.019

UNIDENTIFIED SPEAKER: One of my biggest complaints about the document, which strangely enough some of us do actually read it, a lot of times, under the affected environment, you list everybody all the way from Rio Rancho to Belen and everybody to the west. There are people who live east of Manzano Base. It is the fastest growing area other than Rio Rancho, and this is something that needs to be brought up.

Interstate 40 where these SSTs go right down is our major corridor. If something were to happen like if we had an accident there where some truck turns over, that blocks the whole east side of the mountain. In order to get to Albuquerque, it is 120

HT13 (CONTINUED)

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miles if you go by way of Santa Fe or whatever, so transportation through that corridor is a really crucial issue. Should something happen in, as we lovingly call it, "Nuke Mountain" or on the highway, you have created a major problem for the whole southwest.

HT13/18 14.067

Also, I wish the documents in the future would at least admit that we exist. Kirtland, in 1989 when they started the fire by accident, which was an accident, said that South 14 could be the fire break. There are over -- at that time, there were 500 homes. Now, there is probably 750 to 1,000 families who live directly east of this facility. We would like some recognition of our concerns as well as the Four Hills residents.

MS. BERGMAN: Thank you.

MS. FOUNDS: Any other comments? No other comments?

UNIDENTIFIED SPEAKER: If you are going to get rid of them, why don't you ship them and then take them apart? Why are you taking them apart -- which is easier, and which is safer?

MS. FOUNDS: Which is safer is to take them apart at Pantex, so we disassemble the HE, they are taken off, the HE is taken off the pits at the Pantex

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plant and then shipped, and that is the safer configuration.

UNIDENTIFIED SPEAKER: While we are on the subject of bombs, there are also bombs at Kirtland Air Force Base. I know that is a classified thing, and I am sure the major can't say a whole lot about it, but I'd like to hear what he can say about it, and that issue is not at all discussed in this document.

MR. MARTIN: I think I need more specifics about what your question is exactly.

UNIDENTIFIED SPEAKER: My question is, isn't it true that there are bombs stored not in the bunkers at the Manzano equipment storage area but in another facility at Kirtland Air Force Base?

MR. MARTIN: Are you talking about any specifics?

UNIDENTIFIED SPEAKER: I am talking about nuclear bombs.

MR. MARTIN: It is the policy of the Air Force to neither confirm nor deny the presence of nuclear weapons.

UNIDENTIFIED SPEAKER: Isn't it true -- that's always been the Air Force's position, I have heard it. Isn't it true, however, that the Air Force has now, in fact, confirmed that the Manzano weapons

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storage area, the area we are talking about for pit storage, did, in the past, store nuclear bombs?

MR. MARTIN: I need to reiterate that it is the policy of the Air Force to neither confirm nor deny the presence of nuclear weapons.

UNIDENTIFIED SPEAKER: So the Air Force officials who have confirmed and, in fact, have taken the media on tours of the same bunkers that we are talking about and told them there were, in fact, nuclear bombs stored there were saying something that was unauthorized?

MR. MARTIN: I am not privy to that information as far as what was told and what was not told.

UNIDENTIFIED SPEAKER: Let's go on to

HT13/19 12.001

something that hopefully you can talk about. In the document on 5-60 and 61, you talk about intrasite transportation within the bounds of Kirtland Air Force Base. There is no discussion here, and again, no reference documents, that describe any transportation-related accidents within the bounds of the base.

I am interested in information in terms of varying kinds of accidents ranging from fender benders to other kinds of accidents that would have happened

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HT13/19 12.001 continued

within the bounds of the base over whatever period of time you have that information.

MS. FOUNDS: Well, of course, on the base and things like that, speed limits are controlled, the drivers of the SSTs, et cetera, are instructed to follow the speed limits and things like that. Therefore, you are not talking about accidents that are capable of causing dispersal accidents. You can have controlled situations on the base.

Obviously, in transporting them from Pantex, you do not have that kind of control as you do on the base.

HT13/20 12.002

UNIDENTIFIED SPEAKER: That wasn't my question. My question was what documentation exists of transportation accidents within the bounds of the base?

MS. FOUNDS: What Air Force documents?

HT13/20 12.002 continued

UNIDENTIFIED SPEAKER: DOE has got documents. If the Air Force has documents, that is fine. I want to know what exists because there is nothing referenced in this document, in the sitewide.

MS. FOUNDS: As I said, as part of the document, we have done an analysis for the intersite, and again, the intrasite is primarily based upon an analysis of the types of operations, which would be

HT13 (CONTINUED)

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the lower speed, et cetera, operations, and the access roads to those particular areas, so again, those type are not considered dominant or capable in a risk scenario.

Cecil, do you have some clarifying remarks?

MR. BLACK: In chapter 4 of the Pantex plan where we talk about the operations in Pantex, there is a discussion of intrasite transportation at Pantex which covers the same kind of operations and others up to the point where the pits would be removed and transported by forklift.

Up until the point at which a forklift is introduced into removal of the pits to place them in magazines, the safety analysis reports that Pantex has done have indicated there is no credible transportation accident which could cause a dispersal of the plutonium. The forklift accident is analyzed at both Pantex and at Manzano. In Pantex it is not a dominant accident because there is another type of accident which could have a greater possibility of releasing plutonium.

The only credible accident that could occur in a place like Manzano is a forklift accident because all of the other high explosive materials have been removed.

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UNIDENTIFIED SPEAKER: I will be glad to get to the accident scenario in a little bit, but my question hasn't been answered. Just to sort of add to it, there is some interesting numerical information in chapter 4 about actual numbers of transfers internally within Pantex. There is not that same kind of information in this document about Manzano, and that is the kind of information I am looking for, and either you don't have it -- and so, Nan, my specific question to you is as you were looking at intrasite transportation issues, did you receive, did you have access to, did you look at actual transportation analysis of accidents, transportation accidents, not necessarily dispersal accidents, just accidents within the bounds of Kirtland Air Force Base?

HT13/21
12.003

MS. FOUNDS: What we really looked at is sort of the type of operations that are ongoing in what you say is the transportation of them. We did not do studies or gather information, for instance, about all different types of accidents that have occurred on the base, for instance, if that is what you are asking.

UNIDENTIFIED SPEAKER: Let me ask the major the question then. Is he aware of information that presumably the Air Force, but I don't care whose

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information it is -- are you aware of information about transportation-related accidents? And again, I am talking about accidents, I understand that there could be lots of dispersal, but accidents within the bounds of the base.

MR. MARTIN: I am not aware of any such study, no.

UNIDENTIFIED SPEAKER: Are you aware of individual reports of accidents that have occurred within the bounds of the base?

MR. MARTIN: Information such as that I would recommend be referred to the Office of Public Affairs who could conceivably look at Base records to see what sorts of accidents there are. I am not aware of such data. It may, in fact, exist.

UNIDENTIFIED SPEAKER: Nan, are you the AT-400 expert? You are the one whose's been talking about it. You are the expert?

MS. FOUNDS: In terms of this, I am the one at the moment to talk about the AT-400. If I cannot answer your question then, of course, we will take the comment and have the people who are working on that prepare additional responses to your comments.

UNIDENTIFIED SPEAKER: I am interested in a variety of kinds of information more than what is in

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here and more than some other printed material that I have seen coming out of the Pantex office specifically, including the design criteria and detailed design.

Are there detailed design documents available -- let's go one at a time. They aren't cited in here. Are they available?

MS. FOUNDS: I don't know if they are available to the general public. I will have to go back and look and see. I am assuming that what you really want is the type of information that would be in a packaging SAR.

UNIDENTIFIED SPEAKER: That was my next question. When are you going to have a SAR?

MS. FOUNDS: I will have to get back to you as to when there will be a SAR for the AT-400, the actual final date.

UNIDENTIFIED SPEAKER: Do you have an idea when the date is? Are you expecting it before there is a final out?

MS. FOUNDS: Actually, yes. It was my understanding that the schedules for those things were before the final for this document, but those could have changed since the last time that I spoke with the AT-400 people.

HT13 (CONTINUED)

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UNIDENTIFIED SPEAKER: You have said, and the draft EIS also says, that there has already been some testing done of the AT-400 at Sandia, and you have talked about the results of those. Again, there is no written documentation that is cited in the EIS about the results of those tests, and I am wondering about the availability of written information about those tests.

MS. FOUNDS: I want to make sure that -- in the back of the document, we do talk about the transportation aspects, and we do describe the AT-400, et cetera, so you want specifics?

UNIDENTIFIED SPEAKER: Even before the SAR, traditionally, and I have done this with numerous other Sandia tests of transportation containers, traditionally, before there is a SAR, there is actual information memos, et cetera, about the result of the test.

MS. FOUNDS: Right.

UNIDENTIFIED SPEAKER: I assume that it exists because you seem to talk about it, and the document seems to talk about it, but there is no memos. There are no reports.

MS. FOUNDS: There is a videotape.

UNIDENTIFIED SPEAKER: I have seen lots of

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videotapes. I find written information actually a lot more useful.

MS. FOUNDS: We will communicate with you on that. I will go over and ask the AT-400 people if they have any additional information that is releasable and that we can give to you on that subject. As I said, in our document, we analyzed for a Type B package shipping container, and so therefore, that is the basis for our accident analysis, et cetera.

One of the things I'd like to do is maybe at a break, we could go over the references in there and what you think you still need besides references that are in there.

UNIDENTIFIED SPEAKER: Oh, good, yes, we can do that. Let's move on to the health and radiation exposure issue. Nan, in your chart that you showed at the beginning, you showed a couple of things, you showed the comparative chart, and you also talked about the exposure numbers. I am a little concerned about how the document deals with that issue, and I won't even go into sort of the health related things I am concerned about, but, for example, on 4-182, it talks about exposures at Pantex to workers from loading pits.

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MS. FOUNDS: Correct.

UNIDENTIFIED SPEAKER: It talks about -- it talks about several things, but the rem numbers that you use seem inconsistent between Pantex -- let me ask the question differently. Is your assumption that the levels of exposures to workers are the same from loading the pits at Pantex as they would be to the workers who would unload the same pits at any of the other sites?

MS. FOUNDS: Yes, that is primarily sort of the baseline there. The numbers are approximately the same.

UNIDENTIFIED SPEAKER: They are about the same, but they don't seem to be exactly the same, which is why I asked the question.

MS. FOUNDS: Cliff wants to clarify that.

MR. JARMAN: For the assumption of how much exposure the workers would get unloading the pits, we used -- what you see for the workers at Pantex is they do things other than just loading the pits, so they receive other exposures, so the numbers are not the same for what the Pantex workers get and what the others get. For the loading and unloading activities only, yes, it is the same, but the Pantex workers would also be loading and unloading weapons and doing

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other things, and they get some exposures from that.

UNIDENTIFIED SPEAKER: Without going into a long debate, Pantex workers could be limited from a radiation exposure to just loading the pits. Those workers could be assigned so they do have other jobs that would have no radiation exposure, so it is not a requirement from a population standpoint. Certainly there would be higher cumulative doses because there are other operations going on.

MR. JARMAN: We assumed the same workers would be doing it, so we showed the largest amount the workers could get. Individual workers might not get that amount because they might not be doing both activities.

HT13/22
02.007

UNIDENTIFIED SPEAKER: You may not want to talk about this, but it seems like the Department is taking the position that these workers' doses that we just talked about are inevitable, because even if the pits stay at Pantex, they will still have to be loaded out of zone 4 and moved again, because the disposition PEIS says even if they all stay at Pantex, they would be loaded into zone 12, is that correct?

MS. FOUNDS: Isn't that the stockpile stewardship and management that says that they would move the number 4, the strategic reserve, into zone

HT13 (CONTINUED)

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12?

UNIDENTIFIED SPEAKER: The disposition EIS also says if you did long-term storage of pits at Pantex, you would also move them to zone 12, they would not stay at zone 4, so in essence, you are saying that the worker exposures are going to happen regardless at Pantex?

MS. FOUNDS: Concurrent with the alternatives that are being looked at.

HT13/23 01.009

UNIDENTIFIED SPEAKER: Does anybody else want to jump in before I go into some other things? How did the 20,000 number get established; 20,000 pits?

MS. FOUNDS: That was the bounding number from dismantlement that was considered.

HT13/23 01.009 continued

UNIDENTIFIED SPEAKER: Why is that the bounding number since when we started dismantlement, we had considerably more warheads than that?

MS. FOUNDS: Tell me what your reference is when you say "considerably more warheads than that."

HT13/23 01.009 continued

UNIDENTIFIED SPEAKER: It is a public number that the United States in the '80s had well over 25,000 nuclear weapons. It is also a well-established number in the START II treaty which has been ratified by the senate of the United States that the goal would

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HT13/23 01.009 continued

be to come down to 3,500 warheads, so on the face of it, we would dismantle more -- from dismantlement, we would have more than 20,000 pits.

MS. FOUNDS: You are talking about for the cumulative amount? The projection of those that needed to be stored from the dismantlement operation were based upon what we would be taking back from the stockpile now, and that much had to be stored in an interim fashion.

Cecil, you wanted to say something else?

MR. BLACK: The issue that you have raised is really addressed in the stockpile stewardship EIS. However, the number of warheads or the number of weapons governed by START II is not really weapons but is deliverable weapons. Under the START II treaty, the United States would have a number of weapons greater than 3,500. That number is classified, and I don't even know what it is, so there is not necessarily a discrepancy between the numbers that you cite and the fact that the Department plans to dismantle up to 20,000.

HT13/23 01.009 continued

UNIDENTIFIED SPEAKER: Let me ask the question a little differently. Isn't it true that the 20,000 number was first used by the Department of Energy in an Environmental Assessment done three years

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HT13/23 01.009 continued

ago, more or less, at Pantex, which was an environmental assessment that said, "Let's do this interim storage of 20,000 pits at Pantex"? That is the first place that I am aware of that the Department used that number. Is that not true?

MS. FOUNDS: That is my understanding.

UNIDENTIFIED SPEAKER: That number is a pre-START II ratification number, and it appears to me it is a pre-START II number in any case, and the real question is to put it in the context of the sitewide. The sitewide says there is the potential of handling up to 2,000 weapons a year in terms of the analysis of the operation at Pantex, it talks about up to 2,000 a year, although it assumes that a more likely number is 1,000 a year during this ten-year time frame.

Isn't it the case that in terms of Pantex and the numbers of pits that during the next ten years, there could be more than 20,000 pits?

MS. FOUNDS: In terms of the math that you are citing from the dismantlement operations, it is not my understanding that we will exceed the 20,000 pits. Now, if you look at all pits out there, I would have to go back and understand exactly what all of those numbers are, but these are primarily from the dismantlement operation.

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In terms of responding to your comment, we will have to look at the numbers in stockpile storage and management and make sure our math adds up.

HT13/24 01.010

UNIDENTIFIED SPEAKER: I guess the specific question that I'd like to see addressed in the final, this final, is 20,000 pits for interim storage actually a bounding number, or within the next ten years, could the number actually be higher than that? That is the specific issue I would like to see addressed.

MS. FOUNDS: For our alternatives, we are considering no more than 20,000, so therefore, you cannot undertake an activity that would put more than 20,000 out there unless there were other decisions that were part of the consolidation efforts under the storage and disposition, so 20,000 is what we are considering as the definition of what our alternatives are.

HT13/25 01.011

UNIDENTIFIED SPEAKER: Two questions in that regard, one is that if, in fact, the Department is taking the position that they would have to somehow supplement this or some other NEPA document before they completed 20,000, that should be expressly stated, and if that is not the Department's position, that specific statement needs to be made in this

HT13 (CONTINUED)

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HT13/25 01.011 continued

document and in the ROD.

Related to that, I would also request that the document analyze where the 20,000 number came from and how that would relate specifically to less than START II levels of dismantlement.

MS. FOUNDS: Thank you.

UNIDENTIFIED SPEAKER: As you know, a lot of us have argued, in the context of the stockpile stewardship and management, the Department needs to analyze an arsenal much less than 3,500. The Department doesn't want to do that, but we don't need to get into that argument. The point is that it is possible that there will be dismantlement of less than START II to an arsenal smaller than START II within the time frame covered by this document.

MS. FOUNDS: Again, I would say that that is an issue that we will probably address with stockpile stewardship and management, because it is really their document that would analyze those stockpile cases.

UNIDENTIFIED SPEAKER: I am suggesting you also have to do it here.

MS. BERGMAN: Does anyone else have any questions?

HT13/26 01.012

UNIDENTIFIED SPEAKER: I am going to throw out something, that you drop Kirtland, Sandia, from

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this project because it is not going to be a permanent storage. You should get your act together and put it where it is finally going to be. Put it at one of the places that will be a permanent storage because of the

HT13/26 01.012 continued

fact that you, yourself, have said it is only considered able to handle the plutonium and not others, and this is only interim. Well, just wait and put it where it is finally going. Get your other plan together, decide it, pick a site and hold onto it until then.

MS. FOUNDS: Thank you for your comment.

MS. BERGMAN: Do we have any other comments or questions? Did you want to continue?

UNIDENTIFIED SPEAKER: I can continue, or I can also stop.

UNIDENTIFIED SPEAKER: I have a question or statement relating to how the sitewide and the two PEISs, the surge and disposition and the stockpile stewardship PEIS, are relating. We just spent a lot

HT13/27 02.008

of time working on bringing people from all over the state to the stockpile stewardship hearings, and the main topic of discussion is plutonium pit fabrication at Los Alamos, and here we are talking about thousands and thousands of plutonium pits being dismantled.

It seems to me like the left hand doesn't

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HT13/27 02.008 continued

know what the right hand is doing. One hand is trying to figure out what to do with pits, and the other hand is creating more. Is that something that can in some way be tied in --

MS. FOUNDS: What you are talking about is not fabrication of new pits.

UNIDENTIFIED SPEAKER: I understand that, it is retooling.

MS. FOUNDS: Right, so we really aren't looking at new pits as you are calling them, not fabricating them from new plutonium.

HT13/27 02.008 continued

UNIDENTIFIED SPEAKER: I understand that, but if we have got pits, it seems to me confusing that we would need to retool them to different specifications.

MS. FOUNDS: It is a -- do you want to answer that?

UNIDENTIFIED SPEAKER: No, I want to contradict that.

UNIDENTIFIED SPEAKER: Contradict me?

UNIDENTIFIED SPEAKER: No, I want to contradict her.

MS. FOUNDS: Before I answer, basically, it is an issue with maintenance of the stockpile to make sure that the availability of the weapons that are

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considered necessary, we keep reserved quantities, and therefore, in order to maintain those weapons for the purposes that they were designed for, et cetera, we may need to have the ability to keep the pits available for maintenance of the stockpile. Then I will let Don contradict that.

UNIDENTIFIED SPEAKER: Before Don jumps in, I think that retooling pits may be making them better, if there is such a thing as a better pit, contradicts the intention of arms control treaties and is sort of setting a new arms race, within the certain amount of weapons that we are allowed to have, that we are going to have the best darn weapons out there. To me, that violates the spirit of the arms control treaty.

MS. FOUNDS: That is a policy decision by the United States, and the weapons that are needed in the stockpile are determined by DOD and are communicated to us, and we are the ones responsible for making sure we can support that stockpile.

UNIDENTIFIED SPEAKER: To me, it doesn't seem very efficient.

UNIDENTIFIED SPEAKER: It is also downright dangerous. I guess I want to clarify what you said, Nan, because I couldn't believe my ears. Were you suggesting that in the context of the stockpile

HT13 (CONTINUED)

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stewardship and management PEIS, the Department is not including a plutonium pit fabrication capability at Los Alamos?

MS. POUNDS: No, that is not what I said. She asked about new pits. I was referring to -- the production capabilities at Rocky Flats have been shut down, so we do not have the capability to start from scratch at the Rocky Flats plant in order to fabricate new ones at this time.

UNIDENTIFIED SPEAKER: You don't have that capability at Rocky Flats, but you do have that capability at Los Alamos, and part of what the stockpile stewardship and management PEIS wants to do is to specifically say that that capability will be clearly identified and clearly available at Los Alamos for the next 25, 30 years or longer, correct?

MS. POUNDS: Yes.

UNIDENTIFIED SPEAKER: Including the capability -- just to nail this point down, including the capability to fabricate, quote, new pits?

MS. POUNDS: For maintenance of the existing stockpile.

UNIDENTIFIED SPEAKER: What I wanted to clarify is I thought you had said that Los Alamos and the stockpile stewardship and management PEIS does not

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cover that capability of fabricating for new pits, and that is what I felt was a contradiction. If I misheard, that is fine, but I wanted to clarify it so it is clear what SS&M does.

MS. POUNDS: I was confused by what you said.

MS. BERGMAN: Does anyone else have any questions or comments? Let me just mention again, if you do have comments you want to make but this is not the form you want to do it in, there are lots of opportunities to make comments through E-mail, Internet, fax, 800 number, so please recognize that the comment period is open until July 12th, so there will be lots more time and opportunity in case you do have more comments.

HT13/28
22.008

UNIDENTIFIED SPEAKER: I have another question. Will there be any difference in the level of transparency in the plutonium pit disposition process if the plutonium pits are sitting on a DOD or DOE site in terms of international surveillance or in terms of the public being aware of what is happening with pits? Is there any difference in what the public will know --

MS. POUNDS: DOD maintains control of those pits, and the information about those would come under

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the jurisdiction of the Department of Energy.

HT13/28
22.008
continued

UNIDENTIFIED SPEAKER: The Department of Energy's secretary does have a policy of greater openness, which is not something I have heard from the Department of Defense and don't expect to hear it from the Department of Defense. I am wondering where there will be some difference should be pits be at Kirtland.

MS. POUNDS: The information about the pits will be the same. Again, that is what we are talking about here is DOE activity on an Air Force base.

MS. BERGMAN: Do we have any other questions or comments? We have got ten more minutes. Don, did you want to make a few more?

MR. HANCOCK: I will take considerably less

HT13/29
02.009

than ten minutes so people can get out early. Two points I want to make are, one, the fact that we have such difficulty in figuring out what to do with 20,000 pits, which I certainly do and would hope that everybody here is, on the one hand, glad that we are getting 20,000 pits out of bombs. That is a good thing, but the fact that what comes from the good thing of having fewer warheads armed and able to destroy the world several times over is another problem, which is what to do with the 20,000 pits.

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HT13/29
02.009
continued

It is even more complicated because, as has already been stated, it would be one thing to say we know what to do with the 20,000 pits in the short term because we know what it do with the 20,000 pits in the long term. We know what the disposition is. In fact, we don't know what the disposition is.

I have talked about it in another context, so I will just summarize. I have no confidence that the disposition PEIS in fact is adequately analyzing or is going to come up with a possible reasonable solution for longer term what to do with those 20,000 pits. So I think it is something that some of us in the public and hopefully people in the federal government will pay a lot more attention to in the future.

HT13/30
14.068

We have created some problems, quote, inadvertent problems, that we dare not create. The dangers associated with these plutonium pits in or out of warheads are going to last for a long time, and it is unfortunate that we didn't have a broader public discussion about all of these issues before a decision was made to even create the 20,000-plus warheads and what these unintended consequences would be.

I certainly hope we don't do that again, and I certainly hope as we talk about interim storage of

HT13 (CONTINUED)

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HT13/30 14.068 continued

pits, which frankly, for better or worse, is going to be a lot longer than ten years, and this document should more clearly state that kind of along the lines, Nan, that you, in fact, said in answer to Janna's question, but I don't really see that kind of comment reflected in here, so that is the kind of change that needs to be made in this document.

MS. FOUNDS: I do want to point out in the beginning, it does talk about the other PEISs and the decisions that are being made, and they are for the long-term storage until those disposition options are there, so that is the other.

UNIDENTIFIED SPEAKER: As long as you add the word "supposedly" being made in those other documents, I might agree.

MS. FOUNDS: Thank you for your comments. We will be available for a few minutes at the display, so if there are any other questions that we can answer, they will not be recorded, however, but we will be happy to talk about the various displays that we have.

Thank you very much.

(First session concluded at 4:53 p.m.)

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* * * SECOND SESSION 6:00 P.M.* * *

MS. BERGMAN: I'd like to introduce Major Martin, who is our Air Force representative here, and between Nan and myself and the Major and some of our technical experts, we'd be happy to try to address your questions and receive any comments that you might have at this time.

This is our only mike. This afternoon, we seemed to do pretty well, the voices seemed to carry in the room without the mike, but we may need to ask you to use this if we have difficulty hearing you, so at this time, does anyone have any questions or comments?

UNIDENTIFIED SPEAKER: How close is the Manzano bunker storage area to the 2,000 warheads that are stored already at Kirtland Air Force Base?

MS. FOUNDS: We looked at the pits, which are in the bunker area, and you have that fence, and we primarily looked at it just within the region with the fence and that being the buffer area.

MR. MARTIN: To give a comment on your question, it is the policy of the Department of Air Force that we will neither confirm or deny the presence of nuclear weapons.

UNIDENTIFIED SPEAKER: I feel that it is

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very hard for us to assess how dangerous this is for us or not dangerous it is for us when we don't know what goes on at Kirtland Air Force Base now. There are so many things there that we are not allowed to talk about or hear about. The Tribune years ago did an article on the bunker, which if I remember correctly is within two miles of the commercial runway there that has bombs in it which have aging safety devices. I understand those were taken out of the Manzanos and now are in the bunker.

I question in my mind if the Manzanos weren't safe for the bombs, are they safe for the plutonium pits? Why were those bombs moved? I feel like before there is any more projects on Kirtland, this veil of secrecy has to be lifted somewhat because we are much more frightened here in Albuquerque now by the nuclear projects in our state than we are by any enemy we can see, which makes us focus on the dangers at home. We feel like the war is here in our state. We have many nuclear projects here.

MS. FOUNDS: We will take your comments. The policies of the DOD in general are not an issue within the NEPA, and I understand what you are talking about in terms of looking at accident scenarios and things like that. Primarily, the pits are going to be

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stored in the bunkers that are out there in the mountain, and other activities that are reasonably foreseeable out there are not a danger to the pits in terms of a dispersal accident.

We have looked at what is out there. We have looked out bounding-type accidents. We have looked at the aircraft crash scenario for that mountain, too, which would probably bound any of the hazards that Kirtland presents to those pits, so that is why we give that in terms of the storage accident, both, a bounding accident is a forklift puncture out there, and also, we did look at the aircraft crash scenario.

We are also considering the bunkers that are on the east side that would be farthest away from other operations on Kirtland Air Force Base.

HT13/31 01.013

UNIDENTIFIED SPEAKER: How many bunkers are required for 20,000 pits?

MS. FOUNDS: It is -- about 4,500 square feet was the selection criteria, and I think that is nominally about 25. I am going to look to my technical experts to look that up. It is in the document.

UNIDENTIFIED SPEAKER: Page 5.

UNIDENTIFIED SPEAKER: So 25?

HT13 (CONTINUED)

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MS. FOUNDS: Yes. I'd be happy to let you look the page up, Don.

MR. HANCOCK: Yes, ma'am.

HT13/32
17.006

UNIDENTIFIED SPEAKER: Our group hasn't taken a position on this issue, but when you are considering environmental justice, do you also consider the number of nuclear projects that are already within a state? I have been to so many hearings lately that I hardly have time to eat dinner.

I mean it is like I am up in Los Alamos, and they want to move Rocky Flats operations to Los Alamos. They want to shoot missiles. They want to dump radioactive waste in the Rio Grande. They want to put midlevel waste at WIPP. They want to do more -- they want to expand the Alamogordo testing range. Shouldn't that be part of environmental justice to look at how many nuclear projects there are already in the state?

MS. FOUNDS: Our guidance in terms of that is looking at what projects that we are considering and then seeing how our project affects the local area, and that is our implementation guidelines. You are always -- we will accept those comments and forward them up to headquarters, because many things

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come into play when the actual ROD is considered, but in terms of the sections of the EIS for the relocation alternatives, we consider what our project will do and how that interrelates to the standards that DOE has.

HT13/33
17.007

UNIDENTIFIED SPEAKER: Isn't there an impact section that addresses the fact that there is no evidence that cumulative impacts will lead to a significant consequence to the people? Is that a part of the environmental justice?

MS. FOUNDS: A part of the overall document is the cumulative impact, and that is particularly prevalent for the Pantex site where we are looking at all of the activities on the Pantex site in looking at that, its impacts to the population.

Yes, ma'am?

HT13/34
23.025

UNIDENTIFIED SPEAKER: I would suggest that cumulative impact part of your Environmental Impact Statement should also include a cumulative psychological impact of all these projects on the people of New Mexico and how much people here are going to take before there is some kind of rebellion involved. We already know that cancer rates at Los Alamos, breast cancer rates, are 20 to 50 percent higher. We know that the child death rate there is higher than anywhere else in the state. We know a lot

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HT13/34
23.025
continued

of bad things about Los Alamos.

We are looking at the rest of our state and wondering if the rest of our state is going to go that way, too, so I would suggest a psychological impact also be part of the cumulative effect of projects in an area.

MS. FOUNDS: We will be happy to take your comment on that. I will -- it has not been the policy to do that in terms of NEPA, and I believe that there are some court rulings that state that for NEPA analysis, you do not have to do that type of an analysis, but we will take your comment into consideration.

Sir?

UNIDENTIFIED SPEAKER: All of the recent surveys and public attendance in the last decade or more, public opinion polls show that the people of the State of New Mexico are very much in support of both the Department of Defense and the Department of Energy's activities, so I don't know what the basis of some of these -- factual basis of some of these remarks are.

MS. FOUNDS: I appreciate your comment.

UNIDENTIFIED SPEAKER: That is not completely true because the majority of the state have

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been stated to be against the WIPP project, and the people in northern New Mexico who have been in favor of Los Alamos Lab are quickly losing their favor for that lab since it's been planning production and fired about 1,000 people from around the lab.

MS. FOUNDS: I'd like to take this opportunity for a moment, and I don't want to necessarily get into a large debate here about Los Alamos because right at the moment, I'd like to, if we can, focus on the NEPA analysis here at the Kirtland Air Force Base. I understand your concerns at Los Alamos, but as far as the analysis in our document, there would be no impact to residents in the Los Alamos area because of that.

If you are concerned about what is happening here, we have done the analysis for dispersal accidents and for transportation risk, and those are the type of operations that we are concerned about here in Albuquerque.

UNIDENTIFIED SPEAKER: But you don't live in Albuquerque, and I am telling you what I am concerned about living here in the state.

MS. FOUNDS: Yes, I do. I live in Albuquerque. I am based here in the Albuquerque area.

UNIDENTIFIED SPEAKER: Do you live here?

HT13 (CONTINUED)

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MS. FOUNDS: Yes.

UNIDENTIFIED SPEAKER: How do you feel, yourself, about storing plutonium pits in a population center with 650,000 people, surrounded by that many people?

MS. FOUNDS: Like I said, this is sort of a personal debate, and I am not trying to get into a personal debate, but we have looked at the risk of doing that, and the risk is not -- is not high against our evaluation criteria.

HT13/35
22.009

UNIDENTIFIED SPEAKER: I guess the problem with the Department manager doing the risk is that nobody trusts the Department of Energy. I think that if you had somebody independent doing the risk analysis, then it would be more palatable.

MS. FOUNDS: I understand what you are saying, but we do have specific guidelines and procedures that we do follow in doing this. The contractor that supports us is very knowledgable in these risk areas and things like that and do constitute at least a partial independent review of this analysis, and we do follow the procedures and guidelines that most other agencies use in assessing risk.

MS. BERGMAN: The State is also looking

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closely at our data to make sure they can understand the logic there and that they follow it as well, so there are some independent reviews of the data outside of the DOE arena.

MS. FOUNDS: I might also point out that that is the very nature of these public forums is to get that information out to you so you can comment on it and give us comments.

HT13/36
22.010

UNIDENTIFIED SPEAKER: I appreciate all your efforts, but there is just such a long history of deception here that it is hard to overcome and believe and trust data that comes out of the Department, and I am sorry that is true.

MS. FOUNDS: Any other comments?

UNIDENTIFIED SPEAKER: What is the role of the Air Force?

MS. FOUNDS: They are a cooperating agency. In other words, they supplied us data for our analysis, and they have agreed to be a cooperating agency in terms of the consideration as an alternative for the relocation of the pits. If I am not answering your question, please clarify a little bit more.

UNIDENTIFIED SPEAKER: In what way were they helpful with the data? What did they provide?

MS. FOUNDS: They provided us baseline

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environmental data that they had. Also, we went out to Sandia for some of that information.

UNIDENTIFIED SPEAKER: Doesn't the Air Force decide if you should store pits at Manzano? Isn't that the relationship?

MS. FOUNDS: There would have to be memorandums of agreement on how to effect that so DOE would retain control over the material, and the procedures, et cetera, that would be followed would be DOE procedures. Obviously, the material command, the Air Force Material Command would remain the owner of the facility, so to speak, but we would have jurisdiction over the material, the way it was handled, the way it was operated and those type of things.

UNIDENTIFIED SPEAKER: Is it permissible to comment about publicly available information that perhaps the Air Force officer is not free to discuss, but it's been in the Albuquerque Journal and perhaps could respond to some of their anxieties? Is that permissible?

MS. FOUNDS: What is that?

UNIDENTIFIED SPEAKER: Is it permissible to provide information as a private citizen that perhaps the major is not free to provide?

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MS. FOUNDS: You want to make comments?

UNIDENTIFIED SPEAKER: Yes. I want to help answer that question.

MS. FOUNDS: You are free to make a comment.

UNIDENTIFIED SPEAKER: I don't know what is in the Kirtland underground munition storage area, I don't know what is in there, but I do know it is a couple miles away from the Manzano weapons area.

MS. FOUNDS: I thank you for your comment. I will refer back to what the major said in terms of Air Force policy.

UNIDENTIFIED SPEAKER: I was just asking if you are getting information from the Air Force and are able to confirm or deny any of the data they give you.

MS. BERGMAN: Yes.

MS. FOUNDS: As I said, we also did look at some of the Sandia data, too, for baseline information.

UNIDENTIFIED SPEAKER: Does the gentleman over here know how many miles it is from the runway? Is it 2 or 1.8 our 1.4, do you know, or a closer distance than about 2 miles?

UNIDENTIFIED SPEAKER: It is closer to the runway than it is to the Manzano weapons storage area

HT13 (CONTINUED)

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in Four Hills, but it is out of the way, and it is below ground, and it is extremely heavily -- extremely heavily reinforced.

MS. FOUNDS: Any other questions?

UNIDENTIFIED SPEAKER: This afternoon, there was a considerable discussion about some of the information related to Kirtland and what you had considered and not considered and what documents were available and what is not available. I guess the question I want to ask, and I'd like both Nan and the major to answer it, please, is if currently, the Manzano site is not the preferred option.

MS. FOUNDS: Yes.

UNIDENTIFIED SPEAKER: If the Manzano site became the preferred option, what additional NEPA analysis would be done?

MS. FOUNDS: What additional NEPA analysis would be done? If we actually store the pits here? The intent was to make this EIS such that it would constitute the NEPA analysis for implementing that alternative, so there would be no other NEPA analysis necessary to implement that if the regular decision so stated.

UNIDENTIFIED SPEAKER: I'd like the major to answer that question, too.

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MR. MARTIN: There are some other requirements that extend beyond the requirements of the National Environmental Policy Act, or NEPA. What we would get into would be what is known as a real estate transaction, and we, the Air Force, as owners of the land would require the Department of Energy as the users of the land to get a real estate authorization saying, "You may go ahead and use this for your intended purpose," and it would be their stated purpose.

The main thing that would be required is we would have what is known as an environmental baseline study done. What that is is at the time of turnover of authorization -- not turnover, we don't give them the land, we still retain ownership of the land, but at the time we say they may go ahead and use this land, snapshot in time, what are all the environmental questions there, taking into account past activities.

We would go out and look at, for example, old restoration sites and so forth. We would say, "Okay, this is the state of the land when you got it." If the lease were terminated at some time, either not renewed or they changed their mind or whatever, moved somewhere else, then there would be memorandums of agreement and understanding for

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restoration of the property based on what they did.

Does that answer your question?

UNIDENTIFIED SPEAKER: So is it the Department of Defense's position that -- since you have the microphone, I'd like you to answer it first, and then we will go back to Nan. Is it the Department of Defense's position that the draft EIS as it currently exists adequately analyzes environmental impacts associated with pit storage at Manzano, and

HT13/37
10.002

the second part of the question, is it your position that it adequately analyzes archeological sites for historic preservation purposes?

MR. MARTIN: Let me answer the second one first. The whole archeological and cultural resources requirements of NEPA have been taken into account. We have a natural resources person in environmental management, of which I am the deputy director. We also have someone who does the cultural resources. We have had studies done on both concerns, and those were fed to the Department of Energy saying, "Okay, we have got these concerns at these sites."

Does that answer that adequately?

UNIDENTIFIED SPEAKER: If that is all you are willing to answer.

MR. MARTIN: Of all the sites that have been

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identified, we have done a cultural and natural resources survey for the Air Force base and for the affected area we are talking about. We identified our concerns to the Department of Energy.

MS. FOUNDS: I would point out that the Air Force Material Command has concurred on the document as it stands as a draft, and they will be asked to concur on the document in final form.

UNIDENTIFIED SPEAKER: Concerning the cultural resources at Manzano, national labs for the Department did a very extensive archeological survey of the entire Manzano weapons storage area.

UNIDENTIFIED SPEAKER: I have just gone from being mildly concerned to being outraged. If this is the new, open DOE, I'd like to say for one thing, we never got a written notice of this hearing at all. The last hearing about the DOE weapons complex, the 20-year plan, two weeks before that hearing, I was calling everybody in DOE trying to find out the date, and no one even knew the date yet.

This is outrageous that you say this is going to be the only hearing about storing plutonium pits in our mountains. Nobody knew about this hearing. You put a notice in the paper a few days ahead of time. We didn't get a written notice at all.

HT13 (CONTINUED)

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and you are going to say that this is the only hearing you are going to have when you are talking about storing the most deadly element known to man in our mountains. It is outrageous.

MS. FOUNDS: I want to make sure that our comment period actually extends to July 12th, and there are various avenues by which you can continue to comment on our document. We have, out in the lobby there, a poster by which you can comment by fax, by mail, by telephone, by E-mail, and what is the other one?

UNIDENTIFIED SPEAKER: In order for the people of Albuquerque to be represented, they have to be at a meeting, and they have to be able to ask questions and have answers to those questions. They need a month's notice before an important hearing that will impact their -- possibly impact their health and welfare. This is outrageous what you are doing. You are trying to sneak things in on people while pretending to be open, and it is outrageous. I am outraged.

MS. BERGMAN: May I ask what group --

MS. FOUNDS: Citizens for Alternatives to Radioactive Dumping, and I have already gone through this whole thing with Al. We were left off the list.

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MS. BERGMAN: We sent a notification to Garland Harris, that was the representative we were given, and it was sent to the home address of Garland Harris. If this is not the appropriate contact, please, we want who is and where we should send it.

UNIDENTIFIED SPEAKER: How far in advance did you send that notice?

MS. BERGMAN: It was about a month ago. We sent them out as soon as the Notice of Availability was put in the Federal Register, so it's been about a month. We apologize for that. Our intention certainly was that everyone had adequate notice, and we really want to know who the appropriate contacts are.

UNIDENTIFIED SPEAKER: We have many members in our group, and we'd like to receive notice at our office, please.

MS. BERGMAN: Could you indicate on the card where we should send that to in the future and who it should be sent to so we can make sure that this never happens again?

HT13/38
22.026

UNIDENTIFIED SPEAKER: Well, I also feel that if Kirtland becomes your number one choice that it is your obligation to hold a hearing here, not to just do this.

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MS. BERGMAN: Thank you. Did I see another hand?

UNIDENTIFIED SPEAKER: I got my letter at least a month ago.

MS. BERGMAN: I guess we have had some problems with the mail, I guess. Do we have any other questions or comments?

Yes, sir?

UNIDENTIFIED SPEAKER: I am just coming in late, but I didn't see any discussion, at least in the summary of the EIS, on what further research into high explosives is going to be done at Pantex and the environmental impacts projected for the continued work testing new or old high explosives.

MS. FOUNDS: In terms of our analysis, the summary, you may have to go into the main body. They do describe the alternatives in the proposed action, and it does indicate those operations, and that includes continuing high explosive operations out at the Pantex site, so we have looked at that as part of our alternatives in the proposed action, the continuing missions out there.

Now, there is also the stockpile stewardship and management which is actually looking at possibly relocating those operations from the Pantex site to

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Los Alamos or Lawrence Livermore.

HT13/39
14.037

UNIDENTIFIED SPEAKER: Could you talk some about the scope of what the high explosive research program is and what the fatality rate has been over the last decade for workers who are messing around with high explosives?

MS. FOUNDS: In the document, we go through a -- it is under human health, and in there, it identifies different accident scenarios. Part of what is identified in there is a detonation of high explosives as part of the machining operations. I believe that that has happened once in the last 20 years, and we have in there -- we discuss what the accident was and what the changes in the procedures are.

Again, I said that happened many, many years ago, and procedures have changed since that time.

UNIDENTIFIED SPEAKER: So in terms of research on new types of high explosives and accidents involving research on high explosives separate from the dismantlement --

MS. FOUNDS: That is mainly the operations out there, and that would be the dominant scenario, because that involves most of the handling because you are machining on high explosives, you are handling

HT13 (CONTINUED)

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them and things like that, so that describes primarily the dominant accident scenario that is involved at the Pantex plant from high explosives.

HT13/40
14.038

UNIDENTIFIED SPEAKER: So is the Pantex plant going to be planning to experiment with new types of high explosives as we look ahead in the coming years that the sitewide is supposed to cover?

MS. FOUNDS: Cecil?

MR. BLACK: The principal role of research and development at the Pantex plant is not really in developing new types of explosives. That work is principally done at Los Alamos and Lawrence Livermore. What the Pantex plant does primarily in R&D of explosives is testing explosives to see how they perform over time.

When they bring in a weapon and disassemble it, there may be a requirement for a test on a particular explosive removed from that weapon, for example, to see what has changed in that explosive since we made it, so it is not really the kind of thing that you are probably thinking of.

UNIDENTIFIED SPEAKER: I thought I remembered, in fact, they are continuing to explore different sorts of -- the chemical makeup of different sorts of high explosives. In fact, that is where the

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fatality of the last decade occurred.

MR. BLACK: There's been one accident involving a fatality. The fatality the last decade was a Lawrence-Livermore-developed high explosive, and it was an experimental high explosive that Lawrence Livermore had developed, and the Pantex plant was doing fabrication research on that material.

UNIDENTIFIED SPEAKER: So they were fabricating an already --

UNIDENTIFIED SPEAKER: All research and development activities, and I believe it was on -- I am not going to guess what it was, but all of that was done at Lawrence Livermore National Lab.

HT13/41
16.018

UNIDENTIFIED SPEAKER: Will Lawrence Livermore and Los Alamos be shipping different sorts of compositions to Pantex and expecting them to do the machining and tooling?

UNIDENTIFIED SPEAKER: I would presume whatever the role that is identified for Livermore and Los Alamos in the stockpile stewardship and management that it will be supported by Pantex in their mission.

UNIDENTIFIED SPEAKER: I couldn't find it in here.

UNIDENTIFIED SPEAKER: If you look in the summary, it talks about one paragraph of the R&D of

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high explosives. I presume, if I recall, what the total document has is much more detailed.

HT13/42
01.014

UNIDENTIFIED SPEAKER: Is there a justification for continued exploration and alternatives forms of high explosives at this point in time that would justify the health and environmental risk?

UNIDENTIFIED SPEAKER: I wasn't aware that NEPA was a justification kind of document. I thought it was merely an analysis of environmental proposed activities.

UNIDENTIFIED SPEAKER: My understanding was there had to be a justification for the environmental and health risks.

MS. FOUNDS: Sir, again, NEPA requires us to analyze the action. There is a purpose and need described in the document for the continuation of the activities at Pantex, but again, as was pointed out, it is not a justification document, per se. It is analyzing those and giving what the impacts would be at the site considered.

UNIDENTIFIED SPEAKER: I want to clarify a couple of things in this conversation, particularly for the record. I'd like it to be indicated that the person who discussed the fatalities, et cetera, was

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Dave Rosson, retired Department of Energy employee, who has been intimately involved with this document, which is the reason that he can speak to it knowledgably, but because he wasn't identified, I think the record should be clear in that regard.

HT13/43
14.039

Secondly, related to that, there's been some discussion about a fatality related to the Lawrence Livermore incident. Man, I thought you said the fatality occurred at Pantex. That is not necessarily what I thought I heard Dave say, so I wish that somebody would clarify that with as much information as you fully have so that it is clear to everybody.

MS. FOUNDS: Let me make sure of this thing. We do have a procedure in place at these meetings that individuals may or may not, as they wish, identify themselves. As you indicated, the individual who did speak is no longer with the Department of Energy. Just as -- I do not require you to give your identification either, unless you wish, so I want to make sure that we adhere to those policies. Since the individual back there --

UNIDENTIFIED SPEAKER: What I said, Don, was that the R&D in the main development of explosives was done at Livermore, and the fatalities occurred while Pantex was doing fabrication studies on it. That is

HT13 (CONTINUED)

what I said.

MS. FOUNDS: It was still in the machining operations, and those procedures have changed. They are robotically done at this time. As I said, those procedures and designs of the handling or the machining is quite different.

UNIDENTIFIED SPEAKER: I still need clarification. Dave, you said in the last decade --

MR. ROSSON: I think that happened in 1978. I am not sure, but I believe that is when it happened.

HT13/44
14.040

UNIDENTIFIED SPEAKER: I would like to clarify for everyone there were three people killed at Pantex in 1977. If I remember correctly, two of them inside the building and one of them outside the building was killed, so what I would like to ask is how will a document like this handle a facility at Pantex that is known to be deficient?

There is a high explosives machining facility at Pantex that has public access and public parking too close to the building, and it does not meet the plant's current standards, so how is something like that addressed in a document like this?

MS. FOUNDS: I'm sorry, I am not sure I followed you on that one. You are saying that which parking lot at the Pantex plant --

HT13/45
14.041

UNIDENTIFIED SPEAKER: I am saying you have a facility at Pantex that is a high explosives facility that the public can get too close to the building, and this is something that was brought before the Pantex Citizen Advisory Board a couple months ago.

MS. FOUNDS: The public can get too close via what route?

HT13/45
14.041
continued

UNIDENTIFIED SPEAKER: People at the plant that are not working inside that building, there is a parking lot too close to the building so that people who are outside the building could be injured by an accidental explosion, that is other workers at the plant that may not be working in that facility, but they can be near that facility because the buffer zone is not appropriate.

How does a document like this handle a deficient facility?

MS. FOUNDS: Let me make sure that I understand, because I want to clarify this. When you say a deficient facility, what DOE guidance are you looking at to state it is deficient?

UNIDENTIFIED SPEAKER: I can't remember, but it was presented by DOE that it does not meet the plant standards, and I can't tell you if that is an

SAR or what, I can't remember, but it was presented to the Citizens Advisory Board for the Pantex plant.

UNIDENTIFIED SPEAKER: Nan, is this issue that she is talking about addressed in this document, and if so, where?

MS. FOUNDS: We are not indicating that there is a deficient facility. What we are looking at are the types of operations and the accidents, that is why I want to make sure I understand her comment in terms of a deficient facility. We will try to address that on a very specific basis, and if you could give me any other additional information, when it was presented and what facility it is, I'd like to take a look at that and see how we did look at all the buildings, because we did go through and look at the operations out there and come up with our bounding scenarios.

We looked at everything from emergency management procedures, SARs, et cetera, to come up with our bounding accidents, et cetera, and those things do look at the types of structures and the workers, and in each of our accident scenarios, we do look at workers, noninvolved workers, which would be members of the plant itself and how close they are and also maximally exposed public individuals as well as

public exposure within a 50-mile radius.

HT13/46
14.042

UNIDENTIFIED SPEAKER: In theory, I want to understand how a sitewide EIS addresses a facility that is not -- do you just do this generally? Also when you find something specific, do you discuss it in this document in general, or do you turn it into a generalized accident scenario rather than addressing specifics?

MS. FOUNDS: In terms of this, as I said, we analyzed it in the document. There is a discussion in the back of all the different accident scenarios that we considered, and then we look at what the bounding cases would be so that you can get a risk analysis for the public as well as workers and noninvolved workers.

MS. BERGMAN: I still don't think you were answered. I think what you are trying to say is that we would have analyzed the accident scenario for that building in relation to how close things were, and if it was known, come up with some mitigative measures, and that would have been indicated if the results of the accident scenario warranted it, and that is the way we would look at it, I think is what you were trying to say.

MS. FOUNDS: We did do a screening level of analysis.

HT13 (CONTINUED)

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MS. BERGMAN: Your concern is if we didn't look at it, is this something we should look at, and we need to take a look, and that is why we want to know which building you are talking about.

HT13/47
14.043

UNIDENTIFIED SPEAKER: Let me express a concern that I think is related to this, and that is why -- let's keep on this point, because I don't think Nan is quite understanding the point, which is on the high explosives facility and the parking and also related to the gaps in the doors of the zone 12 assembly/disassembly bays, there was analysis done related to this document.

However, I believe, and I would be delighted if anybody here can point me to it, I believe that neither of those specifics, the lack of buffer zone around high explosives and the specifics of the gaps and the mitigation efforts that have been taken, neither of those things, in fact, are included in this document.

MS. BERGMAN: The doors are.

UNIDENTIFIED SPEAKER: The discussion of the doors and the gaps that were found and what was done is in this document? Where?

MS. FOUNDS: As part of this, what we do is we have -- I believe it is scenario 1 in there, and we are looking at the risks from dispersal initiated as a one-point detonation of the high explosives. That is a combination, and it is looked at in that discussion from what would happen if you had an explosion in bays, cells, and special purpose facilities, and that is looked at, and because what we are looking at is the overall Pu dispersal accident and what the consequences would be from an accident in one of those and also what the cumulative effects would be from having plutonium in any one of those facilities.

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There is not a detailed discussion in that document as to, yes, we are considering a gap size of so much, et cetera, but in terms of the risk that is identified in that document, it does include an analysis of the cells. It also includes the analysis of bays and special purpose facilities because that is where a one-point detonation can occur.

UNIDENTIFIED SPEAKER: Let me just ask one more question to see if we can get a short answer.

MS. FOUNDS: Okay.

HT13/48
14.044

UNIDENTIFIED SPEAKER: Where in this document does it specifically say that you have, in an existing high explosive facility, a parking lot that is closer to the building than what current DOE requirements are, and secondly, where in this document

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HT13/48
14.044
continued

does it say that there were gaps around doors in virtually all of the major assembly/disassembly bays at Pantex that were there for up to 13 years? Where are those two statements in this document?

MS. FOUNDS: Those statements are not in there.

UNIDENTIFIED SPEAKER: Thank you.

HT13/49
14.045

UNIDENTIFIED SPEAKER: What computer model did you use to assess the risk associated with transporting the pits from Pantex to Manzano? I have a series of questions I want to ask.

MS. FOUNDS: It is the adroit model, and that was one that was developed by Sandia National Laboratory. The Department has used it in what are called the DIPTRA, which is an accident analysis scenario, so that is what was identified in the document as the model that was used to assess transportation.

HT13/50
16.019

UNIDENTIFIED SPEAKER: In that model, there are several options for how you input the human population numbers along the transportation route?

MS. FOUNDS: Yes.

UNIDENTIFIED SPEAKER: Can you tell me which of the options for the input of population data into those model runs, which of those options were used?

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HT13/50
16.019
continued

Are there some default values such as rural is one person per square mile, urban is five persons per square file, suburban is 2.5, defaults values, then there are more specific ways to enter population data into the model?

MS. FOUNDS: For the population, et cetera, what we used was the 1990 census data along those transportation routes in order to get very specific cumulative doses to the population on those transportation routes.

HT13/51
16.020

UNIDENTIFIED SPEAKER: The default values are also calculated from the 1990 census. I think my question was more specific in that we have this route, I-40, between Amarillo and Manzano, and I am wondering whether actual population data for, let's say, a quarter mile, approximately, on either side of I-40 between Manzano and Pantex, is that the sort of information that was used, or was it just the default value plugged in where the default value also comes with the '90 census, but it is like a statewide average or a regional average for rural and suburban?

MS. FOUNDS: I will have to go back and check for specifically the radius that was used, et cetera, but I can tell you that you are much more than several meters and things like that away from the

HT13 (CONTINUED)

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outside of the trucks themselves. You don't have large exposure, and it is not much of a background, so it falls off very rapidly.

HT13/52 16.021

UNIDENTIFIED SPEAKER: Could you give me an answer in sufficient time so I could submit a written comment about the values before the deadline?

MS. FOUNDS: Yes, I can do that.

UNIDENTIFIED SPEAKER: I was looking again and couldn't find it. Perhaps I have missed it in volumes 1 or 2 for the discussion of the tritium risk, current and proposed activities in Pantex. I understand during disassembly, they have to take the tritium bottles off of the weapons, and sometimes there may be trouble with the valves being open that should be closed.

HT13/53 14.046

I didn't see any discussion in here of the number of times that a base had to be shut down because of tritium release setting off the monitors, and I didn't see any analysis of what the health risk was from the tritium exposures that happened during dismantlement in the current report.

I didn't see any more generalized analysis of should an accident happen that allowed tritium to go into a water form and escape from the building kind of what the analysis of the public and environmental

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HT13/53 14.046 continued

health and safety was. Did I miss it somewhere, or is it not in here?

MS. FOUNDS: Let me make sure that I understand. You are saying that there are many scenarios by which the alarms go off at Pantex?

UNIDENTIFIED SPEAKER: There is a history, isn't there?

MS. FOUNDS: From what basis?

UNIDENTIFIED SPEAKER: Tritium.

MS. FOUNDS: From what basis that the alarms go off consistently?

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: I didn't say "go off consistently," but I have heard there's been a number of incidents were tritium has escaped from a weapon that was under dismantlement.

MS. FOUNDS: I believe in our accident scenario, it does go through, and it talks to that.

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: I didn't see any accounting of the numbers of tritium releases that have happened inside.

MS. FOUNDS: In terms of that, we look at the probability of that happening, and it is in one of the scenarios that we give, and I can't identify exactly which scenario. If I can, after this comment period, we will go through and look at that particular

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scenario, but we do go through and look at the probability in order to come up with our risk numbers, and again, we looked at that and then came up with the bounding accident scenarios.

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: How many times has there been tritium released during dismantlement to this point in time?

MS. FOUNDS: I believe there was one incident out there in the cell, and that cell is currently not operational.

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: In your bounding scenario that you have got, you are ballparking how many times that will happen as we move ahead into the future?

MS. FOUNDS: That would be consistent with the dismantlement. We were looking at -- in our analysis of the 5,000, 1,000 and 500 levels, we looked at that for consistency with those numbers as if we were dismantling those, completely dismantling those weapons.

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: Do you expect there to be a subsequent tritium accident where there is tritium released?

MS. FOUNDS: Again, that is defined by our risk analysis, and those probability numbers are given

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there. Cecil -- I can go over that with you in the document.

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: Is it the usual 1 x 10-4 when you have already had an accident that was 1 x 1?

MS. FOUNDS: As I said, I can go through that with you in terms of the probability. I will be happy to show it to you.

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: What I am suggesting in my comment is really the failure to report accurately on the accidents that have already occurred at Pantex.

MS. FOUNDS: We actually do discuss that cell scenario in this document, and I'd like to look at that with you.

UNIDENTIFIED SPEAKER: Let me just finish my comment, if it is okay.

MS. FOUNDS: Sure.

HT13/53 14.046 continued

UNIDENTIFIED SPEAKER: The failure to really have a full discussion of the accidents that have already occurred makes the public reader of these documents be somewhat skeptical about the extremely low estimates about accidents happening and extremely low estimates of health effects from the accidents that come about.

HT13 (CONTINUED)

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HT13/53 14.046 continued — A more full discussion of the accidents that have already occurred, I think, would have contributed to a much greater sense of public credibility and that which I think you will be encountering through the rest of this process.

MS. FOUNDS: Thank you for your comment.

MS. BERGMAN: I'd like to suggest that we take a ten-minute break and come back again at 7:35.

(Recess taken and reconvened.)

MS. BERGMAN: We are ready for more questions or comments. Would anyone like to start?

HT13/54 15.041 — UNIDENTIFIED SPEAKER: When you did your aircraft crash analysis for Pantex, you assumed it would be in what kind of container?

MS. FOUNDS: You mean the pits?

UNIDENTIFIED SPEAKER: Yes.

MS. FOUNDS: I believe the analysis was done on the AL-RA for the aircraft crash scenario. I want to make sure that I point out that the dominant scenario is a weapons incident out there, and that is what the dominant scenario is for Pantex. I will also check and confirm that that analysis was done on the AL-RA.

HT13/55 14.047 — UNIDENTIFIED SPEAKER: In your accident analysis, you have a puncture, so that is a puncture

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HT13/55 14.047 continued — of one pit container, right?

MS. FOUNDS: That is correct.

HT13/55 14.047 continued — UNIDENTIFIED SPEAKER: Did you ever consider the possibility that there could be more than one?

MS. FOUNDS: Well, in general, what you are looking at is the operation of the loading and unloading, and that is, essentially, the time on the forklift, so in general, it would not be credible to state that you'd have two punctures, two cans, because you don't have that ability to puncture multiple containers.

The other thing that I do want to point out is that there is a conservative analysis in terms of the ability to puncture those containers because the AT-400 undergoes a drop test where it is dropped from 30 feet onto a spike, and we have had pictures of that. That is part of the process to certify that it meets those standards for Type B packaging, and it does not damage, it does not breach the containment. You might see a few dents on the outside of the container.

The container itself weighs about 350 pounds and is stainless steel, so again, it is a fairly conservative analysis that assumes that it will get punctured.

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Any other questions?

HT13/56 14.048 — UNIDENTIFIED SPEAKER: Yes, ma'am. What is the fire tolerance?

MS. FOUNDS: Again, it is the fire standards that are appropriate for Type B packaging, and at this moment, I can't remember the temperatures that it is exposed to, but it is like a 30-minute fire test, and they are tested in serial. They will drop them, they do the crush test, and then they do the fire test.

HT13/57 16.022 — UNIDENTIFIED SPEAKER: I just want to make sure I understood. Would you repeat what you said about the drop onto a spike in terms of transportation testing?

MS. FOUNDS: I believe that is a -- I said 30 feet, right? Drop onto a spike that has a flattened surface on it.

HT13/57 16.022 continued — UNIDENTIFIED SPEAKER: Would you then explain why on page 4-256 of the document it says the puncture test is a free drop of 40 inches onto a 15-centimeter diameter steel pin?

MS. FOUNDS: I believe that is one of the tests. This is another part of that test, and again, the videotapes can show that, but --

HT13/57 16.022 continued — UNIDENTIFIED SPEAKER: Again, to clarify, because I am trying to understand what is the

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HT13/57 16.022 continued — information people should rely on, on page 4-256, the 30-foot drop test which you have talked about, and this is a quote, "a 9 meter 30-foot drop onto an unyielding surface." It is not onto a pin or a spike. It is onto a flat, unyielding surface. I just want to clarify what you are saying in relation to what is in the document.

MS. FOUNDS: There are multiple standards that this thing must go through, and one of them is dropped onto an unyielding one, then there is also the ones onto the --

MS. BERGMAN: I think Don's point is that the distance is different between what you are saying and what the document says, and we will go back and double-check that.

Dave?

HT13/57 16.022 continued — UNIDENTIFIED SPEAKER: In the document that was identified or accepted by the Department of Energy for its container certification, and I assume you are talking about the AT-400 certification, there are three tests that are done. One is a 9-meter or approximately 30-foot drop test. The other is a drop test on an unyielding object. The other test is a puncturing test where they drop it from a lesser distance, and I believe it is 40 or 50 centimeters. I

HT13 (CONTINUED)

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HT13/57 16.022 continued

am not sure, on the spike that they are talking about.

These tests are done in sequence, and then there is also a temperature test. Those tests are done and required by the NRC for certification of over-the-road transport of special nuclear material.

UNIDENTIFIED SPEAKER: I do want to point out that in these documents, please go back for very specific measurements to the document.

DR. KERLINSKY: My name is Dr. Dan Kerlinsky. I am with the New Mexico Physicians for Social Responsibility. We heard a lot of discussion in the SS&M. There is an S&M --

MS. FOUNDS: It is storage and disposition, and that is referred to multipally as --

MS. BERGMAN: He was talking about the stockpile stewardship and management.

HT13/58 14.049

DR. KERLINSKY: We don't have any records about how these pits are going to hold up in the coming decade, so we need to invest multiple billions of dollars in doing research to see if problems could develop in these pits sometime in the next 10, 20, 30, 50 years. There is a lot of discussion about multiple billions of dollars going into trying to answer those questions.

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Then when we get to the pit storage site when we have to ask how stable are these 20,000 pits in storage going to be over the next 50 years, somehow, did I miss, again, somewhere in this document where there is some discussion of what the stability of the pit is going to be over the next 50 years and what sort of research is underway to see what the long-term storage risks are? Because certainly, with a city like Albuquerque, which is kind of -- may not have the history of Pantex, the notion of thousands of pits coming here where we don't know what the long-term stability of the pit is going to be inside the containers that are being developed, did I miss that?

MS. FOUNDS: Let me make sure that I clarify in a couple of areas. For stockpile stewardship and management, they are concerned about the performance as a nuclear weapon, and that is a key to looking at their alternatives and things like that. That is a little bit different in terms of the stability in terms of a hazard to the public and things like that.

This isn't going to necessarily decay or things like that. They are in these containers. The containers are sealed, and there is a surveillance program so that we will monitor the aging effects of

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the pits and be able to assess what kinds of problems there could be, if indeed there are any.

HT13/59 14.050

UNIDENTIFIED SPEAKER: Currently, how many of those pits in storage are actually under surveillance or actually looked at visually each year of the 12,000 whatever it is pits in storage in Pantex? How many of them are actually taken out and looked at each year? Could you give us a ballpark idea?

MS. FOUNDS: How many each year, it is in the document, and I discussed this with my office partner because he was one of those people. It is around like ten, I believe, a year.

UNIDENTIFIED SPEAKER: Ten out of that 12,000?

MS. FOUNDS: What it is is Sandia goes through and does a statistical analysis and does present a sampling regime for looking at those pits, and they will continue to monitor those things to determine aging effects in terms of the stability.

HT13/60 14.051

UNIDENTIFIED SPEAKER: What is the length of time that the current containers have been studied to see how effective their seal has been?

MS. FOUNDS: In terms of the AT-400, those are recent designs.

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HT13/60 14.051 continued

UNIDENTIFIED SPEAKER: So what is the track record?

MS. FOUNDS: The history of these particular ones, since they have only been designed in the recent years, there isn't historical data to go back 10 or 20 years.

HT13/60 14.051 continued

UNIDENTIFIED SPEAKER: The reason why I ask is the similarity between the stockpile stewardship concern about what is going to happen to plutonium in the aging pit inside a very carefully sealed weapon where there's been decades of study of humidity, moisture, air pressure, materials compatibility --

MS. FOUNDS: It provides a good basis for what we are doing with the AT-400.

HT13/60 14.051 continued

UNIDENTIFIED SPEAKER: With all this study, they are still investing multiple billions of dollars, because if you get a leak inside your pit, inside your container, inside your weapon, if there is even a pinprick air hole, you can get moisture introduced inside a weapon, and the moisture can cause all sorts of problem, and oxygen, as we know, with these materials can cause all sorts of problems, but somehow, those same sorts of problems could happen with the pit in storage, could it not, if the seal on the containers is broken?

HT13 (CONTINUED)

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MS. POUNDS: Some of those things do not present a hazard to the public in terms of the health risk. What they are very concerned about in terms of some of those is its operation as a nuclear weapon, again, to produce a yield that is reliable, et cetera. So we are interested in making sure that there is not a process going on inside of those containers that we are not aware of, and we are pretty much aware from the vulnerability studies and things like that what kinds of processes go on. Again, that is why we have designed the AT-400 the way it is.

HT13/60 14.051 continued

UNIDENTIFIED SPEAKER: I may be wrong about this, but apart from the risk of a criticality accident, a nuclear explosion, aren't there also risks from the plutonium meld getting oxidized, and isn't the oxidized metal more mobile than the metal itself in the shape and the form of the pit? Isn't there a flammability risk for the plutonium metal as well? I thought I understood there were those two potential risks.

MS. POUNDS: I think what you are doing is talking about plutonium vulnerability studies like up at Rocky Flats and how it was stored, so we are storing it differently than how they were in those containers, and again, those containers were in powder

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form, et cetera. You talk about a couple of things. Criticality, there is not a criticality problem with these pits in that form. Again, they are in sealed containers, and we are going to be monitoring them throughout this process to make sure that we understand what the aging processes are.

HT13/61 14.052

UNIDENTIFIED SPEAKER: Are you saying there is no flammability risk for the pits that are in storage in the current containers?

MS. POUNDS: Plutonium, particularly in a powder form, has somewhat of a flammability issue. However, in the pits, in the pit form, it doesn't present that same problem.

UNIDENTIFIED SPEAKER: So are you saying it is pyrophoric, meaning that it ignites on contact with air?

MS. POUNDS: It can ignite.

HT13/62 14.053

UNIDENTIFIED SPEAKER: So if your container developed, for example, a pinprick --

MS. POUNDS: It would not ignite. The pits would not ignite.

HT13/62 14.053 continued

UNIDENTIFIED SPEAKER: If the seal on the pit developed a pinprick hole or rusting crack --

MS. POUNDS: It would not ignite.

HT13/62 14.053 continued

UNIDENTIFIED SPEAKER: -- then the plutonium

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HT13/62 14.053 continued

metal became oxidized from the contact with the oxygen which it wasn't supposed to have, and you had some plutonium in an oxide form inside the plutonium metal pit, and if it was exposed to air, are you saying there is no flammability risk and no dispersal risk?

MS. POUNDS: From the scenario you outlined, there really isn't a flammability issue.

UNIDENTIFIED SPEAKER: Because why?

MS. POUNDS: Because the form that the pit is in does not present itself as a highly flammable issue. Also, the oxidation reaction does not immediately ignite the rest of the pit.

HT13/63 14.054

UNIDENTIFIED SPEAKER: If you drilled a hole, for example, through your container, then you drilled a hole through a pit, and you left it sitting out in the sun for a couple of decades, there wouldn't be any problems whatsoever with any health or safety or environmental problems with the these stored pits? Is this what you are saying?

MS. POUNDS: I don't think that the Department has ever considered that scenario. We understand the hazards that are involved with these materials and take very meticulous care of it in order to make sure that we are not going to have a problem.

HT13/64 14.055

UNIDENTIFIED SPEAKER: What is the

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HT13/64 14.055 continued

difference between a drilled hole and a pinprick hole in terms of introduction of oxygen into a part of the nuclear weapon pit that wasn't designed to have contact with oxygen? If you have never considered this scenario that, in fact, you might have a leak in a storage vessel --

MS. POUNDS: I am not sure what you were saying --

UNIDENTIFIED SPEAKER: -- environmental element, what is the use of all these documents?

MS. POUNDS: Let me go back to this gentleman.

HT13/65 14.056

UNIDENTIFIED SPEAKER: Isn't it true that the container in which the pit is placed is multilayered, there is metal, there is styrofoam, and there is stainless steel? We are not talking about going through the external wall of the pit container, and then you have got the pit right there.

MS. POUNDS: Right, because even though, for instance, if you punctured it with a forklift, there is not an ignition hazard.

UNIDENTIFIED SPEAKER: What if you had a pinprick hole --

MS. POUNDS: What I am saying is that I have considered the accident scenario where you puncture

HT13 (CONTINUED)

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the container so that you expose that, it comes out, you have a dispersal, but there is no, as I said --

HT13/66 14.057

UNIDENTIFIED SPEAKER: What if you puncture a pit, what happens then?

MS. FOUNDS: You have the ability to disperse the plutonium.

HT13/66 14.057 continued

UNIDENTIFIED SPEAKER: How much of the pit would disperse?

MS. FOUNDS: How much? I think we consider about -- for conservative purposes, okay, we analyzed, I believe, about 20 percent of the pit.

HT13/66 14.057 continued

UNIDENTIFIED SPEAKER: How would it actually get dispersed from a puncture?

MS. FOUNDS: Again, the scenario that we considered was that because of the mechanical properties, it would be damaged in a mechanical sense, and it would be formed into particles that could actually come out of the container itself.

HT13/66 14.057 continued

UNIDENTIFIED SPEAKER: These would be metal particles or oxidized?

MS. FOUNDS: They probably would be oxidizing as part of the process, but it is not a --

HT13/67 14.058

UNIDENTIFIED SPEAKER: Over what length of time would that oxidation process and dispersal process happen if you have had a puncture through a

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HT13/67 14.058 continued

pit?

MS. FOUNDS: Minutes.

HT13/67 14.058 continued

UNIDENTIFIED SPEAKER: Then how would the dispersal occur? Would the process of oxidation actually suspend some of these particles into air spontaneously without it having to receive further kinetic energy?

MS. FOUNDS: You could get it from the mechanical properties and things like that, but the dispersal mechanism, again, it would just be a mechanical dispersal from the kinetic energy from the forklift puncture, and it would not be dispersed in a wide area.

MS. FOUNDS: We are fairly conservative because, in general, a forklift puncture would not cause a high amount of this material to be dispersed, so we are being conservative in our analysis.

HT13/68 14.059

UNIDENTIFIED SPEAKER: So if you had somebody that opened up 100 pits and poked holes in all of them, this kind of scenario like an internal sabotage scenario, somebody was really mad at the DOE for getting laid off from their job after serving their nation for 25 years in a job where they get picked on by the public all the time, and they went in and they opened 50 of these containers and poked holes

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HT13/68 14.059 continued

in pits and walked out, what would the general scope of plutonium dispersal impacts be? Did I miss it somehow?

MS. FOUNDS: You missed that one in there because that is not considered a credible --

HT13/68 14.059 continued

UNIDENTIFIED SPEAKER: Same where the wind is blowing 50 miles an hour?

MS. FOUNDS: That one is considered an incredible.

MS. BERGMAN: We don't look at incredible accidents, and that one is considered incredible.

HT13/68 14.059 continued

UNIDENTIFIED SPEAKER: But you have all the security around Pantex and the Kirtland base, and you don't consider that.

MS. BERGMAN: We need to, and that is one of the things that is discussed in there, if the pit storage operation was moved to Kirtland, there would have to be some upsizing of the security force in order to protect it, so that is discussed.

HT13/69 16.023

UNIDENTIFIED SPEAKER: So if you are transporting 8,000 pits, and somebody gets ahold of a shipment -- I forget how many pits are on the typical shipment.

MS. FOUNDS: About 20.

UNIDENTIFIED SPEAKER: So somebody got ahold

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HT13/69 16.023 continued

of 20 pits and decided to poke holes in them --

MS. BERGMAN: You can't pop the containers open. It is still an incredible.

MS. FOUNDS: If you can show me the bit that is going to go through that container, I'd like to see it.

UNIDENTIFIED SPEAKER: What?

MS. FOUNDS: If you can show me the bit --

HT13/70 16.024

UNIDENTIFIED SPEAKER: What is the material that is so powerful?

MS. FOUNDS: It is stainless steel.

HT13/70 16.024 continued

UNIDENTIFIED SPEAKER: How thick is this?

UNIDENTIFIED SPEAKER: In the last couple or three years on the front page of our newspapers, we saw on opened plutonium canister and a powdered substance, which was plutonium, and it was caused by a pinprick hole, and the comment of the Los Alamos scientist was, "We don't know very much about storing plutonium," so it comes a little bit out of our experience as citizens.

MS. FOUNDS: What were the documents you were looking at?

UNIDENTIFIED SPEAKER: The front page of the newspaper, and it was a powdered plutonium.

MS. FOUNDS: That is not what we are

HT13 (CONTINUED)

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considering here. Again, as I showed you, it is a metal form that is about that size, and they are not in a powdered form.

UNIDENTIFIED SPEAKER: This had not been when it was stored.

MS. FOUNDS: Right, that is what you are looking at, and the article was very specific for the type of storage operations, I believe at Rocky Flats, is that correct?

UNIDENTIFIED SPEAKER: This was at Los Alamos.

MS. FOUNDS: We are talking about a form where you have got it in a pit, which is essentially a ball, but it is not the highly dispersible form when you have it as a pit as opposed to the powder.

MS. BERGMAN: When was it in the paper?

UNIDENTIFIED SPEAKER: I think it was a couple of years ago. I remember that we talked to the scientist when we went up there for a hearing, and he just said, "We really don't know much about the storage of plutonium."

UNIDENTIFIED SPEAKER: Here I am with my memory again. As I recall, the incident you are talking about was at the Rocky Flats plant, and it was about some plutonium pieces that were stored in a

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glove box, in a stainless steel unsealed can that was put there, and they were in process when in 1989, the Secretary of Energy ceased processing it at the Rocky Flats plant.

In fact, there was a leak in that can, and the plutonium did, in fact, turn to oxide. There was no fire. There was no release because it was inside the glove box. As far as someone saying, "We don't know very much about storing plutonium," I can't comment on that because the Department of Energy, at least up to six months ago, knows a considerable amount about storing plutonium as pits.

UNIDENTIFIED SPEAKER: I don't think it is the same instance because this seemed to have taken place in Los Alamos, and the person we spoke to was at Los Alamos.

MS. FOUNDS: Do you know the person you spoke with?

UNIDENTIFIED SPEAKER: Dan, do you remember this, that young physicist who said, "We don't know much about storing plutonium"? He carried a mock-up to a hearing we went to.

MS. FOUNDS: A mock-up of what the thing had looked like?

UNIDENTIFIED SPEAKER: Joe Marks.

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MS. BERGMAN: Does anybody else have any questions?

UNIDENTIFIED SPEAKER: I do, but let him go ahead.

HT13/71 16.025

UNIDENTIFIED SPEAKER: Somebody passed me this nice diagram, AL-R8, and this is what you were telling me was the container that was so secure that nobody could ever get a hole through it?

MS. FOUNDS: That is the one that is currently used for storage at Pantex. The AT-400 is a different container, and again, where did it go? There is a mock-up of the container back here, and there are specifications of the container here, too. You have it, I believe, there on the left-hand bottom picture. There is the AL-R8 -- I'm sorry the AT-400, and it is in the process of being certified as a Type B transportation container.

HT13/71 16.025 continued

UNIDENTIFIED SPEAKER: It is a quarter-inch stainless steel, this new one that is proposed that isn't yet being used, that is a quarter-inch.

MS. FOUNDS: And the other one was three-quarter-inch stainless steel with overpacks in it, and then the pit itself rests inside of both of those vessels.

HT13/71 16.025 continued

UNIDENTIFIED SPEAKER: So you are saying you

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HT13/71 16.025 continued

don't think it would be possible for anybody to get that container open following a transportation accident because of that quarter-inch of stainless steel?

MS. FOUNDS: You are also in safe, security transport trailers.

HT13/71 16.025 continued

UNIDENTIFIED SPEAKER: Well, again, the credibility of believing that that sort of container would be so -- that there would be no possibility whatsoever that that container could be breached under any sort of accident scenario --

MS. FOUNDS: I believe we do go through in the document and go through the forklift accident which does describe the risk associated with that kind of a Pu dispersal, and we consider that to be a bounding case, so anything that you would be considering, the multiple scenarios you are considering are probably incredible, but the other ones would have less dispersal than what would be considered by our forklift puncture scenario.

HT13/72 14.060

UNIDENTIFIED SPEAKER: Page 5-61 of the draft statement says that each of the bunkers at Manzano has the capacity to store up to 800 pit containers in a stage right configuration, and you showed the stage right configuration in your slide

HT13 (CONTINUED)

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HT13/72 14.060 continued

show. Has there been a safety analysis report done on storing 800 -- up to 800 pits in those bunkers?

MS. FOUNDS: No.

HT13/73 14.061

UNIDENTIFIED SPEAKER: Has the safety analysis report for storing pits in zone 4 at Pantex been updated since I believe it -- was it the 1993 safety analysis report that was done at the time of the EA for interim pit storage at Pantex?

MS. FOUNDS: It is currently being updated. Tracy, can you give me the time frame? I know for that one. I believe it is into Albuquerque in a concurrence process for the update.

HT13/74 24.002

MR. HANCOCK: My specific question is, and what my comment would be, is that that safety analysis report be made available as the previous safety analysis report for zone 4 was made available to the public, and I specifically, Don Hancock, Southwest Research and Information Center here in Albuquerque, want to be noticed when that safety analysis report is available.

MS. FOUNDS: Thank you for your comment. We will interact with the plant to get those documents out.

MS. BERGMAN: Did you have a question?

UNIDENTIFIED SPEAKER: If no one else does.

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HT13/75 14.062

Back to the AL-R8 which is currently being used at Pantex, that has an oxygen atmosphere, and it is not a neutral atmosphere, it is not a sealed container, am I right?

MS. FOUNDS: When you say a sealed container --

HT13/75 14.062 continued

UNIDENTIFIED SPEAKER: You haven't put a special neutral helium in there, and you are not preventing oxygen from getting in there. It is just air, right?

MS. FOUNDS: I believe that is correct.

HT13/75 14.062 continued

UNIDENTIFIED SPEAKER: Thank you. So what I would like to know is how this document accounts for not just an accident like if a forklift threw something, but a pit that has a minor flaw that you all had checked for but overlooked so that over time, years of storage, you once again have this perhaps pinprick sort of thing going on in a container where oxygen is present, so you have your plutonium to oxidize over time and perhaps surprise some worker when they open that canister at some later date.

How does this document evaluate that kind of scenario?

MS. FOUNDS: You are talking about the aging, et cetera. Again, what it has looked at is

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primarily the AT-400 as the long-term -- interim storage container for this analysis, and it has documented that the procedures that we will be using is to continue to monitor the pit for these types, as you said, of flaws to identify any aging effects to the material in those containers.

HT13/76 14.063

UNIDENTIFIED SPEAKER: Do you stand by your earlier comment that about ten pits per year are all that are examined out of the almost 8,000?

MS. FOUNDS: Yeah, I think that is --

HT13/76 14.063 continued

UNIDENTIFIED SPEAKER: That is the number that I think are destructively tested.

MS. FOUNDS: That is right, that is the number that are destructively tested out there. I will go back and check those numbers.

HT13/77 12.004

UNIDENTIFIED SPEAKER: Are you all, in this document, proposing that the pits, currently AL-R8 containers, be transferred into AT-400 containers in this interim time frame?

MS. FOUNDS: Yes.

HT13/77 12.004 continued

UNIDENTIFIED SPEAKER: What is that time frame? Over what period of time would that transfer be done?

MS. FOUNDS: Well, in terms of my understanding is that it would be sort of on the

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availability of the containers themselves, and they would be specific for the type of pits, and time frames would be something on the order of four or five years, but I would have to check and make sure what those schedules are.

HT13/78 14.064

UNIDENTIFIED SPEAKER: Where are the impacts, including radiation exposures, from that transfer to be discussed in the Pantex draft EIS?

MS. FOUNDS: It is -- let's see. Cliff, can you help me out on that particular one? We discussed that before in terms of where that was handled in the document.

MR. JARMAN: For the pit repackaging as currently written down, the packaging may be undergoing some changes in how they foresee doing it. Currently, in written plans, they were looking at doing that remotely, and so the amount of repackaging would be in with some of the other activities from the Pantex plant workers that you had mentioned before. That is why it is different at the Pantex plant than the other sites. Some of that was repackaging.

As plans are being finalized as to exactly how they might repackage certain pit types and lines, we are getting some more information on that. During the final, we will be looking at the estimates for

HT13 (CONTINUED)

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worker exposure.

HT13/78 14.064 continued

UNIDENTIFIED SPEAKER: Just to clarify that, you are getting information to use in the final, so there will be -- this further information you are talking about will be available before the final? I am trying to figure out essentially where it fits in.

MR. JARMAN: If they officially change their plans before the final is finished, we will have it in the final. If they don't change their plans on how they are doing it, then it is already included. If they change their plans after the final is done, that is not my call.

HT13/78 14.064 continued

UNIDENTIFIED SPEAKER: Let me say what I understood you to say so you can correct me if I misheard. You are saying that any worker exposures, radiation exposures to workers, for this transfer from the AL-R8 to the AT-400 is covered in the overall worker exposure analysis of operations in this document?

MR. JARMAN: In the total, yes.

HT13/78 14.064 continued

UNIDENTIFIED SPEAKER: Is the operation -- is that operation, in terms of where it happens at Pantex, in terms of what facilities, et cetera, is that discussed in the document, and if so, where?

MR. JARMAN: No, it is not discussed in

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detail in the document. Most operations, single operations as to what building each single operation at the Pantex plant takes place in, the procedures by which it takes place, how many people are involved in each procedure, none of that is discussed in that level of detail in the document.

HT13/78 14.064 continued

UNIDENTIFIED SPEAKER: Is there a safety analysis report or other document that describes this transfer process?

MS. FOUNDS: One of the things that I do want to make reference to, is the information is in documents at the Pantex plant which discuss more of that type of detail in them.

HT13/78 14.064 continued

UNIDENTIFIED SPEAKER: I am asking you now to tell me which specific document that you are talking about.

MS. FOUNDS: The Pantex has information documents. They are the program information documents, the environmental information documents and the safety information documents, and those describe operations in a little bit more detail for that type of thing in those documents.

HT13/78 14.064 continued

UNIDENTIFIED SPEAKER: Again, just so we are speaking the same language, those three documents that I heard you talk about are what I call the three

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HT13/78 14.064 continued

background information documents.

MS. FOUNDS: Yes.

HT13/78 14.064 continued

UNIDENTIFIED SPEAKER: I don't recall, and if there are people here that know these documents better than I, that is why I am asking, I don't recall in any of those three background information documents that this transfer procedure is, in fact, described. If it is, I would like somebody who knows that to tell me, because I missed it, and I'd like to read it.

MS. FOUNDS: We will have to find out and get back to you on that.

UNIDENTIFIED SPEAKER: Are these documents released yet?

MS. FOUNDS: I believe there have been copies sent to several individuals. They are also in the reading rooms.

MR. JARMAN: There are copies here in this reading room in Albuquerque and more copies, I believe, are going to be delivered.

UNIDENTIFIED SPEAKER: I requested a set of them.

MS. FOUNDS: They are in the printing process, so if you are on the mailing list, et cetera, and have requested those -- Cecil?

MR. BLACK: As you said, they are not back

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from the printer yet. What we have is an advanced copy that we made a copy of and put in the library here.

UNIDENTIFIED SPEAKER: I just wanted to make sure I understood the differences between the plans for the plutonium pits and the can assemblies. Do I understand correctly that there is no consideration of storage of can subassemblies along with the plutonium primary pits? Currently, are can subassemblies being stored in Pantex, and are they under consideration for storage in Albuquerque?

MS. FOUNDS: Only as part of the continuing operation, they are shipped to the Oak Ridge facility, and that is where they are being processed and then stored, so in Pantex's part of the continuation of operations, they would not be stored other than staged out to Oak Ridge.

UNIDENTIFIED SPEAKER: So they generally get shipped off as soon as they are dismantled?

MS. FOUNDS: Within a reasonable lot, so to speak.

HT13/79 01.015

UNIDENTIFIED SPEAKER: As I imagine the process, then they go through a series of disassembly of the can subassembly to separate the different layers of metal, et cetera, so the final storage of

HT13 (CONTINUED)

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HT13/79 01.015 continued

the can subassemblies, is that considered anywhere?

MS. FOUNDS: Not in our documents, because the scope of our document was to consider the transportation of those to the Oak Ridge site.

HT13/80 01.017

UNIDENTIFIED SPEAKER: I wouldn't be incorrect in assuming that there is much more processing of a can subassembly that has to go on before it is ready for some sort of storage and the processing involved in the plutonium pit once it is removed? Is that correct?

MS. FOUNDS: Yeah. For the plutonium pits, yes, it is just a mechanical disassembly, et cetera, and the exact process out at Oak Ridge that they undergo, I am not that familiar with.

HT13/81 02.010

UNIDENTIFIED SPEAKER: Have they decided what they are going to be doing with the metal components from Oak Ridge once they have disassembled the secondaries to the point that they could go into storage that is equivalent to what the plutonium storage would be, and would these sites possibly be considered in the future for storage of components of the secondaries the way we are currently looking at storage of the primaries?

MS. FOUNDS: Cecil?

MR. BLACK: Can subassemblies are shipped to

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the Oak Ridge Y-12 plant. The only involvement Pantex has in those components is to ship them to Oak Ridge. At Oak Ridge, they take care of any processing, any disassembly and any storage that is done on those, and for that, we'd refer you to the Y-12 EA which was published about a year ago.

HT13/82 02.011

UNIDENTIFIED SPEAKER: They were not planning on shipping any of those components that are disassembled from the secondaries back to Pantex or Albuquerque for -- it is all going to stay at Y-12 and Oak Ridge?

MR. BLACK: As far as the future goes for all the stockpile management activity including that, please look at the stockpile stewardship and disposition PEIS where it picks up where the other left off and handles all those activities.

HT13/83 02.012

UNIDENTIFIED SPEAKER: You understand my general concern is you develop a bunker that can store a pit in a storage vessel, then you have got a bunch of spherical uranium or plutonium in the secondary components that need to go in at some point in a storage bunker inside a container format. Wouldn't we be looking at the potential of once we put, for example, an Albuquerque bunker system into process, we'd be looking at potentially in the future getting

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HT13/83 02.012 continued

more than just the primary pits and looking at potentially getting a variety of others?

MS. BERGMAN: We are not aware of any plan like that, but that would be addressed in the SS&M.

HT13/83 02.012 continued

UNIDENTIFIED SPEAKER: So the can subassemblies would be going into underground storage at Oak Ridge, or they have got a whole different --

MS. BERGMAN: We don't know. We didn't cover that in this EIS.

MR. BLACK: Long-term storage and disposition of materials coming from that would be handled by the storage and disposition PEIS.

MS. BERGMAN: Don?

HT13/84 13.006

MR. HANCOCK: Reference page 6-4 in the draft where it talks about permitting and specifically permitting at Manzano if pit storage was done, and I have several questions related to that. Has either the Department of Energy -- has the Department of Energy had discussions with the New Mexico Environment Department about what kind, if any, of permit modifications would be needed if the pit storage was done at the Manzano site?

MS. FOUNDS: No, there have been no consultations with the New Mexico Environment Department on this. We have briefed some of the

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committees on these particular actions.

HT13/84 13.006 continued

MR. HANCOCK: Has the Department -- does the Department have a position about whether pit storage would be subject to a RCRA permit at Manzano or any other site?

MS. FOUNDS: Since this is not waste or surplus material, it would not be part of a RCRA permit.

MR. HANCOCK: Reference page 6-4 which says in the discussion it has about permit requirements and the fact that Kirtland has an existing permit, it says that new permits or permit modifications could be required. Would you explain that statement in relation to the statement that you just made, Nan?

MS. FOUNDS: Basically, we are just trying to make sure that any type of waste streams from just the monitoring, which would be minimal at best, would be covered, and those types of things would have to be, but it does not include the pits themselves.

HT13/84 13.006 continued

MR. HANCOCK: So will the final EIS have a clear statement about what RCRA permitting requirements the Department feels will be necessary at Manzano or any other site from a RCRA standpoint?

MS. FOUNDS: Can I make sure? Your comment was for which page? 6-4, we will look at that in

HT13 (CONTINUED)

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terms of our other discussions in there about our activities going on.

HT13/84 13.006 continued

MR. HANCOCK: Just as a follow-up to complete the loop, and I have primarily been talking about the Manzano site, but the question really relates to that I was surprised that the draft singles out Kirtland for that on this page. The Pantex site, of course, also has a permit, so the question is is the similar waste stream modification, to use your term, or waste stream results, would that be included at any site that had a RCRA permit?

MS. FOUNDS: Now, at Pantex, since they are currently doing this operation, it is included as part of their levels, et cetera.

HT13/84 13.006 continued

MR. HANCOCK: To make sure I understand, you are saying that the existing Pantex Part B permit covers storage of 20,000 pits at Pantex?

MS. FOUNDS: Let me go ahead --

MS. BERGMAN: It is not RCRA. It wouldn't fall under --

HT13/84 13.006 continued

MR. HANCOCK: RCRA waste might result from those kinds of operations, but that is not saying those are RCRA-type waste.

MS. BERGMAN: The section under Manzano, we cannot be covered by the Air Force permits, so

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whatever permits would be needed, if any, we have to go and get ourselves. We cannot fall under Air Force permits, so that was the intent.

MR. MARTIN: That question was asked specifically of us, and I talked to my compliance chief to make sure, and he said, "No, they have got to get their own. They can't use ours."

MR. BARTOSCH: Waste management. Jim Bartosch, Tetra Tech. In this particular one, Kirtland, because of the memorandum of understanding that has not been drafted yet, we didn't know what the exact language would be for the Manzano area and any waste that would be generated in the storage process. As an example, the safety worker, maintenance or repair, we put this statement in to tell you that there could be a permit modification either through Sandia or through some combination with Kirtland.

I understand what the major just said, but we put that statement, and the Savannah River and Hanford sites we believe generate similar types of waste in managing plutonium in some form or another for similar types of storage activity waste streams, and they could easily add that activity without having a permit modification.

In the case of Pantex, since they currently

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store plutonium, they currently generate small quantities of waste in inspection, in security checks, in minor maintenance of the magazines, that type of activity, it clearly fits within their permit, and therefore, there was no statement similar to this one that pit storage activity would generate a permit modification at Pantex.

HT13/85 13.007

UNIDENTIFIED SPEAKER: To follow up on that helpful comment, is there a document that exists that describes that analysis that you just gave?

MR. BARTOSCH: For Pantex, the information identifies the types of waste they generate per certain activities, and that information is in there. In terms of their permit, they list also waste streams that cover a wide range of activities including storage of plutonium.

In terms of the other sites, yes, you can go back to their permits and, again, any additional documents like a notice of registration for waste stream lists, and I can't speak facility by facility within those cells, but again, we believe that the information exists that would not require a permit modification because of pit storage.

HT13/85 13.007 continued

MR. HANCOCK: My comment would be that prior to the time of the final, I would hope there would be

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HT13/85 13.007 continued

some written-down analysis that would be either included in the EIS or referenced in a supporting document reference that provides this explanation that has just been made, because I don't see it in page 6-4 in the way I read it, and certainly, there is no document referenced, document or documents referenced on that page that provides that information.

MS. BERGMAN: Thank you. Other comments?

HT13/86 14.065

UNIDENTIFIED SPEAKER: I want to go back to an issue that was brought up earlier about the accidents at Pantex and about supposedly deficient facilities at Pantex. I think it should be noted that accident occurred nearly 20 years ago, the high explosives accident that was spoken of earlier.

The practices have changed since that time. The facilities at Pantex for high explosives are extremely modern. They are the only facilities in the DOE complex that can perform this mission today without any modification. The parking lot problem is being addressed by management at the plant. It was brought up to the PBCAB in order to let them know that they are addressing that.

The door gap issue has been widely discussed in PBCAB meetings and in the community in Amarillo. I think that's been mischaracterized in the meeting

HT13 (CONTINUED)

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HT13/86 14.065 continued

tonight. I think that is being addressed by management at the plant.

I guess my comment would be both those issues have been raised in recent months concurrently with the production of this EIS, but near the end of the process at the time the draft was issued, I think it is unrealistic to expect very contemporary events that occurred near the end of the process to be addressed in this when they are really day-to-day management things that are being handled by plant management, and they are being done in concert with the PBCAB.

I will further comment that Pantex has an outstanding safety program. Pantex is used as a resource by employers in the Amarillo region for training information, for how to institute a safety program, and there is an extreme confidence in the safety and reliability of not only the weapons but the employees who handle those weapons at the plant.

HT13/87 01.016

Pantex has a high degree of public support in the region. In repeated polling, it has registered over 80 percent for continued operation of the plant. The discussions here tonight about the deficiencies in the high explosives program, I think, are misguided, and Pantex should be selected as a preferred

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HT13/87 01.016 continued

alternative in the other PEIS, the SS&M PEIS, for continuation of high explosives.

I make those comments on the record as Bob Juba with the Amarillo Economic Development Corporation speaking with the endorsement of the city government of Amarillo.

MS. BERGMAN: Any other comments?

HT13/88 23.027

UNIDENTIFIED SPEAKER: I just wanted to clarify the high explosive building with insufficient buffer. I used as an example what I would ask that this sitewide do which is provide to people an accurate description of the state of the plant, a Pantex plant sitewide EIS.

So my hope is that we understand -- I would like this document to contain an appendix or something that gives us an update on the status of the SARs at the plant, the facilities and the status of whether or not they are in compliance with whatever DOE orders or whatever applies that DOE establishes to make these facilities meet whatever standards they have decided upon.

That is what I would like the sitewide to do. It is not to criticize the plant because in 1977, three people were killed, but it is telling that in 1996, you have a building that still has a similar

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HT13/88 23.027 continued

problem, that people can get too close to it, so I would just like for this document to be complete enough that people can read the sitewide EIS and get an understanding of the plant and where it is going, mitigation, whatever is needed, and it goes forward from there. That is my question.

MS. BERGMAN: Don?

HT13/89 14.066

MR. HANCOCK: I have a request that is kind of similar to and follows along with actually both of the last two comments which related to this document, and that is that not only the history of safety practices at Pantex, but the history of safety practices at each of the alternative sites be included, because while it is not necessarily always specifically factored into your risk analysis that you do in these documents, from a public standpoint, the public is interested in evaluating the safety performance of facilities in terms of handling hazardous and radioactive materials.

There are lots of differing perceptions on the part of the public as to which facilities are safe and which facilities are dirty. The most helpful and objective way of having some analysis of that is actually having some comparative analysis of the historic practices at those various facilities so that

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HT13/89 14.066 continued

it can be identified whether certain facilities may have a, quote, better or, quote, worse safety record.

It is not up to me or anybody else to say, "We suppose this," or, "We suppose that." There is some actual data that is released in unclassified form so that it could be available to the public, and so I would request that that kind of information be done on all of the sites and included either in the document or a reference document that cites that.

MS. BERGMAN: Any other comments?

MR. HANCOCK: Is there going to be, with the final EIS on this document, a classified appendix?

MS. FOUNDS: There is not an anticipated appendix.

MS. BERGMAN: You act like you have no more questions.

MR. HANCOCK: I have lots of questions, but I can ask them in Amarillo.

MS. BERGMAN: Are there any other questions or comments? We thank you very much for coming tonight. We have gotten some excellent comments. We really appreciate it.

(Proceedings concluded at 8:34 p.m.)

HT14

UNITED STATES DEPARTMENT OF ENERGY

PANTEX SITE-WIDE ENVIRONMENTAL IMPACT STUDY

CERTIFIED RECORD OF PROCEEDINGS

PUBLIC HEARING

May 23, 1996

Richland, Washington

6:00 p.m.

Facilitator: Ev Avara

RICHMAN REPORTING (509) 627-0869

Portions of the transcripts unrelated to this EIS have been omitted.

MR. AVARA: Okay. Thank you, sir.

MS. FOUNDS: Did you want me to respond?

A CITIZEN: Yes, please.

MS. FOUNDS: Basically, it's -- Okay, it's the plutonium that we would be considering coming here, and there are three different documents being done all about the same time. Storage and Disposition of Programmatic EIS is also looking at the Hanford Site for the mixed oxide fuel options, and I think there are several people who can probably talk to you more about those.

But, yes, I think that Hanford is being looked at for many different capabilities, and the decision for interim storage won't be made in a vacuum against those other documents. Does that answer your question?

MR. AVARA: Anyone else?

A CITIZEN: Just real quickly, the gentleman that asked about cost studies, are all of the facilities equal as far as where they are in the stage of receiving the plutonium pits? Are there going to be some upgrading, refurbishing that has to be done to any of the facilities? And, also, if you are going to do cost studies, what is that versus cost of transportation to the farthest site versus maybe refurbishing Kirtland, just a cost benefit analysis?

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MS. FOUNDS: Yes. We haven't done that at this point and we're asking Headquarters as to whether or not they think they need to do those costs. If you're asking me: Are all of them equal? In our site selection, one of the criteria was that, you know, if an assessment would be made as to whether or not each of these facilities could start handling pits within about six months or so, and all of them were considered to be within that realm.

MR. AVARA: Mr. Blair?

MR. BLAIR: My name is Walt Blair. I live at 706 West 22nd Place, Kennewick, Washington. I'm the primary alternate for the non-management, non-union employees on the Hanford Advisory Board. I'm also a member of the Hanford Advisory Board Health Safety and Waste Management Committee, and I'm a member of Plutonium Round Table.

The Hanford Advisory Board has given some advice. It's consensus is Advice No. 46. The subject was the Storage and Disposition of Excess Weapons Usable Plutonium and Special Nuclear Materials. I'd like to have this document submitted as official comments. And basically -- I'll quickly go through it, if you want.

MR. AVARA: Go ahead.

HT14/1 01.005 | MR. BLAIR: Okay, number one, any plutonium

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HT14 (CONTINUED)

HT14/1 01.005 continued

or special nuclear material storage disposal program must be compatible and integrated with the Tri-Party Agreement commitments and milestones and should not affect the rate or funding of cleanup. The program would have the safe disposition of plutonium as a priority.

Two, any plutonium program assigned to Hanford must be fully funded from new funding sources. This funding should include appropriate site infrastructure, overhead costs. Funding should fully cover the cost of treatment, storage and disposal of any new waste streams.

Three, the acceptance of plutonium at Hanford should not delay, defer or negatively impact Hanford cleanup.

HT14/2 23.010

Four, appropriate local and regional public information and involvement programs must be conducted by the agencies to ensure that the public is fully informed of the risks, hazards and impacts of such a program. This would be part of the national dialogue on all nuclear materials prior to assignment of any nuclear materials to a specific site.

Five, any permit or plan approval for new Hanford programs/activities must be fully integrated and must comply with all Washington State public health and

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safety rules and regulations.

HT14/3 21.002

Six, equity impacts must be addressed in the assignment of new nuclear materials, including plutonium, to Hanford.

HT14/4 16.015

Seven, the transportation of plutonium and special nuclear materials to Hanford storage will require careful planning of routes and consideration of weather emergencies to minimize the likelihood of an accident. Emergency preparedness for minimizing the impacts of an accident will require financial support from DOE for state, tribal and local involvement, including adequate equipment and training. When materials are shipped, timely notification should be provided to the transportation agencies.

Eight, the choice of disposal options re: Pu will be a determinant for sites such as Hanford. Prior to the choice of the disposal option, complete characterization of the material and the impacts of short and long-term disposition technologies must be reviewed by the public and regulatory agencies.

Nine, acceptable processing techniques, including waste processing, must be developed as an integral part of the new Hanford storage and disposal program. Permanent disposal of waste plutonium at Hanford is not acceptable.

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HT14/5 02.002

Ten, a systems analysis approach should be utilized to select the most effective method for processing and interim storage. This analysis should adequately address public and worker health and safety and environmental issues.

Eleven, if a plutonium disposition mission is assigned to Hanford, every effort should be made to use existing workforce, facilities, technologies and other resources.

I would like to submit this. And if anyone here would like a copy, it would be nice if you'd provide it.

Another document I have is from the Office of the Governor. It's dated the August 31st, 1994, comments of Governor Lowry on the Storage and Disposition of Weapons-Usable Fissile Materials. I'm not going to go through all four points here -- Well, I could.

Safe disposition is only one part of the legacy all Americans must face from the nuclear standoff of the past half century. Decisions about plutonium must be integrated with those about disposal of high-level, low-level, and mixed wastes left over from producing plutonium in the first place.

Two, we believe in shared responsibility. That's the whole gist of this statement here. All citizens

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must bear some risk, as well as the costs of cleaning up this legacy. The burden must be equitably distributed, recognizing that some citizens have already incurred risks and problems as the fissile materials were created.

Three, the proposed programmatic environmental impact statement should examine all reasonable alternatives for permanent management of weapons plutonium, and thoroughly assess the magnitude and distribution of the risks and burdens.

Four, this legacy is a major national problem now in no small part because of the secret practices of the past. Broad, respectful, open, deliberate, and early public involvement is essential to break the distrust and ensure that today's solution does not become our grandchildren's problems.

The overall gist of the Governor's comments here is shared responsibility. In other words, we're willing to do our share as long as everyone else is equitable. And that's why we're pushing very hard for the National Equitable Dialogue. This is another document, if anyone's here, it would be nice if you made them a copy.

I would like to now speak for myself representing the local work force. We, the local work force, is

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HT14 (CONTINUED)

willing to be involved in the final disposition of plutonium. We would like to have Hanford considered as the primary site for the disposition of plutonium. We are not interested in the long-term storage.

MR. AVARA: Okay. Thank you, sir. I appreciate that. Did you want to respond to some of that?

MS. FOUNDS: There were a lot of -- I think most of them went to the disposition ones. So I will let you know, too, that we are coordinating comments with the Storage and Disposition between -- because they're also dealing with long-term storage, as well as what we're dealing with as interim storage, too.

So, just to let you know, our final EIS will be coming out in October 1995, and then after that the Storage and Disposition final EIS will be coming out also. And then a Record of Decision on ours is scheduled for the November 15th, and then theirs is also scheduled for shortly thereafter, I think in the December time frame.

MR. BLAIR: The problem is the word "interim." Members that I work with on the Hanford Advisory Board, when we say "interim," it may be a thousand years. So they aren't going to consider it unless there's an agreement ahead of time who's doing

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the disposition of plutonium. They consider it long-term storage.

MS. FOUNDS: The one thing is that, again, we were talking about interim, and that means until a decision is made on the storage and disposition one because they are actually talking about long-term. But I understand what your comment is and will pass that along, too.

A CITIZEN: I'm, like, a high-schooler, so excuse me if I ask a really funny question. But I'm wondering just in the general proximity how many jobs, if any, will this create for the Tri-Cities.

HT14/6
11.007

MS. FOUNDS: In terms of the number of jobs, I think we're estimating -- To some extent it's a little bit difficult to estimate because I think it's only like 50 or so, because a lot of -- it's the security forces more than anyplace else that we need for the storage option. And you already have an existing security force, et cetera.

So we've estimated across the sites anywhere from 50 to, I think, a hundred or so, if which were actually going to put the interim storage at a particular location, depending upon how many more people the site would have to hire in order to accept the plutonium storage option.

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Cliff, did you have any clarifying on that? Those are the numbers that I remember.

MR. JARMAN: The exact number needed would be about 120 people, and the thing is, we don't know how many of those would be reassigned from current work forces or from job retraining and such. So the absolute peak would be 120 new jobs, but it more than likely will be less than that.

MR. AVARA: Here we are, sir.

A CITIZEN: Well, I'm the high-schooler's dad and these are my concerns because my family was born and raised here and I'm here and I brought my girls home, and the reason why is we want to keep our future in the Tri-Cities, and we also have a beautiful facility out there. And what I was concerned about upfront -- hopefully I did it the right way -- is the interim storage which you accurately pointed out.

If we're going to do this thing right, we don't store things for thousands of years. We figure out how to make other things work. That facility out there where this is going to go hopefully could make it work that we could create additional jobs, do the right things, and not store it and cost the taxpayers more money to keep it in the ground. That's not what we're all about here.

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What we're all about here is the leading edge of technology with the right people to do the job, and that's what my daughter's here for. That's what I'm here for. Thank you.

MS. FOUNDS: Appreciate your comment.

MR. AVARA: I'd like to mention briefly, this is not the only forum in which you can make comments. The period for comments ends on July 12th, and you can either submit comments through the mail, by phone, by fax or by E-mail, and there's some addresses on the poster outside the door to do that.

A CITIZEN: My name is Pam Brown, and I'm the Hanford Analyst for the City of Richland, and I'm sharing comments tonight not only for the City of Richland, but also for the other communities in this area.

We have an organization known as the Hanford Communities, which is composed of Richland, Pasco, Kennewick, Benton City, West Richland and Benton County. We have recently taken a very careful look at the plutonium or the fissile materials programmatic environmental impact statement and have submitted comments to DOE Headquarters, and I was pleased to hear that you'll be incorporating comments from this process with that process.

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HT14 (CONTINUED)

I would just like to summarize some of the issues that we've dealt with, and this position was adopted unanimously by the city councils of all of our communities. One of the things that we think is very important is that the United States deal with the disposition of plutonium and not just simply the storage of it. And this is an issue must be addressed within the United States and that this material should not be sent to Canada or anyplace else.

We also believe that existing facilities should be used to the best extent possible, which would be consistent with what you've discussed this evening. We do not want Hanford to be the nation's plutonium disposal facility, but we believe we can play an important role in the disposition of the plutonium.

We have at FMEF not only a facility that can store materials, but one that can make mixed oxide fuel and could potentially house a small vitrification plant, as well. We have two reactors on site, the Washington Public Power System Plant No. 2 and FFTF that can burn mixed oxide fuel.

We believe that we should form a partnership with other DOE sites in the country that have the facilities to play a role in this process. So the Pantex role in disassembling the weapons is important, and Los Alamos

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or Pantex perhaps could be involved in the conversion of plutonium so that it is available for fabrication into mixed oxide fuel.

So that is the general nature of the comments of this community, that we do want to play a role, we have the facilities, equipment, the talented people, and we look to working in partnership with other sites on the DOE complex.

MS. FOUNDS: Thank you very much.

MR. AVARA: Anyone else like to make a comment?

(No response)

MR. AVARA: Okay. We'll take a short break now, and if some more folks come in, we'll take some comments from them. For right now we'll take a 10-minute break and we'll be back shortly.

(Recess)

MR. AVARA: We're going to try and get started again shortly.

MS. FOUNDS: Ladies and gentlemen, if there are any other questions that you'd like to present to us at this time, we'll be happy to answer them. We will be here until 9 o'clock tonight. So if you just want to stay and have us explain anything else -- We do have the displays in back there where we can talk

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about the transportation, the AT-400 Area or any other questions that you might have. Sir?

MR. BLAIR: The 12,000, 8,000 pits, total of 20,000, has there been any discussion about declaring any of those surplus weapons or what's the deal? Now, we have -- Presently at the PFP we have, I forget the actual amount, but we have plutonium that's stored that was declared excess weapons program. What's happening with the pits in that direction and what about international controls through the International Atomic Energy Agency? What's gone on?

MS. FOUNDS: Well, right at the moment those pits are not considered excess to the Department's needs at this time. In our document we've considered them as we need to store them from the part of the dismantlement process. It would be the Storage and Disposition who would take the -- and declare that portion excess to the Department's needs that they would be talking about for disposition.

Then in stockpile search, upper management, then they will consider part of, all of it to be the strategic reserve that would support the stockpile. So anything that would be considered excess would be dealt with under the storage and disposition PEIS. Does that answer your question?

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MR. BLAIR: More or less. In other words, its not under your control at Pantex?

MS. FOUNDS: Right, yeah. And we're basically not dealing with that. None of this is considered surplus at this time.

A CITIZEN: I'd just like to offer some general remarks as a citizen and taxpayer. My name is Gordon Rogers and you have my address on the sign-in sheet. I have a strong personal interest in this subject. At one time I was the engineering manager during the design and construction of the Fuels and Materials Examination Facility and it's been a source of frustration for over ten years, now, that that thing has never found a suitable mission.

I know this discussion of the plutonium disposition is not within the scope of your current EIS, but I'd like to just make a general plea to you as Department of Energy employees, as well as our own local staff here, to do what you can with the Headquarters staff, the Administration and Secretary, and I know you have the same problem that all the other citizens do, but, you know, from the common-sense standpoint and the taxpayers and citizenry, it would be criminal idiocy not to make some constructive use of this plutonium that the nation spent several trillion

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HT14 (CONTINUED)

dollars manufacturing.

We can save and store what we need for future weapons replacements and things of that type, but the prospect of constructively using that as fuel and for energy recovery and electric generating plants, such as the Supply System's Plant 2 and the Fast Flux Test Facility, is clearly a sensible thing to do. This would avoid the consumption of fossil fuels, much of which are imported by this nation.

And I think we also have an ethical need to show the world that the United States can take advantage of its technology to avoid further consumption of -- excessive consumption of fossil fuels, and leave these for the less-developed nations to upgrade their standard of living. It's really unconscionable for us to blindly consume natural gas as though it were going out of style. So many people are standing around wringing their hands over the alleged global warming, which is substantially due to carbon dioxide emissions from fossil fuel burning.

We really have a win-win situation here that I think we just all need to really beat on our government representatives, our congress persons, the White House, Secretary of Energy, to sit down, get real, and let's move ahead on this and dispose of this plutonium. It

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avoids long-term storage cost and makes use of something that cost us a lot. I think we'd all be better off for it. Thank you very much.

MR. AVARA: Thank you, sir, for that comment. Anyone else like to make a comment this evening?

(No response)

MS. FOUNDS: Again, there are various forms where you can write in to us, or E-mail us if you happen to like the computer systems, or fax us, et cetera, and we will be passing your comments on and entering them into our comment response document.

But we appreciate your attendance. Thank you for coming. And we will, again, be around for a while if you'd like to ask us any other clarifying questions, et cetera. So, thank you.

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(HT15)

TECHNICAL INFORMATION EXCHANGE
ON DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE CONTINUED OPERATION OF THE
PANTEX PLANT AND ASSOCIATED STORAGE
OF NUCLEAR WEAPON COMPONENTS
JUNE 25, 1996
MORNING SESSION

(Due to the acoustics of the room during the morning session, this transcript cannot be certified to for accuracy.)

KARY A. WINGO, CSR, RPR

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Portions of the transcripts unrelated to this EIS have been omitted.

And at any point along this progression if the aircraft accident probability falls below one one-millionth per year, no further analysis is called for.

In the briefings that we've heard this morning, we see that all the analyses that have been done have been larger than one one-millionth, typically in the range of 2 to 4 times 10 to the minus 5th, or 20-millionths, if you will.

So the progression is as follows: You start with an easy screening method and it runs very quickly. And then (inaudible) count. You do it. If your probability is less than one one-millionth, you need to do no further analysis. If not, then you need to go further. And the current DOE guideline goes beyond the old Solomon model with four factor on aircraft analyses and uses FAA operational data collected from control towers. And it uses predetermined coefficients for accident probability. And it makes a prediction.

If that prediction is less than one one-millionth, the guidelines say that's all you need to do. You don't need to go on and look

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at the hazard release probability. If, however, that analysis does not fall below one one-millionth, the standard calls for a full probability risk assessment. And that risk assessment, the recommendation, is that, rather than use FAA categories of aircraft which lump a large number of different kinds of vehicles into a group and then treat them all as if they're the worst penetrator of the group when you do your analysis, you should go ahead and characterize in as many subcategories as your data allow. This has not been done.

HT15/1
15.045

And so I pose a question for DOE. Why in the prepared draft environmental impact assessment did the analysis of aircraft accidents cease at the four factor analysis? And request that before the final EIS is published that the probability risk assessment be conducted.

We've heard this morning that we have tremendous detail because of the foresight that DOE had to install this RAMS, regional radar air monitoring data system. So we've got all the details about where the aircraft are and what kind of aircraft they are. We can do a better analysis. We can follow the guidelines DOE has

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HT15 (CONTINUED)

published.

And then there's a second question that I have. The analyses that have been done have been done on the basis of historical data. And the purpose of that analysis is to predict the likely impact on the future operations at Pantex. We know the future of some of the risk factors in the aircraft accident rating. We know, for example, that GPS approaches already exist, so some aircraft are now flying different routes.

HT15/2
15.046

We know that the T-37 flights from Reese Air Force Base ceased this month. And we know that the T-37 flights, T-38 flights and the B-1 flights from Reese will cease in December. So we know a number of the aircraft that in the four factor model have driven this outcome of about 4 times 10 to the minus 5th for probability of an aircraft accident in a year will not exist in the future.

And I recommend that in the final impact analyses those things that we know be included in the analysis so that we can all together look at the most accurate possible aircraft accident prediction. Thank you.

MR. MATNEY: Thank you, Dr. Rock.

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I believe now Dr. Mike McNerney will speak.

MR. MCNERNEY: I'm Mike McNerney. University of Texas at Austin. And I'm director of aviation of the University of Texas and former Air Force instructor pilot and a research engineer, civil engineer. And I had some more or less specific comments. I had a chance to look at the DOE standards a little bit and I had some questions related to the DOE and the application to the Pantex site-wide.

And some of them are rather specific. I would like to see if I can get some answers to these. If we can review the draft EIS and analysis (inaudible).

THE REPORTER: Can you speak up, please?

MR. MATNEY: Speak up.

MR. MCNERNEY: Okay. If you talk about the previous analyses that have been done in the Solomon model, and, from my understanding -- and get your input on that as well. Does the Solomon model have a high contribution to the in-route airplanes, airplanes that are flying overhead (inaudible) flying over this country that (inaudible) flying over the Pantex plant?

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(Inaudible).

MR. SIMPKINS: That's exactly right. The Solomon model is dominated by high-altitude aircraft using the VORTAC, not those using the airport. Not airport operation, but the high altitude in-route traffic dominates the risk of using the Solomon model.

MR. MCNERNEY: And there's a different treatment now between the old DOE draft and the new DOE standard. Will the new DOE standard be applied by this EIS?

MR. SIMPKINS: Assuming it doesn't change any further, the latest draft will be used for the EIS. It's my understanding that the draft we have today is not necessarily the final draft. The authors of that are here today. We can ask them.. But we will use the latest DOE standard that would (inaudible) that we would use.

MR. JAMALI: My name is Kamiar Jamali. I'm with DOE headquarters. I am responsible for the draft standard. We are planning to finalize this standard within the next week or two. It is very good that you have available to you as what you call some concerns because at the very time we were sending that

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information to you. However, this question is just raised. You're somewhat unhappy with some of the shortcuts that were observed in the in-flight model for general aviation and commercial aviation.

So, as I said, that particular document, we were working on that and we believe that we have come to a consensus position with respect to the final resolution of those sticking points. And if I were to assume that the rest of our technical experts will go along with our proposed solution, I can venture to say that the standard will be finalized in about a week, a week and a half.

HT15/3
15.047

MR. MCNERNEY: In the draft standard appendix it says the generic crash rates for each aircraft category and subcategory (inaudible) accident reports published by the FAA in the RSD and by the United States military aircraft -- military craft. Did -- you don't reference that published data. Is that data available and can we get a copy of that data?

MR. JAMALI: The data for general aviation and commercial aviation can be made available to you. The military data cannot be

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HT15 (CONTINUED)

made available.

HT15/4 15.048

MR. McNERNEY: You said the evaluation techniques used to estimate crash rates are documented in References 1 and 2. But those references are also in the draft and they're not available to us here.

MR. JAMALI: That's correct. They will be made available soon after the standard is finalized. That should be hopefully less than two months. Some of them are available, the ones (inaudible). The structural response technical support documents (inaudible).

HT15/5 15.049

DR. ROCK: The methodologies that you used to convert FAA or military accident data into crash probability (inaudible). Is that methodology available for our review?

MR. JAMALI: Yes, it will be.

DR. ROCK: When you do calculate that crash probability data, one of the important things is that -- doing landings by retrieving these -- each individual landings part of the data so you have a probability based on each individual landing. But the accident data (inaudible) the accident data to crash rates per incident landing, particularly when some military sorties have

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multiple landings per sortie.

HT15/6 15.050

I guess the question is until we've had a chance to look at your data and an opportunity to do analysis, how do we know that the crash probability distribution or the crash rates per landing probabilities reflects military operations, other military people, military pilots (inaudible) this analysis?

MR. JAMALI: I guess probably the best thing is to wait until we've had an opportunity to review whatever portion of that data that will be made available to you. But we had a large number of experts with a variety of backgrounds that contributed to the developing of the standard and they would also be all Q.A.ed.

So hopefully you will find that both the introduction numbers and the assumptions made on the crash rate you see are defensible. We have, as a rule of thumb throughout the standard, attempted to learn and (inaudible) and, depending on the level of the uncertainty took steps toward conservatism throughout the standard.

So I guess what was one of the unknown contributors to the conservatism (inaudible).

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DR. ROCK: I have no other questions.

HT15/7 15.051

MR. McNERNEY: Were you able to determine the small military operations that are actually from Reese Air Force Base?

MR. SIMPKINS: No, we do not have that. We also don't know when they leave Reese, whether they're going to some other base that may still conduct flying from here. So we did not attempt to answer that question.

HT15/8 15.052

MR. McNERNEY: The initiative Tom Williams spoke about in the reduction initiative, is that taken into account in your application to the standard in the EIS or will it?

MR. SIMPKINS: There's a brief statement within the EIS that talks about previous analysis and risk reduction associated with those measures. It's not specifically in the numbers I presented today. But if you define all of those risk reduction measures that they outline, moving the backcourse localizer approach, implementing the GPS. We even projected some time out in the future, say, 65 percent of the aircraft are equipped with GPS, as opposed to five percent now. We got a relative risk reduction of 82

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percent.

So what you could do is take that hit probability that I presented and reduce it by 82 percent to account for those measures that were mentioned. This is just one more level of conservatism of the EIS.

HT15/9 15.053

MR. McNERNEY: The other point I wanted to make is small military tends to be the controlling hit probability in the environmental impact statement. And because there's such a wide variety of aircraft types, why can't we actually do the analysis subcategory. Why can't we actually identify individual aircraft types and use available crash rates?

MR. SIMPKINS: We had that same discussion yesterday, and are working to do exactly that. And the concerns that Dr. Rock mentions also the initial (inaudible) will be included when we do the final analysis.

DR. ROCK: I'm not sure this question was addressed. But the final draft of the DOE standard and aircraft accident analysis, we're told that will be released in two weeks.

HT15/10 15.075

We're told that the support documents, the driving coefficient that control the outcome of the four

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HT15 (CONTINUED)

HT15/10
15.075
continued

factor detailed analysis will not be available for two months. And we're being asked to wait. It's an issue of we're being asked to trust the support documents are fine, but we're not in a position to see for external peer review. That is per the DOE.

And yet I'm here today because I've been asked to do a technical peer review of the draft and of the final EIS if we get a chance to review that. That depehds on soon to be published DOE standards that depends on support documents that will not be made available.

HT15/10
15.075
continued

And my question is can they be made available in a fashion that will keep this process in a time line and give us a reasonable opportunity to do a technical peer review?

MR. JAMALI: (Inaudible). I'm not for quite certain. I sympathize with your position. It's not an issue of not making it available to you. We just haven't created them yet. We had some earlier versions of these technical support documents that are no longer valid.

So we don't even have an internal review copy, if you will, to supply to you. We've

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gone out of our way to supply you with material. (Inaudible). These are really documents taken -- we will make them available to you at whatever shape they would be available to us when they're available to us. But they're just not put together yet. And we don't (inaudible) them.

MR. ROCK: We do too have a finite problem in time.

MR. SIMPKINS: I can tell you how we would respond, given the schedule that the EIS is on. We'll do the same thing on the draft. We have a schedule-driven level of detail. And if the additional documents aren't available to us, we went to the authors who were working on those documents and got the best information we could get from them to incorporate into our volume.

Where additional level of detail is not available, we remained conservative with our analysis.

DR. ROCK: And that leads to what I think will be my last question this morning. One of the difficulties I have with published risk assessments throughout the environmental impact

HT15/11
15.054

process -- so this is not specific to DOE. It's a generic problem. We've talked several times this

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HT15/11
15.054
continued

morning about the safety factors.

The safety factors are there and they're not quantified. Is it possible to produce a document that says this is our best estimate and this is the uncertainty that remains in the assessment?

MR. SIMPKINS: In many cases, it is a matter of how much additional money you want to spend quantifying the uncertainties. That can certainly be done.

HT15/12
15.055

DR. ROCK: Since these numbers as point estimates will be used to make your decision, I think it's important that we be able to tell the senior decision-makers when we have a lot of confidence in a number and when it's sort of a fuzzy number.

MR. SIMPKINS: That's actually exactly why we stay conservative.

HT15/12
15.055
continued

DR. ROCK: No, no. When you stay conservative, you create another problem. If I focus exclusively on one risk in life to the exclusion of others, I can bring that risk to very near zero, but my risks in other areas go up.

MR. SIMPKINS: (Inaudible). One of the answers to your first question as to why we

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didn't go into additional level of detail. when the aircraft crash was analyzed to the point that it wasn't a predominant risk, we began concentrating on other risks that were more dominant. That's why the aircraft craft was not as dominant as the cell scenarios for accident case.

DR. ROCK: Okay. Thank you.

MR. MATNEY: Are there any other questions from state officials? Roger? Sir, would you identify yourself?

MR. MARTILLOTTI: I'm Joe Martillotti. I'm with the Texas Department of Heath, Radiation Control.

HT15/13
15.056

Given the limited availability of the final analysis numbers. I find it very difficult to try to guess what the impact might be in the refinement of the standard. And I haven't heard this morning any kind of estimates as to whether or not the refinement of the standard and the supporting documents might provide some clarification on this fuzziness Dr. Rock talked about, this conservatism.

Is it generally agreed upon that there will be some reduction in that numerical risk probability or is there any kind of feeling

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HT15 (CONTINUED)

HT15/13 15.056 continued

that anyone has on this?

MR. SIMPKINS: Based on what we've done so far and my understanding of the additional level of detail that we can go into now, the next generation document, the risk numbers are likely to go down. They're not going to go up, based on my understanding of the existing models.

MR. MARTILLOTTI: Is there any way to guess?

MR. SIMPKINS: It would be just that, a guess. I'm guessing at least probably, for the fire case, it would be higher than for the explosive case. And they're likely to be in the 10 to the minus 7, low 10 to the minus 7 range. Possibly even 10 to the minus 8 range if we find a way to account for the super stout structures, for example. It's going to be well below other risks that are analyzed in the document also.

MS. FOUNDS: Joe, I want to make sure I'm getting the argument. You do believe that, at this point, that we're conservative in our analysis for the EIS, based upon the discussions that we've had here? So in each one of the steps that we could or will be taking will be to reduce those conservatisms, as Bret was

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saying. So, again, it's sort of -- it's our responsibility to, within the time frame of the EIS, to give the decision-maker an appropriate point.

And what we have been saying is that our analysis is conservative, but it's reasonable in order to let a decision-maker have what's there now from a hit probability. We're looking first to state -- the hit probability that drives us to the consequence. Then we look at those overall risk numbers. They are still fairly low for the Pantex site. So it still provides the decision-maker with a good reference frame, with the understanding that it is still a conservative model.

MR. MARTILLOTTI: That does provide the decision-maker some measure of comfort, if you will, in the conservatism of the numbers, but it does the exact opposite to the

HT15/14 15.057

local citizens. It provides them a sense that the plant may not have been as safe as indicated over all the years that it's been in existence, which I don't believe is the case. I believe that there's a point somewhere in between that is more like the real answer to this problem. And that needs to be

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HT15/14 15.057 continued

stated.

What I'm hearing is that the information model might be available in two weeks, the supporting documentation available in two months. If the EIS moves along on this driven schedule, my understanding is that the final date is October?

MS. FOUNDS: That's correct.

MR. MARTILLOTTI: Well, we're looking at two and a half months from -- we're end of June now -- for the information to be available to do those calculations and present that data. There won't be enough time to look at that and to say we accept this or we agree with this.

It really places the state reviewers in a difficult position at this

HT15/15 15.058

point. I think it's impossible, actually. And I'm wondering about the date that the EIS is driven, given that the other two PEISs that accompanied this document are now, I think, in some question as to what dates they will be available or -- is that correct? Are they on track? Is this still concrete or is there a possibility that we might allow for more comprehensive review of the information to provide

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HT15/15 15.058 continued

the level of certainty that we can for --

MS. FOUNDS: If I can, as I said, if you sort of agree that this provides a decision-maker a reasonable basis, we can continue to work together in terms of the standard and provide the basis for the EIS bounding numbers. And then, as the rest of it progresses to sorting out those other conservatisms, provide that information to you.

In your mind, you're saying that it's conservatively limited to the EIS. What we're saying is that it still provides the decision-maker the appropriate tool at this time to make those decisions. And then, as the additional information comes along, there are other methods to stay in contact and to show how, from this base line, you get that increased reduction in conservatism.

And as far as I know, the stockpile stewardship and management is still on track. And so is the storage and disposition for their dates. Are -- essentially, what you're making is a request to extend the deadline?

MR. MULDER: This Roger Mulder.

HT15/16 15.059

I'm with the State of Texas. Yes. What we want

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HT15 (CONTINUED)

HT15/16 15.059 continued

is the right information and we want accurate information in the EIS. And if that calls for a delay in order to get the right numbers in there, then we are going to formally request that the site-wide EIS delay until those right numbers are clear.

MS. FOUNDS: I think what we can do is we've discussed here some of the additional numbers that can be put in there. Like the T-38 and the skid distances and those types of things can be put in to our model for the final document.

Now, in terms of some of the additional support, like I said, as long as we may be bounded, NEPA is not necessarily held to, you know, the -- because after the standard is published there may be some additional data that comes, as you said, such as aircraft movement, and things like that. So, as I said, we'll take that as a consideration and get back to you. But whether or not we're still conservative, those numbers are still very low in order for the decision-maker --

HT15/17 15.060

MR. MULDER: If I hear you correctly, you're saying that you are driven by a deadline. And if later information comes in after

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HT15/17 15.060 continued

that deadline you'll make those adjustments. And what we're saying is we're not bound to that deadline. We'd rather have the right information. And if that takes a couple of months, we're willing to move that deadline back.

DR. ROCK: On the issue of whether the EIS properly characterizes the conservatism, I will not in this comment refer to the EIS. Instead, I will refer to the Pantex meeting of the final draft of the DOE standard. And in Table B-14 it talks about minimum and maximum numbers for general aviation and crashes per square mile. It has a minimal value of about six in a million and has a maximum value of about 200 in a million. And then it lists site by site all the values for DOE sites, laboratories, and so forth.

Not a single one of those sites is in the range of the one in a million. They're all in the range of 200 in a million or higher. And so I submit that this table nowhere says -- when a decision-maker looks at this table, there is nothing here that says that these may be an important factor.

It isn't self-evident when anybody

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looks at the summary. And the only way we can make it self-evident is where the numbers appear to give the minimum and maximum values of the actual probability, so that a decision-maker knows if they're looking at a minimum or maximum value. Thank you.

MR. JAMALI: I can respond to that. It's interesting that you should say that because the present version of that table has no midpoint (inaudible) values stated for each one of these sites. So I think you will refer to that. We were not comfortable with that particular table. (Inaudible). The current estimates we have for Pantex, in particular, will be more.

DR. ROCK: And will that discipline carry over to the final draft, the final version of the EIS?

MS. FOUNDS: Yes.

HT15/18 15.061

DR. ROCK: So it will give a range and best estimate and worst case estimate, and, if we're really lucky, the lowest accident estimate?

MS. FOUNDS: We will continue to describe conservatisms that are in the EIS.

HT15/18 15.061 continued

DR. ROCK: If you only put it in the introduction and you don't put it with the

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HT15/18 15.061 continued

numbers so that the numbers are self-evident -- all of us have had enough experience with the media -- I understand the headline will lead to an incorrect assumption.

MR. MATNEY: Are there any other questions from officials here? Yes. Please identify yourself. Be sure that you get the microphone close enough. Our audio is having a hard time trying to get all of this broadcast.

MR. JUBA: I'm Bob Juba with the Amarillo Economic Development Corporation. I'm also here today representing the City of Amarillo at the request of the Pantex facility. I'll lead

HT15/19 15.062

off my comments. First, I want to thank the DOE for the hard work on reducing and minimizing the risks, to the extent possible. The committee that Tom Williams has worked on changed the approaches to the airport.

But, to build on the last comment there, I'm afraid that in a very important process like an EIS process is (inaudible) and should be. I'm reminded somewhat of the scientific information that was put out by groups that later proved incorrect, like a food scare about eggs are good for you or bad for you, whatever. We get

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HT15 (CONTINUED)

HT15/19 15.062 continued

these maybe presumptive announcements about the risk factor that don't concur necessarily with previous ones and they've not undergone the type of scrutiny that good science work demands.

And that is what the State of Texas is asking for today is to try and do that kind of peer review based on documents that will be coming in in the future.

Going back to meet the consistency, people need to understand what the risks are and grasp that, including the new level of conservatism that over -- you know, one element is very conservative and another (inaudible). The accumulative effect of that conservative changes the number radically from what was the risk published in previous studies.

I think there needs to be -- as Dr. Rock mentioned, there needs to be annotation in the document itself if you're going to remain fixed on those numbers. And I think the public deserves a very good explanation of why this number may not square with previous numbers because the number of planes flying over there and the types of planes hasn't changed.

Finally, I think that some mention

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-- and perhaps you can do this through using actually a number for the risk today because you're looking at the current operations of the plant. But you're also looking at the operation of the plant 10 years in the future.

HT15/20 15.063

If you know that steps are being taken to minimize that risk or the number of overflights over Zone 4 in the future, maybe there should be a number for what the risk will be in those outcomes if it is indeed reduced through mitigation steps. And I think those are things that could serve the public well and will make them feel more comfortable.

MS. FOUNDS: Just to respond, the document does go through and outline the various mitigation measures that have been undertaken by the overflight reduction. And they are outlined in the document. And, as Bret said, there are going to be some numbers in there where the flight path, what the relative risk reduction may actually be.

Again, it's hard to quantify exactly because, as we have RAMS data right now for what we're looking at, we obviously don't have RAMS data for what's going to happen five years

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from now. But the document describes those mitigating actions and also some of what could be anticipated as the hit probability reductions based on some of the actions that have been taken.

So it does try to address some of those issues. And we can, again, continue to emphasize that in the final draft -- or in the final document.

MR. JUBA: I appreciate that, Nan.

HT15/21 15.064

But, I guess the only comment I had is the numbers look very much different than they did in past studies. And what I'm hearing from you is really things are extraordinarily conservative and minimized, but that's not what's conveyed in the text. And maybe there's some way to convey that more clearly in the text.

MR. MATNEY: Other questions from state officials? If not, we'll go to comments from the public.

HT15/22 15.065

MR. MARTILLOTTI: Nan, where you referred to the Zone 4 overflight work initiatives quantifying the results, does that mean -- this would be Volume 1. The initiatives are described in Section 41454, I think. But there's no numbers

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HT15/22 15.065 continued

applied there. There's no reduction, I guess, in the estimates.

MR. SIMPKINS: Give me a few minutes.

MS. FOUNDS: Joe, we'll point that out to you as soon as we find it.

MR. MATNEY: If there are no more questions from the stage, let's take a 10-minute break and come back and pick up public questions and comments. There's coffee in the back of the room. The restroom facilities are over here. And we'll stand in recess for 10 minutes.

(Recess.

MR. MATNEY: I believe that Bret Simpkins has a response to the last question. Bret, you'll be on Mic 2. If you will, Bret, get very close to your microphone, please.

MR. SIMPKINS: Joe, in response to your question, the 82 percent reduction number is documented in Section 4.15.6, potential mitigation measures. Page 4-253 of the document, second column. It says it is estimated that implementation of the MOU, the offset localizer, relocation of the VORTAC and 65 percent use of the GPS will result in an 82 percent cumulative risk

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HT15 (CONTINUED)

reduction, DOE 1995b:22.

MR. MATHEY: We would now like to open this issue for comments or questions from the general public. We would invite you to sit at the table, if you'd like, or approach a microphone. Do we have a question from the public or a comment? Ms. Gattis. And I believe she's on Mic 6.

MS. GATTIS: I'm Beverly Gattis. I have one or two things. A brief question. I was curious about if I may -- I don't see the gentleman still here. In the figures for -- gosh, I've lost it now -- closest point approach 244

HT15/23
15.066

days of information. And it looks like there was a whole year that you were able to draw information off of, April '95 to March '96. (Inaudible) 244 days instead of 365?

MR. WILLIAMS: First of all, the data is being processed as it comes in manually, people putting this data together. That particularly applies here in Amarillo where the air traffic controllers write, for each flight, a paper (inaudible). We link that up with computer information data, radar and someone has a manual. And I believe there's probably at times at least a

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30-day delay period, or more, on how fast we can get that data in there and actually record it. At the time we decided to take on this effort (inaudible) data was used for modeling and so forth. We had a cutoff date and said, let's take all the information we have available right now. (Inaudible) and so forth. So, more or less, there was a decision from this date back. This information is what was in the information we had at that time.

As data went out, we got more and more data. So it's a matter of time. It's a matter of collecting and putting it together and so forth. So the data will be a lot more than what we have as time moves on more and more.

MS. GATTIS: Thank you. Shall I go ahead?

MR. MATHEY: Sure, go right ahead.

HT15/24
23.040

MS. GATTIS: We really are interested, as the State is as well, in seeing that the evaluations are good science, good process and all those things, because I don't think any of us are interested in having the numbers be unreasonable for any reason or uninformed for any reason.

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HT15/24
23.040
continued

So that is a problem for us. We do like the idea of being able to read the document and understand thoroughly from what is in the document, that we do think it's clear; there are not terms that are used that are not explained.

To go on a minute about a concern that I see and I'll just raise here to respond to

HT15/25
14.091

the issue. Under the description of the risk about plutonium on Page D-5, both workers involved and the public are vulnerable to plutonium inhalation if an accident occurs that disperses it as respirable particles, for example, a fire or explosion. Then when you go over to Page D-3 in the application of the accident (inaudible). On Page D-23, there in the first column, first paragraph, it says the long-term exposure pathways and the liquid exposure pathways were not considered.

So we want to be sure, not only that you can take into accurate account types of flight and that type of thing. We want to make sure also that the consequences of the release on a population on-site or off-site are accurately taken into account. And (inaudible) given for

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HT15/25
14.091
continued

plutonium we have (inaudible) long-term exposure have to be a consideration with soil, farming and water. And so I would raise that concern. I have certainly not done full justice to this document, but I raise these issues.

And I do have one more thing. If y'all would like to respond I'm happy for that to happen.

MR. SIMPKINS: With respect to the long-term exposure and resuspension, we left the analysis at (inaudible) assuming emergency response evacuation and cleanup, which is typical, I believe, of processes that we see at DOE.

MR. JESSEN: I am Jim Jessen and I'm from Tetra Tech. Just one point to add to that. We did review the Rocky Flats dose reconstruction data that reviewed past accidents at Rocky Flats. And one of the areas of information was that the dose from the initial cloud was dominate and -- the long-term effects were minimal. So we did look at other studies and explore that issue.

MS. GATTIS: That's fine. I understand that. (Inaudible) I would like to offer that as a private issue speaking about

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HT15 (CONTINUED)

farming. And it's a decision based on events from Rocky Flats we would like to have taken into account.

MS. FOUNDS: I wanted to point out, too, is that to print out for 50 years and assuming that (inaudible). So, again, this is only the dominant.

MS. GATTIS: Thank you. The other

HT15/26 15.067 observation I'd like to make is that statistics are a fascinating thing. They are not a solution. They are no guarantee. So the aircraft crash probability to be quite low is one thing. But it is that such things don't happen can happen. As I think Walt Kelley said at a previous meeting on one of those issues, statistics only get you so far.

HT15/27 15.068 I think the most impressive thing to me are the mitigation efforts that the Department is undertaking, as well as made. What I would like to know is if in all those calculation (inaudible) looked at probability. And I think that's valid.

HT15/27 15.068 continued I want to know is it possible that the Department of Energy will then stop those mitigation efforts and we will not try to move aircraft from flying over the plant.

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MR. JOHNSON: The mitigation factors we've already given the tower notification. So everything is on track and we're going through with that regardless of what those numbers show. Because I don't agree with what you said. And I know we've had a discussion on risk before. Risk analysis, to me, shows you sensitivity analysis, shows you comparative analysis, not one risk compared to another. (Inaudible) risk management make it possible for absolutely anyone. And our commitment at Pantex is to reduce the risk in any way we can regardless of what those risks are, using the most reasonable approach.

You have to (inaudible). But we are committed to the aircraft reduction issue.

MS. GATTIS: Thank you. I guess

HT15/28 15.069 my final comment I'd like to make is that one of the effort of Pantex in moving overflights further toward the northwest corner of the plant. I can't help but observe that's where the nuclear reactor might be and that there are other facilities that are going to have to be taken into account so that we know this is considered under this aircraft crash analysis versus the aircraft analysis that

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HT15/28 15.069 continued related to the current EIS. Thank you.

MR. MATNEY: Thank you, Ms. Gattis. Are there other comments from the public on this issue? Ms. Smith. Let me suggest -- there's an echo in this room. And let's be sure that all of us, in answering the questions or in commenting, please get the microphone right in front and speak loudly. It must be very difficult for Ms. Wingo to try to get a transcript.

MS. SMITH: I am Doris Smith and I am a neighbor to the west of Pantex. And I can appreciate the work that's been done with regard to the -- I can appreciate the work that has been done with regard to the moving of the aircraft away from the hazardous materials storage areas in Zone 4, et cetera. And I can appreciate all of the GPS, VORTAC and all of the instrumentation that is indicated in the document.

What comes to my mind is where in all of this analysis does human error and reliability fit in and has that been factored in in some way within the document?

MR. JAMALI: Well, in this particular analysis, human error initiates. So the crash rates that you're observing, whatever

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they maybe contribute half to crash in the first place. Are basically reflected in the frequency of the aircraft crash impact to the facility. From then on, there's no responsibility taken in the model and active systems and, hence, there will be no human contribution taken into consideration thereafter. So, basically, as far as -- the short answer to the question is the only impact of human error is the past rate and that is not something we control.

MR. GOLDER: I'd like to add to that. There's an old axiom that says that the pilot is usually first to arrive on the scene of the accident. So he will do everything he can to avoid a facility like Pantex to the best of his ability.

MS. SMITH: I'm sure that that is,

HT15/29 15.070 but there are those times when there are accidents that do happen and that are beyond the control of any of the mechanical problems that possibly could go wrong with an aircraft. And this was just an issue that we were wondering if it has been factored in and how it was going to be factored in.

MR. JAMALI: Well, crash rate and

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HT15 (CONTINUED)

impact (inaudible) and in fact that contribution stops. Another thing that subsequent to the crash of the aircraft involves (inaudible).

MR. WILLIAMS: I think moving the aircraft away from the facility is the Number 1 thing we can do to take that human element out, by getting them out of the proximity of the facility that effects them. That's the most effective measure you can take. A pilot out of Dallas/Fort Worth isn't going to affect Amarillo International Airport. Albeit, pilot error not in proximity to the Pantex plant is not going to effect it either.

So the best thing we can do is physically move those aircraft away from the facility. Mitigation itself is a way of trying to prevent that from happening. And that's actually why we're doing that because, in the present circumstances, under normal operations, aircraft fly over the plant every day. And either through mechanical difficulty now or pilot error now if we move those airplanes, then that likelihood goes down significantly and that probability.

MS. SMITH: My next question that I'd like to ask, since there are maintenance and

HT15/30
15.071

modification of facilities at the Amarillo

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Airport, there are planes that are out on test flights. And they do a lot of circling. And we wondered were there considerations that these are not aircraft that are in tip-top flying shape given consideration in the document?

HT15/30
15.071
continued

MR. GOLDER: The maintenance chief of the facility, who is in charge of repairing these planes and then maybe sending them back to their own fleet, has to file with the FAA before an aircraft can take off on what you call a test flight for a letter of reception to give for the period of flight. And what happens, this takes place long before the actual day of the flight. They file this with FAA with a few exceptions. For instance, the plane will have to take off with VFR conditions and can't take off in bad weather.

Usually what happens is it's brought in and they check the airplane. And they're an experienced certified crew, airline crew, that will take off and just make one circle of the area to make sure everything is working properly and then they'll go on their way. (Inaudible).

MS. SMITH: Are these test flights included in the EIS?

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MR. GOLDER: The numbers will be included in the RAMS data. I can tell you that.

MR. SIMPKINS: They're included in the sense that they are part of the operations, so they will be reflected in a number of operations reported to us by the FAA.

MS. SMITH: Are these test flights always from the same runway and do they use 04, or is there a difference in the runways that these aircraft can use?

MR. GOLDER: For safety reasons, it should be take off into the wind. However, we had discussed this yesterday. We could approach the FAA and in that letter take issue, make a statement, that we would take off on 22 to avoid that.

MS. SMITH: I think that we would like to see some information included in the document to make certain that these issues were addressed.

MS. FOUNDS: What I'd like to do is wrap up some things in the overall sense of operations of the airport and how we do include them in the EIS. Now, if you're talking about mitigating action, then we can include that as,

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again, under a regular action section, these are how things are done as part of that process.

HT15/31
15.072

MS. SMITH: I think that where we really are having difficulty with this on test flight is, to our knowledge, they are not all the time actually perfect aircraft that are taking off. And I do appreciate this thing that they have to be in a certain condition. But that does not mean they do not have a problem at the time of test flight. And these considerations, we thought, needed to be brought out in the document.

MR. MATNEY: Mavis Belisle.

MS. BELISLE: This is a follow-up question to, is it, Jim on the soil dispersion? Just within the last couple of weeks we've received some reports out of Rocky Flats from studies there that indicate movement of plutonium in soil maybe much greater than they had previously anticipated. Are you aware of those studies?

MR. JESSEN: Yes. We will be reviewing them for the final. They're coming out of the review group. Another point I'd like to make is, as Bret mentioned, we assumed some type of remediation.

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HT15 (CONTINUED)

MR. MATNEY: Any other questions or comments? Mr. Ahlenius.

MR. AHLENIUS: My name is Steve Ahlenius. I'm with the Amarillo Chamber of Commerce. I'd like to commend DOE and the FAA in their attempts to alleviate some of the concerns of the citizens on the probability of airplane crash in Zone 4 and Zone 12.

HT15/32 15.073

I hate to show my ignorance in this, but could you, in plain English, tell us what the probabilities of a crash are? Is it one in a million? Is it --

MR. SIMPKINS: It's 4 times 10 to the minus 5, which is 40 in a million.

HT15/32 15.073 continued

MR. AHLENIUS: In previous studies that number was quoted around. Why has that increased?

MR. SIMPKINS: The study that I referred to, the Zone 4 SAR, which was referenced by the 1994 EA, that number that was later rejected when errors were found in the calculations. And all of those other studies that I referred to are indicated that if the probabilities are tending to agree with each other, the various models and various studies at

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the 4 times 10 to the minus 5 range.

HT15/32 15.073 continued

MR. AHLENIUS: Does that take in those hit probability factors?

MR. SIMPKINS: Yes. The skid distance is a model as part -- skid is a model as part of our target area.

HT15/33 15.074

MR. AHLENIUS: In past studies that skid area has been factored and reduced. Is that -- which skid factors are you using to determine?

MR. SIMPKINS: We used the recommended skid lengths from the draft standard. And we -- from each part of the facility, each facility, we looked at a 360 degree circle around that facility, to then identify any adjacent facilities that would be in the way of a skidding aircraft. And we reduced the skid lengths for cases where one building was protected by another. So the skid numbers aren't simple circles.

They're buildings with specific targets, specific surroundings. There are several structures out there in Zone 4, for example, that are not taken into consideration. There is a vehicle there, an aircraft domestic cable barrier,

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steel pylons that encircle Zone 4. There's five fences -- three fences. One of those fences has a vehicle barrier. Those barriers were not considered in terms of shielding, although they do certainly provide some.

MR. AHLENIUS: And then with regards to the number of igloos or facilities in which plutonium pits are actually stored, does that number take into various accounts, in terms of the number of pits stored versus the percentage chance that they'll be hit?

MR. SIMPKINS: Yes. The frequencies for fire case verses explosion case. In the fire case, the plutonium pits are only in six of the 16 modified Richmonds. And I don't recall the number of SAC magazines. That was taken into consideration. How many of those magazines are occupied by pits, pits with no high explosiveness, and how many of those magazines are occupied by full weapons.

MR. MATNEY: Are there any other questions?

MR. JAMALI: I just wanted to add one small note to these proven numbers and not really a number of interest. In number of

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Comments omitted from intervening pages here do not concern this EIS.

HT15 (CONTINUED)

accidents are not severe enough to cause deterministic effect. And that is based on the ICRP and, of course, the dose numbers calculated in the EIS.

The final slide we have here is regarding synergism between chemical and radiological exposures. Our understanding of that issue, as of right now, is that there have been synergistic effects seen in laboratory animals and cultured cells, but the data is very limited for humans. And we realize that a lot of people are studying the issue. Right now there is no model to quantify those effects. And, with that, I think that's all we have.

MR. MATNEY: Now, I believe Gerry Johnson is here. Gerry, are you next up on this? No? Anybody else from Tetra Tech or DOE on this issue? No one? We'll go to our state officials then. And I believe Mr. Martillotti.

HT15/34 14.092

MR. MARTILLOTTI: For transportation of material, the listing of the accident scenario included environmental impacts for transportation accident (inaudible). In the evaluation of those accidents, it wasn't included in this event tree analysis.

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MR. JESSEN: It was a separate analysis that will be discussed probably this afternoon. And in terms of what you asked, the human health analysis looked at on-site transportation impacts. And if you want to look at Pantex EIS Appendix F, there is detail of the methodology that was used for inter-site transportation, if you want to.

MS. FOUNDS: I think, Joe, that this is just a difference in we had structured human health around the accident scenario. And transportation is later.

MR. MARTILLOTTI: That's actually the transportation that you assessed.

MR. JESSEN: No, we did both.

HT15/35 16.029

MR. MARTILLOTTI: I see what you mean. In that section, I don't believe that there was the same degree of detail according to the review of hazardous material as there may have been to the radiological aspects of transportation.

I don't the aspects of transportation, but not in the potential for explosion, potential for HAZMAT spill, those sort of things in transportation in the transportation

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HT15/35 16.029 continued

section. And I didn't see those addressed as potential candidate scenarios.

MR. JESSEN: Again, we focused our analysis on radiological impacts, based on stakeholder concerns, information on chemicals and high explosives. We'd be happy to add to the final EIS. And, you know, there's not tanker trucks that have chemicals coming in on a regular basis. And if you want a complete listing of all the chemicals used as in a supporting document to the EIS, the safety information document. And if you want more detail, you can consult that.

MR. MARTILLOTTI: Thank you.

MR. MATNEY: Other comments? Roger? Geof?

HT15/36 14.093

MR. MEYER: I'm Geof Meyer with the TNRCC. (Inaudible) it's really talking about the risk for inhalation of hazardous substances, as I understand the document. The risks for ingestion haven't been included in there. (Inaudible). And that's the only one you used?

MR. JESSEN: No, that's not correct. The model used inhalation and ingestion.

MR. MEYER: What was it used for?

MR. JESSEN: In terms of plutonium

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risk significant pathways.

MR. MEYER: And for hazardous? My understanding is it was only used for --

MR. JESSEN: Yeah. We're confusing what model was used for what. In terms of the hazardous chemicals, ICS will be used. They will talk more to that in the air quality discussion.

HT15/36 14.093 continued

MR. MEYER: Okay. The inhalation cancer risk is above normal, except for 1.45 times 10 to the minus 7. (Inaudible). And also I

HT15/37 14.094

wanted to ask what was the assigned risk bin for accidents involving the Ogallala Aquifer.

MS. FOUNDS: I'm not sure. When you're talking about release to the Ogallala Aquifer, in terms of we analyze the accident scenarios in the document and looked at their effects, in terms of population inhalation of those, et cetera. So there is a portion that describes, therefore, if you have plutonium release transported down to the Ogallala, when we go back to our accident scenarios, those probabilities are given in the document. Is that what you're referring to?

MR. MEYER: Not quite. I was

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HT15 (CONTINUED)

HT15/38
14.095

wondering whether we had a similar contact with the other PEIS with the accident -- we had trouble, particularly when the Ogallala was involved. We had trouble accepting -- multiplying the risks times the frequency that would happen. Thereby (inaudible). In other words, if you're considering 10 to the minus 7 or 8 or 9, that multiplied by the likelihood of the accident occurring, it reduces the significance (inaudible). The problem with reducing the Ogallala is it would be such a catastrophic event that we'd rather not allude to the risk by the possibility of the accident occurring. Do you understand what I'm saying?

MS. FOUNDS: I'm not quite sure. What you're saying is that you want us to look at it as if the accident had occurred?

MR. MEYER: That's correct.

MS. FOUNDS: And there is a short write-up, because this was done, my understanding -- and I think Cliff can talk to this a little bit more -- is that they looked at it as if you had the accident and looked at the transport down to the Ogallala. Then they looked at it as if you had cleaned up and transport down to the Ogallala.

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And this was a (inaudible) analysis. So that write-up is also in the document, a short summary of that particular study.

MR. MEYER: Yeah, I understand.

HT15/39
14.096

That was done in the past. And I understand this EIS really evaluates the future activities at Pantex and several standard alternatives. So I think that approach is valid. But it seems that if the hazardous instances were discounted, one, because it was limited -- the constituents' concern were limited, based on that, were not seeing above this particular level. Their evaluation was not carried forward.

My understanding is that the risk was posed only for inhalation pathways, not that that would be only added together. (Inaudible).

MS. FOUNDS: Are you talking also about the (inaudible) when you look at, for instance, what the plant uses -- and we have looked at the emission sources and things like that. And then, from past activities, they have evaluated further environmental restorations program and cleanup levels for that. Now, that's separate from future, you know, projections right at the moment complying with their permits. And,

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therefore, we looked at their permit levels and what --

MR. MEYER: I agree. I'm not concerned about that. I was wondering about the likelihood of an accident is from (inaudible) 100 (inaudible).

MS. FOUNDS: Yeah, in terms of the (inaudible), the dominant risks, again, the chlorine. We went through the matrix of looking at the risk base hazards. Otherwise, the material that they use and controls are not, like I said, risk dominant in that sense. So you went through this matrix of overall versus (inaudible). And any chemical releases would have been documented by chlorine release.

HT15/40
14.097

MR. MEYER: Model for chlorine. (Inaudible) especially for chlorine (inaudible) I take it was dropped out?

MS. FOUNDS: That's right.

MR. MEYER: I think I'll save that (inaudible) if that's all right.

MR. MATNEY: Thank you. Sir, for the record, would you identify yourself again?

MR. MEYER: Yes. Geof Meyer, the TNRCC out of Austin.

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MR. MATNEY: Thank you. Other questions from the state officials? Roger? No? Hearing none, we'll ask now for comments or questions from the public on the issue of health and safety. Yes. Mr. Finegold. Be on the audience mic.

MR. FINEGOLD: I have a few questions. First, on the summary of consequences to the public, you have some figures here. It says excess cancer fatality risks. Is the calculation of this risk based upon the population dose that you claim in the adjoining column or is the calculation of that risk based upon some combination of the likelihood of an accident with the expected consequences of the population dose as you have it here? Let me state it another way. Do you understand the question?

MR. JESSEN: Yeah. The risk number is frequency times the consequences of the accident.

MR. FINEGOLD: The risk number then is based not simply upon this population dose, but upon the product of that with the possibility or estimated probability of an accident occurring?

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HT15 (CONTINUED)

MR. JESSEN: Yeah, you're correct.

HT15/41 14.098

MR. FINEGOLD: Okay. Did you base the probability of the accidents occurring on the data of accidents that have occurred in the past?

MR. JESSEN: In some cases for anticipated events, that's correct. But for the events that haven't occurred, we based it on existing safety analysis.

HT15/41 14.098 continued

MR. FINEGOLD: Would your analysis predict that there has been as many as one fatality in the plant due to a radiological release?

MR. JESSEN: No, I don't know that would be correct.

HT15/41 14.098 continued

MR. FINEGOLD: What would you say the probability is, based on the data that you have, that there would be a death from the radiological release at the plant by someone working in the plant?

MR. JESSEN: First of all, are we talking accidents?

MR. FINEGOLD: Yes, we are.

MS. FOUNDS: In our document, we're not projecting anything happening due to a radiological event. We did look at both 100 meter

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worker and the public. So, in terms of that -- and if there was a, for instance, like in the aircraft crash analysis, in there for workers you might have fatalities because it would be more likely to be hit by the aircraft than have the radiological. So, in that sense, we are not projecting the radiological.

HT15/41 14.098 continued

MR. FINEGOLD: Based on past experience with the plants, you do not project any fatality -- any fatalities from a radiological accident?

MS. FOUNDS: Not in this document.

HT15/41 14.098 continued

MR. FINEGOLD: Did you estimate any probability of this occurrence based upon previous experience?

MR. JESSEN: As we already pointed out, we identified the HE operation risks dominant activity to the workers.

HT15/41 14.098 continued

MR. FINEGOLD: But the radiological risks were regarded as negligible; is that correct?

MR. JESSEN: No, that's not correct. We identified them in the document.

HT15/41 14.098 continued

MR. FINEGOLD: Well, if you calculated them, what was the probability that

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HT15/41 14.098 continued

someone would incur a fatality on account of a radiologic incident, one in 10,000, one in a million?

MR. JESSEN: We merely -- we would have to look at each scenario, step by step to get the number.

MR. FINEGOLD: Did you do any overall risk assessment from that?

MS. FOUNDS: Yes, sir. We did that and we looked at it in terms of the latent cancer fatalities. And what we're doing is calculating those tests and then multiplying that by a latent cancer fatality number. And then that comes up with, given the doses of, and then you multiply that by the risk. So, in that sense, we have had analyzed.

HT15/41 14.098 continued

MR. FINEGOLD: Fine. So what did you calculate the probability to be that any worker at the factory would die as a result of a radiological release?

MS. FOUNDS: We calculated -- the probability numbers in there state that for the population for the -- something like that -- you have less -- much less than one expected fatality. So the higher probability is that no one won't

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because that's what we're talking about in terms of the excess latent cancer fatality.

MR. FINEGOLD: How much less than one would it be? I suppose --

MS. FOUNDS: I think we have numbers up there of risk factors, 5 times 10 to the minus 7th. That's off the top of my head for those types of things.

HT15/42 14.099

MR. FINEGOLD: Have you ever heard of a case of Mr. Glen McGough? The data indicates that there actually has been a death due to a radiological accident at the plant.

MS. FOUNDS: I'm sorry. I'm not familiar with that. Obviously, you have a story in mind.

MR. FINEGOLD: Well, actually I have several stories in mind. And the question

HT15/43 14.100

is, based upon the actual history of the plant, could you have calculated fatalities in the future? And if the calculations that you made indicate extremely low probability of deaths in the future from radiological release, how reliable are your calculations since what we do have, what we actually know is (inaudible) indicates a vastly greater risk than even you calculated.

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HT15 (CONTINUED)

MS. FOUNDS: What are you referring to in particular?

HT15/42 14.099 continued

MR. FINEGOLD: A case with a man named Glen Edward McGough. The exact cause of his leukemia was never exactly identified. And the court case was sealed in 1983 so that there never has been an attempt to find out if his particular death was due to a radiological release.

We've also got recent cases involving a man named John Bell who claims that his illnesses are due to a radiological release. And he also anticipates his demise very soon. There may be some other cases. I have heard of a few.

In other words, without taking the actual records on·people who have worked at the plant and doing anything, the probability that their deaths were in some way related to accidents that occurred in the plant, we have no reliable way of projecting how many deaths may occur in the future.

MR. JESSEN: I guess the general response is that the overall cancer risk in the state of Texas is greater than 20 percent. And, in terms of just because someone worked at Pantex

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and developed cancer, doesn't correlate that Pantex was the cause of the cancer.

HT15/44 14.101

MR. FINEGOLD: This is certainly true. And it bears some examination as to whether or not these particular cases are attributable to the fact that some of them were working at Pantex.

However, the point is that you've made a risk calculation. And in order to determine whether or not it's accurate, we need to identify cases which may be contributable. It's not so much that I fear what is current activity at Pantex. It's what I anticipate may be coming in the future if the plutonium processing occurs. And, in that case, we need to be exceedingly careful about the possibility of radiological production.

If we calculate now what may happen in the future and our calculations are inaccurate, we will probably be inclined to take a much greater risk in the future operations in the plant than we ought. I think you should give that consideration.

MR. JOHNSON: Could I ask? You mentioned Glen ----

MR. FINEGOLD: McGough. I believe

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it's spelled M-c-G-o-u-g-h. And the records were sealed in the court of Judge Edward·Nobles, I believe, in 1983. And there may be some of these

HT15/45 14.102

other cases which are worth examining. I think it's worth noting that in one obvious example of an industrial accident which occurred at Pantex in 1979 that resulted in fatalities, neither the plant operator nor the federal government was willing to take financial responsibility for the consequences of the accident.

MR. MATNEY: Thank you. Are there any other questions or comments on the issue of health and safety?

MS. FOUNDS: Can I -- just for one moment. And I may put Rex on the spot here. If he could describe sort of the model. What you do is you go out and you determine what the person-rem doses are to individuals. And then, through studies that have looked at what radiation does, then that's where you get what your latent cancer fatalities are. So, again, we are using valid scientific bases for what our computations have said. We will all (inaudible). But, in terms of the models, these are appropriate for the person-rem and to the latent cancer conversion

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factors.

Rex, can you add anything to that?

MR. MATNEY: Sir, if you would kindly step up to the mic.

MR. BORDERS: My name is Rex Borders. I'm a Department of Energy employee. My title is environmental scientist. I'm also a certified health physicist. And the document identifies the potential dose to the workers over the next 10 years as 330 rem, to 330 workers over 10 years.

And, through the recommendation of the International Commission on Radiological Protection, a factor of 4 times 10 to the minus 4 latent cancer fatalities per rem is applied to that number to result in an estimate of .03 total latent cancer facilities occurring in these 330 workers through this method. And this is in addition to the estimated 20 percent of people that will experience a fatal cancer in their life.

So what Nan says is essentially correct. The estimated dose to the workers is multiplied by a factor which is recommended by an international body of radiation experts, through

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HT15 (CONTINUED)

the study of human data and the latent cancers in this population. And these numbers are recommended in the EIS as well. And the site-wide environmental impact statement identifies this dose to the workers as the result of an external source from within the weapon components and working on these materials. And, essentially, that identifies (inaudible) exposure to these workers over an extended period. And that's about all I can add, unless there's a specific question.

MR. MATNEY: I now recognize Don Hancock.

MR. HANCOCK: Don Hancock from the Southwest Research and Information Center in Albuquerque. The reason I wanted to come in now was to ask you a couple of questions related to the same page the gentleman just referred to in the EIS, Page 4-219. Statements made on that page that the maximum dose to an individual involved worker is not allowed to exceed 900 millirem during the operation.

My question relates to is that a current administrative limit? Is that administrative limit going to stay for the entire 10-year period of the EIS. And, in fact, if the

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doses discussed in the document are true, why is the administrative level not being lowered for the coming period of time?

MR. JOHNSON: This is Gerry Johnson, Department of Energy. The national standard, Department of Energy standard is five rem per year. Mason & Hanger, I believe until -- I think until the early 1990s had established an administrative level of two rem per year. The current limit is one rem per year. And Mason & Hanger is now indicating the possibility of moving it down to 500 millirem per year. So we continue to try to lower the results as we possibly can.

MR. HANCOCK: If I could respond. I guess part of the reason I raise the question is I've heard you say similar things in the past about what this document won't reflect, but the final would reflect the policies more than this -- what the statement I just read seems to indicate, which to me is a little misleading in terms of what Gerry just described.

The other question I had is related to the actual data on worker exposures

HT15/46
12.013

coming from the document. And it's not clear to me that the document reflects worker exposures of

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HT15/46
12.013
continued

workers who have been dealing with pit storage in Zone 4 west. So I'd like to have some clarification about what is and isn't included in terms of the numbers that you're giving in the documents.

MR. JESSEN: In terms of the Zone 4 workers, those numbers are provided in the intra-site transportation section. Those are workers that have responsibility for pit handling and storage.

HT15/47
12.014

MR. HANCOCK: So what's included in as transportation staging includes the workers in Zone 4 as well as the Zone 12 workers involved in those two sites? I'm just trying to clarify.

MR. JESSEN: Yes. Those records are from transportation and safety department relating to storage and transportation.

HT15/48
12.015

MR. HANCOCK: So, the calculations, then, for those workers (inaudible) are those the 1993 to 1994 similar reading; is that correct?

MR. JESSEN: Yeah. The reason --

HT15/48
12.015
continued

MR. HANCOCK: When are the 1995 similar reading information going to be available and that be included?

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MR. JESSEN: Yeah. They are available and we are looking at them.

MR. JOHNSON: I would like to add two comments. Mason & Hanger has developed a new concept of pit storage called stage right, which basically now everything is handled -- in the past, up until just a couple of weeks ago by shielded forklift. Stage right reduced the radiation exposure by approximately 90 percent. Approximately two weeks ago Mason & Hanger started using remote control vehicles. So now there is not reason for workers to actually enter the magazines in which the pits are being stored. And so I would expect to see radiation exposures to Zone 4 workers to show -- probably should have in '95 -- and in the future start showing further decrease.

Second comment was made, I believe. And I believe it was made to Bret about the fact that if you move plutonium pits to another site the additional exposure would be packaging. In reality, we're going to repackage all the pits into AT-400A containers, irrespective of whether they stay at Pantex or whether they are shipped elsewhere. So that maybe is going to be

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HT15 (CONTINUED)

achieved. Whether or not achieved under the term, that will happen whether or not those pits are removed or stay in the magazines.

MR. MATNEY: I'd like to recognize Ms. Beverly Gattis on Mic 6.

HT15/49 14.103

MS. GATTIS: I just need some help understanding about the consequence categories. When I looked at that, it struck me that this was an acute exposure, a one-time exposure type; is that correct, or am I misunderstanding?

MR. JESSEN: It essentially characterizes (inaudible) because in terms of the chemicals, there's a difference on impact radiological release and in terms of HE exposure, radiological exposure. But I think your question is in regards to long-term pathways; is that correct?

HT15/50 14.104

MS. GATTIS: Well, I just wanted to understand what we're talking about when we talk about consequences. The consequences are greatly varied depending on the material we're talking about, just as you referred to. So sometimes you say the acute exposure is probably acute exposure is from an explosion. But, just as we talked about previously with aircraft and the

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HT15/50 14.104 continued

probability of a (inaudible) to a plutonium release getting into the soil. (Inaudible). There are materials that are toxic. There are materials (inaudible). So I'm wondering how do they take all those factors into account?

MR. SIMPKINS: The reason we have is, to start with, is so that HE events, radiological events, so we compare them to like scenarios. And they were determined as less dominant when compared with like scenarios. And so the consequences from a radiological source are typically measured in 50-year CEDE.

MS. GATTIS: Does that mean some (inaudible) from having people who, when the accident happened (inaudible) and then subsequent exposures shall happen over time also.

MR. SIMPKINS: (Inaudible) possibility.

MS. GATTIS: Exactly.

MR. SIMPKINS: As I previously told you, the inhalation method is shown to be the predominant risk. It's assumed with respect to that (inaudible) clean up (inaudible).

MS. GATTIS: I guess (inaudible) a decision at level of acceptable exposure as to

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whether or not (inaudible). So I think that's a bit more (inaudible).

MR. SIMPKINS: We attempted to look at similar -- other accidents occurred, such as one in Spain where they dropped (inaudible) countryside. I don't know what (inaudible). I know it was an extensive cleanup. We did not consider that in this event.

MS. GATTIS: And then I guess (inaudible) I understand real quickly. The statement to the public is dominated by (inaudible) exposures at Pantex. There are a (inaudible). I continue to work to be made clear

HT15/51 14.105

in the document the exposure through the operation of Pantex are in addition to, not other than, so as not to avoid one choice or the other. These are additions to exposure.

The other thing -- the point next I would just offer (inaudible) the converse is true or not. (Inaudible) Pantex is not contributing to cancer, which is (inaudible).

And the other thing, (inaudible). I understand that (inaudible) with this document.

HT15/52 14.106

Latent cancer fatality (inaudible) are all Greek to me. Would you all talk to me about that?

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MR. SIMPKINS: As I said, the doses are 50-year CEDE for the exposure period. Because that's the lifetime this document is intended to cover.

HT15/52 14.106 continued

MS. GATTIS: This isn't (inaudible) I'm not sure that I know what CEDE is and what it means. But I thank you.

MR. JOHNSON: Let me comment. Earlier, comments were made about the individual who contracted to keep. In the 1983 EIS there was in fact a fatality study (inaudible) national laboratory. And it basically concluded that -- and looked at all fatalities of all workers at Pantex for whatever reason, and basically concluded that the work force was the only (inaudible) at the Pantex plant (inaudible).

If you're considering -- if you look at the industrial setting, the working forces typically in the general population. We estimate (inaudible) until this time. They (inaudible) as part of this effort, but we've also asked (inaudible) to help (inaudible) to help us update the EIS study for Pantex purposes. The State of Texas has also requested to have. So we're hoping that we will have better current data on

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HT16

TECHNICAL INFORMATION EXCHANGE

ON DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR THE CONTINUED OPERATION OF THE

PANTEX PLANT AND ASSOCIATED STORAGE

OF NUCLEAR WEAPON COMPONENTS

JUNE 25, 1996

AFTERNOON SESSION

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Portions of the transcripts unrelated to this EIS have been omitted.

MR. MATNEY: We will continue discussing the health and safety issue. And we were into public comments and questions. As we begin this session, I would like to call on Mr. John Bolin, who is going to address the question regarding inhalation calculations and the resuspension question.

We'll ask Mr. Bolin for his remarks and then we'll open the floor with additional questions or comments. Mr. Bolin.

MR. BOLIN: I just wanted to clarify about the max calculations. For the population dose, the ground resuspension was included in the calculation. Since it's a -- basically, it's an inhalation contributor as part of the long-term dose for that -- for all the plutonium release accidents.

MR. MATNEY: Thank you. And we'll now recognize Ms. Doris Smith.

HT16/1
14.107

MS. SMITH: Okay. Along with that inhalation and the statement that was made in the document that DOE only addresses inhalation exposure, inhalation is the only pathway accounted for in the assessment of chemical and radiological airborne hazards from normal operations. Page

2

HT16/1
14.107
continued

4-205.

Now, does this mean that there are exposure pathways of non-airborne hazards, for example, through groundwater contamination? And are these included in the analysis and where do we find them?

MR. JESSEN: Doris, I'll try and answer that. The water pathways were looked at, but in terms of the long-term dose from accidents, they are not a significant contributor. In terms of the dose, the inhalation as the cloud is passing and the resuspension are the dominant long-term dose pathways.

HT16/2
14.108

MS. SMITH: Are there other pathways and accidents that are non-normal operations? Are these included in the accident analysis?

MR. JESSEN: The only other pathway that we found significant was inhalation through -- or absorption through the skin for tritium oxide. When a cloud engulfs a person, it easily absorbs into the skin. And it can get into your body that way. And, in terms of the plutonium, inhalation is the only dominant pathway.

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HT16 (CONTINUED)

HT16/6 14.112 continued

MS. SMITH: Was this analyzed in
the document?
MR. JESSEN: Yes.
MS. SMITH: Just another note that
I had. The Acquazella Study I believe was
referred to, the study on the workers at Pantex.
Am I correct that this study compares workers to
the community at large; isn't that correct?
MR. JESSEN: Yeah. We'd have to
look that up. We don't remember that
specifically. That's the worker mortality study?

HT16/6 14.112 continued

MS. SMITH: Right.
MR. JESSEN: Yeah. I don't think
we can answer that right now.
MS. SMITH: Okay. In the accident
scenarios and analysis, it seems as though
everything has to work 100 percent correctly all
the time. Are there -- is there any built-in
analysis for if something does not actually fall

HT16/6 14.112 continued

into place like it is supposed to?
MR. SIMPKINS: Sure. That's what
the initiator frequencies are for the various

HT16/6 14.112 continued

accident scenarios. It's the failure mode,
whether it was a mechanical failure of a crane or
the probability of a forklift puncturing a pit

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container. So failure modes are built into the
risk assessment. And that's where you get the
accident scenario from is an accident initiator,
which is, by definition, a failure of one kind or
another.
MS. SMITH: And do you consider
that there are different initiating events at
different times that would cause a different
sequence?
MR. SIMPKINS: Sure.
MS. SMITH: And is there data that
supports this claim?
MR. SIMPKINS: Yes. Each sequence
that's analyzed has a series of references where
we got frequency numbers from from previous
studies, typically, the SID, Safety Information
Document, or the existing safety analysis, the
safety analysis reports.
MS. SMITH: Thank you.
MR. MATHEY: Thank you, Ms. Smith.
I'd now like to recognize Mr. Steve Ahlenius from
the Amarillo Chamber of Commerce.
MR. AHLENIUS: Just for my own
clarification, what is the Panhandle's background,
as far as radiological exposure? What's the norm

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for the region?
MR. SIMPKINS: It's published, but
I don't have it memorized.
MS. FOUNDS: It is in the

HT16/3 14.109

document. And if you'll let Jim look it up here,
he can give it to you. I think it's around 400,
something like that. But if you'll give us a
minute, we'll look that up.
MR. JESSEN: Here it is. It looks
like a total of 400 milligram per year for each
individual from background sources.
MR. AHLENIUS: From background
sources. And in the document you show 330?
MS. FOUNDS: Yeah. The 330 was

HT16/4 14.110

historical -- well, it was for 1994, right?
MR. JESSEN: The number I gave you
is in that table. It's under all other sources,
which includes medical and other extras and that
type. 334 is the total natural.
MR. AHLENIUS: 334 is the total
natural?
MR. JESSEN: Yeah.
MR. AHLENIUS: So the 330 that you
have here, is that in addition to the 334?
MR. JESSEN: The 330 is over 330

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people.
MR. AHLENIUS: Okay.
MR. JESSEN: And this 334
milligram per year is for each individual in the
vicinity. And the 330 deals with workers only.

HT16/5 14.111

MR. AHLENIUS: So the background
then is how much again?
MR. JESSEN: Natural background
radiation is described on Page 4-207. And it's
334 milligram per year.
MR. AHLENIUS: Okay.
MR. MATHEY: Are there any other
public questions or comments on the issue of
health and safety? Yes. Ms. Neusch.
MS. NEUSCH: Hello. I'm Trisch
Neusch. And I just wanted an explanation. On
your overheads, Bret, you had, under synopsis of
results, you have public risk from radionuclide
exposures is dominated by sources other than the
Pantex plant, like we've been discussing. But
this next sentence was, thus, none of the
alternatives will measurably change the public
risk from radiation exposure. Could you explain

HT16/6 14.112

your reasoning on that, please?
MR. JESSEN: Trisch, I'll try and

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HT16 (CONTINUED)

alternatives.

MS. NEUSCH: I see. But this is the site-wide document that will address all of those issues, but you aren't looking at it, right?

MS. FOUNDS: Right. The decisions for those are in the other documents. And so what we've tried to do, again, is summarize, to the extent that we can as we were developing this, this document along with those other ones to give the cumulative impacts should a particular decision be made. But this document will not make decisions on those alternatives.

MS. NEUSCH: But it includes the other documents and those decisions?

MS. FOUNDS: It tries to summarize what those things are because the decisions haven't been made yet. And there were multiple alternatives in those documents, so we tried to summarize what it would be, considering those alternatives.

MS. NEUSCH: So it's basically an ineffective document when it comes to those decisions?

MS. FOUNDS: I guess I'm not quite sure what you mean by that.

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MS. NEUSCH: Well, I mean that any person that picks up this document and thinks this is about the site-wide environmental impact statement -- you're talking about impacts on the environment in a site-wide future?

MS. FOUNDS: Uh-huh.

MS. NEUSCH: And, to me, it bears to mention some of those other alternatives that you've discussed in this document.

MS. FOUNDS: And, as I said, in those sections where it talks about cumulative and, in fact, under each of those resource areas it summarizes what's been done in those documents and they go out and look at the different risks too. And so we've pulled them together and said, okay, what is -- what's the information in those documents so you can get an idea what the cumulative impact is.

MS. NEUSCH: Okay. And I'd also request that, Bret, when you're going over these overheads and everything, those of us that have looked through the documents and are familiar with the acronyms, realize what those mean, but there are some of those that you're talking about that it would help, when you say the acronym, if you

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would explain what that is. It would kind of help. Thanks.

MR. MATNEY: Thank you, Ms. Neusch. Other questions and comments? Yes. Ms. Gattis.

MS. GATTIS: I guess Trisch has touched on a subject that is kind of a concern to me. I really would like to understand why you all have those cumulative impacts in here like you have, for instance, on -- just one example, Page 4-239, where you're talking about the storage and disposition PEIS. And the last sentence in there is: All doses would be within radiological limits and well below levels of natural background radiation, et cetera, et cetera.

HT16/7
02.019

This document has consistently referred back to the three PEISs and made, I'll say, claims evaluations -- I'm not even sure what the right word is -- but statements about impacts that it doesn't seem, to me, this document has the information to do. Can you all talk to me a little bit about that?

MS. FOUNDS: Part of what it is is, I mean, we're always bound by the radiological control manual, for instance. That's a DOE

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order. So it limits the amount of exposure that any one person would get. So, in that sense, we're all trying to stay within those guidelines, their DOE orders, et cetera. So we're trying to do that in those statements that are there.

But then what we do is go out to those documents and look at what the overall impacts that they have projected for those and are trying to summarize them in this document.

MS. GATTIS: I hear what you're saying. I'm not sure I'm persuaded. To me, it's still a very difficult area, a real debatable area and a debatable thing that this document does. It gives the impression you're making solid judgments that I don't think the information is sufficient to do.

HT16/7
02.019
continued

MR. MATNEY: Mr. Hancock.

MR. HANCOCK: Let me try just a couple of follow-up questions on what has just been talked about. This morning when we were talking about probabilities and the basis, the data base, for the probabilities, in some cases you talked about historic plant operations, for example.

HT16/8
14.113

This document and, frankly, the

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HT16 (CONTINUED)

HT16/8
14.113
continued

other PEISs, don't have historic data on worker exposures at MOX fuel facilities that they're basing their projected impacts on. They don't use that kind of data. So when you come to the public and make statements like we're going to be within regulatory limits, that's not -- that doesn't have anything to do with your probabilities and your risks, because the probabilities and risks are not necessarily always related to the regulatory limits.

Sometimes regulatory limits are developed based on those kind of historical practices, but in some cases not. And in this country we don't even have good numbers for what regulatory limits for, for example, a MOX fuel facility should be. So I think it's a legitimate concern that folks have. And I think one of the things that I would suggest is that you make clearer in the text of the document, particularly on the health issues, specifically how you're basing your analysis on historic data and where you really don't have much historic data or very limited historic data that you are, therefore, extrapolating to a 50-year CEDE or to a 10-year operational lifetime.

HT16/8
14.113
continued

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MS. FOUNDS: In terms of, well, your last one, when I said extrapolating to a 50-year CEDE, we have the codes in place because it's based upon the rems that are received. It's based upon data from studies as to what those latent cancer conversion factors are. And then the dose rates is based upon biological studies, et cetera, for coming up with a 50-year CEDE.

And are you stating that I should summarize, for instance, in the human health section, what those studies were in terms of that extrapolation?

MR. HANCOCK: Well, there are a couple of issues, Nan. One is the basis -- the basis you're using for actual exposures from various types of facilities. In some cases, you, in this document, are using historic Pantex data. In some cases, you are not. I think it would be helpful to be more clear in the document about which you are and which you aren't and for what period of time.

Obviously, the operations at Pantex have been different at different points in its last 40 years of operation. So I'm certainly not saying, you know, let's use radiation

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exposures of 30 years ago if you had good numbers, which you don't, for what those exposures were as saying that's what you should be using. But you should be clearer about what you're doing in that regard.

HT16/9
02.020

The second issue I raise, though, is, for a number of the types of operations that are being talked about for the future, plutonium conversion facilities, plutonium processing facilities, MOX fuel facilities, a new revolutionary light water reactor, there really are no history. There are no good history to go on, in terms of what the actual releases are. So you're basing your analysis -- the disposition PEIS is basing its analysis on what the current or assumed regulatory levels are going to be, not on, in fact, historic performance.

And so the point is that you should be quite clear about that, which I think, in some cases, it's really not. For example, on Page 4-239 that Ms. Gattis just mentioned to you, I think it would be very helpful if you would just say, in terms of some of these facilities, there isn't historic data to base it on, so we are basing our analysis on these plants would -- are

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HT16/9
02.020
continued

assumed to operate within the applicable regulatory limits.

You know, that would be helpful clarifying information to folks to know you're not basing it on any kind of historic data or practice. You're basing it upon what the assumed regulatory limits are going to be, understanding that regulatory limits also change over time.

MR. MATNEY: Other questions and comments? Yes, sir. Mr. Williams.

MR. C.E. WILLIAMS: On this same line of questioning, my question is if, in fact, Pantex was selected for some of these additional functions, would there be any additional environmental documentation that would have to be done prior to actually starting into those missions?

MS. FOUNDS: There would -- in some cases, there would have to be specific project NEPA documentation, et cetera. But maybe I can have Gary or Dave talk to those issues specifically.

MR. MATNEY: And, sir, would you identify yourself?

MR. NOLTON: Yes, I will. I'm

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HT16 (CONTINUED)

Dave Nolton from the Office of Fissile Materials, Department of Energy in Washington, D.C. Art and I have responsibility for the fissile materials long-term storage and disposition PEIS. In the case of storage, we would not expect to do subsequent tiered documentation. We've done analysis in the document that we believe covers the various alternatives at the six sites that we evaluated.

In the case of disposition, we would, in most cases, require tiered NEPA documentation. And I qualified that because some of the alternatives that we have looked at involve existing facilities. For example, if we were to choose the MOX fuel option, where we combine the plutonium with tritium oxide and put it into a reactor to burn it, one of the options we look at is using the existing commercial reactors, which are regulated by NRC. The NEPA requirements are in accordance with the NRC requirements.

If we were to vitrify using the defense waste processing facility at Savannah River, a lot of that NEPA has been done. But, in most cases, we would require additional NEPA documentation. Certainly here at Pantex if we

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were to construct a new reactor or vitrification plant, there would be site-specific NEPA documentation required.

MR. MATNEY: Yes. Ms. Gattis.

MR. GATTIS: I'd like to ask Mr. Nolton for clarification. If you did -- in your document, storage would not require additional NEPA coverage. And, yet, isn't, in your document, it's anticipated as a new facility, not Zone 4 magazines, but a new facility that would be built?

MR. NOLTON: The analysis of our document for the alternatives -- we have three alternatives, basically, upgrade in place, consolidate at a single facility or single site, or consolidate and collocate plutonium and uranium. And we have done the analysis in the document to cover those alternatives. And we do not think that additional NEPA analysis would be required.

MR. MATNEY: Other questions or comments? Yes, ma'am. Would you identify yourself, please?

MS. ARCHER: I'm Jonell Archer. I thought that not plutonium or uranium necessarily, but tritium was on the table, and that was all,

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and that there weren't any games going to be played, that -- to use the man from Washington exactly, Honey, we're not playing games here; it's all or nothing; 12,000 jobs are on the table. Would you speak to that?

MS. FOUNDS: Ma'am, are you talking about the tritium EIS that was analyzed? Because there are several documents. And I may go back to Gary or Dave again. But there was the stockpile stewardship PEIS and then there's the storage and disposition PEIS also. Is that what you were referring to?

MS. ARCHER: Yes. It's the long-term storage. And that was what was on the table when they came down from Washington. And that was after I got an invitation to go to Washington and discuss what they were going to discuss here, but there wasn't a plane ticket in the invitation.

Then the man from Washington had been on a -- he didn't even really identify himself. He just came and sat down at the table and discussed it and that was it, went back to Washington. But it was at one of our meetings at the Sunset Convention Center. And he had been on

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a hiatus for three years studying. And Steven Sulvinski or whoever came up to the table. So he sent the invitations.

MS. FOUNDS: Gary, do you have -- can you clarify?

MR. PALMER: My name is Gary Palmer. I'm from the Office of Defense Programs from Washington. I think you might be referring to Steve Sohinki, S-o-h-i-n-k-i. Steve had responsibility for the tritium production programmatic and environmental impact statement, which has been completed and the Secretary has made her decision. That decision was to site those tritium production facilities elsewhere. So it's no longer an active consideration, although it was once upon a time for Pantex.

So at the time he was probably talking to you in terms of possibilities. But those possibilities have been resolved in terms of no possibility for Pantex here at this time for tritium production.

MS. ARCHER: But not storage? The storage is still on the table is what I hear.

MR. PALMER: Tritium normally doesn't require storage. We have such limited

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HT16 (CONTINUED)

quantities that we're using it constantly. And more of a concern is the recycling of it, how you take it from one application back, clean it up, so to speak, and put it into another application. So there was a recycling component of it in addition to the production. And that recycling remains at Savannah River, where it has been traditionally. That's the best I can do at this point. I think that answers your question.

MS. ARCHER: Okay. Thank you.

MR. MATHEY: Other comments or questions? Comments or questions on health and safety? Hearing none, let's close our discussion on that issue and move to our third issue. And that is the issue of transportation.

We do want to remind you that if you would like to ask a question anonymously, you may do so by getting a card out in the lobby and writing your question and have someone -- perhaps one of the officials around the room -- bring it to me and I'll be glad to phrase that question for you.

Also, for those of you who may be new to our afternoon session, our format is that the Tetra Tech and DOE officials will present the

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issue. And then state and local officials will ask questions and make comments. And then we will open that particular issue up to public questioning and public comments.

So let's move forward with the transportation issue. And I'll turn it over to Tetra Tech official Jim Jessen. Jim.

MR. JESSEN: Okay. In terms of transportation, we looked at the impacts from both off-site and on-site transportation activities. We analyzed the impacts from normal operations and potential accidents and we analyzed the differences between the alternatives.

In terms of the proposed action, we looked at the radiological exposure expected to the transportation workers on site. We based that on that historical information. And the numbers there are in the graphs. No public impacts are expected from normal operations.

For the no action alternative, which is to store only 12,000 pits at Pantex, those numbers go down a little bit because there will be fewer pit transfers related to the repackaging activity.

In terms of the relocation of

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pits, we found that it would increase the risk to the workers due to the additional handling, specifically the loading and tie-down within the SST. And that's estimated at 28 person-rem.

The inter-site transportation, we also evaluated normal impacts and potential accidents. The methodology is discussed in Appendix F. Again, we evaluated the differences between alternatives.

And, just to summarize those results a little bit, relocating the pits will increase the risk to the public relative to the proposed action. The shipment of 20,000 pits to the Savannah River is the highest impact alternative. And that would increase the normal operational radiological risk by 58 percent and the accident risk by 31 percent.

And we kept this short since we were running over time. Thank you.

MR. MATHEY: Okay. We'll ask now if there are questions from any state or local officials. We'll start, I believe, with Joe Martillotti.

MR. MARTILLOTTI: Joe Martillotti, Texas Department of Health. The stockpile

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stewardship and management PEIS discussed manufacture of high explosive components at other sites and transporting them to Pantex, as it was briefed, as, I believe -- maybe not a written alternative, but a preferred verbal alternative at the April meetings. And that issue is not discussed at all in the transportation materials in this EIS. And I believe, if that's an open possibility, it should be addressed.

MR. JESSEN: In terms of that, like Nan said, we're looking at the nearest 10-year term. And those activities are not going to occur while this document -- in the time frame we're looking at this document. The analysis for that should have been covered in the stockpile stewardship PEIS.

MS. FOUNDS: So we would just tier from that document. At the time that we were also writing this, there was no preferred alternative at that time either. So we would be going back and looking at the stockpile stewardship and looking at what transportation risks that they would be and tiering that into our document, in terms of a summary format. Pat, did you have anything to add to that?

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HT16 (CONTINUED)

MS. O'GLENN: My name is Pat O'Glenn. I'm with the Department of Energy in Albuquerque. We don't have a preferred alternative yet on the HE mission. We won't have until probably later in July. However, the transportation of HE components in and out of Pantex for all alternatives was assessed in the SSM PEIS.

MR. MARTILLOTTI: It was in the SSM PEIS, but not in this document?

MR. O'GLENN: Right.

MR. MARTILLOTTI: And, if that occurs, it would occur after this 10-year period. Is that what you're saying here?

MS. O'GLENN: It would probably start to occur around the year 2000 or so.

MR. MARTILLOTTI: Yeah. It was my understanding that it would occur within that 10-year period if it did.

MS. O'GLENN: Yes.

MR. MARTILLOTTI: So that's what I'm saying. If it were a possibility, it should be looked at in this issue.

MS. POUNDS: We would just tier from their document to say, okay, this is the

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impact that they have shown in their document in our transportation analysis for what they would say. So it would just be going back to their document and tiering from it.

MR. MATNEY: Other questions from state or local officials on this issue? Hearing none, we'll open the questioning and comment session up to the public on the issue of transportation. Yes, ma'am. If you would identify yourself, please.

MS. CLUSKINS: My name is Dorothy Cluskins. It just occurred to me just as I was listening to you talk about whether or not there would be less exposure if the pits were left on site rather than transporting them -- and I wondered if the repackaging were not part of the

HT16/10
12.016

long-term storage in that option if they were to be left on site. And -- well, if so, if

HT16/11
14.140

repackaging is a part of the action, that would be part of the analysis also? Because it would provide the same worker exposure as taking it out of the bunkers and moving it to a new location.

MR. SIMPKINS: Repackaging is a part of the analysis that's in our site-wide EIS. And Gerry addressed this topic earlier this

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morning that the repackaging is going to take place independent of where the pits ultimately are stored. Is that right, Gerry?

MR. JOHNSON: That's correct.

MS. CLUSKINS: So if the pits --

HT16/12
14.141

if Pantex is chosen for long-term storage, then the workers would actually be exposed to the same activity bringing them out of the bunkers as they

HT16/13
12.017

would if they were taken out and moved to another location?

MR. SIMPKINS: The activity -- the radiological exposure associated with repackaging will take place when repackaging takes place. The AT-400 that they will be repackaged into is a better package, in terms of subsequent radiological doses, because it provides better shielding.

MS. CLUSKINS: If it's decided that they're to be moved, would they be repackaged prior to moving?

MR. SIMPKINS: Absolutely. They have to be repackaged in a Type B container. The package they are in now is not certified for over-the-highway transportation.

MS. CLUSKINS: And if it's

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determined that they will stay over a longer period at Pantex, will everything there be repackaged in that case?

MR. SIMPKINS: That's what Gerry said this morning, yes.

MR. JOHNSON: The reason for that is that the AT-400 is a sealed container. stainless steel. And it's also -- it basically provides a new sealed barrier around the plutonium head. And so whether they stay -- if they stay at Pantex, we want to do that just because it increases the safety margin. If, in fact, they're going to be shipped somewhere else, they have to be repackaged because the AT-400 is an approved shipping container and the current containers are not approved for off-site shipments.

MS. CLUSKINS: Okay. Thank you.

MR. JESSEN: I just wanted to add something to that. A lot of the dose that we're predicting is coming from tying down these containers within the SST. At that point, they have to take it out of the stage right configuration and it takes a long time for each container. And that is a unique operation.

MR. SIMPKINS: This topic came up

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HT16 (CONTINUED)

in a discussion yesterday. It's -- presumably, DOE will develop a new technique for tying down the containers. If they undertake a massive relocation of pits, they're likely to develop a more -- a less exposure method for grouping the AT-400s and maybe palletizing them and placing them in the trucks on the shielded forklifts, rather than having each individual pit container be chained down by an individual in the truck.

So that question has not really been answered as to how that would be undertaken. The analysis we did includes the conservative individual cans being tied down by the transportation workers.

MR. MATHEY: Ms. Gattis.

MS. GATTIS: When you transfer pits on site, do you move them in an SST or do you move them in some other way?

MR. SIMPKINS: There's a special design pit trailer that carries four-packs and six-packs of the pits in the stage right configuration. That's the predominant method of moving them on site.

MS. GATTIS: So if we did in the future a centralized new facility in Zone 12, as

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was talked about in the disposition PEIS, for instance, you're still going to have to move these pits? They're going to be removed -- very likely to be moved out of the magazines anyway. I base that partly on your figure in this book that the igloos have an estimated lifetime remaining of 32 years. So that's not as long-term as some things.

Anyway, so they'll be moved -- they'll be repackaged on the site and they're going to be moved -- or inevitably are going to be handled to be repackaged and they're inevitably going to be moved.

MR. SIMPKINS: If they stay in the stage right pallets, they can be moved with very low doses.

MS. GATTIS: Good.

MR. SIMPKINS: They aren't currently designed -- the pallets aren't designed to be chained down in the SSTs when they're transported over the highway. That's why I said presumably a better method would be developed before DOE would undertake shipment of thousands of pits off site.

MS. GATTIS: Okay. Thanks.

MR. MATHEY: Mr. Hancock.

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MR. HANCOCK: I have a couple of transportation questions. On Page 1-10 and 1-11 it says, approximately 30,000 transfers of radiological and explosive materials take place each year at the Pantex plant. Where in the document or where in some other document are the actual levels of exposures to workers documented from those 30,000 transfers?

MR. JESSEN: Like I stated before, the transportation and staging worker doses are in -- I think it's 4-14, Section 4-14. And they're responsible for all moves on site.

MR. HANCOCK: So let me make sure I'm following you here.

MR. JESSEN: Okay.

MR. HANCOCK: Page 4-179 lists cumulative doses in the transportation and staging department, the number of people involved in that department and the maximum individual doses for 1993 and 1994. Are you saying that all -- those are the people and those are the exposures related to all 30,000 transfers?

MR. JESSEN: First of all, I'm not really sure where the 30,000 number came from.

MR. HANCOCK: Well, it's on Page

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1-10, so I hope somebody can tell us where it came from.

MR. JESSEN: But in terms of the doses, yes. All on-site transportation activities are performed by the transportation and staging department.

MR. HANCOCK: I guess my additional comment is the -- if -- well, there needs to be better documentation about this 30,000 transfers, where it came from, what is involved. When you look at Page 41-74, where it talks about inter-zone transfers -- these are inter-zone transfers between Zone 4 and Zone 12. If you take those numbers, they add up to about 5,500 transfers, far less than 30,000.

So, I mean, my concern is that there are great differences in the numbers we're talking about here. And that doesn't mean -- and that's the reason my question was -- that doesn't mean that there are worker exposures that are falling outside, but I also -- from the document, I also can't tell what things are related to what things.

MR. JESSEN: We promise to explore that and get a better feel for that, where that

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HT16 (CONTINUED)

number came from.

MR. HANCOCK: I'd be glad for Gerry Johnson to respond, as it looks like he's interested.

MR. JOHNSON: Basically, you have two types of transfers of nuclear materials. One is inter-zone. That would be moving from Zone 4 to Zone 12 or backward. The other thing is we have 64 -- well, approximately 64 assembly bays. We have a number of special purposes bays. And we have a number of assembly cells. Any movement from any one bay to another bay is a transfer. And that's all handled by material handlers.

And so each movement would be -- when it moves from one building or one bay to another bay is considered a transfer. And the transfers are all handled by the same people, which are material handlers. So you have your production technicians who do the assembly/disassembly work, and then you have the material handlers who actually move the materials from location to location.

So you would have a lot of movements within Zone 12. You also have some movements within Zone 4. As you would move them

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from one magazine to another would be a transfer also.

So my assumption is that that's where the 30,000 come in, which would be about right.

MR. MATHEY: Yes, sir. If you would identify yourself, please.

MR. JARMAN: Okay. My name is Clifford Jarman. I work for Tetra Tech on the EIS. If you read that sentence, it also includes explosive transfers, which would not have doses associated with it. And so there's one of the sources of why the number is higher in what you're reading from Zone 4 to Zone 12, in addition to what Mr. Johnson said.

MR. HANCOCK: We don't need to have a long debate about this. My concern is that these numbers need to be better documented and better explained. And I've already heard that you're planning to do that, so I will look forward to that.

MR. MATHEY: Other questions or comments? Yes, sir.

MR. PALMER: Once again, my name is Gary Palmer from defense programs. In this

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presentation and the previous one, some questions came up about the relationship between this EIS, this environmental impact statement, and the stockpile stewardship of tritium and, finally, the storage and disposition.

And I just wanted to give one piece of historical information that might help explain how it's presented. And that is that when we started on the path of doing all these EISs at the same time, we consulted our -- DOE's office of NEPA assistance and policy because we recognized real quickly that if we didn't do something we were going to have four EISs looking to the same issue, at considerable expense to the taxpayer.

So we discussed it with them and actually got an agreement from Carol Borgstrom, who is the director of that office, that basically the programmatic EISs -- take, for example, stockpile stewardship and management, would go into the generic programmatic levels and would look at the impact of placing new programs at new sites. And they were the only ones that had to do that.

So, for example, if they were going to propose moving a facility to Pantex, we

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didn't want the Amarillo area office and Donna Bergman's office to have to go out and calculate what the effect was going to be on Pantex. Rather, that was done by the larger programmatic document. So, in an attempt to smooth things out, that was the basic method that was taken.

Then the Pantex environmental impact statement would take that information from the programmatic document and simply report it. Even more important was the probability or the lack of probability of knowing which programs actually were going to go to which site because, under NEPA, you consider all the alternatives.

So, for example, stockpile stewardship and management was considering multiple sites and multiple missions. And it would be even more inefficient to have each of those sites looking at each of those issues and doing those calculations. So, in the end, we basically agreed to simply have the programmatics do the work and then the site-wides take that information and report it.

In this particular EIS, I think, if you look in Chapter 4.21, it reports the cumulative impacts. It's in a table so one can

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HT16 (CONTINUED)

actually add -- you can decide which option you think is going to come to Pantex, and you can add up the cumulative impacts for yourself. It's not added all the way across because it's almost impossible to do that. It's not clear which options may or may not come.

So, rather than try to presuppose a case, we simply presented in here all the various options. And you, the reader, can look at them yourself. That's the history. That's how we came to be this way. And I thought it might help to explain that, based on the questions that came from Ms. Gattis and Mr. Hancock and also the State of Texas.

If that isn't clear, I'd like to expand that. I'll be around. I'll be glad to talk to you off to the side. But it was a conscious decision made over two years ago to pursue it that way.

MS. FOUNDS: Thank you, Gary.

MR. MATHEY: Other comments or questions?

MR. HANCOCK: This is probably more in the nature of a comment than a question, but certainly anybody who wants to respond to it

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can. There's been a lot of discussion today about the AT-400A. There is, in fact, however, in the document very little discussion about the AT-400A, in part because it is not, in fact, in service. It is not, in fact, ready to go, et cetera.

So I guess my comment would be I would hope that in the final there is included more analysis and particularly results of actual testing on the container, the limitations on the testing that has been done and those sorts of things so folks will be a little more familiar with how the container is performing in terms of its tests and how it's expected to perform long-term so it will be a little easier to evaluate how well it actually does work, because, at this point, you're basing your analysis on the regulatory requirements that it's trying to meet as opposed to any actual performance of them.

And, historically, whether we talk about these kinds of containers, like the AL-R8 or other containers used to transport other things over time, they frequently are shown to not perform as well long-term as what they have been designed to perform at.

MS. FOUNDS: Well, this is a

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question that you had at the Albuquerque. And I am still talking with AT-400A. What they've said is -- a lot of the designing information is classified for the AT-400A. So that's one of the reasons that we've also gone to the -- looking at the analysis in terms of the transportation Type B packaging container in that performance.

So we've -- at a minimum, the AT-400A will have to meet those standards. And so that is presented in the document. Any additional information that I can have in there about the AT-400, I will try to put in there. But, just to clarify that I did go back and talk to them, and much of that information is actually classified.

MR. HANCOCK: And I appreciate that. I guess my concern is if you can't put the actual information in the document, there are a variety of Type B containers that have been used, not for plutonium pits, but for other nuclear materials, over the last 15 years. And there is some history about their performance over time and how many of them have been recalled for modifications and those sorts of things. And that kind of information should, therefore, be included so folks have a little better basis of

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understanding, you know, what historic practice has been, understanding it's not historic practice of this particular container because this particular container doesn't have any historic practice to be based on.

MR. MATHEY: Gerry Johnson.

MR. JOHNSON: I think, Don, you bring up a very good point. One of the things on the storage option of plutonium pits is, just like we have a very rigorous quality assurance program evaluation program for nuclear weapons, there's also one that's been established for the storage of plutonium pits, which on an annual basis, a certain percentage of the containers, as well as the plutonium pits, will be pulled and fully evaluated and sampled to determine any long-term trends that are negative or any kind of modifications or changes that need to be done.

So the only point I would like to make is there will be a rigorous surveillance program. So they're not going to be just put into storage for X number of years and not monitored or check or evaluated.

MR. HANCOCK: And it would be helpful if that process got written down so people

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HT16 (CONTINUED)

know what's being expected and proposed, et cetera.

MR. JOHNSON: And that program has been defined so it could be described in there.

MR. MATHEY: Yes. Dr. Rock.

HT16/14
12.018
HT16/15
15.078

DR. ROCK: Hello. My name is Dr. Rock. My question has to do with Figure F-6.3.1 on Page F-19, Appendix F as in fox-trot. There is listed a variety of collisions that might occur during transportation which form the basis for the risk and the consequence analyses in that appendices. And I note that aircraft collisions with the transport train have not been considered, or at least they're not listed.

MS. FOUNDS: With the transport train?

HT16/14
12.018
continued
HT16/15
15.078
continued

DR. ROCK: The stage right trailer, the whatever trailer you would like to consider. I guess there's something hauling a trailer, so I think of it as a train. I admit there's no caboose.

MS. FOUNDS: No. It's just Pantex at one time had railcars. And I was wondering if you were referring to those, and you're not.

MR. SIMPKINS: That was not an

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oversight. We had considered that potential. But the target is so incredibly small compared to the footprint of the entire plant where plutonium resides that it would -- it's several orders of magnitude below other similar risks.

I mean, we can put it in there. It won't make any difference to the overall results, but it could be included.

DR. ROCK: I guess either I don't understand the target footprint concept and the target shadow concept, or else this target isn't as small as it appears. Because the skid distances that will approach this target are just as long as the skid distance -- we have two targets. We have this one moving slowly and we have the rest of them not moving at all.

MR. SIMPKINS: The ones that are not moving at all are there 24 hours a day also. You also factor in the limited time exposure that those are out in the open. There's another small fraction, another conditional probability that would be added onto that. It gets very small, in terms of a risk number, but it could be addressed.

HT16/14
12.018
continued
HT16/15
15.078
continued

DR. ROCK: That's true. If we're really looking at 30,000 movements a year, which

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HT16/14
12.018
continued
HT16/15
15.078
continued

was the number referred to earlier in the discussion, the total exposure of all of those targets averaged over a year may match the total exposure of a single storage facility, in terms of hours of vulnerability. So it relates to an observation that I've had that, in analyzing the aircraft crash probability, there's been no consideration of the fact that the aircraft is only in a position to impact the target for a short duration, a very short proportion of its entire flight.

Here we've got a slowly moving target that's only vulnerable for a short period of time and we've not worried about it. When you're moving the missile instead of moving the target, we worry about the sum total of all these passes. When we're moving the target more slowly, we say, well, it's in the open for such a short period of time that it's negligible.

And I guess I'll just leave it that that's a question. And I don't have the answer, or I'd have given it.

MR. SIMPKINS: We can demonstrate that it's negligible, if that's what DOE directs us to do. We can certainly consider that in the

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final EIS.

DR. ROCK: Thank you.

MR. MATHEY: Other comments? Yes, ma'am.

MS. LEE: I have a question. I'm Susan Lee from Austin. I'm associated with several grass-roots groups. I have more experience with nuclear power plants and transportation relating to that. But I know that there are always emissions from trucks carrying radioactive material that can affect the public on the highways as they are alongside of a vehicle or being passed by a vehicle. And I wonder if there's any explicit documentation in the EIS about public exposure on the road as missiles are brought in. That's my first question.

MR. JESSEN: Yes. It's described in there. If you want me to point it out, I'd be happy to.

MS. LEE: That would be helpful.

MR. MATHEY: While he's looking at that, would you like to ask another question?

MS. LEE: Right. The estimates of missiles that will be dismantled, are these only the US missiles or do these include the missiles

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HT16 (CONTINUED)

from the former Soviet Union that I read in an Austin paper that UT's Dale Cline was recruiting to bring to Pantex for dismantling?

MS. FOUNDS: No. In this case, we're just looking at the dismantlement for US weapons in our EIS.

MS. LEE: Okay.

MR. JOHNSON: I know of no plans or evaluations or consideration for bringing any foreign warheads or bombs into Pantex for dismantlement. The only assistance that the United States has offered the Russians is to provide some analysis and help with them as far as packaging of their plutonium containers. For example, we have an AT-400 container. We have designed and provided containers to them that's very similar in nature.

We've also worked with some of their transportation systems and we've helped them in the design and the construction of a storage facility. But there's really been no technical exchange or discussion as far as helping either side with the dismantlement of nuclear weapons.

MS. LEE: Perhaps he was misquoted or perhaps he has another understanding. I'll be

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glad to share the newspaper article with you.

MR. SIMPKINS: I can answer your previous question now.

MS. LEE: Great.

MR. SIMPKINS: Page 4-269, Table 4.16.2.1-1.

MS. LEE: 4.16.2-1?

MR. SIMPKINS: It's the only item that's on Page 4-269. You don't need the table reference.

MS. LEE: Thank you. And is that with and without accident?

MR. SIMPKINS: This particular table includes the public incident free.

MS. LEE: Is there one which includes an incident?

MR. SIMPKINS: And expected number of latent cancer fatalities from dispersal accidents, those two columns are both in that table.

MS. LEE: Okay. Great. Thank you.

MR. MATHEY: Other questions, comments? Ms. Neusch.

MS. FOUNDS: I'm Trisch Neusch.

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And I was wondering did you reference or consult with the Texas Department of Transportation or the local emergency planning commission in completing this document, and, if so, how? And, if not, why not?

MS. FOUNDS: In terms of that, we didn't consult with them in terms of the numbers that are in there. We did send the document over to the State of Texas for their comments. And, in fact, I think that's somewhat of the technical interchange that's going on today.

MS. NEUSCH: I see. So the data did not include anything particularly from the Texas Department of Transportation?

MS. FOUNDS: No. In terms of the analysis for both the incident free and the accident, we use -- or included in there, you know, national statistics and things like that on transportation accidents and the type of accidents that do go on. So we have used statistics, but we did not consult directly with the Texas transportation department.

MS. NEUSCH: Okay. Thank you.

MR. MATHEY: Any other comments or questions regarding transportation? Hearing none,

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1994 usage was, at 439 million liters.

For water production, the 1994 usage was 836 million liters, as compared to a capacity of 1,890 million liters. 2,000 weapons level is 1,011 million liters. 1,000 weapons level is 791 million liters. And, again, the 1,000 weapons level and 500 weapons level is less than what the 1994 water usage was.

So that pretty much concludes my presentation.

MR. MATHEY: It is now 3:30. Let's be in recess for 10 minutes. And we'll come back with questioning. A 10-minute break.

(Recess.

MR. MATHEY: Ladies and gentlemen, we'll call our meeting back in session. We've just heard the technical presentation on air and water monitoring. And now we'll ask for state officials to ask questions and make comments. Yes, sir. If you will identify yourself with title and ask your question or make a comment.

DR. GUSTAVSON: My name is Dr. Thomas Gustavson. I'm with the Bureau of Economic Geology at the University of Texas. My main concerns about the discussions of the Perched

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06.048

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HT16 (CONTINUED)

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06.048
continued

Aquifer and the Ogallala Aquifer have to do with the limited amount of information that is available describing the limits of the Perched Aquifer to the south and southeast.

And I'm also concerned about the lack of discussion of leakage of Perched Aquifer waters through the perching horizon. In my reading of the draft EIS, these two issues are not treated with any -- in any kind of detail. And I would like to know if there's any additional information available that may be added into the final statements.

MS. MONKS: Essentially, we are going to consider information that is presented to us up until the cutoff date that we have for this document. In terms -- for those of you who may not have heard me, what I just said is, essentially, we'll consider information that is made available to us before our information cutoff date for this document. So -- was there anything in particular that -- any particular studies that you were referring to?

MR. GUSTAVSON: No. I'm pretty familiar with the information that is available. It just seems to me that there's a lack of

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information, particularly with respect to analyses from the unsaturated zone beneath the Perched Aquifer to determine whether or not there are contaminants that have made their way through the Perched Aquifer and are infiltrating, flowing down to the main Ogallala Aquifer.

I suspect that much of the sampling analyses from the Ogallala Aquifer is from wells that have long screen intervals, hence if there were any contaminants, say, towards the top of the main Ogallala Aquifer, that these things might be diluted to the point where you wouldn't know whether contaminants had reached the

HT16/16
06.048
continued

Ogallala Aquifer. We don't know for sure, for example, what happens to perched Ogallala -- excuse me -- Perched Aquifer waters when they reach towards the limit of the perching horizon. Are they simply flowing off the edge of the perching horizon and then into the Ogallala Aquifer, or is it possible in some cases that the southern margins of the perched horizon are more or less continuous or sort of flow into the Ogallala Aquifer?

If you extend some of the maps in that direction, the elevations of the surface of

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the Perched Aquifer and the Ogallala Aquifer get to be fairly close to each other. So I'm interested in those kinds of questions.

MS. MONKS: Okay. Well, that will certainly be considered for the final.

MR. MATNEY: Yes. Joe Panketh, please.

MR. PANKETH: My name is Joe Panketh. I'm from the office of air of the TNRCC. And I'm the Pantex project coordinator for the ambient air monitoring that we're doing at Pantex. A couple of comments I want to make with

HT16/17a
07.004

regard to the presentation. One of the items that were mentioned was that one of the pollutants that we monitor for is for suspended particulates, which is no longer true because there is no standard for total suspended particulates, so we stopped monitoring for TSP. Although we take samples, those filters are forwarded to the Bureau of Radiation Control for radionuclide analysis.

HT16/17b
07.005

And the other item that was mentioned was that we monitor for metals. Again, we don't -- on a regular basis, we don't analyze for metals. We did take a sample from 1993 about 30 days -- 30 samples. And then we analyzed for

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07.005
continued

about 20 different metals through kind of a screening method. There aren't any concerns there or we haven't been able to identify any. So we have not done any additional analysis for metals.

Now, with regard to the EIS, my comments are only for the non-radiological part of

HT16/18
07.006

the air quality. And with regard to air quality impacts, both for no action alternative or the consolidation alternative, the non-radiological air quality impacts will be minimal. Only potential is for particulates if more construction activity takes place due to consolidation alternative. And, as the EIS mentions, that if that happens, that mitigation measures will be used to control the particulate emissions. And I think that is a TNRCC-accepted method of control for particulate emissions.

HT16/19
07.007

I would like to bring up some inaccurate statements in the EIS that needs to be corrected. In table -- on Table 4.7.1.3-1 there's a footnote discussing the National Ambient Air Quality Standards, and I think that statement is not accurate, because for ozone and PM-10 the standard -- statement of the standard is determined by statistical methods. And that is

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HT16 (CONTINUED)

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07.007
continued

based on expected exceedances over a three-year period. And if the -- in a three-year period, the number of exceedances or expected exeedances, averaged over the three-year period, it has to be one or less, otherwise that area is considered non-attainment for that pollutant.

For sulfur dioxide and nitrogen oxide annual standards and for lead, the quarterly standard, are not to be exceeded. And carbon monoxide, there are two standards, the one-hour standard and the eight-hour standard. And sulfur dioxide, a three-hour standard and a 24-hour standard can be exceeded only once per calendar year. And the statement in the EIS does not make that clear.

And on Page 4-93, there is a statement that says that Air Quality Control Region 211 is designated by EPA as better than national standards for total suspended particulates. That statement is incorrect because when EPA established new standards for PM-10 for (inaudible) particulates, the standards for PM-10 were taken out. So there is no more national standard for TSP.

On the same page, 4-93, there is a

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07.007
continued

discussion about methylene chloride was found in our monitoring at 213 parts per billion by volume on July 6th, 1993. But there is -- no mention is made that this concentration was seven times the effects screening level established by TNRCC. Although, further review and analysis by our staff, toxicology and risk assessment staff, concluded that this one-time episode would not result in any long-term health effects. There is greater discussion about the slightly above ESL concentration of dichloroethane, whereas the discussion on methylene chloride was left out.

Another point I want to make is that in our four years of monitoring at Pantex we have found a number of exceedances of PM-10 National Ambient Air Quality Standards. Although the modeling done by both TNRCC and the EIS staff did not predict any possible PM-10 violations, actual exeedances happened. They could be due to blowing dust or localized earth-moving activities. But that is precisely the kind of scenarios anticipated in the consolidation alternative if additional construction activity takes place. The EIS addresses this issue in Section 4.7.6.

The other item is the modeling

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07.008

that was done that is included in Appendix B. Our modeling staff reviewed the modeling results that was given in the EIS. The TNRCC did clean air modeling in 1995 under the agreement in principle. And our staff used a different methodology to do the modeling for Pantex, the site-wide modeling. And the EIS staff did -- they used the same model, the Industrial Source Complex model, but they used a different methodology to do the modeling. But the conclusions that were arrived at by both models were the same, that only alcohols exceeded the effects screening levels. And when it was modeled for outside the Pantex boundary, there was no exceedance of the standard or the guideline ESL. So that sort of validates the model, that two different groups of people modeled the same emissions using different approaches, but came up with the same conclusion.

However, by reviewing the input into the models our staff found that a number of emission points were left out in the modeling that the EIS staff conducted, like the carbon monoxide emissions from emission points 54, 85 and 160. Some of them are very minimal emissions. But, for example, emission point 160 is a natural gas

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07.008
continued

boiler. It has the emissions of 13,000 pounds per year, which was not included in the EIS modeling. The same thing, from the same boiler, the NOX emissions, the nitrogen oxide emissions, 53,000 pounds a year, that was not included in the EIS model.

Again, when the modeling results came out, there was no impact from these criteria pollutants in both models. So it was -- I just want to point out some omissions. The same thing, there were a number of hazardous air pollutants that were left out in the EIS modeling, which the TNRCC staff used in their modeling.

HT16/21
07.009

In conclusion, what I have to say is that the modeling results that were used in the EIS does not -- do not indicate any air quality impacts from either the current operation of Pantex or any expanded operation of Pantex. But, because we have had some PM-10 exeedances, although it happened at the property, they are not considered a violation of the National Ambient Air Quality Standards. But that is one thing that needs to be taken into consideration when this expansion or consolidation alternative is considered, that some mitigation measures will be

HT16/22
07.010

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HT16 (CONTINUED)

HT16/22
07.010
continued

employed to avoid exposure to the workers or even potentially to the neighboring residents. That's all I have to say.

MR. MATNEY: Thank you, Mr. Panketh. Other comments or questions from state or local officials? Geof Meyer.

MR. MEYER: I'm Geof Meyer, TNRCC Austin, industrial hazardous waste. I'm going to make some comments. I'm going to read Boyd Deaver's comments. He's not here today. He comes out of the Region 1 office. Then I have my own comments.

On Page 4-57, the first paragraph is somewhat confusing. We'd like to see a statement which clearly states that Pantex did at least historically discharge of Playa 5. It's implied in the statement they have in the first paragraph. We would like to see it just a little more clear cut.

HT16/23
06.049

With regard to Ogallala contamination, I understand the EIS had been written before we discovered some slight amount of contamination in the Ogallala proper. Since the EIS hasn't come out in its final version, I think it ought to be revised to go ahead and reflect the

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06.049
continued

conditions we know about now.

HT16/24
06.050

With regard to the Ogallala, the homestead wells, the EIS should note that the low vertical permeability of the fine grained zone may be compromised by these abandoned homestead wells that have been found on the Pantex site. These wells could provide contaminant pathways through the fine grained zone to the Ogallala.

With regard to the facility boundary, the EIS should mention that DOE will take whatever action is practicable to clean up the groundwater to residential drinking water standards beyond the facility boundary.

HT16/25
06.051

And Pantex plant playas, on Page C-2 there's a statement that risk reduction rules -- well, no -- the Texas State Surface Water Quality Criteria do not apply to Pantex playas. But if you go through the Risk Reduction Rules, 30 Texas Administrative Code, Subchapter S, Chapter 335, you'll note that Texas Surface Water Quality Criteria does apply to the Pantex playas.

Surface water quality values. The surface water quality determined in accordance with Risk Reduction Rules take precedence over the risk based concentration guidelines from EPA

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06.051
continued

Region 3, which was cited on Section C.1.2. The list of decision criteria doesn't list the Texas Risk Reduction Rules, which also include Texas Surface Water Quality Criteria and drinking water standards and so forth. We prefer that you not -- well, since the EPA Region 3 guidelines don't apply to Pantex, which is in EPA Region 6 and also in Texas, and we have the Texas Risk Reduction Rules and the Texas Surface Water Quality Criteria, all of which do apply, we'd just as soon you drop the EPA guidelines and substitute the Risk Reduction Standards. This gets to be a problem later on.

In Table C.1.2-1, some of the values cited apparently cite the EPA Region 3 guidance. For instance, the standard for antimony should be 0.006 milligrams per liter, based on the Risk Reduction Rules, which refers it back to the safe drinking water act, rather than the 0.15 milligrams per liter cited by EPA Region 3 guidance. So, because we're using the wrong guidance, we're getting the wrong numbers cited in the EIS.

Standards for gross alpha activity, according to the Risk Reduction Rules,

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continued

should be 15 picocuries per liter rather than N/A. I'm not sure what N/A -- not applicable. That was cited in the table. No water quality standard is provided by the Texas Surface Water Quality Criteria; therefore, the Risk Reduction Rules specify use of drinking water standards which are based on the Federal Safe Drinking Water Act.

Proposed drinking water standards should be 50 picocuries per liter or 4 millirems per year for beta particle activity. Again, drinking water standard.

And the TNRCC requests that DOE revise Table C.1.2-1 to cite the more stringent surface water quality standards for radionuclides that are developed in accordance with the Risk Reductions Rules. As such, the standard for plutonium-239/240 would be 2 times 10 to the minus 8 microcuries per milliliter, based on the TRCR standards. I can't remember what that stands for. Where is Joe Martillotti? Well, anyway, they come out of the Bureau of Radiation Control, Texas Department of Health.

Radium-226 and 228 should be 6 times 10 to the minus 8 microcuries per

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continued

milliliter, again, based on the drinking water standards, Federal drinking water standards. Tritium should be 1 times 10 to the minus 3 microcuries per milliliter, based on the TRCR standards. Uranium-234 and 238 would be either 3 times 10 to the minus 7 microcuries per milliliter, which is a TRCR standard, or 20 milligrams per liter, proposed drinking water standard, whichever is more stringent.

And that's all the comments I have. Thank you.

MR. MATNEY: Thank you, Mr. Meyer. Any response?

MS. MONKS: We'll take that into consideration.

MR. JARMAN: Move that into the final.

MR. MEYER: These comments will come to you in writing once they get past management. I don't expect them to get changed.

MR. MATNEY: Other comments from state or city officials on this issue? Okay. Hearing none, let's now move to the public session on this issue of air and water monitoring. Comments or questions from the public? Yes, sir.

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Mr. Williams.

MR. C.E. WILLIAMS: On Page 4-13, Paragraph 4, the City of Amarillo has pledged 5,526 million liters per year of water as a part of a potential expansion. I have three questions from this statement. Number 1, are disposition missions considered expansion? Also, is there any plans on where the water is to be withdrawn from? And, three, what are the time frames and conditions of this pledge?

MS. MONKS: I'll go ahead and address each one of those separately. With respect to your first question, the disposition missions are not considered to be expansion, not in this particular document anyways.

With respect to your second question regarding where the City is planning on withdrawing that amount of water, the City would develop reclaimed waste water from the City of Amarillo Hollywood Road waste water treatment plant. The use of the reclaimed waste water could actually curtail the annual decline rate of the Ogallala Aquifer.

So it wouldn't be pulled from the Ogallala Aquifer itself. It would be water reuse

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from the waste water treatment plant, if that was necessary. However, again, that particular -- what that really had to do with, more than anything else, with respect to that pledge, had to do with the large quantities of water that would be necessary if the tritium supply mission was enacted at the Pantex plant.

However, since the date that this particular document was written, as I believe it was stated earlier today, the tritium supply mission has been deemed as a non-viable alternative for Pantex.

Regarding your question about the time frame and conditions of the pledge, details regarding the time frame and conditions are under negotiation.

MR. MATNEY: Mr. Juba on Mic 11.

MR. JUBA: As was just stated, that offer was made by the City of Amarillo in regards to an accelerator production of tritium. As you recall, the water demand requirements for an accelerator for tritium production are quite high. We've never come back and said that offer is no longer good, because if there were a mission that required the use of that water, we might

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consider providing treated waste water for a mission.

Under this EIS, it's really not an issue because there's nothing that would cause that kind of demand that would require us to build a pipeline from the Hollywood Road plant to Pantex.

MR. MATNEY: Other questions and comments? Mr. Williams.

MR. C.E. WILLIAMS: I have another

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question. My question refers to -- it's on Page 4-78. And you recognize, and I quote, groundwater management is a responsibility of local jurisdictions through groundwater management districts. The Pantex plant is located in Panhandle Groundwater Conservation District Number 3, which has authority to require permits and limit the quantity of water pumped.

And, in view of this statement in the document, why have you chosen not to register the perched water production wells and the monitoring wells in compliance with Rule 4 of the Panhandle Groundwater Conservation District?

MS. MONKS: Could you repeat your question again, please?

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MR. C.E. WILLIAMS: Why have you chosen not to register or permit all of the perched water production wells and the monitoring wells on the site, as required in Rule 4 of the Panhandle Groundwater Conservation District?

MS. MONKS: I believe that the main reason for that has to do with the production, because the perched wells I believe on site are just used for monitoring; however, I believe somebody from the plant may be able to add to that and sort of expound upon that.

MR. SCHUSTER: I'm Kent Schuster with the Mason & Hanger legal department. C.E., if we need to register those wells, it was -- it may have been an oversight, but, as I understood, the Groundwater District required the registration and permitting of production wells. And, as I understood -- I'm not well-versed on these right at this second. But I'd be glad to work with you on that.

But, as I understood it -- and I'm not really the person to be talking to you on this, but that person is not here. And I can get clarification with you for that question. But, as I understand it, for the monitoring wells and for

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-- in the Perched Aquifer, it wouldn't need permitting through you all?

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continued

MR. C.E. WILLIAMS: It does not require permitting, but it does require registering and a semiannual report of any water quality analysis that were taken from the monitoring wells. It's a fairly simple process and I'd be sure willing to work with you.

MR. SCHUSTER: I've worked with you before and I'd be glad to take care of that with you. And I'm sorry if there was an oversight on our part.

MR. C.E. WILLIAMS: That's fine. I have one other question while I'm going.

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I guess I have some concern and I'd like for one of the DOE people to characterize to me how the system failed when, on a meeting on May 13th with Johnny Bolin and Danny Ferguson of DOE, Boyd Deaver from the TNRCC here in Amarillo and myself, agreed that it was in everyone's best interest to not plug the Lee Cockrell windmill located off site. And then, two days later on May 15th, it was related to me that that well was plugged. And I just wondered where the system failed and what has done to correct it.

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MS. FOUNDS: Gerry, did you have any comment?

MR. MATNEY: Gerry Johnson.

MR. JOHNSON: Basically, the well was plugged by mistake and it's being redrilled right now. And the drill rig is out there and it's already being -- I think it's going to be drilled down to a depth of 270 feet. And then samples will be taken from there to decide whether to drill it out further or not. But that's all being coordinated with Boyd Deaver from the TNRCC and we're proceeding under his direction and guidance at this point.

MR. C.E. WILLIAMS: Okay.

MR. MATNEY: Other questions, comments? Yes. Ms. Belisle.

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MS. BELISLE: I have two. When you were making the presentation on the water, you said that radionuclides were significantly below DOE standards. Does that mean that they are detectable?

MS. MONKS: It depends upon -- in some instances, yes, I believe they were detectable, but they were detectable in low levels. When you analyze for radionuclides, you

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tend to get a lot of activity. The way that I understand it is that, essentially, what happens when you do those particular types of analyses, is you take your sample and you, essentially, heat it up. And what you're measuring is the activity of the radionuclides.

It's a rather uncertain type of measurement because, as you might imagine, what you're really measuring is the activity rather than the concentration. You tend to get a lot of variation in the numbers. So, as a result of that, there does tend to be a lot of uncertainty. And so sometimes you can get things that are detected, in terms of radionuclides, that may actually be present or not be present.

MS. BELISLE: Thank you. The other question that I have is related to the air monitoring -- well, not air monitoring, but modeling for air emissions and the fact that none of the residences on the south side of the plant were cited. And there are at least six residences within a mile of the fence line on that side.

Can you tell me how that oversight occurred and what's being done to correct it?

MS. SINHA: We have reported one

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resident -- at the south side we have reported two of them. Yeah, the south side we have two resident. And I'm a little bit -- not geographically very good. But I think the south side, on the bottom, we reported two residents. And along the west side, about two of them. And the north side, about -- where the burning ground is there, about four or five of them. Again, on this side, which is the east side, we have reported at least two of them.

So we have reported mostly all the residences. And if you are looking at the map on the EIS right now, it's a little bit in error in reporting the residences actually. But, in modeling, it went very good. We have to correct that map. That's all. I think that might be a problem on that map. So we will be giving you a correct map in the final draft.

But we have taken the residences all around the boundary in the Pantex Plant.

MS. BELISLE: Okay. If the map is incorrect, how can we correlate the numbers, one through 11, with locations? How can we do that analysis?

MS. SINHA: We will give you the

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correct map. Right now I don't have with me the correct map. We will provide you -- I'll make sure you'll get the correct map. The resident 10, what I have presented in my slide, which had alcohol slightly over the ESL level about 12 millirem, that is below the Zone 12. I think that the southwest -- southeast. I'm sorry. As usual, I'm -- west and east, I'm always confused. But it's under the Zone 12 on the southwest side.

MR. JARMAN: There was a slight mixup in the residences used in the noise modeling and the air modeling. And when we were trying to consolidate -- I know it doesn't look like it, but we were trying to make the EIS be as compact as possible -- that the figure got confused. The residences 1 through 5 are the same. And those are -- okay. We will be -- I tried to call you personally, but we'll be sending out a figure to you and to the contacts that we have along the south and west -- south and east sides to show where the proper locations are so you can correlate it to the numbers.

MS. BELISLE: And the numbers in the appendix will refer to the numbers on the corrected map?

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MR. JARMAN: Yes. The numbers in the appendix are correct for the locations. We went back and double-checked and drove around the plant site with the map, and all of the locations are of residences. There was just a confusion when we were trying to consolidate maps.

MS. BELISLE: And we'll have those before the comment period?

MR. JARMAN: Yes. To give you a quick idea, I can point out basically where they are. Like I said, on the map you have on -- I'm not sure what page. 1 through 5 --

MS. BELISLE: 4-94.

MR. JARMAN: 1 through 5 are the same. 6 is about there. 7 is there. 8 there. 9 here. 10 there. And 11 there. Did I go through too fast on that?

MS. BELISLE: I'll talk to you afterward.

MR. JARMAN: Okay.

MR. MATHEY: Gerry?

MR. JOHNSON: I guess I have a question on -- the comment was made that there was radionuclides found in the water, the groundwater. What kind of radionuclides?

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MS. MONKS: Well, that information is listed in Appendix C, in terms of the actual radionuclides that were detected. And, essentially, what they were included gross alpha and gross beta; however, it's important to notice that gross alpha and gross beta are both essentially screening anolytes. They're taken in order to determine, essentially, whether or not you do have any radionuclides present. And they include things like uranium and radium and other radionuclides in them. So it's a more -- since it's more of a screening type analyses, it's not as exact as when you're analyzing for the different radionuclides themselves.

MR. JOHNSON: Where did you get the information from?

MS. MONKS: All of that water quality data came out of the annual site environmental reports.

MR. MATHEY: Questions and comments? Ms. Gattis.

MS. GATTIS: I don't know this part of the document well, so let me just

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ask. Are all the known emissions for Pantex included in a list in this document, regardless of

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continued

whether or not there's a standard that it was tested for, or do we only talk about things that there's a standard that applies that you pick up in monitoring?

MS. MONKS: Would you mind repeating that, please?

MS. GATTIS: I just wondered if all the known emissions from Pantex are specified in this document, regardless of whether or not there's a standard that applies to them so that we get a picture of the emissions from the plant. And then are they monitored for or not? Is that

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07.011
continued

specified? Or are they only monitored for if there's a standard and if there's no standard they're not tracked or whatever? Have I confused you as much as I've probably confused myself now? I'm trying.

MS. FOUNDS: I'm trying to decide which one can answer that question. We were giving a list of the inventory for the Pantex plant and it was based upon their process knowledge of what they use. And so that was put into the models. And what you're seeing, I believe we modeled -- we modeled about 95 pollutants, but the only ones that are in there

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are sort of the ones that were of any significance, in terms of health criteria.

And when I say that, we had -- they're below the ESL levels in the document. And so that's -- but they're a comparative measurement. But we did model for 95 pollutants.

MS. SINHA: Yeah. We modeled for 95 pollutants, hazardous pollutant -- no, hazardous and plus the criteria pollutant, modeled 95. Then, to report, we decided 36 of them in total hazardous pollutant, which is, from the health risk point to the public, supposed to be -- we wanted to investigate on them how they would affect, although every one of them at the boundary, for the public, it was below ESL level.

So -- but still we went ahead and investigated all those hazardous pollutant, how they will affect. And it is in the -- I think it's in the human health section, if you will see the tables are there. And also we compared how it is going to affect the workers who are on the site. So in both the places we have reported the health effect, according to OSHA's exposure limit and also TNRCC's ESL levels.

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continued

MS. GATTIS: I guess I would be

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continued

interested, and would like even to request, it would be nice if this document gave us a good thorough picture of the plant, regardless of, perhaps, health effects or whatever, just what are the emissions. And, if there are no health effects attached to certain things, that's nice if you can specify that or just that there's not a standard, or whatever. But it would be nice to have a better picture, a clearer picture, of this plant as it currently operates.

MS. SINHA: In Appendix B, you see in the air quality we have given the total emissions. We reported all the emissions coming out of the Pantex plant at present and also for the future we projected. We have also shown what are the facilities which will be affected in the future, which is not going to be affected. Every -- all the -- the whole inventory is in that appendix of the air quality, Appendix B. Let me mention the page number.

MS. GATTIS: That's fine. That's what I asked originally. I just wanted to know whether it was included in the document.

MS. SINHA: Yes.

MS. GATTIS: And it's

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comprehensive?

MS. SINHA: Yes, it is.

MR. MATNEY: Yes, sir. Mr. Panketh.

MR. PANKETH: Joe Panketh from

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07.012

TNRCC. As I mentioned in my presentation, when we reviewed the emissions data that they have reported in Appendix B and the emissions inventory that was submitted to us for our AIP modeling, there were a number of hazardous air pollutants, about 50 of them, that were left out. And, as I said, they are not very high quantities, but they were mentioned in the emissions inventory that was submitted to us, but it is not included in the EIS. And I have a list of those compounds that I can make available to you. And this has been submitted and now in written comments to.

MS. GATTIS: Good. I just -- I think it would be very helpful to have that sort of thing complete in a document like this.

MR. MATNEY: Questions, comments? Yes. Ms. Gattis.

MS. GATTIS: You mentioned on the water issue that you were available to receive information until the information cutoff time.

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When is the information cutoff time? I wasn't sure what -- is that the same date as the comment period?

MS. FOUNDS: It's going to extend a little bit longer. But we're scheduled to get our sort of review copy for the EIS August 17th to have for people to review. So we'll have to back that sort of cutoff date up there. But what we're using is asking people to project beyond that to see if there's additional information they think might affect the document and identify that to us. But, essentially, we're looking to, you know, data cutoffs around the middle of July to the end of July.

MR. MATNEY: Any more questions or comments on this issue, air and water monitoring?

MR. SCHUSTER: I'm Kent Schuster with Mason & Hanger. Just a little bit to help us all understand how some of the environmental regulations impact Pantex's operations. As far as the environment restoration and the water issues, everyone needs to remember that Pantex has drafted a risk reduction guidance document. And that document will help us, as far as governing Pantex's cleanup under our RCRA permit. And it

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will bring in to our operations the risk reductions rules. And that document has undergone several revisions. And it's been with the TNRCC and we've incorporated their comments, as far as compliance or governing our cleanup under the risk reduction rules out at the plant. And that's all enforced under our hazardous waste permit, which, as you know, was modified and renewed in February.

Then one other topic is that the plant is a DOE facility. And, of course, the DOE has the obligation to self-police itself for radionuclides. Those radionuclides and the laws that DOE has passed to govern itself are subject to oversight and enforcement by the EPA. And so, when you think of Pantex, you should think of federal enforcement of radionuclide limits for emissions for affluent discharges.

And, as I understand it, the State does not have the jurisdiction over the radionuclide aspect of Pantex's operation, whether that would be through the Texas Bureau of Radiological -- I haven't got that exactly right. But, as I understand it, the State has jurisdiction over possibly normally-occuring radioactive materials, but it would not have

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jurisdiction over radionuclides at Pantex other than that.

And, again, the risk reduction rules are being enforced and implemented out at the plant through our cleanup activities through our environmental restoration department. Thank you.

MR. MATNEY: Thank you, Mr. Schuster. Any other comments? Comments, questions? Ms. Gattis.

MS. GATTIS: Related to what Mr. Schuster brought up -- sorry about that -- I didn't carefully read the section that outlined who had regulatory authority over various parts of

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22.017

the plant, but it would probably be helpful to know where there are places where the plant is self-regulating, where there isn't an external regulator with regulatory authority, as opposed to oversight. You are certainly welcome to describe oversight also. But, for the missions where Pantex is self-regulating, I think that would be very helpful to have those distinctions made. A clearer picture of the regulatory structure for a DOE facility like this would be valuable.

MR. MATNEY: Other comments?

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activity level and the environmental restoration wastes that are also projected for our EIS time frame. And that concludes waste management.

MR. MATNEY: Thank you, Mr. Bartosch. And I believe Mr. Meyer has some questions and comments; is that correct?

MR. MEYER: Yes. Again, Jim Meyer, TNRCC in Austin. I've got three comments here from Boyd Deaver, Region 1 and a couple of my

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own. The first is that the permit, the hazardous waste permit 51289 which is issued by the TNRCC and mentioned on Page 4-189, the comment on Page 4-189 should be amended because the brand new permit became effective February 16th, 1996. So, basically, I mean we understand the EIS is somewhat dated, so just put in the new date for the new permit.

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continued

And Section 4.13.1.3 on Page 4-79, some of the units identified in the third paragraph have now been closed and you'll probably want this reflected in the EIS. Again, updating the EIS.

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continued

On Page 4-147 and 148, these paragraphs should be reviewed by the low-level mixed waste team for updates on the current waste

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continued

inventories, waste plans and waste activities. Also, discussion of MTU's may need to be revised on these pages. Again, I think that's a comment to update the EIS. Because we have, I think -- we've issued the agreed order, site conception. It's an agreed order issued October 2nd, 1995 concerning mixed waste. I'm not sure that's fully reflected in the EIS.

My comments were the hazardous waste treatment plant and treatment and processing facility. I don't know how likely it is to have the no action alternative as opposed to the proposed action alternative that you all have promoted in the EIS, the site-wide EIS. But, under the no action alternative, the hazardous waste treatment and processing facility is not to be built. Well, the no action alternative is essentially the same site conditions as when we were negotiating the agreed order for the site treatment plan for mixed waste. And, in that plan, the hazardous waste treatment and processing facility was proposed.

Yet, when you turn around and read the EIS, under the same site conditions, no change, it is now not to be constructed. And we'd

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like to see that hazardous waste treatment processing facility built, regardless of the alternative, even the no action alternative, because we feel it's an updated and modern process facility that Pantex, by their own admission, needs in order to keep in compliance with the October 3rd, 1995 agreed order, which we all negotiated in good faith.

MR. BARTOSCH: If I could comment. That's an important issue. The first three comments you made, yeah. That's partially my fault. When we received the copy of the permit that was reissued by the State, I said no, we're not going to make any changes because it was too far along in the process. And there's permitting language throughout this document. And I didn't want to make updates in only certain sections of the document and thus get comments about that.

But the no action alternative, unfortunately, in the NEPA process, requires us not to build the facility. It is not a reflection of the plant's lack of commitment to do it. They want to do it. That's why it's in the proposed action. But it's a NEPA-related requirement. And has brought -- this particular comment has been

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almost from day one within the internal review by DOE and contractors like myself. So, unfortunately, that's going to remain that way in the EIS under the no action, because of that NEPA requirement.

MS. FOUNDS: Just to let me clarify. NEPA requires that you have a base line of which to compare impacts to. So, under the proposed action, we do annotate, okay -- under the no action -- we do annotate that the hazardous waste treatment and processing facility is part of the Federal Facility Compliance Act. And so we have annotated that to make sure that people understand that the no action, again, is a base line from which to compare impacts that exists today. The facility does not exist today.

So we're actually, you know, analyzing for those impacts so you have a base line. And that's why it's no action. You can actually pick the no action alternative within any one of those projects and say, this is my record of decision, if that's what the Department wanted to do. So they could even do that without picking the proposed action. So you can do that because we've analyzed the impacts for all the

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construction projects and, in particular, the hazardous -- the HWTPF.

MR. MEYER: So the treatment and processing facility was, is it safe to say, dropped out of the no action alternative simply for analysis rather than --

MS. FOUNDS: That's right. It's a requirement of NEPA process to say, okay, at this date, this is the effect to the environment. That's what exists today. So, therefore, you put into the proposed action to say that, you know, what is the difference there between what exists today and what may be down the road. It doesn't mean that you won't build that facility. You could actually pick the no action, if you wanted to, and still construct the HWTPF by stating in the raw that we're going to pick the no action alternative plus the HWTPF. Does that make sense? But it gives you that base line from which to compare.

MR. MEYER: Sure. Thank you very much. I'll add all those into my comments. The other six projects, or the five projects, the laboratories and such that replace the original laboratories built in the '40s and '50s, from just

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a purely waste management perspective, any modern updated facility that can handle these wastes better is something that I think the TNRCC would promote.

My last comment has to do with something I said earlier and, I think, generated a comment from the legal -- Mason & Hanger's legal attorney. I think it's Schuster. And also Betty Holwell is hot on this issue as well. I'll read

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it verbatim: TNRCC would be more willing to embrace the Pantex mission within the State of Texas if DOE would promote independent regulatory oversight of radioactive source, special material and byproduct material. We applaud DOE's willingness to share its information concerning radioactive contaminants; however, it is our opinion that the public would be better served and potential waste management errors minimized if the oversight authority was shared with the TNRCC.

Now, we're well aware of -- this might be a little too brutal -- of DOE's legal obstructionist attitude for the State picking up regulatory authority over radionuclides. We understand we do not have the authority. We also understand that EPA in their assertive program do

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have the authority. And we are working now with the EPA to pick up that authority, at least to piggyback on to it, not that we can assume it or they can give it to us, but we can certainly hold hands, in a sense, partner with the EPA in their assertive program while this NPL is decided, to get some oversight on radionuclides, not that we feel like it's a great issue. The issue is not that we feel there's a bunch of contamination out there. The issue is solely that we want -- we think that DOE would do a better job with oversight.

It's not an issue for Pantex necessarily. We feel that Pantex has done a pretty good job, far better than some of the other DOE sites. It's strictly our ability to do what we are asked to do by the citizens of Texas, which is to regulate and to watch and to concur or not to concur. We don't want to hurt DOE. We don't want to hurt Pantex. We just want to do our job. And that will be -- we're in the middle of an FFA negotiation right now. And this will be an issue that we're not going to drop. We'll get to discuss it quite a bit. And so stay tuned. Thank you very much.

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MS. FOUNDS: Sir, let me just -- of course, I can't answer a question about who has regulatory guidance. All we did, in this EIS, is to look at the processes, report the impacts. And, of course, you're part of the process in terms of the NEPA analysis.

I do want to make sure that we clarify one thing. When we were discussing radionuclides in our last conversation, I do want to make sure that it was understood that you're essentially accounting for background radiation on what the site reports. And what the screening level is is to make -- it's to look at that, look at the gross alpha and gross beta. And so what you're taking up is background radiation. I think we had some comments then in the back after that discussion. And I just wanted to make sure that we clarified that.

(Inaudible unidentified speaker.

MS. FOUNDS: Yeah. That was in terms of radionuclides. And this was in the water quality section. So I just wanted to clarify that. And I also know that the citizens advisory board I think has been briefed several -- at least on one occasion by ANSAR, which is part of the

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Center for Disease Control. And they've looked at the various radionuclides. And I think they've said that basically it's background radiation that's out there.

MR. MEYER: Yeah. Actually, one more comment, Mr. Johnson, please. The technical staff of Pantex and TNRCC and Joe Martillotti with the TDH have had preliminary discussions about radionuclides and cleanup standards. And I might be a little too quick with this to say it, but my understanding is we're in agreement on what the cleanup standards are. We are not in conflict. I mean, we essentially all agree, I think, that we can come up with water standards that everybody can live with. So that in itself is not an issue, what the standard should be. What I quoted was strictly -- I mean, I didn't generate them. I got them from the safe drinking water act, so on and so forth. Anyway.

MR. MATHEY: Mr. Johnson.

MR. JOHNSON: All of my waste management folks have deserted me here, so let me try to wing this as best I can from memory.

There's a series of questions. I think that your chart showed that the potential waste stream, it

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could have a potential impact with some low-level mixed waste. And I guess I've got some questions. You talked about there was no off-site disposal, but we, in fact, have disposed a significant part of our mixed waste in envirocare. I wasn't sure if that's being considered. We also are working with Idaho National Engineering Laboratory now to do some experimental work to put actually more of the mixed waste into envirocare.

You used a factor of 1.45 expansion for treatment. And I'm just wondering what treatment technology, because, at one time, we had talked about mobile treatment units and encapsulation. Now we're talking about simple drum overpack procedure, which is approved-EPA process, but does really not expand the volume at all.

Also, you talked about potentially running out of amount of space. We've made a significant effort over the last two years to minimize the amount of generated low-level mixed waste through the increased characterization and segregation of those activities. I'm just -- there's been a lot of activity over the last year, year and a half in mixed waste. I didn't know if

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all of these additions would be factored in to your analysis or not.

MR. BARTOSCH: The simple answer, I guess, is that we will look at that again. In terms of the space issue, we looked at it from the worst-case kind of scenario. We didn't give you any credit for any shipment potential through envirocare. The DSSS, something like that, is also out there. We didn't give you any credit for that. We're looking at it from the worst case, what would happen if you did not ship, for whatever reason.

Essentially, the numbers, the projections, include the plant's estimations and effects by waste minimization. And, although we have added back a 10 percent margin factor in to see if we could come up with an adverse impact, if you would, that was all considered. The 1.45 expansion, again, we can go back and look at that. That, again, was something that the plant provided to us to use. So we'll entertain, you know, these comments.

MR. BLACK: I just wanted to add that one of the things we wanted to do in analysis was to make sure we provided a bounding envelope

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so that the plant would not be constrained, but, yet, we could look at the impacts at the outer edges of that envelope so that anything else within that envelope that was done to improve operations or come up with a better way of doing something would be just a bonus and would be well within the analysis itself.

MR. MATHEY: Sir, would you identify yourself?

MR. BLACK: Cecil Black.

MR. MATHEY: Any other comments from state or city officials on this issue, the issue of waste? Hearing none, we'll open comments now from the public, comments and questions from the public on the issue of waste. Ms. Gattis.

MS. GATTIS: Okay. Thanks. In your view graphs, you've got the page that deals with solid waste management facilities. And there's -- the first phrase at the top of the page is burning ground (only when burning materials have been designated as waste.) Would you talk about that a little bit, please?

MR. BARTOSCH: As you know, the burning ground serves two purposes for the plant. It manages its hazardous wastes that's

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high explosives related at the burning ground. And it also provides the Pantex plant with the capability to demilitarize and sanitize the materials -- I'm going to use the wrong terms -- the classified sensitive -- requiring what demilitarization and sanitization does. And that's where the difference. That's why this particular thing was put in there. And I believe it's also explained in the EIS in a number of locations, including Chapter 1, if not Chapter 3. Does that help any?

MS. GATTIS: Yes. Thanks. I just wanted to be sure that was what you intended by that. The burning ground is described on Page 4-193. And the second column, the first complete paragraph, in the middle, it says, the burning ground is designed to handle waste HE and explosive contaminated waste from HE research and production activities.

The paragraph starts talking about both hazardous waste and low-level mixed waste, but that wasn't mentioned there. But this facility does handle mixed waste, does it not?

MR. BARTOSCH: Yes. And being somewhat of a purist, I guess, that mixed waste is

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HT16 (CONTINUED)

a subcategory of hazardous waste. And that's where that distinction comes from. I did not purposely leave that out. but, yes, mixed waste is managed -- or the ability to manage mixed waste at the burning ground.

MS. GATTIS: Okay. Well, you might want to just clarify that for folks to know a little more easily.

MR. HATMEY: Gerry, do you want to add something to that?

MR. JOHNSON: Historically, mixed waste was -- not exactly mixed waste. It was -- I'm not sure of any mixed waste that was disposed out there. There were some -- there was some explosives, but they were in the form of components. But all of that work now is done by fluid jet machining. And so the components are all separated before they're sent out to the burning grounds.

It's my understanding now that the only thing that's burned out there is explosives. I will have to get some more information from my folks. I'm not aware of any mixed waste being burned out there.

MR. BARTOSCH: I'm trying to use

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my words correctly. But the Pantex plant permit allows for hazardous waste that is high explosives related and also radioactively contaminated to be processed through the burning grounds. But -- yeah, I'd be more than happy to, again, take that into consideration and provide a little more clarification.

MS. GATTIS: Right. Because it's a major factor in the site treatment plan and the compliance plan, if the burning ground is really prominent as being sufficient as it is for handling some of those waste streams.

MR. BARTOSCH: Correct.

MS. GATTIS: And that's a bone of contention between us all, which we have gone through before. I wanted to -- on your other view graph, you said, on the low-level waste impacts, storage surge capacity is flexible since no permits are required. Why are no permits required for the low-level waste storage surge capacity?

MR. BARTOSCH: Essentially, that's DOE's waste and -- in a simple manner. It's a lot more complicated if you go through the regulations. But, essentially, the Department of Energy is responsible for that waste. They set

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the requirements. The TNRCC is, as brought up and mentioned across the table here, is not -- does not have regulatory authority over the low-level waste.

HT16/34
13.012

MS. GATTIS: Okay. Then on Page 4-197, first column, first full paragraph, when you describe: In Zone 4, two magazines, eight permitted conex boxes and 25 conex boxes are used for storage of low-level waste. I think I understand that better now. It was very confusing to me when I read it. So eight of the conex boxes are permitted and the other 25 are just the surge capacity that's been added without any permitting process?

MR. BARTOSCH: When the EIS was written as it is today, essentially, there were eight hazardous waste storage conexes at the plant. Recently, five additional ones were added. And those five were in previously low-level waste storage and as part of the 25 that is mentioned there. So, in other words, now, there would be 13 hazardous waste conexes and 20 low-level waste conexes.

MS. GATTIS: You may want to fix that paragraph.

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MR. BARTOSCH: You'd be surprised how much fixing has gone on. But, yeah, be more than happy to.

MS. GATTIS: Thanks. And then there is, on Page 4-195, the second column under the first paragraph under other waste types.

MR. BARTOSCH: Uh-huh.

HT16/35
13.013

MS. GATTIS: There's a sentence in the middle of that paragraph that says: Stormwater discharge associated with industrial activities is discharged to the playas on site. I don't know what that means. Can you help me there? I didn't know that stormwater discharge was used in industrial activities. And I'm sure I'm wrong about that.

MR. BARTOSCH: I think it points to the permitting language associated with stormwater runoff versus construction-related activities versus industrial activities, if I'm not mistaken. And I think you can see that on Page 4-188, where we get down to NPDES general permit, NPDES. And you have stormwater discharge associated with non-construction industrial activity, as well as stormwater discharge associated with construction activity.

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HT16 (CONTINUED)

But I think your general comment is maybe a little more wordsmithing for that to clarify what we're trying to say.

MS. GATTIS: Sure. Well, I really hate to drag through all of this, but I was curious. I will quit. But I do want to offer on Page 4-204 where you do your cumulative thing with the PEISs again for the disposition alternative. You list the types of wastes that will be involved in that alternative. And even though a reactor, a nuclear reactor, is kind of the bounding case there, there's no high-level waste mentioned in category of waste that will be generated under that option. I think maybe you may need to add high-level waste or spent fuel storage or something that's going to be impacted under that.

HT16/36
13.014

MR. BARTOSCH: I will. Yeah, we'll go back through and pull it out.

MR. MATNEY: Thank you, Ms. Gattis. Any other comments? Yes, sir.

MR. SCHUSTER: Kent Schuster again. I'm not in the waste management department, and that will probably be evident pretty quickly. I'm in the Mason & Hanger legal department. And my boss probably wishes I

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wouldn't be talking today, but I was trying to help Beverly understand some of these issues that she's pointing out. And, Beverly, I apologize. I wasn't flipping pages with you.

It helps me to understand this -- and it may be because I'm from Brazos County. And we all know that there's a lot of Aggies in Brazos County. But it helps me to understand this issue better on the low-level waste and the hazardous waste permit. Texas has jurisdiction out at the plant over hazardous waste. Now, you can have a subset of hazardous waste, as the gentleman said, that would be mixed waste. And that has a radioactive component. So, for the hazardous waste portion or the hazardous waste aspect of a radioactive waste out at Pantex, the State has jurisdiction. And, therefore, we have to comply with what the State has put into our hazardous waste permit.

And, therefore, mixed waste has to be stored in a permitted area. For example, I believe you referenced something in the document about some conexes or some boxes or -- I can't ever remember the difference between a conex and an igloo. Thank God I'm not in charge of that.

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But what happens is you have to have mixed waste in permitted storage areas. And then it has to be treated according to the permit. And, secondly, low-level waste would not be treated -- I mean, not be regulated by the hazardous waste permit, but it would be regulated by DOE regulations. And we would have to comply with, for example, Nevada test site waste acceptance criteria. And we have an annual audit from that through all of our waste streams that go to the Nevada test site. And, therefore, the storage requirements for low-level wastes must be met under DOE regulations.

Again, I believe -- and I could be wrong -- that the DOE would be self-regulating as far as the low-level waste storage, but then the EPA would have enforcement control over that. If DOE and probably the Department of Justice -- the DOE has its own inspector general for that aspect of that.

I'm trying to help Mr. Johnson since we can't seem to find a waste management person to come up here to this microphone right at this second. You'll find in our hazardous waste permit, as far as what can be treated at the

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burning grounds, I believe that you can have only low-level tritium contamination from the HE. And I can't really speak to that. I failed to bring my permit with me today. But we were going to try to clarify that for you all. And I'm sure that we can do that through Tetra Tech's offices.

But whatever goes to the burning grounds, as you know from our contested case negotiations, is regulated by that permit.

MR. JOHNSON: Yeah. I think that that does make sense, because all of the explosive components coming off the line do have very low levels of tritiated contamination -- tritium contamination. And there is no diminimous level at this point in time. And so that may make sense and that may be what you're referring to.

MS. GATTIS: Part of the point of a document like this is to have it clear enough that you don't have to have folks come and explain it to you and that you can get a grasp of it. So it's lovely to have the explanation and I appreciate that. But a document needs to stand more on its own and be clearer that way. And that is one of the things we're really shooting for.

Another issue I would raise for

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HT16 (CONTINUED)

HT16/37 13.015

you is, since the contested case hearing negotiations got mentioned, in the settlement agreement there was a much appreciated and significant commitment on the part of the DOE to at least examine one alternative to the burning grounds, an alternative method of incineration of those wastes. It's not mentioned in this document. It should be.

MR. BARTOSCH: I agree. And we'll make the necessary changes regarding the contested case hearing and its decisions and its potential impacts, not only to the plant, but to the operations within waste management.

MR. MATNEY: Mr. Johnson.

MR. JOHNSON: There are -- I think Beverly made a very key point. There are really two initiatives underway. One is the Department has issued a diminimous level now for tritium contamination. We've negotiated with the State of Texas. And right now I think the standard is 1,000 PPM I believe is the criteria that the State uses, which is an NRC criteria, which, basically, now, with that diminimous level, we can, in fact, sell the high explosives versus burning the explosives at the burning grounds if in fact there

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are buyers out there.

We're even exploring the options of paying someone to take the explosives off. There has been a demand for explosives in the past we were not releasing because of the very low levels of tritium. And we are exploring basically getting -- disposing of the material off site because it does have a commercial value.

The second activity that she's talking about is a concept called base hydrolysis which, basically, is a concept where we would actually use -- destroy the explosives (inaudible) verses burning them out at the ground site. And both concepts, in fact, should be discussed in the EIS.

MR. BARTOSCH: I agree.

MR. MATNEY: Other comments? Mr. Sewald.

MR. SEWALD: My name is William Sewald. And I have a question on one of the bullets on your view graphs. It was on the page titled impacts from new facilities construction and upgrades. And the first bullet makes one of these sort of broad assertions that it's difficult for some of us to rectify, both with what we read

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in the document itself and the stated objectives of such an effort.

HT16/38 13.016

It says new facility construction and upgrades are not expected to impact waste operations. One of the things that I have a concern about in this document is the pit conversion and reuse facility, one of the two new facilities that are covered by this document, which we don't seem to learn a great deal of detail about, in terms of what it generates in waste streams, et cetera.

And, when you went through this view graph, I seem to infer from what you said that this statement was based, in part, on new facilities, I assume waste handling facilities, that had been built on site. And so I'm asking you is my concern a basis of definition of what impact is or what -- I mean, how we bring these kind of broad blanket assumptions back into a document where you're talking about dust particles when you do construction and then you assert that there's no impact. Did that make any sense?

I mean, how do we relate this broad assertion to the fact that we have new plutonium handling functions that are going to

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HT16/38 13.016 continued

come onto the plant in this document in this new facility and we have new kinds of hazardous waste operations that are coming on the plant with the other new facility? How can we say that that has no impact?

MR. BARTOSCH: As part of our analysis -- you've got a couple of items in there in your comment. In terms of the pit reuse facility, Tetra Tech and the plant put together the generation rates for each of these facilities, the gas analysis lab, the nondestructive evaluation facility. We put the methodology together to predict what categories of waste and volumes of waste associated with each of those particular activities.

And, for the pit reuse facility, it is not expected to generate any waste that the plant in the past hasn't handled. So, again, that's part of the assertion that there would not be any impacts. And the amount of waste that would be generated by those operations is relatively small, again, compared to the overall plant operations.

And, at the same time, to answer the other half of your question, again, because

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HT16 (CONTINUED)

the plant has added a number of facilities over the past few years and has generated construction debris and waste, from hazardous to non-harzardous in the construction process, they have a track record of handling those waste volumes and managing them in accordance with the regulatory requirements for those wastes.

And our position is that, because of that, to add new facilities in the construction phase would not adversely impact the plant because of that past record. Does that help any?

MR. SEWALD: Well, I think it does, but that's not exactly what you said in your

HT16/38 13.016 continued

view graph. I mean, if you're talking about negative impact as opposed to impact, it's not accurate to say that it has no impact. Maybe your assessment is that none of it is a negative impact. Is that an accurate interpretation?

MR. BARTOSCH: We might be dancing around a couple of words. The view graph says not expected to impact waste operations. And I think that's the same thing that's almost verbatim in the EIS itself. I would say, again, that it will not adversely impact the plant, based on the construction and based on the actual operation.

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MR. MATHEY: Mr. Hancock.

MR. HANCOCK: I guess I need to ask couple of questions about the pit reuse

HT16/39 23.041

facility, in part, because none of the documentation related to the pit reuse facility is available to the public in Albuquerque, which is where I live, because the DOE reading room has none of these documents available to the public.

HT16/40 01.021

But my specific question relates to Appendix H-14, where on the pit reuse facility it talks about the glovebox type operations and the glovebox bays that will be included in this facility. I guess I have a couple of questions related to that. How many glovebox type enclosures are currently operating at Pantex?

MR. BARTOSCH: Being in the waste, per se, I don't believe I can answer that question. Maybe one of the plant personnel could. Or we'll have to get back to you. But, typically, waste management operations don't require glovebox, so I can't answer that.

MS. FOUNDS: Gerry, did you want to try?

MR. JOHNSON: We need to get you the exact answer. But it would be, like, a few.

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MR. BRADFOOT: Okay. I apologize if I'm repeating someone else. I was reading this and I want to make sure that this is gone over.

HT16/41 13.017

On the Federal Facility Compliance Act, this was being drafted when this draft document was made. And the document says that the impact of this is going to -- well, it's unknown at this time. I want to know if there's been an update on this or will we have -- will there be more information forthcoming?

MR. BARTOSCH: You're talking with FFA, correct?

MR. BRADFOOT: The Federal Facility Agreement on 4-196.

MR. BARTOSCH: Yeah.

MR. BRADFOOT: Concerning environmental restoration.

MR. BARTOSCH: Maybe Kent would like to speak, or Gerry. We'll use the most recent information about that, but I don't know the details as to where that is.

MR. JOHNSON: That -- currently, there's negotiations going on right now between the Environmental Protection Agency, DOE and the State of Texas on the FFA, if I'm not mistaken.

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And that will cover some of the jurisdictional issues and also the cleanup standards. But those negotiations are underway right now to revise that.

MR. BRADFOOT: So we don't know if it will impact it or how it will impact it?

MR. JOHNSON: I don't know the extent of those negotiations. They just started, I believe, within the last couple of weeks, or last week. And they've just really started -- it really deals with the fact that if you look at our cleanup, environmental restoration cleanup, historically, it was done under RCRA, which the State of Texas does have jurisdiction, with Pantex, as listed under the national priority listing. That placed us under CERCLA also, which is an EPA jurisdiction. And now the EPA and the State of Texas and DOE are trying to negotiate a federal facility agreement which, basically, would talk about who has jurisdiction and what would the cleanup standards be, which would address all three.

And the only feedback I've gotten is the fact that those negotiations are proceeding, but I don't have the results of that.

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HT16 (CONTINUED)

But we ought to have that fairly quickly. Whether they'll be in time to be appropriate here or not. I'm not sure, in the EIS.

MS. FOUNDS: That's basically what we've said in the EIS, is that we're trying to make sure that we're covering the total activities at the plant, which includes environmental restoration. But these have a process all of themselves that are very similar to the NEPA, so we're reporting them -- those results in this EIS to make sure that we are trying to get a complete picture of the plant.

MR. MATHEY: Yes, sir.

MR. SCHUSTER: Kent Schuster again. Adding to Mr. Johnson's statement, we met this week with the EPA Region 6 counsel and technical representative for the plant, as well as with several members of the TNRCC and I believe the attorney general's office for the State to restart the federal facility act negotiations and to hash out whether we would continue with efforts under RCRA and CERCLA as an integrated approach or whether it would be something different than the drafts from last summer. So that's a restart of those negotiations this very week. And the

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technical people are going to meet without the darn attorneys sometime in the next 30 or 40 days. So things may go well.

MR. MATHEY: Other comments, questions? Hearing none, then let's conclude the issue of waste. And it's been indicated to us that it's important that we cover the economic impacts issue. Let me ask this: Is there any opposition to dropping the Pantex plant missions issue, any significant opposition to dropping that issue? What we would do is come back at 7, after a dinner break, pick up with the economic impacts, and then get into our public comment session, unless there is opposition. Ms. Gattis?

MS. GATTIS: I just wondered if I could ask one or two quick questions.

MR. MATHEY: Sure.

MS. GATTIS: If that suits people.

HT16/42
12.019

I was interested, in the document, it commented that 18 magazines are currently being used for pit storage. And then there was a chart that indicated pit storage magazines, 22 of them was all. And, yet, there -- as of August 1995, there's 7,950 pits at the plant. And it just doesn't add up. We need to know where else the

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HT16/42
12.019
continued

pits are at the plant. You've got too many pits for too few magazines.

MR. JOHNSON: Too many pits for the magazines?

MS. GATTIS: Given the numbers that are in the document, if 22 magazines are going to be used for pit storage and currently only 18 are being used for pit storage and you've got right at 9,000 -- I think someone said earlier -- but in the document you say as of August 1995, there's 7,950.

MS. FOUNDS: I think what we can do is get with Bret here and go through the math of where the math is in this particular document. So if you want to, we can sit down with you and go through that.

MS. GATTIS: I don't mean to take up a lot of time, but I think we need, if nothing else out of this document, a good clear picture of how many magazines are going to be dedicated to pit storage. Your chart says 22. That's not sufficient storage. And just different things like that need to be clarified. We need to understand.

MS. FOUNDS: Let me make sure that

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-- what's the chart that you were referring to in there and we'll look at that page?

MS. GATTIS: 4-10. It's a table. Page 4-10.

MS. FOUNDS: Okay. Let us have a chance to look at that and we'll go through the math on that one.

MR. JOHNSON: Basically, we have 18 Richmond magazines, which we've restricted to pit storage. And, also, we're converting, on an as-needed basis, our SAC -- our steel arch construction type magazines, which can be used either for nuclear weapons or for plutonium pit storage. We don't mix the two. But a facility could be dedicated to one or the other. I'd have to get the math numbers, though, but I thought we could get -- we sure don't have a capacity problem out in Zone 4.

MR. BARTOSCH: I can answer the question, because I was also responsible for the infrastructure section, which is what you're talking about here. The table says: Pit storage; approximate number of buildings, 22; example of facilities, magazines, vaults, staging facilities; and approximate area; year built; and remaining

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HT16 (CONTINUED)

life.

18 are the Richmonds. And then the staging facilities, as listed in the plant's capital assets management plan that are used for that activity. So there's a vault -- I'm not too familiar. It's been a while. But each of them is listed in our WIP files that we generate, work progress files, to come to that 22. Each of those 22 would be listed.

MS. GATTIS: Let's just say it isn't real obvious to a person who knew enough to be able to read it and still came away with a lot of questions about where stuff is. And I think we need a clear understanding. I also would like you all to clarify -- there's a place where you say pits accumulated on site. I would like to know if there's a certain point at which a pit is designated as being in storage and is there kind of an interim staging step where you can have some X number of pits, who knows what? I don't want the terminology to trip us up. If you don't mind, I would like to have clarity about how all pits are categorized, they fall into what categories, et cetera.

HT16/43
12.020

I mean, to say pits have

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accumulated, does that mean they are all in storage, or do you have a different category of staging before it becomes -- it's a stored pit? Golly. I'm sorry. Y'all are as tired as I am. And this is not seeming to come quite clear.

MR. JOHNSON: The process flow is basically you would do a disassembly and then the plutonium pit is put into a container. Right now it's an AL-R8 container. Typically, there will be four to six of those, like in an assembly cell. They'll be moved out and palletized into either a four-pack or a six-pack. And those pallets are moved out in Zone 4 and put into the stage right configuration. And that process flow runs fairly smoothly, fairly straight-forward. It's not weeks; it's more in the matter of days that those may be in Zone 12. Then they're moved to Zone 4. And, once they move to Zone 4, they're into interim storage at that point in time, once they go into the stage right configuration. And, typically, they will be put into a magazine. When the magazine is filled, then the magazine is sealed for a period of about 18 months.

MS. GATTIS: Okay. Well, that's an issue that just needs to be quite clear.

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HT16/44
12.021

Something that also doesn't seem to be in the document is the air-conditioning that's being installed in some of the pit storage you use. Things like that that have to do with current operation and status of the plant, we'd like to understand better.

MR. JOHNSON: And what I don't remember and I've got to find out -- the Richmond magazine has two sides to it. And I can't remember what the capacity is. It's 400 or it's either 200. I can't remember for sure. But it's 400 per side.

(Inaudible unidentified speaker.

MR. JOHNSON: 400 per Richmond magazine. We do, in fact, record the status and location of all of our pits to the State of Texas and we do notify them whenever we open a magazine or close a magazine down there, so that they do have the opportunity to observe that operation if they so choose. It's easy enough to find out how many facilities are being used.

MS. GATTIS: Well, currently, the document says 18 magazines are being used and that 424 pits fit in a magazine. And when you multiply 18 times 424, you don't have enough space for

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HT17

TECHNICAL INFORMATION EXCHANGE
ON DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE CONTINUED OPERATION OF THE
PANTEX PLANT AND ASSOCIATED STORAGE
OF NUCLEAR WEAPON COMPONENTS
JUNE 25, 1996
EVENING SESSION

BRENDA ROHRS, CSR, RPR

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Portions of the transcripts unrelated to this EIS have been omitted.

levels were compared to the baseline to determine the time and amount of change.

The 1990 census results showed that there were 196,144 persons and 75,067 households residing in the four-county ROI, with more than 95 percent of them being located in the Amarillo metropolitan area.

Further, 96 percent of the Pantex Plant employees also resided within this ROI.

As of July 1st, 1993, there were 204,140 individuals within the ROI, an increase of nearly 8,000 persons from the time of the 1990 census. And this represents a 1.25 percent increase per year.

The projections that we came up with indicated that through the period 2005, the population is estimated to range between 214,353 and 246,464.

This chart summarizes various weapons activity levels within the proposed action at either the 2,000, 1,000, or 500 weapons activity level.

And it shows the employment, earning, personal income, and unemployment rate for each of these weapon activity levels.

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Really, the weapons activity levels show the greatest change within socioeconomic. As indicated in the summary and also in the socioeconomic resource section, there is no significant difference between the proposed action, the no action alternative, and the relocation alternative.

One area of interest is the farm economy, based on some of the comments we got. And the regional farm economy is expected to maintain its growth trend.

Since 1950, shortly before the nuclear weapons activity at Pantex began, the value of crops grown and sold within the ROI has increased 151 percent, relative to a 142 percent increase in the Producer Price Index for crude foodstuffs and feedstuffs within this same time period.

This is a breakdown of some of the farm indicators that we looked at, such as the number of farms, the value -- average value of crops, the number of cattle and calves, and then the value of crops sold, and also the value of cattle or calves sold during various time frames from 1950 through 1992.

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HT17 (CONTINUED)

And particularly you'll see one of the most marked increases is in the value of cattle going from approximately 12 million in 1950 to over 254 million in 1992.

And that, I believe, is our last slide summarizing the socioeconomic resources. And I'll be happy to answer any questions that you have or try to find somebody who can get back to you later.

MR. MATNEY: Thank you, Dr. Pratt. And now we'll ask who will be speaking now.

Mr. Juba? Would you identify your position, please, and we'll hear your comments.

MR. JUBA: I'm Bob Juba, with the Amarillo Economic Development Corporation.

I'm here tonight representing the AEDC, but also at the request of Mayor Kel Seliger, representing the City of Amarillo.

I really don't have that extensive comments on the socioeconomic portions of this.

HT17/1 11.028

I think the DOE has done a pretty good job of describing our economy; however, I think on the impact section there are some weaknesses.

It's more of a descriptive document

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about our economy than it is a projection of what the impacts of Pantex might be on the economy.

The first is -- I have one question I'd like to ask, first of all. I know you've used a number of figures for your job multiplier, in terms of how many jobs in the economy exist as a result of the operations at Pantex.

HT17/1 11.028 continued

And the question would be: Is that a regionally sensitive multiplier that you've come up with, or is that something that's just standard across the board for the nation?

DR. PRATT: Basically what we did, if I understand you correctly -- your question correctly, and I don't think there's anything hidden in that, it's just assuming that I understand your question, basically what we did is we took the data we got from the various sources shown earlier, and also additional data within DOE, and then we ran it through an economic model that is frequently used in doing EIS's and other NEPA documents, which is the Regional Input/Out Modeling System. And based on that, that's how we came up with our

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projections.

MR. JUBA: But it is a regional-based system?

DR. PRATT: Yes.

MR. JUBA: Okay. We've commissioned our own studies through the years to do that and we've submitted those to you.

And I would just encourage you to again take a look at those and consider what that might do to the job -- I will say that there are differences in all the EIS's that we've read, and the Site-Wide seems to do a better job than the others in terms of actually accurately measuring the impact of Pantex on the economy.

HT17/2 11.029

I think there is some weakness on looking at the effects on certain sectors of the economy.

In particular, I would note it doesn't talk a lot about what it would do to retail sales and employment in the retail sector, which has been a tremendous growth portion of our economy over the last five years.

HT17/3 11.030

It doesn't look extensively at wholesalers and industrial suppliers, many of

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whom supply product to Pantex, but also associated with industry in general.

HT17/3 11.030 continued

We wouldn't -- we wouldn't have the diversity of industrial supply companies in Amarillo without Pantex, and I think that should be taken into account.

HT17/4 11.031

And then perhaps the most important would be the impact if there were significant job losses.

And I know this EIS doesn't contemplate it, but if there were significant job losses beyond what's mentioned -- well, even including what's mentioned in the EIS in terms of looking at the thousand weapon per year, let alone the five hundred, the real estate sector would suffer considerably.

HT17/5 11.032

And I think we have some pretty good historical data in Amarillo on what happens when there's large outmigrations in number of jobs and in population.

You can look back to what happened when the air base left town or look back in the late eighties, what happened to our economy.

HT17/6 11.033

I'd also ask that maybe additional analysis could be done on the tax revenue

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HT17 (CONTINUED)

HT17/6
11.033
continued

portions.

Again, going back to the problems that happen when you talk about severe job losses in the manufacturing sector of the economy, in terms of real estate, it would have a dramatic affect on all the cities in the region and their ability to raise revenue through property tax.

You have mentioned -- there is discussion of the city's revenue capacity in the document, but I think it could be strengthened.

HT17/7
11.034

Counties are also very dependent in Texas on property tax. In fact, Texas counties are nearly completely dependant on property tax revenues. So, they suffer severely when there are declines in property tax values.

Finally, school districts, which aren't mentioned at all in the document and which are also very sensitive to property tax issues.

Changes in the property value can have interesting effects in Texas, because of our school equity financing law.

I'm not sure which way -- I mean, in some ways -- if they have a decline in property value they get more money from the State, but I

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think overall they have less disposable funds because of the way the formulas work out.

I think that needs to be analyzed, and I'll hand it to anyone who can really sift through that, because there's a tremendously complicated effect on school districts.

HT17/7
11.034
continued

I'll note that the Canyon School District, which is in the Region of Influence, is already looking at a million dollar deficit because of certain property tax issues.

HT17/8
11.035

The City of Amarillo, like other local governments, relies heavily on sale -- on property taxes. But it's also the regional retail center and it relies to a great extent on sales tax, because the voters, in 1989, passed a half cent sales tax to reduce the property tax.

So, in essence, they shifted their taxation burden from property taxes, to some degree, to retail sales.

If retail sales do not grow at least at the inflation rate, that translates into an actual, in essence, reduction in the funds available to operate the city.

HT17/9
11.036

In looking at the government debt section of the document, the majority of the

15

HT17/9
11.036
continued

debt was listed as the City of Amarillo. I think there's 55 million dollars of debt.

That is primarily revenue bond debt that's -- that is financed through utility fees. It's not dependent on general revenue taxation at all.

HT17/10
11.037

So, you need -- I think there needs to be some analysis on what effect this might have on water consumption, on water revenues in the city, because that's what backs those revenue bonds that, you know, secure the debt that you've mentioned in there.

HT17/11
11.038

Finally, the most -- maybe most importantly is population outmigration. Cities tend to be in a growth mode, they tend to plan on future growth.

As happened in Amarillo in the sixties and again in the late eighties, when you have outmigration it dramatically affects all sectors of the economy, particularly retail and otherwise.

And also, of course, governments have already made commitments based on continued growth.

HT17/12
21.005

Finally, I think the overall weakness

16

HT17/12
21.005
continued

is probably in the cumulative impacts. You've broken down the process into bits and pieces, where you look at, if this happens you lose this many jobs, and if this happens you lose this many jobs.

There's a real lack of effort to try to tie those together and integrate that and say worst case, best case.

And I think that would be really helpful for the public at large to find out what the future of the plant is.

And that's my short laundry list of things about the EIS.

I do want to hand it to you. I think this is a better socioeconomic section than in the other EIS's. So, I'll hand it to you on that. I know it's a complex task.

MS. FOUNDS: Bob, we thank you for your comments on that, and we'll be sure to pass your remarks on to the other PEIS's.

And, of course, we will look into the items that you have brought up. As you said, there are very complex issues that go along with trying to estimate what the, you know, tax burdens are and what effects these things --

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HT17 (CONTINUED)

and, of course, we are reporting, because the PEIS has the dominant effect in terms of job loss and those types of things in there, because we're still showing a fairly high level of employment out at the plant for our particular scenarios.

But we will try to do maturing with the other documents and clarify that issue, too. George?

DR. PRATT: We thank you for your comments, and we'll certainly try to improve on the final EIS.

MR. MATNEY: Thank you, Mr. Juba.

Are there any other comments from state or city officials on the economic impacts?

Hearing none, we'll now open this issue to the public. Are there any comments or questions from the general public on this particular issue?

Yes, sir. If you would come to the microphone and identify yourself, please.

MR. MARTILLOTTI: Joe Martillotti.

HT17/13
11.039

Texas Department of Health. The population figures that you just showed on your slides, I

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found on -- in Volume I, on page 4-155.

There's some conflicting population estimate numbers for the Region of Influence given in the section dealing with accident risk estimates and fatal cancer estimates. The numbers that are given there are 267,107 population in the Region of Influence. And I'm wondering what the difference is in those estimates.

HT17/13
11.039
continued

If there are different areas for calculation, I think they need to be clarified.

MR. SIMPKINS: The Region of Influence that we defined were the four counties. The Region of Influence for the risk assessment was a 50 mile radius from the plant. So, they are two different bases.

MR. MARTILLOTTI: They're listed under the same title, so I think you're going to need to drop one of those and reclassify one of those someway.

MS. SIMPKINS: Okay.

MR. MATNEY: Thank you. Any other comments or questions? Yes, sir. Bob.

HT17/14
11.040

MR. JUBA: I neglected to mention one aspect that I think should be taken into account

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on all the EIS documents for all sites, and that's the effect on nonprofit agencies that rely on contributions of the employees at the plant.

HT17/14
11.040
continued

You would have a decline in the revenue to those nonprofit agencies; at the same time, you'd have economic hardships, creating a larger need for those services.

HT17/15
23.042

And I think that there are -- there is an environmental justice section of things; there probably ought to be an economic justice section, also, because I think those at risk populations would feel the effect of an economic slow down, while at the same time those agencies that help them would really suffer in terms of available funds.

And that's more of a blanket statement and I don't know if that really falls under what your tasked to do under NEPA, but I think it's a failing not only related to Amarillo, but to all the communities that you all are looking at.

MR. MATNEY: Yes, Ms. Smith?

HT17/16
11.041

MS. SMITH: Doris Smith. I think that we felt like that -- especially looking at your view graph here, that you have brought it down

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to within just a four-county area for the Region of Influence.

HT17/16
11.041
continued

And yet for all the other study that was done throughout the document, it is a much wider area, as was noted by Joe Martillotti.

HT17/17
11.042

In that case, also, the magnitude of the impact of agriculture was really not addressed and the importance that agriculture has played in this area and the stability of the area.

And when the air base was phased out, it was agriculture that brought this part of the State of Texas -- or that kept it alive and kept it going.

And the State of Texas, one of every four dollars of cash receipts from the State of Texas in total revenue comes from crops and livestock that are produced in this part of the State of Texas.

Right here in this area that is called the High Plains Trade Area, if these counties were detached from the rest of the State of Texas, this would rank number one in states in the nation in the fed cattle in beef production.

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HT17 (CONTINUED)

HT17/17 11.042 continued

These are very important items for this area, because you're right in the middle of a prime agricultural area.

The cereal crops that are grown here are shipped all over the world. For any product that we raise here, if there is the slightest hint of any contamination, that could devastate this total area.

I don't know how many of the other facilities are situated in an area that is a bread basket as much as this area is. I don't think that that was brought out in this document.

I don't think that just using the four counties was an adequate assessment of what agriculture does in this area.

It points out very strongly that the Amarillo economy does depend upon agriculture, but it doesn't show how great agriculture -- the great part that agriculture has played in the area.

HT17/17 11.042 continued

One of four people is employed in an ag-related job in this area. And for anything to happen in agriculture would devastate the area.

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We would like to see a little bit more brought into the document with regard to this. Is there something that can be done?

MS. FOUNDS: Well, I'm assuming that you want to sort of break that down in sort of the overall economy, what percentage, like you were saying one in four, is employed with agriculture, to bring those types of statistics out, is what you're saying.

MS. SMITH: I think that that needs to be brought out, because I think that is extremely important in this area.

HT17/18 11.043

And I think that it's extremely important to realize that even for the State of Texas, the importance agriculture plays has a tremendous effect upon the revenue that the State of Texas receives.

So that even though in this document, which is a nuclear document, it may seem a little strange to address agriculture, I think that a complete risk analysis needs to be done with regard to just exactly what could happen with regard to the future for this area.

MS. FOUNDS: Well, a risk analysis would be very difficult, and we don't do a

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market impact analysis in the NEPA.

But in terms of showing the statistics about the overall economy and percentage of agriculture industry and how those things play in an area, I think we can look at those statistics again and bring out the overall economy a little bit better.

MS. SMITH: I would like to think that

HT17/18 11.043 continued

you could, also. I know that in 1991, when we first began looking at this issue, that the total impact of agriculture in this area was about three billion dollars, and now then that has increased to between five and six billion dollars, and with an economic multiplier that it's in excess of 12 billion dollars.

So, you're looking at a tremendous figure there that could stand a chance of being hurt in some way. So, we'd like to see that addressed.

DR. PRATT: We'll certainly take those comments into consideration as we go into the analysis for the final EIS and appreciate your comments.

MS. SMITH: Thank you.

MR. MATHEY: Thank you, Ms. Smith.

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Are there any other comments on this issue?

Hearing none -- yes. The gentleman right here. If you'll identify yourself, please.

MR. GIDEON: My name is Ross Gideon, and I have some farm land about a mile south of Lee Cockrell's place --

MR. MATHEY: Sir, could you speak a little bit closer to the microphone.

MR. GIDEON: I say I have some land about a mile south of Lee Cockrell's place there on the east side of Pantex where they just drilled the test well out there.

HT17/19 06.055

And I'm concerned, as Ms. Smith is, with the threat that I see to the farmer in this community.

When we see already that some of this stuff has leached down into the Ogallala aquifer, and people, they say -- they keep shooting off them test things out there and all that, and they have all them cracks and stuff in the ground.

And this place does depend on agriculture. If our agriculture goes down, it's

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HT17 (CONTINUED)

Comments omitted from intervening pages here do not concern this EIS.

once five minutes is up, I'll hold my hand up.

I'm not going to hold you right to five, but certainly within the next short period of time, if you would conclude your remarks.

And to begin our public comment session, then, we will ask for Mavis Belisle. Ms. Belisle.

HT17/20
23.043

MS. BELISLE: Okay. I assure you I'm not going to take five minutes. I only want to make two comments. And one is I guess to express frustration at being in the situation we're in so very often with Pantex and the Department of Energy in general of being asked to trust us; the documentation isn't complete, trust us; it's not ready yet, but it will be, trust us; we don't have the cost analysis yet, but it will come, trust us; it's classified, we can't tell you, but we assure you it's okay. And we find ourselves in this position time and time and time again.

And I don't know -- I can appreciate the complexity of dealing with this kind of document and these -- especially in a time of change and flux, when so many other decisions are also pending. But I have to say that it is

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continually frustrating.

HT17/21
01.022

The other comment has to do with the assumption that in the no action alternative, at the -- when you reach the 12,000 pits, disassembly would have to cease.

It's really hard for me to believe that you don't have more creative minds in the Department of Energy than this.

If you can justify interim storage of 12,000 pits at Pantex on the basis of an environmental assessment, I would surely think that you could find ways to justify interim storage of pits at other locations until all of the issues that need to be resolved are resolved. Thank you.

MR. MATHEY: Thank you, Ms. Belisle.

Our next speaker is Alan Finegold. Is Mr. Finegold here?

HT17/22
01.023

MR. FINEGOLD. The unstated question, of course, is whether or not you're going to attempt to do processing of plutonium in the Panhandle.

That's the primary reason that I believe most people here are opposed to the storage.

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HT17/22
01.023
continued

It's not so much the risk of storage, which is, at least to my estimates, not very great, it's the possibility that you will later use the Pantex facility as a staging ground for the processing of plutonium, either taking the contents of the pits and making them into fuel rods or perhaps reprocessing spent fuel rods.

Unfortunately, until DOE actually addresses this issue publicly, we're pretty much in the dark about the intentions; and, therefore, we're inclined to assume the worst, which is that Pantex will eventually be used for this purpose, and that is why we are adamantly opposed to long-term storage of the pits.

There is some sort of idea that Pantex would have no mission if there was not some kind of reprocessing or dealing with plutonium.

I think this is rather ridiculous. You have a skilled work force, especially with regard to metal working and all kinds of electronics and electrical devices.

HT17/23
22.019

The world at this point needs alternative forms of energy, especially solar equipment, and it needs it very badly.

Eventually we're going to have to

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H17 (CONTINUED)

decide which direction to go, whether we are going to go with nuclear power, and that would eventually involve some considerable reprocessing of plutonium, or whether we will go for other means of electrical generation.

HT17/23
22.019
continued

I would like to see the Pantex Plant take the lead in producing alternative methods of generating electricity and not trying to deal with plutonium, which is essentially a waste material of the cold war and the nuclear arms race.

HT17/24
02.021

I would much prefer to see the Nevada Test Site deal with that particular material as the last residue of a very difficult part of this country's history and one which we are better off dispensing with, not continuing into the future.

MR. MATHEY: Thank you, Mr. Finegold.

Our next speaker is Marcia Keevan.

MS. KEEVAN: Thank you for this opportunity to comment. And this time I really, really hope that my comments will make a positive difference. However, I am a realist. I know the difference between hoping for something and actually getting it.

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HT17/25
05.022

There is no such thing as nonhazardous seismic hazards. My research into the geological aspects of the Pantex Plant have uncovered some alarming assumptions made by past experts under contract for the DOE.

Because a list of specifics is rather long, I have prepared a separate report for your review that will be included in my written comments.

The 1995 fault study submitted by the DOE basically suggests that local underground erosion is a primary feature at the Pantex Plant and doesn't delve very deeply at all into the primary feature that occasionally rocks with earthquakes three states at a time.

That Pantex is magically divorced from this phenomenon at its property lines and the Whittenburg trial is all but ignored.

Must we teach our children nonsense? Must we not say? Must all the facts be altered to satisfy the latest political whim?

These are science facts we are playing with, people. Are we hoping there will be no impact from the distortions?

Please be aware that definite

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impressions are being imprinted upon the still developing young minds of tomorrow's scientists and tomorrow's doctors and tomorrow's risk-takers.

Some of these young minds will inherit all of the risk left over from the cold war while processing mountains of misinformation.

Have any of you ever tried to solve problems when you are given too little information or, worse yet, wrong information?

The time spent clearing up confusion generated from a fact from fiction sort is wasted time.

Education -- educators nationwide are challenged enough in their efforts to prepare students to function in this high tech society; misinformation is not helpful.

And can we expect excellence from our young minds and continue to allow incompetence, encourage incompetence, and reward incompetence, both economically and politically at the highest levels of science?

The scum floating at the top of the lake can sometimes choke out the life beneath it. It's called stagnation.

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Take a quick look around this room and ask yourself why, after four years of open recruiting efforts, more young people and their teachers are not interested in these procedures.

Is the subject matter unimportant? Has the subject matter become too controversial?

Has the scum on the top of the lake succeeded in choking out the stirrings of life beneath it? Both anarchy and stagnation are negative social conditions.

It's tragic when good hard work done by graduate students becomes a toy for devious minds to abuse.

I see nothing positive in a situation that asks brilliant minds to be silent or to rework their conclusions to suit the whims of industry.

I salute all those in academia who have not folded to peer pressure, and I abhor all of those who have encouraged or participated in such deceptions.

HT17/26
05.023

The secrets and lies concerning geology, hydrology, past contamination, current

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HT17 (CONTINUED)

HT17/26
05.023
continued

contamination, current pathways, future protections continue.

I am willing to go along with the Save the Ogallala Folks, for what good is it to have an unsaved Ogallala, but I'm not going to pretend we have anything even remotely close to a pristine situation at the Pantex Superfund Site.

We are already in a situation where we just have to drink our poison in small amounts and learn to like it.

The massive amount of data contained within the studies done by the Texas Bureau of Economic Geology, the Argonne National Lab, and others prove this.

The recent samples showing RDX hits in the Texas Natural Resource Conservation Commission lab tests prove this.

We would be ignorant to sight future emissions at Pantex without first reviewing the geological hazards truthfully and openly. Thank you.

MR. MATNEY: Thank you, Ms. Keevan.

Our next speaker is Susan Lee. Susan Lee.

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MS. LEE: I co-created the blue (unintelligible) parked outside the museum to end the nuclear age.

I invite you all to tour to see the exhibits on radiation and health at the break, if there is one this evening, or for a short time afterwards.

HT17/27
02.022

Hearing tonight about transferring plutonium processing from Rocky Flats, which was judged by a DOE report the site most likely to constitute a threat to human life, a nine on a scale of ten, followed closely by Pantex, which was an eight on a scale of ten, gives me some pause for thought.

Both of those sites were rated ahead as threats to human life over the notoriously contaminated Hanford complex.

HT17/28
14.114

My surveys of radiation and health around several different Texas nuclear facilities have impressed me with the failure of government and industry to study the health effects of such facilities in any meaningful way.

I'm happy to hear that there is another investigation of the Pantex area

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HT17/28
14.114
continued

underway this summer by the Texas Department of Health in conjunction with ATSTR, but I believe that we need much more thoroughgoing studies, including door-to-door surveys and follow-ups of former Pantex workers and residents of these counties.

HT17/29
14.115

I found it very instructive to do a simple analysis looking at all cancer mortality before the tritium accident in 1989, in which 40,000 curies were released, compared to the years after, for which I had data at the time I did the analysis.

And there was approximately a doubling of the cancer death rates in Carson County after the accident compared to the four years before.

HT17/30
14.116

A 1979 study by the University of Heidelberg -- a group of University of Heidelberg scientists re-examined the U.S. experiments on which allowable emissions for nuclear facilities were based, and discovered that these -- in looking at the protocols of these experiments, that they were doctored from the beginning.

Soil was cooked so there were no microbes present, so the uptake of plants'

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HT17/30
14.116
continued

radionuclides was minimized.

And the plants were -- the radiation was induced just before the plants were harvested, instead of into the soil from the time the plant was a seed, just as an example of the way in which science was acting to obscure the reality of radiation exposure to humans.

The German scientists concluded that the allowable emissions were too high by a factor of 100.

So, I keep that in mind in thinking about the expansion of operations at Pantex.

And as I was looking through files

HT17/31
14.117

yesterday in preparation to speak, I noticed a study of the area around Rocky Flats by Dr. Carl Johnson of the Jefferson County Health Department, who correlated plutonium levels in the soil with cancer increases around Rocky Flats. It was a very close correlation, which was corroborated later by the DOE's own studies.

The second article I found worrisome was the contention of the University of Colorado scientist who believes that there is no way you can completely capture fine plutonium particles

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HT17 (CONTINUED)

HT17/31 14.117 continued

and prevent them from escaping into the air around plutonium processing facilities.

Given that Panhandle agriculture, the Ogallala aquifer, and the health of many area residents who I'm coming to consider close friends is at risk in the event of contamination by plutonium, among other radionuclides that are released in plutonium processing, I would stress that the excess cancers that Dr. Johnson found, which were leukemia, lymph, lung, thyroid, testes, and breast cancers, which paralleled the cancers found in the survivors of the Japanese atom bombs, are of concern.

And would request that no expansion of Pantex operations be considered until thorough health studies, including door-to-door surveys and follow-ups, be conducted to examine the damage that I believe may have already been done to this area by previous emissions.

HT17/32 14.118

And, finally, to suggest that the track record at Pantex does not give us great confidence that an expansion of an extremely dangerous operation could be handled with any more safety than we've experienced in the past.

Thank you very much.

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MR. MATNEY: Thank you, Ms. Lee.

I would like to remind everyone that if you have a question that you would like to present -- we mentioned this earlier -- and you would like to do so anonymously, if you would simply go to the lobby and submit your question to one of the officials or support crew around the room, then it will be delivered here and we'll be glad to read that question.

I know we're in the public comment session, but I was asked to remind everyone that that is certainly a possibility if you would like to do that.

Our next speaker is Gordon Yellowman.

MR. YELLOWMAN: First of all, I'd like to thank the Department of Energy for giving me this opportunity to speak.

I'd like to comment on some mutual concerns that I have on the cultural resource management part.

HT17/33 10.004

I am a member of the Cheyenne-Arapaho Tribes of Oklahoma, which is a Federally-recognized tribe.

I did receive a letter dated September 15th, 1994 in regard to a summary notification

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HT17/33 10.004 continued

of Native Americans.

They mentioned several tribes on there, and in going through this letter I noticed that the Northern Cheyenne was not on here, neither was the Northern Arapaho Tribe. I would ask that they be included in this Environmental Impact Statement.

I've been involved with a lot of consultations with different agencies in regards to cultural resource management.

We did form a United Tribe Council in the State of Colorado, and we have consulted with Rocky Flats in regards to their Environmental Impact Statements.

HT17/34 10.005

There's a lot of concerns as far as being a member of the Plains Indians Tribes.

This was -- we have a lot of historical and traditional cultural properties related to this area, all the way down -- all the way from the northern Dakotas down to the Palo Duro Canyon.

So, we do have some sites that are significant to us, and I do -- I am concerned about this.

And I would ask that you continue to

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HT17/34 10.005 continued

address this on a government to government type basis and consult with the Federally-recognized tribes.

I would also like to mention that

HT17/35 10.006

there are other tribes out there that are not Federally-recognized who you might consider consulting with them as well.

There may be other separate groups or organizations who might have some concerns as well as interests.

HT17/36 10.007

There's a lot of other concerns that I have, especially with the vegetation within the area, and also I have some concerns with the potential adverse -- inadvertent discoveries of artifacts or human remains that may be there.

HT17/37 10.008

I am the designated NAGPRA representative for the Cheyenne Tribe. I don't know if any of you are familiar with the Native American Graves Protection and Repatriation Act of 1990.

And that was one of my other concerns, that I noticed that it was cited inside this study, but it wasn't really in detail.

HT17/38 10.009

And I did note -- also notice in this letter that there was scheduled visits to the

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HT17 (CONTINUED)

HT17/38
10.009
continued

tribes, and I would just like to ask if those visits have occurred, and if they have occurred, I would like to request copies of the comments that were received from those tribes.

That's all I have to say at this time. And, once again, I thank you for giving me this opportunity to speak on behalf of my people. Thank you.

MR. MATNEY: Thank you, Mr. Yellowman. Is someone able to answer his question quickly?

MS. FOUNDS: There have been no visits to the tribes. We have sent out various letters and have gotten comments in, and they will be annotated in the comment response document. We can see about giving you the comments that have come in so far.

There -- and, again, in the back of our document, we have sent out letters and asked if there was other types of consultation, and so far we have not gotten any further requests in terms of letters back to us on this -- on this document.

MR. YELLOWMAN: I will submit some written comments on behalf of the tribes.

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MS. FOUNDS: Thank you.

MR. YELLOWMAN: Thank you.

MR. MATNEY: Thank you, sir.

Our next speaker is Buddy Seewald.

MR. SEEWALD: Thank you for the opportunity to make comments. Actually, my name in some of this appears as William Seewald.

It seems like our community has been under siege now for five years: On the one hand, set upon by the government grappling with what to do with its bloated nuclear weapons complex, desperately seeking some area they can seduce into taking on their nuclear liabilities; on the other side we face the self-appointed Amarillo business establishment, with the AEDC as their very own Sadie Hawkins, together with a consortium of handmaidens blinded by the Federal dowry.

They have shamelessly pursued a marriage of the Panhandle and plutonium, and it is a shameful project.

Shameful because the taxpayers of this area have been forced to fund an effort that would attempt to convince them that they must trade their long-term safety, as well as the

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integrity of our water, land, and crops, for the nuclear debris of the cold war.

Is our future so narrow and bleak that it truly requires this falsity and bargaining to be secure? I think not.

The issues have been so carefully described as a debate about jobs, because that is the only palatable part of the equation.

Many of us will never be willing to trade our safety, our peace of mind, and certainly not our food crops for unreliable government jobs.

In the future created by moving U.S. plutonium operations to the Panhandle, our grandchildren and great grandchildren will probably have few jobs to show for it, but will get to have all forms of new committees and deal with endless numbers of the very same kinds of meetings.

What a legacy to leave them, wondering how in the world the political well and the funding will ever be found to clean up the nuclear waste left in Carson County by Pantex operations that have converted from its historical role into that of a plutonium

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processing and nuclear waste handing facility.

HT17/39
01.024

This document under review today does not meet the commitments made to the citizens of this area in DOE's agreement two years ago.

The examination of alternative storage sites seems halfhearted at best. If the effort is brought short because of the threat to Albuquerque in using the existing Manzano Mountain facility, what are the citizens of Gray and Potter Counties to make of the government's regard for their safety.

What are U.S. taxpayers to make of a process that seems determined to build an expensive new storage facility at Pantex, notwithstanding past assurances that existing facilities are adequate.

When our grandchildren are attending future meetings about the mess at Pantex, would not DOE and our estimable city fathers wish the record to at least reflect an accurate and thorough investigation of the alternatives?

HT17/40
06.056

Pantex is a Superfund Site. We now have confirmed contamination in the Ogallala Aquifer.

It would seem that before we rush

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HT17 (CONTINUED)

HT17/40
06.056
continued

headlong into new missions, bringing new waves of radioactive pollution to this plant, that the document should at least address the efforts to mitigate pollution already on-site. It really doesn't.

Why does it remain silent on what should be one of the most important missions of the plant in the time frame covered by this document?

Could it just be that discussion of pollution unpleasantly colors the picture of jobs, jobs, jobs?

If DOE doesn't wish some of us to assume the worst, then it really must do its work.

This document is the only vehicle with which to assess the cumulative impacts of existing operations and the proposals being quoted.

It doesn't even provide a full description or analysis of the two new facilities that are included in this document.

Perhaps in private briefings DOE has provided its suitors with more complete

HT17/41
01.025

information, but area residents are entitled to

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HT17/41
01.025
continued

have a better idea of what the waste handling facility and the pit reuse facility really do imply for our future.

The document does not even begin to address the long-term impact of bringing plutonium processing to Pantex, the waste streams generated, the full extent of processing that will be necessary, or what the ultimate disposition would be for the nuclear waste streams that are generated.

Perhaps this document is adequate in the eyes of those who prefer not to talk about some of the unpleasant realities.

Perhaps it is adequate in the eyes of DOE. They didn't seem to really want to produce it in the first place.

But it will never be adequate in the eyes of many residents until it gives the public a clearer and more detailed picture of the future that awaits all of us during the unholy marriage of plutonium and Pantex. Thank you.

MR. MATNEY: Thank you, Mr. Seewald.

If the gentleman who stood just a moment ago and started to approach the microphone, if you will please go to the lobby

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and register, we will be glad to hear your comments.

You may have already done that, but if you haven't, we would ask that you go register.

DR. BOWMAN: My comments are in response to the question raised by Mr. Yellowman.

MR. MATNEY: Yes, fine. Would you approach the microphone and identify yourself and please speak up.

DR. BOWMAN: My name is Allen Bowman. I'm with the Pantex Plant. I'm manager of the EIS support program.

I just wanted to comment that there were a number of Native American tribes for whom we thought there might be interest in the NEPA process at the plant.

These are listed in the EIS, and also in the environmental information document that the plant prepared.

It's my understanding that all these tribes were visited by members of our cultural resources group at the plant. This includes the Cheyenne-Arapaho Tribe of which Mr. Yellowman is a member.

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We will see to it that the comments or records associated with those visits are presented to Mr. Yellowman.

The other two tribes that he mentioned, the Northern Cheyenne Tribe and the Northern Arapaho Tribe, are both tribes located primarily in Montana and Wyoming.

And because of their distance, we overlooked those tribes in terms of their interest in the Pantex area.

It's difficult sometimes to know just how distant a tribe might be who has -- who would have an interest in the Pantex Plant, either in terms of ancestral sites or the other primary interest that was brought up in terms of the graves and associated materials that might be found in an area. Thank you.

MR. MATNEY: Thank you, Dr. Bowman.

Our next speaker is Bob Juba.

MR. JUBA: Thank you for the opportunity to speak tonight.

I guess the panel must really enjoy these times when you take public comment and just get arrows shot at you.

I'm going to try to take a little

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HT17 (CONTINUED)

different approach and try to look at the big picture.

It's evident from the weight of the comments overall, when you consider the April meeting, the written comments, as well as this meeting, that the people of the Panhandle do support the missions of the Pantex Plant.

Repeated public opinion polling within the whole Region of Influence has shown about an eight -- 80 percent -- or eight out of ten support for Pantex and the missions they do there.

The people of the Panhandle believe that defense needs are important and that Pantex has played an important role in maintaining the defense of our nation.

We're also very, very encouraged at the dismantlement that's taking place and hopefully making the world a safer place.

But I want to remind you back to the comments at the April meeting, because I think those are really in large measure addressed to this EIS, as well as the two PEIS's that were discussed that night.

While we support those missions, we

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also, without equivocation, demand that Pantex missions are carried out in an environmentally sound fashion.

We discussed a little bit tonight that like other industries, including the petroleum industry, agriculture, other heavy industries, like other industries, Pantex and the Department of Energy have become better stewards of the environment.

Farmers -- somebody mentioned farmers draining oil on the ground. Well, I'll admit that when I used to change my oil in my car, which was a long way from a farm, in Dallas, Texas, I dumped oil in an alley. Didn't know any better. This was years ago.

We don't do that anymore, I don't, and I hope that most people don't. The City of Amarillo started an oil recycling program years ago with the assistance of the State of Texas.

As individuals have changed their practices in terms of the environment, industries have also. I think that's very important and something people need to keep in mind.

HT17/42
04.008

The tremendous growth of agribusiness,

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HT17/42
04.008
continued

especially the fed beef industry and beef processing industry in the Texas Panhandle, has occurred during the time span that Pantex has been operating.

I think that's pretty good evidence that agribusiness and Pantex can coexist successfully on both counts.

I think it's really unfair to couch things as being either pro Pantex or pro agriculture, because they farm on-site at Pantex, they farm around Pantex, there's no problem with the crops that are raised there, and people need to look at the big picture.

It's easy, when you're talking about hundreds of pages of documentation, to get bogged down in the details, but in the big picture, we have no radioactive contamination in the water, there's nothing to do with plutonium in terms of contamination.

We have industrial contamination that might be similar to other industrial sites if they underwent the scrutiny that Pantex goes under because it's a public entity.

We are -- I'm very encouraged by the cleanup of pollution that's taking place at

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Pantex, especially in light of the slow pace of cleanup at other DOE sites.

Here instead of continually characterizing and characterizing and characterizing, and holding hearings and tearing down hundreds of acres of forest to print the reports to look at problems, we've actually been cleaning up problems at Pantex. And I think that's a good sign for Pantex and for the Panhandle.

HT17/43
15.076

We're also very encouraged to see that the Department of Energy has taken steps, working with the local government of the City of Amarillo and the State of Texas, in reducing the number of aircraft overflights.

I think that shows their good-faith efforts to try to operate in as safe a manner as possible. We also appreciate the Department of Energy's openness policy.

Again, looking at the big picture, ten years ago we wouldn't be here even discussing these things, because everything out there was classified.

Forty years ago they would have said, we're making soap. That's not the environment

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HT17 (CONTINUED)

that we exist in anymore.

And while there's always going to be the need for classification, we appreciate the openness and willingness that the DOE has shown to work with local governments.

And with that, I'll let you all alone.

MR. MATNEY: Thank you, Mr. Juba.

Our next speaker is Trisch Neusch.

MS. NEUSCH: I want to thank you for allowing me to comment tonight. I've basically covered several of my comments that I had, I don't have a formal written statement.

Tonight I just would like to reiterate some of the facts that Doris Smith had mentioned previously and the very real importance of agribusiness to our area, which Bob touched on just now.

We as farmers in the area surrounding the plant continually have been driven by these different regulations and programs with the government.

We strive to follow these to the letter. Sometimes that's not the easiest thing to do, so we can sympathize with some of the

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things that you guys have to deal with.

It isn't an easy situation, but we all try to follow these in order to get along and to protect the environment for future generations.

HT17/44
14.119

In looking at these aspects, we were discussing earlier the effect -- possibly the health effects on farmers that do farm on the plant site itself, if that has been addressed in this document or not. We would like for it to be.

I know that my husband has done some farming on the plant site. Just the other day he was combining some wheat on the plant site. That stirs up the dust, it disturbs the soil.

And I realize that some of that in the questionably contaminated areas of the plant, it has been decreased, and some of those areas have been planted back to grass, but someone had to plant that grass and someone has farmed that area in the past. So, we would like these figures to possibly be included in the document.

HT17/45
04.009

And then, also, it was very distressful to myself and other people that had noticed that farming and agriculture, as

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HT17/45
04.009
continued

important as it is, was basically ignored in a lot of these documents or barely mentioned, possibly four paragraphs, a little over, in this document that I noticed.

And will state again how very vitally important it is to the Panhandle and the Top of Texas.

And as far as when the base closed and whether Pantex may close, I don't think that's on the table here.

What we all have to address today, according to this document, if I may read the general scope of this EIS, includes the assessment of impacts to each area of the human and natural environments affected by operations performed at the Pantex Plant.

And if I may reiterate some of the comments that I made earlier, I appreciate the fact that some of the things that I mentioned may be covered in other documents, but I believe that this study itself has to deal with those things.

HT17/46
02.023

It will be making some of those decisions in the fact that it does include those other documents, and I feel like it has

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HT17/46
02.023
continued

inadvertently left out some of those issues, and that that needs to be more carefully addressed.

And we as farmers and landowners that live across the road from the Pantex Plant, we do have concerns, but you'll notice that not very many of us have shown up this evening.

And it is not because of too little concern, but it's because we are all out in the fields harvesting wheat at the moment or planting milo.

Like my husband is helping a neighbor combine his wheat that don't have combines. It's various things like this that keep them away from the mike.

So, it's not because of a lack of interest or whether they might be pro, con, or whatever, we are all concerned, and I just want to address those comments here, too. Thank you.

MR. MATNEY: Thank you, Ms. Neusch.

Our next speaker is Beverly Gattis.

MS. GATTIS: He just asked me if I wanted to stand up, and I went, yeah, right. My hands will shake and I'll drop my notes.

I know you all were afraid I wouldn't

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HT17 (CONTINUED)

talk again. I have kind of a hodgepodge of things that I want to go ahead and share with you, though I will try and do some written comments.

It has been interesting to me to see different aspects of this document, and some of them have quite taken me by surprise.

One small -- no, it's not small, but one sort of succinct thing to deal with is in your cumulative impact sections, where you try to encompass the PEIS's that are floating around out there, when you deal with the storage and disposition PEIS, you describe storage and speak to that.

HT17/47 21.006

And then you describe disposition and characterize it as sort of your bounding case that includes a reactor, and when there's a reactor, there's a MOX fuel site, a processing site, et cetera, et cetera.

I ask you all to rework your storage definition. Storage does not mean that we won't have processing at Pantex. That's a -- that, too, can be the scenario under storage.

So, I need to ask you to look and be sure that just because -- just get with the

HT17/47 21.006 continued

disposition guys. Excuse me. Work it out, guys.

But to have storage set all by itself is inaccurate and it just won't do. And if this document is going to go that path, then I guess it needs to go that path at least that much more accurately.

HT17/48 24.003

Another piece, though, that really does trouble me is the lack of context that this document builds.

Jerry Johnson, in his introductory remarks, did more to sort of put the context out when we first started this meeting this morning, when he talked about in '89 it was this, in '91 we were talking about expanding, and by the time we got to '93 we were doing thus and so.

A few lines, and yet it put far more perspective about what the department had been through, the nuclear weapons program has been through, and what brought Pantex to where we are today.

And that does not happen often enough in this document, and I ask you all to think in more specific terms.

For instance, instead of saying Pantex

HT17/48 24.003 continued

used to do staging and now we do storage, I think it would not take many more words to say that Pantex staged plutonium components until 1989, when the Rocky Flats plant closed, and at that time it began to hold them, and then say when storage actually initially began.

It is much more informative to people and much more helpful when they pick up one thing to try to learn what they think about this plant. To start with, that will help a great deal.

Something that is missing, though, altogether are some of the issues that have come up since the 1983 Site-Wide and that are still pending issues.

HT17/49 14.120

There has been considerable concern over the status of how the plant establishes its safety envelope, certain things like safety analysis reports that are being redone at Pantex.

There is no place, though I have not read absolutely every page of this document, that presents the fact this has been an issue that was raised, it is an ongoing project.

HT17/49 14.120 continued

What is the status of updating the

safety analysis reports so that you establish the safety of work for this plant?

HT17/50 14.121

Also included in that process, I think there needs to be a description of unreviewed safety questions, or unresolved. Forgive me if I'm using the wrong phase there. The kinds of things that this plant is observing. See, we're talking about Pantex.

I don't think it would hurt at all to have a chart listing what they've been in the past year or two, what are still pending, where we are on that.

HT17/51 14.122

The compliance of facilities at Pantex. What facilities are in compliance and which ones aren't with whoever DOE orders.

And if there's been great change in recent history, then, fine, describe that change, that the orders were changed, whatever, that that's caused problems. Give it the context you want, but please give us more of the story to work with.

There's also been pretty frequent reference -- and this has come up before. I need a formal understanding to be established, if you don't mind.

HT17 (CONTINUED)

HT17/52 23.044

I would like to know the legal connection, if any, of the information documents that you all have composed that go along with this Site-Wide.

There are three volumes that you all have worked with, and I would like to know, when you sit down with a Site-Wide, do you really need to sit down with those three documents, too, to look at the whole thing?

The legal -- or legally does this thing have to stand by itself and are those merely reference documents and they haven't got the same stand-alone right. So, I would appreciate that.

And then in closing, I just have to go

HT17/53 01.026

to the big picture a little bit. It has been really difficult for me to read things like if we don't get to make certain changes, when we get into -- we have 12,000 pits at Pantex and no other arrangements are made, then dismantlement will stop. It is a real frustration to read a line like that, and it feels very disingenuous.

One of the reasons that citizens groups such as mine press so hard for this document and work so hard for those issues, is

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HT17/53 01.026 continued

that we could not believe that the Department of Energy was going to take the posture of we either store them all in one place, we have no backup.

I cannot believe the Department of Energy has not, as Mavis Belisle said in another instance, that there's not more imagination and more preparation to have a backup plan so that you don't have to stop.

And if I could just try and wrap up here, that is important to us and it just showed how important it was when you all took scoping comments.

HT17/54 23.045

In your list of comments, scoping issues that were brought up in this document, you all left off the nonproliferation concerns.

And if you'll go back to your implementation, you will find out that in scoping, nonproliferation received more comments than human health, socioeconomics, transportation, air quality. It was very nearly at the top of the list.

We are in the business of taking care of things here. We all fullfil different roles in that.

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That's what we're here to do. We're here to do it and take care of the people who are doing it, the people who live near it, and the world that is waiting to see that we do it right. Thank you.

MR. MATHEY: Thank you, Ms. Gattis.

Our next speaker is Doris Smith.

HT17/55 11.044

MS. SMITH: In our study of this document, we find that it fails to address the magnitude of agriculture in the Pantex ROI.

In this the heart of production agriculture, it is unthinkable for agriculture, the viable, stable, and essential industry of the Texas Panhandle, not to be appraised.

When considering continued and new missions at Pantex, work with radioactive, toxic, and hazardous materials, omitting a detailed analysis of the agricultural economy, the basis for economic stability in this area, is a significant impropriety.

The good reputation of our agricultural products tainted by the suspicion of nuclear, toxic, or chemical contamination from activities at Pantex can just as easily wipe out Texas farmers and ranchers as a drought

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or natural devastation.

HT17/55 11.044 continued

The dollar value of the agricultural industry to the Panhandle economy is in excess of six billion dollars, creating a local economic activity in excess of 12 billion per year.

The secondary impact to this industry

HT17/55 11.044 continued

in the state and nation is unparalleled. The State of Texas cannot afford a loss in State revenues from High Plains agriculture.

Not only is this document inadequate in the analysis of environmental impacts on the

HT17/56 06.057

agricultural economy, there is no recognition that the Ogallala aquifer is the only source of ground water for the entire Texas Panhandle, the South Plains, and parts of seven other Midwestern states.

The siting of hazardous and radioactive operations over this finite water source is totally unacceptable. There is no substitute for water.

The approach to human health in the

HT17/57 14.123

draft EIS is flawed. We're being asked to comment on a document which seems to be driven by the goal of reassuring the public that there

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HT17 (CONTINUED)

HT17/57 14.123 continued

are no health risks associated with the Pantex Plant.

It uses only optimistic scenarios of exposure, statistical methods that obscure potential risks and problems.

Evidence used is one-sided, a very theoretical presentation which suggests more exactness in scientific knowledge than is supportable and seems designed to lend credibility where it is not necessarily due.

Moreover, the theoretical approach is difficult to wade through. It obscures and hides assumptions and it is meaningless to public concerns, because it is removed from everyday life experience.

HT17/58 23.046

We're forced here to comment on a very narrowly conceived document. We're in a compromise position, because we're forced to play on the agency's ground, with no input into the design of a better draft EIS.

Again, we're forced to be reactive, rather than to confront these issues up front in a collaborative, proactive manner.

HT17/59 14.124

The data are one-sided. The use of prior studies and data in the draft EIS present

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HT17/59 14.124 continued

only one side of the scientific debate about the effects of low-level ionizing radiation.

The presentation is very lopsided. Studies not cited suggest health effects including leukemia, thyroid cancer, and multiple myeloma have been found in nuclear workers whose cumulative dose for their total working years was between 2.5 and 5 rem.

On page 4-205, it is reported that the average annual dose of workers at Pantex is 111 millirem.

If we take a worker who is at the plant for 25 years, then 111 millirem times 25 years is a cumulative dose of approximately 2.775 rem.

This value is within the range for which health effects were observed in these studies.

Moreover, if we take the Pantex control level of 500 millirem per year for most workers, and 900 of workers -- of weapons operation workers, we get cumulative doses over a 25-year working life of 12.5 rem and 22.5 rem respectively.

These values are all much higher than

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HT17/59 14.124 continued

the levels at which health effects are observed in these studies.

The agency should reevaluate the risk to workers from low-level radiation exposures using the risk factors reported in these studies.

HT17/60 14.125

Moreover, as the scientific uncertainty highlights, the standards used by EPA, NRC, and DOE are not protective standards.

They are politically negotiated standards that allow workers and communities in the vicinity of a nuclear facility to bear a higher cancer risk for the social benefits that are believed to come from the facility.

These standards should not be used to suggest that there are safe doses of radiation. There are no safe doses of radiation. This is a commonly agreed point at this time among the scientific community.

HT17/61 14.126

The Acquavella study referred to, of 1985, relies on a weak methodological approach and data sources that compares workers to the community at large.

The cancer registry data are not a credible source of data for detecting radiation

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HT17/61 14.126 continued

effects in the community surrounding nuclear facilities.

HT17/62 14.127

The draft EIS relies on inappropriate data to make risk estimates and comparisons in the communities surrounding the Pantex Plant.

Again, the most optimistic picture is painted with selective use of evidence and methods. More rigorous studies are needed to more effectively estimate these risks.

And I thank you very much for giving us the opportunity to share with you some of our concerns.

And I do have other issues that I have in my comments and I'll hand them over to you. Thank you.

MR. MATNEY: Thank you, Ms. Smith.

Our next speaker is Don Hancock.

MR. HANCOCK: Well, I'm sure I won't be nearly as eloquent as the last two speakers on either side of me, who I think -- I hope people, regardless of what their view of Pantex might be, listen carefully to both what they said and the spirit in which they gave it.

I want to make some comments about what I view as some deficiencies in the draft

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HT17 (CONTINUED)

xis.

And I'll try to only mention things that haven't been mentioned by a variety of other people today, because a lot of them have already been mentioned.

I guess the first point is to say that

HT17/63 01.027

in terms of Nan's characterization that the reason to do the no action alternative is to provide a good baseline for what impacts of other alternatives and other actions would be, I think in numerous cases a not very good job was done of doing that.

In addition to some of those that were already mentioned, let me mention three others.

HT17/64 03.007

One is in looking at what the range of activities would be to even continue on with those current missions that are outlined for the next ten years, I really don't think that in that period of time you would think that you wouldn't need to do a number of other upgrades and changes in your facilities besides the six that are specifically mentioned in this document.

And I think you need to do a much better job of analyzing some of the age of

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HT17/64 03.007 continued

buildings, the -- how you're going to keep going with continuing operations over a ten-year period of time that you say that this document covers.

HT17/65 23.047

Secondly, I think the document provides virtually no -- none of the analysis that is necessary in terms of looking at the baseline operations of existing pit storage at Pantex.

One of the things -- one of the easy things that should be done, and I was frankly surprised was not done, is taking your two and a half year old EA for pit storage of those pits and looking at what it said the impacts would be of anything other than the aircraft analysis, which seems to be the only thing you've even tried to look at, and saying, okay, over the last two and a half years what does the real data show us in terms of what's actually happened.

What of those analyses were right, what of them were wrong, what of them were overly conservative, et cetera.

Since, in essence, the most important decision for long-term work at Pantex in a

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national context is the decisions about pit storage, you need to do a much better job of talking about what the baseline reality is for that.

HT17/66 23.048

Thirdly, I think it is both poor practice and, frankly, hard to -- hard to justify that in terms of looking at the baseline of existing impacts, the document provides no assessment of what the impacts of the operation have been to those nearby surrounding residents to the plant.

There have been impacts, and they need to be analyzed. They can be; they must be.

It's frankly disgusting that your only charting document of where these surrounding residences even are in the document are wrong, but there's much more wrong with the lack of analysis than that.

Also, thirdly, then, in terms of talking about what the next ten years at Pantex are going to look like, this document -- and Ms. Gattis has already addressed this to some

HT17/67 01.028

extent, but it's inconceivable that you could be saying that continued storage at Pantex of pits, if that were to happen for the next ten years,

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HT17/67 01.028 continued

would be done for that entire time in Zone 4.

And so you're going to need to look explicitly in this document at the alternative locations for that, the impacts and effects of that, et cetera.

I have a couple more things I'd like to say, I see Paul is trying to cut me off, so what I'd like to do is to stop right now to let other people who might want to testify do so.

The last time I saw the list I was the last one on the list, but if there are other people who want to testify, I certainly want to give them the option.

But I would also like to, with the indulgence of other people, if there are others, talk for a couple more minutes after other people have a chance to finish. Thank you.

MR. MATHEY: Thank you, Mr. Hancock.

There are no others that are registered on our list, but I would ask all of the audience, is there anyone who would like to make a statement? Anyone who would like to make a public comment? Yes, sir. Please remember our five minute limit.

MR. GIDEON: It won't take me but just

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HT17 (CONTINUED)

a second to say this.

Several of them mentioned looking at the big picture up here. This gentleman over here was talking about it.

And all I want to say is that if we'd have made a recording of what the mayor of Chernobyl had told his people of what a great deal this atomic outfit coming into their neighborhood was going to be for them and amount to them and what a blessing it was going to be to them, we would have probably heard some of the same things that we've heard here tonight. Thank you.

MR. HATNEY: Thank you, sir.

Do we have others that would like to make a public comment? Anyone else in the audience like to make a comment? Yes, ma'am.

MS. KEEVAN: Is there someone that I can present my written comments to, as well as my research into the fault identification study here tonight, or should I just mail these?

MS. FOUNDS: You can give them to me.

MS. KEEVAN: Okay. And if you'll excuse me, thank you very much.

MR. HATNEY: Thank you. Anyone else?

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Then if I could ask the indulgence of everyone, Don will come back and we'll let you complete your statement.

MR. HANCOCK: One other thing that I'm very concerned is going to happen in the final that will not correct the deficiency in this

HT17/58 13.018

document. It's been pointed out several times that this document intentionally didn't try to deal with the permits that have been issued between the time that the document was being written.

And he said, you know, it was hard to do that when the permits were in process and whatever, and that's fine.

And it's been stated that the final will include an analysis of those issues, which is also fine.

HT17/58 13.018 continued

The concern that I have, however, is to -- that it be explicitly stated, not just in a chart showing the duration of the permits, but explicitly stated that the permits that we're talking about here, the existing permits that you will be talking about, will all be -- need to be renewed, revised during, again, the ten-year time frame of this document.

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And that's a very important issue, as some of the DOE people who were involved, as well as some of the citizens, and the TNRCC people who were involved in the most recent rounds of permits know.

There are -- there is considerable interest in those permits, and I would suggest that it's quite likely there will be again in four or five, six years, when they come up for renewal.

And that needs to be explicitly recognized in the document as well, that there are going to be some real limitations in terms of assuming that your continuing operations are just going to be -- need to be within the bounds of the existing permits.

The last thing that I want to say is maybe a similar but a little different way of talking about that big picture that various people have talked about.

The decision to -- if a decision is made to store 20,000 pits anyplace, that will be the first time that has ever happened in this country.

That's a very significant decision and

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one that is good, as several people, including Bob Juba, have said, in terms of the fact that we're dismantling weapons so that we have pits rather than war heads.

But it's a pretty weighty decision, and I'm disappointed that the analysis, neither in this document nor in the disposition PEIS, actually seems to recognize that.

Not only from the aspect of nonproliferation issues that Ms. Gattis has spoken to, but also from a lot of other aspects in terms of health and safety, in terms of public perception, in terms of either the plutonium stockpile capital of the world or the plutonium dump capital of the world, or other characterizations less extreme than those two.

That's going to have a significant effect in a variety of ways, not just the -- what some people would call the soft science of socioeconomics.

And to make no attempt to look at that -- look at that issue at all, I think is a disservice to the public and the department and needs to be corrected, and there are a variety of things that could be done to address it. I

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HT17 (CONTINUED)

think.

And if DOE or Tetra Tech people are scratching their heads about how to do that, there are a variety of people around the country and in some other parts of the world who have done some interesting thinking in those regards and should be consulted. Thank you very much.

MR. MATNEY: Thank you, Mr. Hancock.

If there are no other public comments -- someone else? Yes. And, Mary, if you would identify yourself.

MS. SHENNUM: Yes. I'm Mary Shennum, I live here in Amarillo, and my comments won't be technical ones.

HT17/69 06.068

But I understand that we may comment a bit on the cumulative impact from the three PEIS documents, and the Pantex Plant and associated storage of nuclear weapon components PEIS is one that I haven't taken as much note of as the other two PEIS documents, but I understand that

HT17/70 05.024

in this document there is -- there are some omissions which have been brought out.

One of which, it has been noted that there's nothing said about the Superfund Site projects in the study, and it would seem that

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HT17/69 06.068 continued

HT17/70 05.024 continued

that might be something important to look at.

All of us around here notice the recognition of the Ogallala aquifer, as it is probably, in the United States, the largest fresh water aquifer.

This indeed needs to be really taken into account. And I know you're hearing this over and over again.

We have the problems that were associated at Rocky Flats continually brought to mind.

I lived in Denver during some of the controversial times there and saw the closure of that plant there because of the proliferation of plutonium -- excess plutonium processing waste, and I wonder what we might do about that if it comes up here.

HT17/71 05.025

It's been said that Pantex is using some open and unlined ditches to dispose of waste water, and that should be addressed. This has been brought out, I believe, publicly here.

The difficulties with making the PEIS documents conclusive have to do probably most with the fact that it's very difficult to know what to do with radioactive materials. And

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perhaps an honest admission and an honest assessment of that needs to be made.

Because if we really don't know what to do with these materials, then experimental new research facilities are going to be hard to -- hard to maintain and hard to probably justify at some point.

HT17/72 02.024

If the -- if the nuclear waste that is at such places as Rocky Flats and that has been refused by governors of other states is to be -- is to be brought down here, I assume there will be the same problems as there are at other places, and it probably just needs to be looked at a little bit more carefully. Thank you so much.

MR. MATNEY: Thank you, Ms. Shennum.

Is there anyone else who would like to make some public comments?

Hearing none, then I think we can proceed to close the meeting today.

We began this meeting more than twelve hours ago, and I think that we have had a good exchange of information.

I know that we all want to thank the DOE and Tetra Tech officials, along with state

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and city officials.

But most importantly, we thank you, the citizens of this community and area, for your interest in all of these vital issues and for the time you spend on it.

Donna, do we have anything else that we need to do or may we conclude?

Thank you all very, very much, and we will now stand adjourned.

(Meeting adjourned.)

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HT17 (CONTINUED)

June 25, 1996

COMMENTS TO THE DOE ON THE SITE-WIDE

BY MARCIA KEEVAN

Thank you for this opportunity to comment, and this time I really, really hope that my comments will make a positive difference. However, I am a realist, and I know the difference between hoping for something versus actually getting something.

THERE IS NO SUCH THING AS NON-HAZARDOUS SEISMIC HAZARDS!

My research into the geological aspects of the Pantex Plant has uncovered some alarming assumptions made by past experts under contract for the DOE. Because the list of specifics is rather long, I have prepared a separate report for your review that will be included with my written comments. The April 1995 "Fault Study" submitted by the DOE basically suggests that "local underground erosion" is the primary feature at the Pantex Plant, and doesn't delve very deeply at all into the primary feature that occasionally rocks (with earthquakes) three states at a time. Pantex is magically divorced from this phenomena at its property lines, and the Whittenburg Trough is all but ignored.

Must we teach our children nonsense? Must we just "not say"? Must all of the facts be altered to satisfy the latest political whim? These are science facts we are playing with, people. Are we hoping there will be no impact from such distortions? Be aware, definite impressions are being imprinted upon the still-developing young minds of tomorrow's scientists, tomorrow's doctors, tomorrow's risk takers. Some of these young minds will inherit all of the risks left over from the Cold War while processing mountains of mis-information. Have any of you ever tried to solve problems when you are given too little information, or worse yet, wrong information?

The time spent climbing out of confusion generated in the fact-from-fiction sort is wasted time. Educators nationwide are challenged enough in their efforts to try to prepare students to function in this high-tech society. Mis-information is not helpful. And, can we expect excellence from our young minds and continue to allow incompetence, encourage incompetence, and reward incompetence both economically and politically at the highest levels of science?

The scum floating at the top of a lake can sometimes choke out the life beneath it. Stagnation. Take a quick look around this room, and ask yourself why, after four years of open recruiting efforts, more young people and their teachers are not interested in these processes? Is the subject matter unimportant? Has the subject matter become too controversial? Has the scum on the top of the lake succeeded in choking out the stirrings of life below?

Both anarchy and stagnation are negative social conditions.

It is tragic when the good, hard work done by graduate students becomes a toy for devious minds to abuse. I see nothing positive in a situation that asks brilliant minds to be silent or to "re-work" their conclusions to suit the whims of industry. I salute all of those in academia who have not folded to "grant pressure", and I abhor all those who have encouraged or participated in such deceptions.

The secrets and lies continue concerning geology, hydrology, past contamination, current contamination, current pathways, and future projections. I am willing to go along with the "Save the Ogallala" folks, as what good is an unsaved Ogallala? But I am not going to pretend we have anything even remotely close to a "pristine" situation at the Pantex Plant Superfund site. We are already in a situation where we may just have to "drink our poison" in small amounts and learn to like it. The massive amount of data contained within studies done by the Texas Bureau of Economic Geology, Argonne National Lab, and others prove this. The recent samples showing HMX hits in the Texas Natural Resource Conservation Commission prove this.

HT17/73
06.123

It would be IGNORANT to site future missions at Pantex without first reviewing the geological hazards truthfully and openly. It would be doubly ignorant to continue trying to hide the contamination facts as they relate to the Ogallala today. The recharge rate is MUCH faster than folks believed it to be a few years ago, and MUCH faster than what is being publically acknowledged today.

Plan on Economically compensating our hard working local farmers, our former employees, and the families of Pantex neighbors who have taken ill. America should take care of its own.

Tell the truth, and don't ask our good workers to hide terrible secrets. If these kinds of problems continue, we won't be able to get good workers.

Recognize what horrific damage you are doing "dumbing down" a nation already struggling to educate its students. How will they be able to cope when it becomes their turn to take over?

And Pantex is too on a major fault! I submit my review of the "Fault Identification Study at the Pantex Plant" for your reading.

Thank You

Comments for the
Draft Environmental Impact Statement for
the Continued Operation of the Pantex Plant and
Associated Storage of Nuclear Weapon Components
Amarillo, TX
June 25, 199[illegible]
Doris Berg Smith

[illegible] of this document we find that it fails to address the [illegible] of agriculture in the Pantex [illegible]. In this, the [illegible] agriculture, [illegible] for agriculture, the [illegible] and [illegible] of the Texas [illegible] been [illegible] new [illegible] at [illegible] with radioactive, toxic, and hazardous materials, [illegible] detailed analysis of the agricultural economy, the basis [illegible] in this area, is a significant [illegible].

[illegible] reputation of our agricultural products tainted by the [illegible] of nuclear, toxic or [illegible] contamination [illegible] just as easily [illegible] Texas farmers and [illegible] drought or [illegible]. The dollar value of the agricultural industry in the Panhandle [illegible] in excess of [illegible] year, [illegible] local economic activity in excess of [illegible] per year. [illegible] industry in the [illegible] is [illegible]. The State of Texas cannot [illegible] a loss in state revenues from the High Plains agriculture. [illegible] four to five [illegible] of Texas [illegible] and livestock produced in this [illegible] area.

[illegible] this document woefully inadequate in its analysis of [illegible] impacts of the agricultural economy, there is no [illegible] that the Ogallala Aquifer is the only source of [illegible] for the entire Texas Panhandle, the South Plains and [illegible] other midwestern states. The siting of hazardous or [illegible] operations over this [illegible] prime water source is [illegible].

[illegible] approach to human health in the Draft EIS is flawed. We are [illegible] to comment on a document which seems to be driven [illegible] reassuring the public that there are no health risks [illegible] with the Pantex plant. It uses only optimistic [illegible] of exposure, statistical methods that obscure potential risks and problems, evidence [illegible] is [illegible], a very [illegible] presentation [illegible] scientific knowledge than is [illegible] not [illegible].

[illegible] the theoretical approach is [illegible] [illegible] in terms of [illegible].

We have many broad concerns with the approach, as I listed above, but we are forced here to comment on a very narrowly conceived document. We are in a compromised position because we are forced to play on the agencies ground, with no input into the design of a better draft EIS. We, again, are forced to be reactive rather than to confront these issues upfront in a collaborative pro-active manner.

2) The data are one-sided. The use of prior studies and data in the draft EIS present only one side of a scientific debate about the effects of low level ionizing radiation. The presentation is very lopsided. Studies not cited suggest that health effects, including leukemia, thyroid cancer, and multiple myeloma, have been found in nuclear workers whose cumulative dose for their total working years was between 2.5 - 5 rem (Geiger et al 1992, Gilbert 1994, Kendall 1992, Kneale 1993, Wing 1991).

On page 4-205 it is reported that the average ANNUAL dose to workers at Pantex is 111 mrem. If we take a worker who is at the plant for 25 years, then 111 mrem * 25 years = a cumulative dose of approximately 2.8 (2.775) rem. This value is within the range for which health effects were observed in these studies. Moreover, if we take the Pantex control level of 500 mrem/year for most workers and 900 mrem/year of weapons operation workers we get cumulative doses over a 25 year working life of 12.5 rem and 22.5 rem, respectively. These values are all much higher than the levels at which health effects were observed in these studies.

The Agency should re-evaluate theirisks to workers from low level radiation exposures using the risk factors reported in these studies. Such a reanalysis moreover, would highlight the uncertainties associated with making predictions about the health effects of low level ionizing radiation. The issue of uncertainty in scientific theory is currently glossed by the misleading use of data from only one side of the debate.

Moreover, as the scientific uncertainty highlights, the standards used by EPA, NRC, and DOE are not protective standards. They are politically negotiated standards that allow workers and communities in the vicinity of a nuclear facility to bear a higher cancer risk for the social benefits that are believed to come from the facility. These standards should not be used to suggest that there are safe doses of radiation--there are NO safe doses of radiation. This is a commonly agreed point at this time in the scientific community.

The Aquavella 1985 study relies on a weak methodological approach and data sources (e.g., it compares workers to community at large). The critiques of this study are discussed in more detail in Dead Reckoning by Geiger et al 1992).

2

HT17 (CONTINUED)

3) More about one-sided data. Cancer registry data are not a credible source of data for detecting radiation effects in communities surrounding nuclear facilities (Sage 19xx). This is a study that was done by Michael Sage, Director of CDC/ATSDR. Cancer registry data in Texas are discussed in the draft EIS on page 4-213.

The draft EIS relies on inappropriate data to make risk estimates and comparisons in the communities surrounding the Pantex plant. Again, the most optimistic picture is painted with selective use of evidence and methods. More rigorous studies are needed to more effectively estimate risks--better exposure assessments, assessment of historical releases, and exposure pathways.

HT17/74
14.164

Without better data from these types of analyses, large uncertainties remain embedded in the draft EIS--and these are not mentioned or addressed. These are different kinds of uncertainties than what I mentioned in #2 above. Those were scientific uncertainties. Now I am talking about uncertainties in the data. A third kind of uncertainties occur in measurements (because of lack of precision in instrumentation).

There are also inter-individual sensitivity issues to the public. For example, studies (not reported in the draft EIS) have found that pre-natal x-rays, averaging between 20 mr - 400 mr have been found to double the risk of childhood cancer (Stewart and McMahon). Other studies have found effects from low level radiation exposure (e.g., Kerber 1993).

HT17/75
14.165

By the way, on page D-4 the Agency states that "since nondestructive examination using x-rays and gamma rays is a well established industrial practice, this contribution to worker risk is negligible." It may be a well established industrial practice, but there are newer studies that suggest the risks of low level exposure from x-rays may not be so benign - they clearly are not safe because, again, there is no safe level of radiation exposure.

HT17/76
14.166

4) The draft EIS uses BEIR III and BEIR V reports (page D-1 D-2). The risk factors derived from these reports are based on the hypothetical man. Thus, they do not adequately account for inter individual sensitivity to exposures of radiation. There is no analysis of inter-individual sensitivity in the draft EIS, except the insufficient claim that conservative numbers and scenarios are used. This is not an analysis of inter-individual sensitivity. It is a way of obscuring uncertainties--again. The DOE should recalculate risk factors using a more sophisticated analysis of inter-individual sensitivity. By the way, this is not just necessary for inter-individual sensitivity among workers and men, women, children--it is also an issue for environmental justice. For example, the composition of the workforce at Pantex is 20% minority (see below for more comments about environmental justice).

3

HT17/77
14.167

5) The accident scenarios analysis presents the most optimistic view possible. All administrative control and safety programs are assumed to function properly at all times (e.g., air locks). Numerous examples of malfunctioning or improperly used safety and emergency response equipment and procedures, malfunctioning emergency back-up systems, human errors, etc. have led to accidents in a variety of industries--some of them highly regulated, such as the nuclear power industry, aircraft carriers, offshore oil drilling facilities, airlines, space travel (space shuttle), etc.

In many cases, the failures were of the type that were anticipated but they occurred in sequences or combinations that were not; or the failure rates turned out to be higher than anticipated. Many of the failures can be associated with "human reliability" issues (Tuler et al 1988, Tuler et al 1991, Tuler et al 1992, Kasperson et al 1993); and many many many more.

HT17/78
14.168

In the draft EIS there is no way to know how much attention was given to human error/reliability analysis in the evaluation of accident rates or consequences. As I noted above, the document assumes that all emergency response and administrative safety programs/control function at 100% at all times.

Can the Agency provide data to support this claim? Do they have data about the rates of incidents--human errors in different tasks that are relevant to this study? What is their definition of "recordable" (i.e., reportable) incidents--what is included in Table 4.14.1.4-1. What are the data for events which did not result in a lost worker day?

HT17/79
14.169

The Agency should describe in detail its safety and emergency response plans and training programs. For on-site employees and for off-site personnel (including those in the transportation system). Have any analyses/evaluations been conducted on the reliability and effectiveness of response? Can they supply data about the failure rates associated with the safety and emergency response elements (mechanical and human)?

HT17/80
14.170

Has the DOE completed task analyses of the high risk tasks--e.g., assembly and disassembly of pits and explosive components?

HT17/81
14.171

Generally, how has the DOE studied and evaluated human error in the tasks done at Pantex?

HT17/82
14.172

In addition, the agency uses a baseline "activity level" of 2000 assemblies, disassemblies, testings, etc. per year. They say that the mix does not matter when calculating impacts-- which I presume means risks from exposure from either incident free exposure or accident related exposure (page 3-2)..there must be a failure rate in these tasks. It might be small but it is not zero. They may be initiating events for accidental exposures, or higher than normal "incident free" exposures.

4

HT17/82
14.172
continued

My question is whether there is any reason to believe that failure rates (human errors) in these tasks may be different? Is it "harder" to take a weapon apart than to put it together? I think of a piece of car, where bolts are stripped, pieces stick together, get old, etc. Can this happen? The mix of "activities" will probably change as dismantlement occurs.

Does the Agency have disaggregated failure rate data for the different "activities" included in the operations done at Pantex? Produce the analysis showing that there are no differences in the failure rates associated with the different activities?

HT17/83
14.173

Finally, I began this part by saying that the accident scenarios are all optimistic scenarios in the sense that no (or no significant) exposures result. The Agency should go through the exercise and show us what might be the effects of accidents that are not controlled perfectly--what might be exposure pathways, exposure levels, and health effects of such a scenario? Even if the possibility is small, we would like to see what the consequences are.

HT17/84
14.174

As you say, risk is the product of probability of occurrence and magnitude of consequences. What if worker exposure occurred because contamination did escape from air locks?

HT17/85
14.175

What accidents have occurred at the plant? As shown in Table 4.14.1.4-1., what were these accidents? Can the DOE provide us with descriptions and any results of post-accident evaluations (including the methods of evaluation)? What worked well in containing them--and what did not? In other words, what features of the accident were not anticipated to occur together or with high frequency?

HT17/86
14.176

6) There is no system of community monitoring for contamination off-site? There is an implicit assumption that releases will only occur in controlled areas or that detection devices will observe every possible release. This does not seem to be a valid assumption.

HT17/87
14.177

7) There is no analysis (as far as I remember right now) of synergistic effects among radiation exposures and chemical exposures and among chemical exposures with different types of contaminants.

The DOE should deal with this issue in the EIS, citing and evaluating studies that address synergistic effects of chemical exposures of different types. What analysis have they done to justify a claim that this is not a significant issue?

HT17/88
14.178

8) The DOE only addresses inhalation exposure. But this is a bit confusing. "Inhalation is the only pathway accounted for in the assessment of chemical and radiological AIRBORNE hazards from normal operations" (pg. 4-205).

5

HT17/88
14.178
continued

Does this mean that there are exposure pathways of non-airborne hazards? For example, through groundwater contamination? Are these included in the analysis anywhere?

Likewise, are there other pathways in accidents (non-normal operations)? Are these included in the accident analyses? How?

What data do you have to support the claim that airborne hazards and inhalation exposure is the only significant pathway?

Environmental Justice

HT17/89
17.020

1) The document is designed, again, to reassure. 20% minorities in the workforce is presented as a benefit of good hiring practices, minority populations are assumed to live to far away (17 miles) to have any risk associated with them.

How was inter-individual sensitivity to the worker population assessed in the study? It does not look like it was.

HT17/90
17.021

Do the training programs and safety/information materials to workers and the community account for different literacy rates, primary languages. Does the agency have any data about the extent to which information about the Plant is known or understood, or the effects of radiation exposure are known/understood in the communities (minority and not)?

HT17/91
17.022

2) The agency did not address the issue of radiation exposure to laundry workers, etc. offsite or on site. Often these kinds of exposures are predominantly to minority populations.

HT17/92
17.023

3) How are transportation routes related to minority communities?

Thank you for the opportunity to comment.

CHAPTER 3

Comment Responses

CHAPTER 3
COMMENT RESPONSES

3.1 INTRODUCTION

Chapter 3 provides responses to all comments received during the public comment period.

Section 3.2 below explains how to find information in this chapter. However, the "green" pages at the very front of this volume also provide another, easily located set of instructions for locating documents and comments that are of particular interest.

3.2 ORGANIZATION OF THIS CHAPTER

The comments appearing in this chapter are categorized and organized according to their topic, or resource category. The sequencing of resource categories is as follows:

- Alternatives (01)
- Relationship to other EISs (02)
- Infrastructure (03)
- Land use (04)
- Geology and soils (05)
- Water resources (06)
- Air quality (07)
- Acoustics (08)
- Biotic resources (09)
- Cultural resources (10)
- Socioeconomic resources (11)
- Intrasite transportation (12)
- Waste management (13)
- Human health (14)
- Aircraft crash (15)
- Intersite transportation (16)
- Environmental justice (17)
- Irreversible and irretrievable commitment of resources (18)
- Unavoidable adverse environmental impacts (19)
- Relationship between short and long term effects (20)
- Cumulative impacts (21)
- DOE policy (22)
- NEPA process and procedures (23)
- Miscellaneous (24)

The parenthetical code after each of the above categories comprises the first two characters of comment numbers for that topic category. For example, all comment numbers relating to water resources begin with "06".

It should be noted that during the public hearings, DOE pursued a policy of suggesting, but not requiring, people to identify themselves whenever they made a comment. Whenever a person identified himself or herself, that identification was made in the record of the hearing. When the person did not identify himself or herself, an anonymous identification (such as unidentified speaker) was entered into the transcript. This policy allowed a person to choose whether he or she wished the public record to identify himself or herself with the particular comment. In addition, some of the postcards submitted had illegible signatures. Thus, for these two reasons, there are numerous comments attributed to unidentified commentors.

3.3 COMMENTS AND RESPONSES

In the following subsections, the comments and their responses are placed in Comment Number sequence as shown in the marginal code labeled "RC", for resource category. Thus all comments pertaining to alternatives (resource category "01") are listed together. Following them are the comments pertaining to the relationship of this EIS to other EISs (resource category 02), etc.

3.1 Alternatives

RC: 01.001
Doc: HT11/16

[At]...Kirtland Air Force Base...they already have how many [plutonium pits] stored...in the Manzano Mountains?... Because I've been told otherwise that there [are] a lot of pits stored in the Manzano Mountains.

Response:

In confirmation to the response given at the public hearing, there are no pits stored in the Manzano Mountains as identified in volume I, section 5.5. The Manzano Weapon Storage Area was deactivated by the Department of Defense in June 1992, including deactivation of the Perimeter Intrusion Detection and Alarm System. Since 1990, intersite transportation of pits to Rocky Flats has discontinued. Pantex Plant remains the primary location for interim pit storage. The Manzano Weapon Storage Area is only being considered as an alternate interim pit storage facility. Selection of this site as an alternative is discussed in volume I, section 3.1.4.

RC: 01.002
Doc: HT11/17

So starting in the P-tunnel [NTS], would that mean that you'd be opening it up where those tests happened and taking the pits into the assembly?

How far away from the actual tests are they stored from the sealed area?

Response:

Test areas at NTS would remain sealed and would not be disturbed. The side tunnels used for previous nuclear tests are all permanently sealed off. These areas are not expected to affect pit storage activities. Further, the Defense Nuclear Agency (DNA) nuclear explosives program has been suspended. Should the tunnel be used for pit storage and the DNA nuclear explosives program resume, a new tunnel could be created for that program.

RC: 01.003
Doc: HT11/18

How about the device assembly facility, what kind of place is that where the other pits are [stored]?

Response:

The following detail is provided in addition to the response given at the public hearing. The Device Assembly Facility (DAF) was constructed to perform assembly and disassembly of nuclear test devices and as a backup nuclear weapon assembly/disassembly facility to Pantex Plant. It is constructed with assembly cells and bays which could be used for pit storage. No pits are currently in storage at this facility.

RC: 01.004
Doc: HT11/28

What's the difference between continuing the current mission and no action?

Response:

To reiterate the response given at the public hearing, there is no difference. The current mission is the No Action in this EIS.

RC: 01.005
Doc: HT14/1

Any plutonium or special nuclear material storage disposal program must be compatible and integrated with the Tri-Party Agreement commitments and milestones and should not affect the rate or funding of cleanup. The program would have the safe disposition of plutonium as a priority.

Response: *The Hanford Site Tri-Party Agreement is an agreement among the U.S. Environmental Protection Agency, Washington State Department of Ecology, and DOE for achieving the compliance with the remedial action provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and with treatment, storage, and disposal unit regulation and corrective action provisions of the Resource Conservation and Recovery Act (RCRA). Pit storage operations are regulated by the Atomic Energy Act.*

RC: 01.006
Doc: HT05/8

From an environmental standpoint, what changes when you go from 12,000 pits to 20,000 pits? You seem to have made a fairly substantial deal out of going from 12,000 to 20,000 [pits]. And I wondered if there was anything more to it than what you've just said. What should those of us concerned about the environment worry about going up to 20,000 pits?

Response: *To elaborate on the response given at the public hearing, no new construction of pit storage magazines would be required at Pantex as a result of increasing interim storage to 20,000 pits. Therefore, little to no changes in plant facilities and infrastructure, land resources, geology and soils, water resources, air quality, acoustics, biotic resources, cultural resources, socioeconomics, waste management, and environmental justice are expected.*

Pit storage itself has no impact on the environment other than a small amount of radioactive exposure to workers, and should an accident occur, to the public. As Pantex Plant interim pit storage increases from 12,000 to 20,000, a person in the vicinity of Pantex Plant has a slight increase in fatal cancer risk (4.3×10^{-12}) from potential aircraft crash plutonium dispersal accidents compared with the baseline annual cancer risk of 1.7×10^{-3}.

Clarifying language regarding pit storage activities has been added to intrasite transportation and human health sections as Pantex Plant increases storage from 12,000 to 20,000 pits.

The commentor is referred to volume I sections on Impacts of Proposed Action (4.3.2, 4.4.2, 4.5.2,... 4.16.2) for additional information.

RC: 01.007
Doc: HT13/1

The document talks about the 120-odd bunkers and then it talks about the 41 [magazines] that are actually in the mountain, and on [page] 5-55, it says that more than 30 of these 41 magazines have a minimum overburden of 9 meters, and six pages later, it says 35, so I just first want to get some clarification about the bunkers that we are talking about.

How many are there, and is the position—and Nan may be able to answer this as well as the Major, is the position [such] that if storage happened at Manzano, only the bunkers with at least the minimum 9-meter overburden would be used?

So how many of the 41 [magazines] actually meet that standard?

Response: *Volume I, section 5.5, has been clarified to discuss only the 35 magazines with a minimum overburden of 9 meters (30 feet).*

For the 20,000-pit storage option, approximately 25 of the 35 Type D magazines would be utilized. For the 8,000-pit storage option, approximately 10 of the 35 Type D magazines would be utilized.

The minimum 9-meter (30-foot) overburden was used to reasonably assess impacts for comparison purposes with the other interim storage alternatives. Volume I, section 5.5.1, discusses and analyzes the impacts of storage at Manzano.

RC: 01.008
Doc: HT13/6

I am interested in knowing, since there are 41 identified bunkers in the mountain, and 20 or so, up to 25 could be used if all 20,000 pits would come, what is the present and continuing mission for the other nearby bunkers? What would be in them? What would happen to them? What effect does storing pits have on those bunkers that could affect the mountain and the pit storage?

Are they going to be answered in the context of between now and the time of the final EIS?

Response: *To elaborate on the response given in the public hearing, the storage of pits in certain bunkers is not expected to impact the continuing mission of the other nearby bunkers. At Pantex Plant Zone 4, multi-purpose operations (i.e., storage of weapons, pits, components, high explosives, wastes, environmental monitoring supplies, maintenance equipment) all occur within the same area as pit storage without any problems. The storage of other materials in the remaining 81 bunkers at Manzano would continue. The "Phase I Environmental Baseline Survey—Manzano Weapons Storage Area" contains brief descriptions of the storage activities at Manzano.*

The environmental impacts of interim storage of pits at Kirtland Air Force Base are discussed and analyzed in volume I, section 5.5.

RC: 01.009
Doc: HT13/23

Does anybody else want to jump in before I go into some other things? How did the 20,000 number get established, 20,000 pits?

Why is that the bounding number since when we started dismantlement, we had considerably more warheads than that?

It is a public number that the United States in the '80s had well over 25,000 nuclear weapons. It is also a well-established number in the START II treaty, which has been ratified by the senate of the United States, that the goal would be down to 3,500 warheads. So on the face of it, we would dismantle more -- from dismantlement, we would have more than 20,000 pits.

Let me ask the question [a] little differently. Isn't it true that the 20,000 number was first used by the Department of Energy in an Environmental Assessment done three years ago, more or less, at Pantex, which was an environmental assessment that said, "Let's do this interim storage of 20,000 pits at Pantex?"

That is the first place that I am aware of that the Department used that number. Is that not true?

That number is a pre-START II ratification number, and it appears to me it is a pre-START II number in any case, and the real question is to put it in the context of the sitewide. The sitewide says there is the potential of handling up to 2,000 weapons a year in terms of the analysis of the operation at Pantex, it talks about up to 2,000 a year, although it assumes that a more likely number is 1,000 a year during this ten-year time frame.

Isn't it the case,...in terms of Pantex and the numbers of pits, that during the next ten years, there could be more than 20,000 pits?

Response: *Regardless of the number of operations per year, interim storage of up to 20,000 pits would be consistent with dismantlement to START II stockpile levels. The EIS analysis assumes that combined activities of assembly, disassembly, and modification would not exceed operations on 2,000 weapons per year. For assessment of environmental impacts, the EIS examines impacts across a reasonable range of activity levels by assessing impacts of activity levels for operations on 2,000, 1,000, and 500 weapons per year.*

Operations on these numbers of weapons per year represent a reasonable, but conservative estimate of work that may be required at the plant, based on current policy directives, and allow a set of defined tasks to be accurately analyzed. The operations on each of the weapons in these defined sets are assumed to be extensive (representative of full assembly or disassembly). Actual workload and range of tasks are well understood, and impacts of actual operations are expected to be encompassed by this conservative analysis. Accordingly, over 2,000 weapons per year may be worked on at Pantex Plant without exceeding the environmental impacts identified in this conservative bounding analysis. The 2,000, 1,000, and 500 weapons activity levels should not be considered specific limits.

RC: 01.010
Doc: HT13/24

Is 20,000 pits for interim storage actually a bounding number or, within the next ten years, could the number actually be higher than that? [This] is the specific issue I would like to see addressed [in the final EIS].

Response: *See discussion in section 1.3.1 of this volume regarding the basis for 20,000 pit storage limit. The number of pits stored at Pantex Plant would not exceed 20,000 without appropriate NEPA review.*

RC: 01.011
Doc: HT13/25

Two questions in that regard: one is that if, in fact, the Department is taking the position that they would have to somehow supplement this or some other NEPA document before they completed 20,000, that should be expressly stated, and if that is not the Department's position, that specific statement needs to be made in this document and in the ROD.

	Related to that, I would also request that the document analyze where the 20,000 number came from and how that would relate specifically to less than START II levels of dismantlement.
Response:	*DOE may supplement or revise the Pantex EIS as a result of changes other than interim storage issues. However, DOE expects to review the environmental impact analysis contained in the Pantex EIS before the year 2007 as part of the agency's ongoing compliance responsibilities under NEPA, regardless of the number of pits placed into storage. In regard to the 20,000 storage level, see response to comment 01.009.*

RC: 01.012 **Doc: HT13/26**	I am going to throw out something, that you drop [Manzano] from this project because it is not going to be a permanent storage [site]. You should get your act together and put [plutonium] where it is finally going to be. Put [plutonium] at one of the places that will be a permanent storage because of the fact that you, yourself, have said [Manzano] is only considered able to handle the plutonium and not others, and this is only interim. Well, just wait and put [plutonium] where it is finally going. Get your other plan together, decide it, pick a site and hold onto it until then.
Response:	*See discussion in section 1.3.1 regarding site selection process and section 1.3.2 in this volume regarding site attributes.*

RC: 01.013 **Doc: HT13/31**	How many bunkers are required for 20,000 pits?
Response:	*Approximately 25 Type D magazines are required for interim storage of pits at Kirtland Air Force Base. At Pantex, 18 Modified Richmond magazines and 42 Steel Arch Construction magazines have been identified for storage of pits. Structures other than magazines would be used at other sites.*

RC: 01.014 **Doc: HT13/42**	Is there a justification for continued exploration and alternative forms of high explosives [HE] at this point in time that would justify the health and environmental risk?
Response:	*To elaborate on the response given at the public hearing, high explosives research and development, including testing, is an essential part of stockpile maintenance. As long as there is a stockpile, this function must be performed. The original Notice of Intent for the Pantex Site-Wide EIS (59 FR 26635) included the possibility of relocating some or all of Pantex Plant operations as part of the Relocation Alternative, including HE operations. Upon further review, it was determined that the relocation of operations, including high explosive operations, from Pantex Plant within the time period of this EIS does not meet the purpose and need for DOE to maintain minimum disruption of weapon disassembly operations. The commentor is referred to volume I, chapter 2, Purpose and Need for Action, for additional information. The Stockpile PEIS assesses alternatives for the explosive operations at Pantex Plant.*

RC: 01.015
Doc: HT13/79

As I imagine the process then, they go through a series of disassembly of the can subassembly to separate the different layers of metal, et cetera, so the final storage of the can subassemblies, is that considered anywhere?

Response:

The Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement discusses and analyzes the disposition of surplus canned subassemblies of highly enriched uranium (HEU) at Oak Ridge Reservation (ORR).

Only the transportation of HEU and depleted uranium components from Pantex Plant to ORR for storage, processing, and staging is addressed in this EIS.

RC: 01.016
Doc: HT13/87

Pantex has a high degree of public support in the region. In repeated polling, it has registered over 80 percent for continued operation of the plant. The discussions here tonight about the deficiencies in the high explosives program, I think, are misguided, and Pantex should be selected as a preferred alternative in the other PEIS, the SS&M PEIS, for continuation of high explosives.

I make those comments on the record as Bob Juba with the Amarillo Economic Development Corporation speaking with the endorsement of the city government of Amarillo.

Response:

The original Notice of Intent for the Pantex EIS (59 FR 26635) included the possibility of relocating some or all of Pantex Plant operations as part of the Relocation Alternative. Upon further review, it was determined that the relocation of operations, including high explosive operations, from Pantex Plant within the time period of this EIS does not meet the purpose and need for DOE to maintain minimum disruption of weapon disassembly operations.

Programmatically, for the longer term, consideration of the attributes of Pantex Plant's high explosive capabilities, as well as each of the alternatives considered for siting high explosive operations, would be part of the decision process in the SSM PEIS.

RC: 01.017
Doc: HT13/80

I wouldn't be incorrect in assuming that there is much more processing of a can subassembly that has to go on before it is ready for some sort of storage and the processing involved in the plutonium pit once it is removed? Is that correct?

Response:

The Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement analyzes the disposition of canned subassemblies of HEU at Oak Ridge.

RC: 01.018
Doc: HT12/26

I'm curious [about] what's being done to upgrade and correct that before you talk about putting more there. Also, I have the general comment that storage at Pantex is, like a lot of other DOE programs..., really...only interim action. It really doesn't lead to anything. These pits eventually are either going to be in the strategic reserves, stockpile management program or the disposition program, and really you're a lot better off with bringing them...to Savannah

River where you get this energy of feeding into other programs because Pantex is not an operating plutonium site. ...You just say, well, we don't really have nuclear facilities, we really don't have plutonium facilities. To do these other missions you need those. So my general comment is that you ought to look at putting them [the pits] at a functional plutonium site, [of] which there really only happens to be one.

Response: *The scope of the Pantex Plant EIS encompasses the ongoing operations, including interim pit storage, transporting pits to and storing on an interim basis at an alternative site (e.g. Savannah River Site), and transporting classified components between Pantex Plant and other sites. Pantex Plant already has capabilities to perform all these missions.*

In addition, see discussion in section 1.3.2 of this volume regarding site attributes.

RC: 01.019
Doc: PC-006/1

Pits at Pantex are managed in facilities and operations [that] do not meet any of the DOE's standards for design and operation of nuclear facilities. Doubling the storage of pits under substandard conditions should not be considered a reasonable alternative.

Response: *Pit storage activities are not considered a high hazard operation as defined by the term "nuclear facility" in appropriate DOE standards. Storage magazines are defined as category 2 "non reactor nuclear facility." After repackaging of pits into AT-400A containers, the moderate hazard designation is further reduced.*

DOE disagrees with the commentor that current pit management operations are substandard. The Pantex safety record is excellent. The environmental impacts of interim pit storage at Pantex have been discussed and analyzed, including potential Human Health impacts due to accident scenarios, in this EIS.

RC: 01.020
Doc: PC-024/3

P. S-7, left column, "No Action Alternative," 2nd paragraph, 5th line. The construction of the Hazardous Waste Treatment and Processing Facility should not be excluded under this alternative. Proposals, which make the No Action Alternative unreasonable under NEPA, should not be included.

Response: *In the March 1996 Draft version of the Pantex Plant EIS, the proposed construction of the Hazardous Waste Treatment and Processing Facility (HWTPF) was considered necessary for enhancing waste operational efficiency and safety and meeting regulatory requirements established in the Agreed Order. With offsite disposal shipments of mixed waste in 1994 and two shipments in 1996, as noted in volume I, section 4.13.2.3, and changes contained in the August 1996 FFCA Compliance Plan Annual Update document, construction of the HWTPF is no longer considered a regulatory requirement. However, without the HWTPF, waste treatment and processing capabilities remain greatly limited and do not meet the Department's purpose and need. This information has been incorporated throughout volumes I and II, as appropriate.*

RC: 01.021
Doc: HT16/40

...my specific question relates to appendix H-14, where on the pit reuse facility it talks about the glovebox type operations and the glovebox bays that will be included in this facility. I guess I have a couple of questions related to that. How many glovebox type enclosures are currently operating at Pantex?

Response: *There were 9 gloveboxes in use at Pantex Plant in August 1996.*

RC: 01.022
Doc: HT17/21

The other comment has to do with the assumption that in the no action alternative,...when you reach the 12,000 pits, disassembly would have to cease. It's really hard for me to believe that you [do] not have more creative minds in the Department of Energy than this. If you can justify interim storage of 12,000 pits at Pantex on the basis of an environmental assessment, I would surely think that you could find ways to justify interim storage of pits at other locations until all of the issues that need to be resolved are resolved.

Response: *See discussion in section 1.3.1 of this volume regarding the basis for 20,000 pit storage limit and section 1.3.2 of this volume regarding the relationship between the other EISs.*

RC: 01.023
Doc: HT17/22

The unstated question, of course, is whether or not you're going to attempt to do processing of plutonium in the Panhandle. That's the primary reason that I believe most people here are opposed to the storage. It's not so much the risk of storage, which is, at least to my estimates, not very great. It's the possibility that you will later use the Pantex facility as a staging ground for the processing of plutonium, either taking the contents of the pits and making them into fuel rods or perhaps reprocessing spent fuel rods.

Response: *The Proposed Action and alternatives for the Pantex EIS do not involve processing of pits into any other form. Nor do the alternatives of this EIS analyze a proposal for Pantex to reprocess spent fuel rods. In addition, see discussion in section 1.3.2 of this volume regarding the relationship of the S&D PEIS.*

RC: 01.024
Doc: HT17/39

This document under review today does not meet the commitments made to the citizens of this area in DOE's agreement two years ago. The examination of alternative storage sites seems halfhearted at best. If the effort is brought short because of the threat to Albuquerque in using the existing Manzano Mountain facility, what are the citizens of Gray and Potter Counties to make of the government's regard for their safety.

Response: *In response to Item 1: As described in volume I, section 3.1.4, 60 DOD installations were screened by the Nuclear Weapons Council staff. With the exceptions of the Manzano Weapon Storage Area, located on Kirtland Air Force Base and Seneca Army Depot, the Council staff determined that none were feasible. In addition, see discussion in section 1.3.1 of this volume regarding the Site Selection Process.*

In response to Item 2: DOE recognizes that all its facilities and all its hazardous materials, including plutonium, require varying levels of operational and environmental controls to protect the workers, the public, and the environment. DOE continues to work with EPA, states, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and all hazardous materials.

RC: 01.025
Doc: HT17/41

...area residents are entitled to have a better idea of what the waste handling facility and the pit reuse facility really do imply for our future.

Response:

The commentor is referred to volume II, appendix H. The proposed waste handling facility would improve the Plant's ability to handle its own wastes and enable fulfillment of the Agreed Order (Federal Facility Agreement) with the State of Texas. The pit reuse facility would not have the ability to process plutonium into any other form. It would merely support operations on the surface of the pits.

RC: 01.026
Doc: HT17/53

It has been really difficult for me to read things like...we have 12,000 pits at Pantex and no other [if] arrangements are made, then dismantlement will stop. It is a real frustration to read a line like that, and it feels very disingenuous. One of the reasons that citizens groups such as mine press so hard for this document and work so hard for those issues, is that we could not believe that the Department of Energy was going to take the posture of we either store them all in one place, we have no backup.

Response:

The No Action Alternative describes conditions that would result if the Department should not undertake to change the status quo. The No Action Alternative does not have to be reasonable, and frequently is not. Rather, the No Action Alternative is intended to provide a baseline for comparison. Frequently, as in this case, the consequences of continuing the status quo also serve to point out quite clearly that an action is needed. In the case of this EIS, the Department has a Proposed Action to put up to 20, 000 pits in storage at Pantex Plant, and an alternative of relocating up to 20,000 pits to one of four other sites for interim storage. The Department will not store pits at Pantex Plant beyond the current 12,000-pit level without examining the environmental impacts of storing an additional 8,000 pits. This EIS has been prepared in accordance with requirements of NEPA and CEQ Regulations specifically to allow the Secretary of Energy to make decisions that will permit continued dismantlement of all weapons retired from the stockpile as well as to continue other operations of the plant.

RC: 01.027
Doc: HT17/63

...in terms of Nan's characterization that the reason to do the no action alternative is to provide a good baseline for what impacts of other alternatives and other actions would be, I think in numerous cases a [poor] job was done....

Response:

DOE believes the Pantex Plant EIS is an effective document. See response to comment 01.026.

RC: 01.028 **Doc: HT17/67**	...it's inconceivable that you could be saying that continued storage at Pantex of pits, if that were to happen for the next ten years, would be done for that entire time in Zone 4. And so you're going to need to look explicitly in this document at the alternative locations for that, the impacts and effects of that, et cetera.
Response:	*At Pantex, 18 Modified Richmond magazines and 42 Steel Arch Construction magazines have been identified for storage of pits. No new facilities are required to store up to 20,000 pits. Environmental impacts at the alternative sites have been discussed and analyzed in volume I, chapter 5.* *New pit storage facilities and upgrades to existing pit storage facilities are within the scope of the S&D PEIS and SSM PEIS.*

RC: 01.029 **Doc: FG-003/1**	The DEIS makes reference to "interim storage" of plutonium pits at three DOE sites (Nevada; South Carolina; Washington State) and a Department of Defense site at Kirtland Air Force Base, New Mexico. However, the DEIS did not define what constitutes "interim storage," either a fixed period of years or decades, or until a permanent storage facility is approved, upgraded or built. If possible, the Pantex FEIS should define the minimum and maximum time limits expected by DOE for "interim storage" (we recognize the difficulty in this because nuclear storage projects often run into problems that delay their proposed timeliness).
Response:	*Interim storage refers to the time period until the long-term storage decisions are made and implemented.*

RC: 01.030 **Doc: FG-003/3**	It would be helpful if the Final EIS could provide the tonnage of the 8,000 to 20,000 pits that would be relocated under the interim pit storage alternative. If allowable under the national security considerations, it is recommended that the FEIS quantify the weight in terms of plutonium [Pu], other nuclear material, and other constituents such as *Resource Conservation and Recovery Act* (RCRA) regulated hazardous waste.
Response:	*The actual amount of plutonium contained in a pit is classified. Because of this, it is DOE's policy to present the amount of Pu at Pantex in terms of the number of pits. The composition of other nuclear material, metals, and other constituents in a pit is classified. However, there are no RCRA regulated wastes in the pit form.*

RC: 01.031 **Doc: MG-002/3**	There is information that leads Clark County to question the intent of DOE to actively pursue action alternative of storage of pits at the Pantex Plant. The DEIS makes reference to extensive restoration work that is being planned or is in progress at the Pantex and Hanford sites. We question whether it is sound policy to conduct such environmental restoration work at Pantex, a majority [of] which will be completed by 2000, and then store the plutonium pits on site, even for the short term. Given this, it would appear the pit storage relocation alternative may be more attractive than is presently represented in the DEIS. And, the NTS may emerge as the most feasible site for such relocation, since it

is relatively close to the Pantex Plant, there are minimal environmental restoration plans for the NTS [as compared to other candidate sites] and there are frequent mentions of the NTS as a disposal or storage site in other DOE EISs. For example, the Stockpile Stewardship and Management PEIS includes an alternative which describes the complete closing of the Pantex Plant with its capabilities relocated to NTS, Los Alamos and Lawrence Livermore facilities. The Pantex EIS does not address the implications of this alternative. This issue should be addressed in the final EIS and the Record of Decision.

Response:

Storage of pits does not generate environmental contamination. Environmental restoration activities are independent of the pit storage decision. These activities will continue whether pits are stored at Pantex Plant or not. DOE recognizes that all its facilities and all its hazardous materials, including plutonium, require varying levels of operational and environmental controls to protect the workers, the public, and the environment. DOE continues to work with EPA, states, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and all hazardous materials. In addition, see discussion in section 1.3.2 of this volume regarding Site Attributes.

Cumulative impacts related to changes in Pantex Plant operations from decisions resulting from the SSM PEIS, the S&D PEIS, and the WM PEIS are presented in the Pantex Plant EIS.

RC: 01.032
Doc: PC-031/1

The promised analysis of alternative DOD storage sites looks only at the Manzano Weapons Storage Facility at Kirtland Air Force Base and seems to reject it since it is not included in the Storage & Disposition PEIS. As the facility is deemed technologically adequate, we may only conclude by inference from the very words of the document that the DOE takes a more cavalier attitude toward the safety of Panhandle residents than people who live in Albuquerque. The fact that more people would be threatened in the Albuquerque area in no way justifies placing that liability just 17 miles east of the city of Amarillo in the middle of such a highly productive agricultural area [that] is the beginning of a food chain reaching across the world. Those who assert otherwise are more persuaded by convenience or dollars than reality. Is DOE so awash in funds that it can afford building new facilities when Manzano Mountain is more than adequate? Taxpayers as well as local residents deserve a better explanation than exists in this document.

Response:

In response to Item 1: As described in volume I, section 3.1.4, 60 DOD installations were screened by the Nuclear Weapons Council staff. With the exceptions of the Manzano Weapon Storage Area, located on Kirtland Air Force Base and Seneca Army Depot, the Council staff determined that none were feasible. In addition, see discussion in section 1.3.1 regarding the Site Selection Process.

In response to Item 2: DOE recognizes that all its facilities and all its hazardous materials, including plutonium, require varying levels of operational and environmental controls to protect the workers, the public, and the environment.

DOE continues to work with EPA, states, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and all hazardous materials.

RC: 01.033
Doc: PC-025/7

The first two bullets in the second column on page 3-3 [volume I, section 3.1.1]. Where are security and nonproliferation activities? They are routine correct?

Response:

Security and nonproliferation activities are part of the routine activities performed by the plant along with waste management, infrastructure and building maintenance, etc., in the bullet addressing "continuing routine Pantex Plant activities.

RC: 01.034
Doc: PC-025/8

On Page 3-7 in second column in the second paragraph. It appears a loop hole exists for DOE in dealing with the backlog of stored pits. If a container availability problem exists (like the FL container problem on F-2) DOE could store 20,000 pits without shipping one pit and not violate this EIS. What would be the hard number before DOE would stop dismantlement to put pressure on the transportation end? Lacking cans for shipment seems to make relocation alternatives unreasonable and thus not meeting the intent of NEPA, please provide technical justification. This EIS is flawed because the alternatives are not "technically mature" to use a DOE phrase found in SSM and S&D for rejecting analyses of alternatives. Lack of cans appears to be a reasonably foreseeable impact, please assess. The 12,000 alternative is not possible under this EIS.

Response:

Under the Pit Storage Relocation Alternative, the number of pits in interim storage at Pantex Plant could be greater than 12,000 pits for a temporary period until enough of the planned new transportation containers are available. This is not a loophole since the impact analysis considers the bounding effects of having up to 20,000 pits at the Pantex Plant. DOE's stated Preferred Alternative is the Proposed Action to retain the interim storage for up to 20,000 pits at Pantex Plant.

DOE would not stop weapons disassembly under the Relocation Alternative even in the case that there would not be enough transportation containers available at any particular point in time. The reason for this is that the exact timeframe within which any of the candidate sites could be made ready and the 8,000 or 20,000 pits transferred can not be precisely determined. The need to continue the weapons operations at Pantex is independent of the interim storage issue. Therefore, the disassembly of weapons has not been tied to the pit relocation schedule and under the Pit Storage Relocation Alternative all weapons operations (e.g., disassembly, assembly, etc.) would continue to be performed at Pantex Plant.

The Pit Storage Relocation Alternative is reasonable under NEPA in that the technology for the storage containers is mature. DOE has the knowledge to build the containers and in fact has already built the test models. Furthermore, the Department already has a properly certified Type B container (the FL *container), which could be produced if technical difficulties with the AT–400A certification should arise. The impact of any delay in completing the required testing of the container and beginning manufacture would only be relevant if Pantex Plant did not have the capacity for interim storage of the number of pits which could accumulate while the plant waited for the containers to be manufactured. Since Pantex Plant has the capacity to safely store all 20,000 pits, there is no problem if there is a delay in receiving certified containers.*

The only difference between the Pit Storage Relocation Alternative and the Proposed Action is the potential interim storage of pits at a site other than Pantex Plant. The impacts of the Pit Storage Relocation Alternative consist of those described for the Proposed Action plus those associated with the transfer operations. In other words, the impacts of the Pit Relocation Alternative include the impacts from the possible storage of up to 20,000 pits, and therefore, bound the impacts of the case where containers do not become available. The 12,000 pit limit only applies to, and is discussed under, the No Action Alternative. Under the No Action Alternative DOE would cease dismantlement once the interim storage level of 12,000 pits was reached.

RC: 01.035
Doc: PC-025/9

On Page 3-8 last bullet of page. If shipping cans are lacking, why is 8,000 considered reasonable?

Response:

As stated in volume I, section 3.1.3, the availability of shipping containers affects only the schedule of shipments, not the feasibility of the alternative.

RC: 01.036
Doc: PC-025/11

Three bullets in second column of page 3-8. The rationale contains several fatal flaws. The ability [that] includes past performance in securing pits, nonproliferation, and a safe and reliable stockpile should have been considered in qualifying the sites. Please reassess sites based on these new criteria. Please remember when addressing this comment DOE stated to great length how vital DOE's missions regarding nonproliferation, security, and a safe and reliable stockpile were. What is the National Academy of Sciences' position on plutonium storage?

Response:

The DOE disagrees with the commentor that the alternative storage site selection process including Department of Defense facilities contains flaws or was not reasonable. Current Pantex pit storage operations were used as a baseline for comparison purposes. Security and nonproliferation activities are part of routine activities performed by Pantex Plant. Pit storage is a relatively simple function to perform—unlike manufacturing or chemical processing operations involving nuclear materials. All sites evaluated in this document currently perform, or have performed security functions for either similar materials or materials with similar security needs. All sites considered as alternatives would be capable of securely and safely storing pits and could accommodate nonproliferation objectives. The National Academy of Sciences has not addressed interim storage.

For an expanded discussion of the Pantex Plant Safeguards and Security Program, the commentor is referred to the Pantex Programmatic Information Document (Pantex 1996b).

RC: 01.037
Doc: PC-029/2

Taking nuclear weapons apart at Pantex may make sense, but surely a better site for storage can be found. What do you think? I look forward to the seeing the better alternatives in the final Environmental Impact Statement.

Response: *See discussion in section 1.3.1, regarding the site selection process.*

RC: 01.038
Doc: PC-027/1

Your glossy presentation books don't actually offer much choice or many alternatives. In fact, the choices and alternatives are very limited.

Response: *See discussion in section 1.3.1, regarding the site selection process.*

RC: 01.039
Doc: PC-027/3

Regarding your proposal to use Kirtland Air Force Base/Albuquerque as a pit storage site. Albuquerque is the largest city in our state. It is close to Kirtland AFB—they are separated only by a gate guard—a person can place one foot in Albuquerque and the other on Kirtland Air Force Base. It's like storing nukes in the middle of a city. The highways are busy and prone to accidents. The airport is busy too. One accident and you've lost a major population center. Your publication gives the impression that there is more separation than there actually is between the base and the city. It takes only a few minutes to drive from the city to the Manzano site on the base. Many people work on the base, it is a large local employer. The city and the base actually touch and the city grows every day. Albuquerque may have been a small town when the bomb was developed 50 years ago. It isn't small anymore.

Response: *In response to Item 1: The locations of Kirtland Air Force Base and the Manzano Weapon Storage Area in relationship to the City of Albuquerque are properly depicted in the Pantex Plant EIS.*

In response to Item 2: The EIS, in volume I, section 5.5.1.12, discusses and analyzes an aircraft accident at Kirtland Air Force Base Manzano Weapon Storage Area. With the minimum cover of 9 meters (30 feet) of overburden, the aircraft impact analysis shows potential accidents even with military aircraft carrying conventional bomb loads, not a credible threat to pit storage at the Manzano Weapon Storage Area.

In response to Item 3: DOE recognizes that all its facilities and all its hazardous materials, including plutonium, require varying levels of operational and environmental controls to protect the workers, the public, and the environment. DOE continues to work with EPA, states, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and all hazardous materials.

RC: 01.040
Doc: SG-003/23

Page 3-2, Section 3.1.1 Proposed Action: Care should be taken to ensure that the continued operation of Pantex Plant activities including "quality assurance

	testing of weapon components and the research and production of weapon components" is conducted in a fashion that will not increase DOE's liability for injury to natural resources.
Response:	*DOE recognizes that all its facilities require varying levels of operational and environmental controls to protect the workers, the public, and natural resources. DOE continues to work with EPA, states, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and natural resources. Nothing was found which would inhibit Pantex Plant from performing the missions stated in the Proposed Action.*
RC: 01.041 **Doc: PC-028/1**	Page 5-7, 2nd column, 2nd para - It is not correct to state "and KAFB, near Albuquerque New Mexico-" Comment: KAFB is the southern boundary of Albuquerque, it is a joint use airport, (part of the city) - it is a part and adjacent to Albuquerque. Albuquerque is a major sized city, while the other candidate sites are located away from major cities. You should give major consideration to either keeping Pantex as the only site, or consider the other two choices.
Response:	*KAFB adjoins the city limits of Albuquerque, but is not part of the city. A portion of the airport is under control of the city, but not all of the airport facilities are. See discussion in sections 1.3.1 and 1.3.2, of this volume.*
RC: 01.042 **Doc: CO-007/2**	With all of the research, development, manufacturing and deployment poured into bomb-making, we are very short on environmentally sound methods for storage and disposition. Instead of the euphemistically named and costly program that is before us, we should be considering a "green" Manhattan II. The requirements for dismantlement should be to: 1) dispose of the components in such a way that they are not and could not be used in a bomb again, and 2) minimize, rather than contribute to, or perpetuate the waste stream of radioactive materials.
Response:	*In response to Item 1: The Atomic Energy Act requires DOE to sanitize weapon components that are no longer needed through a process of destroying or removing classified or other controlled matter and to demilitarize weapon components through a process that results in an irreversible modification or destruction of a weapons component or part of a component to the extent required to prevent use in its original weapon purpose.* *In response to Item 2: The Pantex Plant Pollution Prevention/Waste Minimization Program originally implemented in 1991 has significantly reduced waste volumes. The success of the program was instrumental in being awarded the President's Closing the Circle Award.* *Final disposition of weapon-usable surplus plutonium is within the scope of the S&D PEIS.*
RC: 01.043 **Doc: CO-005/10**	The Agency should re-evaluate the risks to workers from low level radiation exposures using the risk factors reported in these studies. Such a reanalysis

would highlight the uncertainties associated with making predictions about the health effects of low level ionizing radiation. The issue of uncertainty in scientific theory is currently glossed by the misleading use of data from only one side of the debate.

Response: *See response to comment 14.129. The DOE understands that uncertainties exist in the methodology for evaluating human health risks. As discussed in volume II, appendix D.6 a degree of conservatism has been introduced to the calculations as a result of these uncertainties. However, DOE believes that the analysis presented in this EIS is reasonable for evaluating environmental impacts of the alternatives.*

RC: 01.044
Doc: PC-033/3

Page 5-55, Kirtland Air Force Base. Under the Pit Storage Relocation Alternative (section 3.13) the pit storage function currently carried out at Pantex Plant would be transferred to another site. The Manzano Weapons Storage Area (WSA) is the candidate storage site at the Kirtland Air Force Base. After reviewing pages 5-55 through 5-75, I believe that the Manzano WSA would be the ideal location for the storage of the plutonium pits. The Manzano Mountain facility has the structure in place (storing office furniture at present); security is available; aircraft seem not to fly in a direct pathway to the WSA; water, air, and soil should not be adversely affected; and the local population should be better protected from accidental releases in this type of facility with the 30 foot coverage and better structure of the magazines. Some of the magazines at Pantex are 40 years old and have been proven to be unreliable for plutonium storage. I am referring to the heat build up in some of the magazines this past year and the installment of air conditioning units. Protection from aircraft intrusion is not as great at Pantex, or terrorist missiles and/or bombs. Security has been proven to be very lax at times at Pantex and the proximity of the plant to the Amarillo International Airport (which is also used for military training flights), is also a concern. What are the reasons for not choosing Manzano WSA over Pantex if that is a reality? If the DOD enters into a Memorandum of Understanding (MOU) with the DOE and Manzano is used for pit storage, would the employees in charge of the Manzano WSA be employees of DOE or DOD?

Response: *See discussion in section 1.3.1, regarding site selection process.*

DOE is currently studying the air conditioning option in four pit storage magazines. By providing air conditioning, DOE seeks improved climate control through reduction in the range of seasonal and daily temperature fluctuation. DOE may choose to provide air conditioning to all pit storage magazines based on these test results. DOE is fully committed to improve Pantex Plant's safe and reliable pit storage operations. Like the recent Stage Right storage configuration enhancement and the proposed AT-400A pit storage container project, the air conditioning option is expected to enhance storage operations. The fundamental safety design of the magazines is the physical structure of the magazines not air conditioning, Stage Right, or AT-400A containers. These *enhancements are improvements to a sound pit storage management at Pantex Plant. Expect DOE to continue increasing the safety envelope.*

The DOE and Pantex Plant take security issues very seriously. Please note the numerous safeguard and security enhancement projects listed in appendix D of the Pantex Plant Programmatic Information Document (Pantex 1996b).

The risks associated with aircraft accidents have been discussed and analyzed in volume I, section 4.15.

If Manzano is selected to conduct interim pit storage activities, the pits would remain under DOE control.

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3.2 Relationship to Other Environmental Impact Statements

RC: 02.001
Doc: HT02-08/4

The agreement to evaluate alternative storage sites for pits, specifically Department of Defense sites, seems to have been an insubstantial one since that site is not included in the actual storage EIS. If, as implied in the analysis, Manzano mountain becomes ineligible because of the threat such a facility represents to Albuquerque, what are we to make of the government's concern for the residents of the Panhandle?

Response:

As described in volume I, section 3.1.4, 60 DOD installations were screened by the Nuclear Weapons Council staff. With the exceptions of the Manzano Weapon Storage Area, located on Kirtland Air Force Base (at Albuquerque, New Mexico) and Seneca Army Depot (at Romulus, New York), the Council staff determined that none were feasible. Subsequently, it was determined that Seneca Army Depot would not be available as a candidate site for pit storage. In addition, see discussion in section 1.3.1 in this volume, regarding the site selection process.

For a discussion on the selection process for long-term storage of plutonium the commentor is directed to chapter 2 of the S&D PEIS.

DOE recognizes that all its facilities and all its hazardous materials, including plutonium, require varying levels of operational and environmental controls to protect the workers, the public, and the environment. DOE has worked with EPA, states, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and all hazardous materials. All of these plans and commitments have been reviewed to determine if there are any conflicts or restrictions which would inhibit the Pantex Plant from serving as a good location for the facilities proposed in the EIS. Nothing was found which would inhibit the Pantex Plant from performing the missions stated in the Proposed Action.

RC: 02.002
Doc: HT14/5

A systems analysis approach should be utilized to select the most effective method for processing [of plutonium] and interim storage [of pits]. This analysis should adequately address public and worker health and safety and environmental issues.

Response:

Processing of plutonium is not within the scope of the Pantex Plant EIS. The systems analysis approach is typically utilized in obtaining licenses, permits, and compliance assurance certification prior to operation of facilities. The systems analysis approach is not typically used in NEPA analysis. The Pantex Plant EIS has addressed public and worker health and safety and environmental issues. Moreover, the focus of the decision in this EIS is the location of the interim storage not the method. A standardized storage method (Stage Right) is evaluated in this EIS in order to compare the impacts at different candidate sites.

RC: 02.003
Doc: HT01-05/1

Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions as well as consolidation of all plutonium storage and disposition and any related functions.

Response: *See discussion in section 1.3.2 in this volume, regarding the relationship between the PEISs and the Pantex Plant EIS.*

RC: 02.004
Doc: HT01-04/2

The EIS that deals with missile materials, storage, and disposition is one that I have spent a good deal of time with. On the topic of storage, I feel like that we're seeing that Pantex in its current role is ideally sited for storage of plutonium pits. If it is anticipated that storage would...continue to be in that form, I don't think there's any question that Pantex, which is already contemplated to have...or will have 21,000 pits in storage.... But certainly the vast majority of the pits in storage at Pantex, it makes sense to continue that function in that location.

Response: *See discussion in section 1.3.2 in this volume, regarding the relationship between the PEISs and the Pantex Plant EIS.*

RC: 02.005
Doc: HT07/1

I just want to follow up and get the distinction, then, that the storage of up to 20,000 pits, those pits are what I'm going to call sealed, but you're talking about material that won't be sealed or will be packaged in some other fashion?

Response: *To elaborate on the response given at the public hearing, each pit is hermetically sealed inside a protective cladding which is bonded to the plutonium. In the future, these pits will be stored in containers known as AT–400A. AT–400A storage configuration provides double shell container protection or, in the words of the commentor, a "sealed" package. Currently, pits are stored in AL–R8 containers. Pits are encased by metal. For weapons-usable fissile materials not in pit form, DOE would require similar multi-layer "sealed" package containment. DOE recognizes that all its hazardous materials, including plutonium, require proper packaging to protect the workers, the public, and the environment.*

RC: 02.006
Doc: HT13/15

Is there a reason why it is only being looked at as interim and not long term, or why is it suitable for one and not the other?

Response: *See discussion in section 1.3.2 in this volume, regarding the relationship of the S&D PEIS and Pantex Plant EIS.*

RC: 02.007
Doc: HT13/22

You may not want to talk about this, but it seems like the Department is taking the position that these workers' doses that we just talked about are inevitable, because even if the pits stay at Pantex, they will still have to be loaded out of Zone 4 and moved again, because the disposition PEIS says even if they all stay at Pantex, they would be loaded into Zone 12, is that correct?

Response: *To elaborate on the response given at the public hearing, the Department of Energy, through its contractor Mason & Hanger Corporation, is fully committed to the As Low As Reasonably Achievable (ALARA) program at Pantex Plant to* *help limit the number of personnel occupational exposures and public/ environmental exposures to radioactive material. The majority of Pantex Plant workers receive no radiation exposures (zero dose) during normal operations. DOE Order 5480.11 and 10 CFR 835 specify a limit of 5 rem per year for occupational workers.*

DOE recognizes to meet interim storage requirements, pits currently in storage at Pantex Plant would require workers to handle radioactive materials including Zone 4 and Zone 12 pit transfers. This exposure has been discussed and analyzed in the EIS. DOE's commitment to reduced exposures, includes the improved pit storage capabilities with the Stage Right automated pit storage system. When fully implemented this year, this system will significantly reduce Zone 4 worker exposures. The Stage Right system uses a remote-controlled forklift to retrieve, place, and inspect Pantex Plant pit storage facilities, thus reducing hands-on radioactive material management.

RC: 02.008
Doc: HT13/27

I have a question or statement relating to how the sitewide and the two PEISs, the [storage] and disposition and the stockpile stewardship PEIS, are relating. We just spent a lot of time working on bringing people from all over the state to the stockpile stewardship hearings, and the main topic of discussion is plutonium pit fabrication at Los Alamos, and here we are talking about thousands and thousands of plutonium pits being dismantled.

It seems to me like the left hand doesn't know what the right hand is doing. One hand is trying to figure out what to do with pits, and the other hand is creating more. Is that something that can in some way be tied in...if we have...pits, it seems to me confusing that we would need to retool them to different specifications.

Response:

See discussion in section 1.3.2 in this volume, regarding the relationship of the PEISs and the Pantex Plant EIS. For the purpose of clarification, weapons are dismantled, not pits. The intact, encased plutonium, or pit, from a dismantled weapon is placed in storage.

RC: 02.009
Doc: HT13/29

... Two points I want to make are, one, the fact that we have such difficulty in figuring out what to do with 20,000 pits, which I certainly do and would hope that everybody here is, on the one hand, glad that we are getting 20,000 pits out of bombs. That is a good thing, but the fact that what comes from the good thing of having fewer warheads armed and able to destroy the world several times over is another problem, which is what to do with the 20,000 pits.

It is even more complicated because, as has already been stated, it would be one thing to say we know what to do with the 20,000 pits in the short term because we know what it do with the 20,000 pits in the long term. We know what the disposition is. In fact, we don't know what the disposition is.

I have talked about it in another context, so I will just summarize, I have no confidence that the disposition PEIS in fact is adequately analyzing or is going to come up with a possible reasonable solution for longer term what to do with those 20,000 pits. So I think it is something that some of us in the public and hopefully people in the federal government will pay a lot more attention to in the future.

Response: *See discussion in section 1.3.2 in this volume, regarding the relationship of the PEISs and the Pantex Plant EIS.*

RC: 02.010
Doc: HT13/81

Have they decided what they are going to be doing with the metal components from Oak Ridge once they have disassembled the secondaries to the point that they could go into storage that is equivalent to what the plutonium storage would be, and would these sites possibly be considered in the future for storage of components of the secondaries the way we are currently looking at storage of the primaries?

Response: *The Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement discusses and analyzes the disposition of surplus HEU at Oak Ridge. In addition, see discussion in section 1.3.2 in this volume, regarding the relationship of the PEISs and the Pantex Plant EIS.*

RC: 02.011
Doc: HT13/82

They were not planning on shipping any of those components that are disassembled from the secondaries back to Pantex or Albuquerque...—it is all going to stay at Y-12 and Oak Ridge?

Response: *See response to comment 02.010.*

RC: 02.012
Doc: HT13/83

You understand my general concern is, you develop a bunker that can store a pit in a storage vessel, then you have got a bunch of spherical uranium or plutonium in the secondary components that need to go in at some point in a storage bunker inside a container format. Wouldn't we be looking at the potential of once we put, for example, an Albuquerque bunker system into process, we'd be looking at potential in the future getting more than just primary pits and looking at potentially getting a variety of others?

So the can subassemblies would be going into underground storage at Oak Ridge?...

Response: *See response to comment 02.010.*

RC: 02.013
Doc: CO-010/1

... We do not believe that the community and stakeholders would support such an action by the Department unless the site were also to be utilized for the processing of the plutonium to a stable form for safe interim storage. Hanford would also be an ideal site for the processing of the excess plutonium either for vitrification of fabrication into reactor fuel for irradiation prior to disposal.

The site has the capability by operation of either or both the Fast Flux [Test] Facility (FFTF) and the WNP-2 Nuclear Power Plant on mixed oxide cores to dispose of a substantial portion of the excess plutonium within the foreseeable future. This capability when coupled with the available mixed oxide fuel fabrication capabilities of the Fuel and Materials Examination Facility (FMEF) offers a single site processing and irradiation for disposal capability not found at other potential storage sites. We believe that the Draft EIS should be revised to objectively evaluate this option in conjunction with the excess weapons disposal Draft EIS.

This area would be expected to be supportive of an excess plutonium storage and disposal mission provided that the related processing and fabrication tasks were also assigned here. Submitted herewith for the record is a position statement recently adopted by the Hanford Advisory Board [that] relates to the disposal of excess weapons materials by irradiation in the FFTF. The Hanford Advisory Board is a DOE sponsored stakeholder group representing various interests in the states of Oregon and Washington. This statement is consistent with the position we have stated above on this subject.

Although the storage of excess weapons plutonium at Hanford in available facilities without further processing or utilization is probably significantly more economical than the construction of new facilities at other sites, we do not feel that this is in the best interests of the community unless a concurrent processing mission was assigned to the site. A single purpose storage mission would be opposed due to the potential conflict of other diversification initiatives.

Response: *DOE believes the interim storage alternatives covered under the Pantex EIS are a reasonable management course for plutonium in pit form. In addition, see discussion in section 1.3.1 in this volume, regarding the site selection process, and section 1.3.2 regarding the relationship between S&D PEIS and Pantex Plant EIS.*

RC: 02.014
Doc: PC-024/5

Page S-10, right column, "Related National Environmental Policy Act Studies" The Pantex FEIS should reflect delays in other EIS such as the SS&M PEIS and the NTS EIS.

Response: *The purpose of the summary is to inform the public that several NEPA documents, including SSM PEIS and NTS EIS, are ongoing and could have impacts at Pantex Plant. The schedule of decisions in those documents does not impact the assessments contained in the Pantex Plant EIS. Cumulative impacts related to changes in Pantex Plant operations from decisions resulting from the SSM PEIS, the S&D PEIS, and the WM PEIS are presented in the Pantex Plant EIS.*

RC: 02.015
Doc: PC-024/6

Page S-13, left column, boldface. The title and the DOE control number for the NTS EIS should be corrected to reflect changes that were made over six months ago.

Response: *The section has been corrected.*

RC: 02.016
Doc: PC-024/7

Page S-13, right column last three lines. This statement should indicate more than the existing waste connection. It should mention the proposals to store plutonium-239 pits there.

Response: *Consideration of interim storage and long-term storage of pits is not within the scope of the NTS Site-Wide EIS. See discussion in section 1.3.2, in this volume.*

RC: 02.017
Doc: PC-024/11

Page 5.6, left column, 3rd paragraph. It mentions that "[t]he P-Tunnel is also being proposed for the long-term storage and disposition of weapons-usable fissile materials." The folks at the NTS are trying to sell the use of limited tunnel space for two different purposes at the same time. It is unlikely that it will be used for both purposes and therefore the competing EIS purposes need to be addressed.

Response: *One of the alternatives in the S&D PEIS is long-term storage and disposition of weapons-usable fissile material in the P-Tunnel at NTS. The 20,000 pits that are addressed for interim storage in the Pantex Plant EIS are part of the inventory of weapons-usable fissile material in the S&D PEIS. Selection of P-Tunnel for interim storage of pits and long-term storage of weapons-usable fissile material would not be using limited tunnel space for two different purposes, but rather for the same purpose.*

RC: 02.018
Doc: CO-006/2

In the Draft S&D PEIS, DOE characterizes Pantex as having the "greatest potential" to experience adverse cumulative impacts from an increased role in plutonium storage and disposition.... These conclusions also totally contradict those contained in the SWEIS which characterize the impacts as "minimal" and "negligible." It is imperative that DOE correct the inaccurate mischaracterizations before making its final decisions for plutonium storage and disposition missions.

Response: *Environmental impacts associated with interim storage of pits are within the scope of the Pantex Plant EIS. Environmental impacts associated with long term storage and disposition are within the scope of the S&D PEIS. The analyses presented in the two EISs are both correct since disposition would introduce plutonium processing not currently done at Pantex.*

RC: 02.019
Doc: HT16/7

I really would like to understand why you [have] all...those cumulative impacts in here like you have, for instance, on...page 4-239, where you're talking about the Storage and Disposition PEIS. And the last sentence in there is: All doses would be within radiological limits and well below levels of natural background radiation, et cetera.... This document has consistently referred back to the three PEISs and made...statements about impacts that it doesn't seem to me [that] this document has the information to do. Can you...talk to me a little bit about that? It [the EIS] gives the impression you're making solid judgments that I don't think the information is sufficient to do.

Response: *The Pantex Plant EIS has detailed information on the impacts of continued operations at Pantex Plant. Each PEIS has detailed information about the impacts of its subject programs. The cumulative impact sections in the Pantex EIS incorporates the information from the PEISs by reference and presents the total cumulative impact. Incorporating information by reference is part of the NEPA analysis process. The "Cumulative Impacts" sections of this EIS address* *to the extent possible information relevant to Pantex Plant. For detailed discussions of environmental impacts evaluated in the other PEISs, the commentor is referred to those documents.*

RC: 02.020
Doc: HT16/9

The second issue I raise, though, is, for a number of the types of operations that are being talked about for the future—plutonium conversion facilities, plutonium processing facilities, MOX fuel facilities, a new revolutionary [evolutionary] light water reactor—there really [is] no history. There [is] no good history to go on in terms [of] what the actual releases are. So you're basing your analysis on what the current or assumed regulatory levels are going to be, [not] on, in fact, historic performance. And so the point is that you should be quite clear about that, which I think, in some cases, it's really not. For example, on page 4-239 that Ms. Gattis just mentioned to you, I think it would be very helpful if you would just say, in terms of some of these facilities, there isn't historic data to base it on, so we are basing our analysis on these plants [that] are assumed to operate within the applicable regulatory limits.

Response: *See response to comment 02.019.*

RC: 02.021
Doc: HT17/24

I would much prefer to see the Nevada Test Site deal with that particular material [plutonium] as the last residue of a very difficult part of this country's history and one [that] we are better off dispensing with, not continuing into the future.

Response: *See discussion in section 1.3.2 in this volume, regarding site attributes.*

RC: 02.022
Doc: HT17/27

Hearing tonight about transferring plutonium processing from Rocky Flats, which was judged by a DOE report the site most likely to constitute a threat to human life, a nine on a scale of ten, followed closely by Pantex, which was an eight on a scale of ten, gives me some pause for thought. Both of those sites were rated ahead as threats to human life over the notoriously contaminated Hanford complex.

Response: *See response to comment 02.001, regarding hazardous materials.*

RC: 02.023
Doc: HT17/46

...I appreciate the fact that some of the things that I mentioned may be covered in other documents, but I believe that this study itself has to deal with those things. It will be making some of those decisions in the fact that it does include those other documents, and I feel like it has inadvertently left out some of those issues, and that needs to be more carefully addressed.

Response: *See response to comment 02.019.*

RC: 02.024
Doc: HT17/72

...if the nuclear waste that is at such places such as Rocky Flats and that has been refused by governors of other states is to be...brought down here, I assume there will be the same problems as there are at other places, and it probably just needs to be looked at a little bit more carefully.

Response: *The WM PEIS addresses DOE programmatic waste management issues and alternatives. In addition, see response to comment 02.001 regarding hazardous materials.*

RC: 02.025
Doc: PC-017/12

Page 4-82 states that pit reuse is not a current activity at Pantex Plant. Can you assure us that the reuse will never become an activity at Pantex? Is reprocessing, MOX, or other potential pit activities ever to be an activity at Pantex? If so, should not those issues be considered and studies on their effects on health and safety for workers, neighbors, and agricultural workers, the potential contamination of our water, air, and agricultural activities and products be addressed before the future at Pantex is determined?

Response: *Noninvasive activities connected with pit reuse are part of the Proposed Action. See the discussion in section 1.3.2 in this volume, for further discussion of the plutonium activities addressed in the S&D PEIS.*

RC: 02.026
Doc: SG-012/9

One alternative considered in the DEIS could have been placing plutonium in a permanent disposal, deleting interim storage (especially at Manzano WSA) as an alternative.

Response: *See discussion in section 1.3.2 in this volume, regarding S&D PEIS. In addition, see response to comment 02.001 regarding site selection.*

RC: 02.027
Doc: MG-002/4

For example, the Stockpile Stewardship and Management PEIS includes an alternative which describes the complete closing of the Pantex Plant with its capabilities relocated to NTS, Los Alamos and Lawrence Livermore facilities. The Pantex EIS does not address the implications of this alternative. This issue should be addressed in the final EIS and the Record of Decision.

Response: *See discussion in section 1.3.2 in this volume, regarding SSM PEIS.*

RC: 02.028
Doc: SG-003/11

In the Summary, page S-11, right column, the discussion on Stockpile Stewardship and Management Draft PEIS omits the "Downsize Pantex with transfer of HE Operations" option briefed as a preferred alternative at the April 22-23, 1996 meetings. The Stockpile Management Preferred Alternatives Report, pages 17 through 20 discusses fiscal impacts related to the transfer of HE operations for fiscal years 1996 through 2020. If this issue is anticipated to impact the Texas Panhandle during the tenure of the Pantex SWEIS, the effect of transporting a large number of HE components over the roadways needs to be included.

Response: *See discussion in section 1.3.2 in this volume, regarding the SSM PEIS.*

RC: 02.029
Doc: SG-003/12

In the Summary, page S-12, right column, the Light Water Reactor disposition alternative from the Storage and Disposition of Weapons-Usable Fissile Materials PEIS has not been removed, although it was indicated in the April meetings that the [Light Water Reactor] (LWR) was no longer being considered for Pantex. This issue requires clarification.

Response: *Final disposition of plutonium alternatives are within the scope of the S&D PEIS. Since the Record of Decision on this PEIS has not yet been announced, LWR continues to be discussed in the cumulative impact section of this EIS.*

RC: 02.030
Doc: SG-010/1

In reference to interim storage of plutonium pits at Pantex, Nevada's position on this issue continues to be that DOE should adopt a proposed action for the permanent disposition of surplus plutonium pits before selecting new interim or long-term storage sites for this long-lived material. In addition, to reduce duplication in storage, transportation, and security costs and to address risks associated with the proliferation of weapons-grade plutonium, DOE should consider adopting a program that combines materials disposition (e.g., plutonium vitrification) with long-term plutonium storage.

Implementing the Proposed Action as defined in the DEIS would enhance such a program; it would also help prevent redundant shipping campaigns of plutonium bearing material on public roads and highways. This is important since excessive transportation of plutonium on public roads remains controversial and is generally unacceptable to the public. For all of these reasons, officials in Nevada have long stated that "DOE should link long-term materials consolidation and management with options for final materials disposition."

Response: *A description of the transportation of pits and the expected increase in risk is presented in volume I, section 4.16.*

RC: 02.031
Doc: SG-010/4

As previously suggested, State officials in Nevada believe that DOE should link long-term fissile materials consolidation and storage with options for final materials disposition, and we believe the proposed action presented in the Draft EIS for Pantex supports this concept. As such, we continue to advocate a strategy that would bring together long-term pit storage with one or more of the plutonium disposition treatment options being considered in DOE's Storage and Disposition PEIS.

Response: *See discussion in section 1.3.2 in this volume, regarding S&D PEIS.*

RC: 02.032
Doc: PC-030/1

While I am reasonably comfortable with interim storage of plutonium pits, I believe that facilities for long-term storage should not be constructed at Pantex or any other site when there is already an adequate facility at the Manzano Weapons Storage Facility at Kirtland AFB in Albuquerque.

Response: *See discussion in section 1.3.2 in this volume, regarding S&D PEIS.*

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3.3 Facilities and Infrastructure

RC: 03.001
Doc: HT13/3

The document [page 5-55] also says that construction began June, '47, and became operational in April of '50, so that would essentially say that the bunkers we are talking about are more than 45 years old. My specific question is, what is the design life of those bunkers?

Response:

Design life is a construction criteria specification rather than an operational capability criteria. More appropriately, the remaining life cycles of the bunkers, like those magazines currently at Pantex, are typically greater than 30 years. Design life of facilities can be extended with routine maintenance. The Nuclear Weapons Council Staff, using DOE Site Screening criteria, determined the degree of construction required to adapt existing Manzano facilities for the pit storage mission as feasible. Although Manzano is not the preferred alternative, if selected and prior to the operation of pit storage activities, DOE would complete a Safety Analysis Report and Operation Readiness Review to further document the safety of the facilities.

RC: 03.002
Doc: HT13/5

... The design question is an important one, I think, from a variety of standpoints. So my request would be that we get some more detailed design and engineering analysis of the bunkers in terms of design life, design capability. The major had said some of them [the bunkers] need to be upgraded. It seems to me we need to have more specific information on those things.

I didn't see any references in the document that give me that kind of detail, so if I have missed it, I'd like somebody to tell me if there is a document that describes it. I'd like to know what it is. If there isn't a document that describes it, I'd like to know how that information is going to be presented.

Response:

See response to comment 03.001. During the selection process, as discussed in volume I, section 3.1.4, several of the magazines at Manzano were visually inspected and found to require only very minor work, such as adjustments or replacement of doors. The great majority of any upgrades that would be needed to use the Manzano Weapons Storage Area is actually not to the magazines themselves, but to reactivate the security fence sensor system. While the fence itself is intact, the computer and sensors used to detect intrusion would need upgrades. The selection process documentation is available upon request.

RC: 03.003
Doc: HT12/20

Does Pantex conduct a plutonium storage operation in facilities that are considered to be nuclear facilities, rated nuclear facilities, and...that conform to the DOE orders for nuclear facilities 6431A, for instance?

Response:

Yes, pit storage magazines are defined as Category 2 "non reactor nuclear facility" in appropriate DOE standards. In addition, see response to comment 01.019.

RC: 03.004
Doc: PC-024/9

P. 5-3, left column, last line. The Final Pantex EIS should clearly explain the real reasons for the existence of the DAF and the P-Tunnel complex. The $100 million Device Assembly Facility was designed and constructed in anticipation of an expanded nuclear explosive testing program at the [Nevada Test Site (NTS)]. It was intended to be the assembly point for the nuclear explosive devices. Since our nuclear test moratorium went into effect in 1992, its primary mission ended about 3.5 years before it was completed. It is now being used to assemble nuclear and nonnuclear devices which involve large amounts of high-explosives. The Pantex DEIS does not address any compatibility problems associated with pit storage and high-explosive assembly work at the DAF.

Response:

The selection of site alternatives for interim pit storage was accomplished by developing site suitability criteria, applying the criteria to candidate sites, and determining the best sites to represent the range of reasonable site alternatives. The selection of site alternatives is discussed in volume I, chapter 3. The Pantex Plant has been identified as the preferred alternative.

Volume I, section 5.2 discusses the DAF's original mission and notes the design of the DAF was based on the Pantex Plant designs for nuclear explosive operations. The original design of the DAF includes both nuclear explosive operation and a pit storage capability.

The current mission of the DAF is to maintain readiness to resume nuclear testing, if required, for national security. Only a portion of the DAF will be dedicated to that mission. The remainder could be made available for storage of up to 8,000 pits. Long term nuclear explosive contingency operations and NTS alternatives are within the scope of the SSM PEIS.

Volume I, section 5.2 also discusses the P-Tunnel's original mission and design.

RC: 03.005
Doc: PC-024/10

The P-Tunnel complex was constructed for the Defense Nuclear Agency's (DNA) nuclear explosive test program which also ended in 1992. The tunnel complex was an alternate, and often much more expensive, way of performing underground nuclear explosion tests. Cost per test were often in the range of many tens of millions of dollars. Several DNA nuclear explosives test were conducted in this tunnel complex. Page 5-7, Figure 5.2.3.--Layout of P-Tunnel at the Nevada Test Site., contains a drawing of the existing complex. This map drawing should point out the locations and names of the nuclear test waste cavities. This, or a updated version of this map, should indicate where, in the vast tunnel complex, the proposed pit storage would take place. The Pantex DEIS makes no mention of where, in the many miles of tunnels, the pits might be stored, The NEPA FEIS should provide such information.

The DNA's nuclear explosive program has been suspended.

The side tunnels used for previous nuclear tests are all permanently sealed off. Disclosure of their location on the map is not necessary since they would not have any effect upon pit storage (in the main tunnel) or on the Stage Right equipment and operators. For pit storage, P-Tunnel would require minimal *facility upgrades (primarily the installation of guide rails for a Stage Right forklift). The P-Tunnel alternative is well suited for the Stage Right equipment and techniques successfully implemented at Pantex.*

In addition, see response to comment 03.004.

RC: 03.006
Doc: PC-023/5

I hope that the Department of Energy has thoroughly inspected buildings on site [that] have been subjected to such energy from explosive testing over many years of Pantex Plant operations. Structural integrity of Pantex Plant facilities, especially storage locations for plutonium pits, is extremely important to the safety of Pantex employees and area residents.

Response:

Volume I, section 4.3 discusses and analyzes environmental impact alternatives on plant facilities and infrastructure. Pantex Plant annually publishes a Capital Assets Management Process Report which includes rating each facility's condition and remaining lifecycle. Pantex Plant facilities and infrastructure are subject to numerous internal and external audits, inspections, reviews, and surveys on an annual basis. DOE understands and is committed to the safety of Pantex employees and area residents.

RC: 03.007
Doc: HT17/64

... In looking at what the range of activities would be to even continue on with those current missions that are outlined for the next ten years, I really don't think that in that period of time you would think that you wouldn't need to do a number of other upgrades and changes in your facilities besides the six that are specifically mentioned in this document. And I think you need to do a much better job of analyzing...the age of buildings...[if] you're going to keep going with continuing operations over a ten-year period of time that you say that this document covers.

Response:

DOE considers sitewide NEPA documentation to be living documents requiring periodic review and updates as appropriate. Tiered NEPA documents may also be needed. DOE has an established NEPA program to handle issues regarding routine upgrades and maintenance of DOE facilities. Since 1990 Pantex Plant, has initiated 354 environmental checklists and NEPA related documents. 206 of the 354 were identified as upgrades, repairs, improvements, and maintenance related activities. Additional language has been added to volume I, section 4.3.1.

Most projects for upgrades, repairs, improvements, and maintenance are relatively small in size and scope and do not require performance of an Environmental Assessment or EIS. Larger projects, such as the six evaluated in this EIS must proceed to the conceptual design phase before sufficient information is available for adequate analysis. The six facilities evaluated in this EIS, represent the only foreseeable major projects that currently have sufficient maturity of conceptual design to allow assessment of environmental impacts.

RC: 03.008
Doc: PC-025/3

Why is infrastructure included in environmental impacts and as an additional consideration? Like my comments on SSM and S&D, if national security and nonproliferation [are] so important, why aren't the environmental impacts discussed in the infrastructure section as a capability, assets, problem, etc. in this document?... Does Pantex out perform its alternative sites on these issues? If so, the decision maker needs to know to make a reasonably informed decision.... Why isn't security capabilities addressed in infrastructure impact analysis so impacts can be reviewed and decide a true course of action? DOE should consider redoing infrastructure analysis to include security related environmental impacts.

Response:

In determining reasonable relocation alternative sites, as discussed in volume I, section 3.1.4, the DOE Site Screening Committee and the Nuclear Weapons Council Staff screening methodology included assessment of the degree of construction required and the degree of isolation. Thus, the security capabilities were assessed. Current Pantex pit storage operations were used as a baseline for comparison purposes. Security and nonproliferation activities are part of routine activities performed. by Pantex Plant. All sites considered as alternatives would be capable of securely and safely storing pits.

Volume I, sections 4.3.2, 5.2, 5.3, 5.4, and 5.5 discuss and analyze alternative site facilities and infrastructure including security assets (e.g., material access control) in the EIS.

For clarification, the phrase "... national security, and infrastructure." has been changed to "... national security, and site specific factors (e.g., local and political support, intellectual and technical competencies).

An expanded discussion of the Pantex Plant Safeguards and Security Program is available in the Pantex Plant Programmatic Information Document (Pantex 1996).

RC: 03.009
Doc: PC-025/12

On Page 4-11. What level of security is the burning ground, zone 10, and firing sites under? The nonshaded area of DOE owned property is under what level of security? The DOE leased property shading is not found in the legend—what level of security is this?

Response:

DOE cannot disclose levels of security involving nuclear weapons sites or facilities.

RC: 03.010
Doc: PC-025/13

Page 4-16. Should it be waste management activities' utilities?

Response:

Yes, the word utility has been made plural.

RC: 03.011
Doc: PC-025/14

Page 4-18. Why Pit Storage Activity? Section 4.4, 4.5, etc. use Activities. In Waste Management Activities. Why no discussion about RCRA Closures?

Response:

The section title has been changed to "Pit Storage Activities." RCRA Closures are included in volume I, section 4.3.2.1, Environmental Restoration.

RC: 03.012 **Doc: PC-025/15**	Page 4-18. Why Environmental Management? Section 4.4, 4.5, etc. call it Environmental Restoration?
Response:	*The title and introductory sentence have been changed to read "Environmental Restoration" to be parallel with sections 4.4 and 4.5 of volume I.*

RC: 03.013 **Doc: PC-025/16**	Page 4-16 uses Environmental Restoration. Should page 4-18 include closures, page 4-16 does.
Response:	*See response to comment 03.012. The text on page 4-18 of volume I of the Draft EIS states that the impacts are the same as those described on page 4-16. No change was made to the EIS.*

RC: 03.014 **Doc: PC-025/17**	General comment in section 4.3. ...Why isn't more presented about nonproliferation and sanitization and demilitarization in this section? Please include environmental impact analysis of these issues in the infrastructure section based on methodology definition on page 4-3 as a support requirement and SSM & S&D emphasis to the issues. How are nonproliferation and sanitization and demilitarization infrastructure effected by the varying levels of activities as required by methodology on page A-1? Is there a backlog? What are the environmental impacts?
Response:	*The environmental impacts from sanitization and demilitarization operations have been incorporated into impacts addressed in Air Quality and Waste management. Sanitization and demilitarization operations of high explosives at the Burning Ground are included in the air quality modeling. Solid wastes generated in the sanitization and demilitarization of weapon components are included in the waste volume projections for the three levels of weapon activities. To account for fluctuations in waste generation rates a 10% margin was used in the analysis.*

RC: 03.015 **Doc: PC-028/10**	Page 5-58, para. 5.5.1.1. The recommendation to utilize the Manzano WSA facilities ignores a very real condition. The Manzano WSA was built in the mid 40's to 50's. Much of the facilities have not been improved over the years. The major plants have water leakage problems along with the storage magazines. The electrical system is outdated and has chronic problems, the fence security system and fence are in need of major repair and upgrade. The facilities infrastructure, except for the Phillips Lab R&D facility at Manzano, [has] been economically neglected and this is why Manzano WSA is not being utilized at historical or design levels. There will be significant cost, overlooked in the Draft EIS, in putting a pit storage area on KAFB.
Response:	*The conditions described apply to Plants 1 and 2 and their associated tunnels which would not be used for pit storage. The magazines that would be used for pit storage are not connected to those problem facilities and are, in fact, in excellent condition. See response to comment 03.002 regarding the upgrade to the fence.*

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3.4 Land Resources

RC: 04.001
Doc: HT02-08/3

There is again no consideration of the most basic industry of the Panhandle, agriculture.

Response:

The EIS has been revised to expand the discussion on agriculture in sections 4.4, 4.5, 4.6, 4.9 and 4.11 in volume I of this EIS. Additional information on these sections is provided in the Land Resources section of the Pantex Plant's Environmental Information Document (Pantex 1996). The proposed action is not expected to adversely impact the agricultural industry of the Panhandle.

RC: 04.002
Doc: CO-008/36

Page 4-40, Paragraph 1, "By virtue of 30 TAC 335.557 (3), the future land use designated at Pantex Plant is nonresidential." How are current agricultural activities on DOE owned land classified?

Response:

DOE owns approximately 2,596 hectares (6,421 acres) of land currently used for agricultural purposes within the combined Main Plant and Pantex Lake areas. These areas are managed by Texas Tech University (TTU) through a service lease agreement with DOE. TTU in turn subleases to local farmers. These local farmers can produce crops or raise cattle. Agricultural activities on DOE property can be limited to the extent necessary to meet Pantex Plant mission needs.

The classification of future land use is a process related to the environmental restoration process as it relates to clean-up levels. This comment specifically addresses the soil and sediment quality at solid waste management units on Pantex Plant, as discussed in volume I, section 4.5.1.3 of this EIS. Neither RCRA nor CERCLA govern agricultural activities at Pantex Plant. However, both RCRA and CERCLA drive environmental restoration activities on DOE property. Both have provisions to protect natural resources at Pantex Plant.

RC: 04.003
Doc: HT12/3

Today at SRS we have a good future use plan. I am concerned that all of the other sites might not have a similar plan. Our SRS future use plan is an effort to ...maintain the largest national wildlife research area in America. I hope the undeveloped areas at all of the sites have that same protection for their wildlife. With SRS's future use plan, all future development is restricted to only areas that have had prior development. No undisturbed areas are to be developed.

I wish that DOE would make this a DOE-wide policy. I know how developers prefer to build on undeveloped land and are reluctant to take land previously used and reclaim it for new development. Future development on all DOE sites start the trend in America to build new on old abandoned sites.

Response:

The DOE Land and Facility Use Planning process (DOE P 430.1) outlines future site development and reuse based on the shared long-term goals of the Department, the sites, and the stakeholders. Pantex Plant has a Multiple-Use Land Plan which addresses continued land-applied chemical use and grazing in sensitive areas of the Plant as well as a Site Development Plan (DOE 1995j) *which addresses the present and future framework for site operations. Four of the playa lakes at the Pantex Plant Site and Pantex Lake have been designated as wetlands. These areas are intended to protect and/or ensure surface water quality and allow compliance with applicable air, water, and other natural resources quality requirements, as well as protecting historical and archaeological sites and ecological resources. The facility construction and modifications presented in the Proposed Action alternative all occur on previously disturbed areas within Zones 11 and 12.*

RC: 04.004
Doc: HT12/5

This has to do with the future use of SRS. ...by the way, I just wrote a book on environmental uses of the Savannah River Site.... So I've done a little research, it's just not off of the top of the head sort of thing. But what I want you all to keep in mind is that if we look at a primary use which is industrial,...nuclear or non-nuclear, you can do a lot of things using the land use concept and multiple use, okay? You've got the primary use right here [that] would be the project that you all are talking about now. And as you go out from this primary area the protection increases.

Are you all aware of this Land-Use Baseline Report that was put out? Well, I want to submit that for you all to look at and read, okay. ...It's a synopsis of what the attributes of the Site are.

Response:

The potential interim storage of pits at Savannah River Site (SRS) is in accordance with the Land Use plans at the site. DOE has reviewed and considered the Land Use Baseline Report in evaluating the impacts.

RC: 04.005
Doc: HT12/37

Savannah River can take these projects and it won't affect the environment. As a matter of fact, if you use a careful planning you can take these projects, put them in the core, we've got 310 square miles, put them in the core and even increase environmental activities in these four or five areas. Does that help?

Response:

The Pantex EIS concluded that use of this federal facility will not affect current missions at SRS, nor will it affect the multiple environmental uses of the site.

RC: 04.006
Doc: PC-024/8

Page 5-3, left column, "The Nevada Test Site," 3rd line. Change the word "owns" to "operates". Change 350,000-hectare to 322,195-hectare and change 864,000-acres to 796,160-acres—the later values are the legal values.

Response:

Text and land area in section 5.2 have been changed in the final EIS with data from the Draft Environmental Impact Statement for the Nevada Test Site and Off-site Locations in the State of Nevada (DOE 1996c). We now state that NTS encompasses approximately 3,500 square kilometers (1,350 square miles) of land area reserved to the jurisdiction of the DOE.

RC: 04.007
Doc: PC-024/16

And finally, I should mention that all the maps of the Nevada Test Site, that are presented in this document, need to be corrected before the Final Pantex EIS is issued. The maps should show the block of land that was withdrawn under Public Land Order 1662, that was to be used in connection with the NTS (23FR

	4700). A proper map of the test site can be found on page 4-10 of the "Draft Environmental Impact Statement for the Nevada Test Site and Off-site Locations in the State of Nevada," January 1996 (DOE/EIS 0243).
Response:	*The NTS maps have been corrected to include the block of land withdrawn under Public Land Order 1662.*
RC: 04.008 **Doc: HT17/42**	The tremendous growth of agribusiness, especially the fed beef industry and beef processing industry in the Texas Panhandle, has occurred during the time span that Pantex has been operating. I think that's pretty good evidence that agribusiness and Pantex can coexist successfully on both counts. I think it's really unfair to couch things as being either pro Pantex or pro agriculture, because they farm onsite at Pantex, they farm around Pantex, there's no problem with the crops that are raised there, and people need to look at the big picture.
Response:	*This EIS is being prepared in response to the National Environmental Policy Act, which requires a thorough assessment of any Federal undertaking that may significantly impact the environment, the populace and the local area. Serious consideration is given to existing and potential impacts to all areas, including agriculture, prior to making a decision on a proposed action. This is a method of looking at the "big picture" through documented, and comparative, research and analysis.*
RC: 04.009 **Doc: HT17/45**	...it was very distressful to [me] and other people that had noticed that farming and agriculture, as important as it is, was basically ignored in a lot of these documents or barely mentioned, possibly four paragraphs, a little over, in this document that I noticed.
Response:	*Agriculture is discussed in volume I, sections 4.4, 4.5, 4.6, 4.9 and 4.11 of this EIS. These sections have been updated with additional information concerning the region's agricultural base.*
RC: 04.010 **Doc: PC-025/18**	... Is Pantex zoned for agriculture, ranching, water utility, irrigation, treatment, disposal, industrial, residential...? Please analyze the above operations for zoning compatibility including this example: If the plant is not zoned for residential use, does the fire department qualify as residential?
Response:	*Zoning is characteristically done in municipalities. Pantex is not inside the boundaries of a municipality. The Pantex Plant is not a residential area. The Plant has a fully staffed fire department located in Zone 12 North. See discussion in section 1.3.3 in this volume.*
RC: 04.011 **Doc: PC-025/19**	On page 4-22. Recommend detailing the location of schools and elderly meeting places including elderly care facilities. It seems to me children and elderly are sensitive areas.
Response:	*Because the impacts to the baseline population as a whole are so minute, looking at individual populations is not warranted. However, the 134 primary and*

secondary schools and the 6 institutions for higher education in the region of influence together with the 27 nursing/convalescent homes in the 9 county region have been included in section 4.4.1.2. in volume I.

RC: 04.012
Doc: PC-025/90

Land Resources assessment methodology is flawed because it does not assess decontamination and decommissioning programs, as stated. There is a flaw since no zoning analysis exists in the analysis to prove or disprove incompatibility. [Where] is an analysis of the Deed?

Response:

At this time no plans have been finalized for the decommissioning of any facilities at Pantex Plant. The designation of facilities is pending decisions regarding the future of Pantex Plant being made in the SSM PEIS. Legal documents concerning land rights were examined and are mentioned in volume I, the summary, chapter 1 and section 4.4.

RC: 04.013
Doc: CO-008/37

Agricultural activities are one aspect of the Pantex Plant. These agricultural operations impact Pantex Plant's natural resources [considerably] and yet have received only cursory mention in various sections in the [EIS]. Because agricultural activities have not been detailed in the document as a continuing operation of Pantex, are agricultural activities not to continue on the public's Federal land, or has the public subtly been denied the opportunity to comment on this use?

Response:

DOE owns approximately 2,596 hectares (6,421 acres) of land currently used for agricultural purposes within the combined Main Plant and Pantex Lake areas. These areas are managed by Texas Tech University (TTU) through a service lease agreement with DOE. TTU in turn subleases to local farmers. These local farmers can produce crops or raise cattle. Agricultural activities on DOE property can be limited to the extent necessary to meet Pantex Plant mission needs. However, at this time there is no documentation that suggests that agricultural activities on Pantex Plant will be discontinued. For the impact of this agriculture to soils at Pantex see volume II, appendix I. For impacts to water usage see the discussion in volume I, section 4.1.6.1.

RC: 04.014
Doc: PC-027/5

Before planning to use the Manzano area as a "pit storage" site, coordinate with the base tenants to include Phillips Laboratory. The Manzano area is used for some research and development which may or may not be compatible with the your proposed nuclear pit storage.

Response:

The tenants that will be affected by the interim storage of pits at the Manzano WSA have been considered throughout the EIS process (refer to volume I, section 5.5). Further coordination with these tenants will be initiated if interim storage at this facility is chosen in the Record of Decision. See also response to comment 04.015.

RC: 04.015
Doc: PC-028/3

Page 5-58, 2nd column, para 5.5.1.2. The statement that Manzano WSA is currently being used, in part, [to store] furniture and documents is entirely misleading. Phillips Lab has a major R&D operation in the WSA. The addition of a pit storage facility will have a major impact on access to R&D operations and dramatically change the security posture within WSA.

Response: *The discussion cited focused only on the current uses of the magazines that would be potential locations for pit storage. There are other facilities in Manzano WSA, as the commentor states, but those facilities would not be used for or affected by pit storage.*

RC: 04.016
Doc: SG-010/3

In an unrelated issue, we note that the Nevada Test Site is described in the DEIS as a "government owned, contractor-operated facility, currently managed by Bechtel Nevada [and] DOE owns the 864,000 acre site in Nye County, Nevada." This statement is incorrect. DOE does not "own" the Nevada Test Site. The Test Site occupies public lands that have been withdrawn for nuclear testing purposes only. The Final EIS for Pantex must acknowledge that the Public Land Orders for the Test Site do, in fact, limit the use of the site to weapons testing and related research and development facilities only. Moreover, when the Nevada Legislature ceded its jurisdiction to the public lands that now comprise the site, it did so on the basis of certain stipulated uses (i.e., nuclear testing) as defined in the Public Land Orders. Thus, while many believe the lands comprising the Nevada Test Site are federal lands, they are in fact public lands that have been withdrawn for a specific national defense purpose, and that purpose does not include long-term storage of fissile materials, [nor] development of any major disposition technologies such as plutonium immobilization.

Response: *The suggested change was incorporated into volume I, section 5.2.*

RC: 04.017
Doc: CO-005/2

In analyzing impacts in this document, the most important issue has to be the region in which the Pantex Plant is located. With the mission of Pantex and related activities being conducted in the heart of production agriculture and the beginning of the food chain, the presumption that these activities do not impact agriculture must be fully assessed.

Response: *See response to comment 04.009.*

RC: 04.018
Doc: PC-033/6

I would suggest that the DOE investigate this area further and include more in depth information in the final [EIS], (i.e., land devaluation in the immediate vicinity of the Pantex Plant, comparing past land values to current values and then future approximate values if various facilities/functions are located here; land use or crop restrictions; monitoring information of the offsite vegetation and soils; and possible additional land use requirements/acquirements for various facilities if located here). I have enclosed a DOE generated land use map of the Pantex Plant for your reference.

Response: *NEPA does not require, nor is it customary for NEPA documents to include market analyses. The land use associated with the new facilities proposed in this EIS are discussed in volume I, section 4.4. Additional information about* *agriculture in the region has been added to this and other sections. Information from soil monitoring activities can be found in volume I, section 4.5. Land use requirements/acquirements for future Pantex Plant facilities are performed as-needed when projects or facilities are projected.*

3.5 Geology and Soils

RC: 05.001
Doc: CO-008/32

Pages 4-38 and 4-39. These pages show that soil quality in many sites has been affected. How much soil has been affected? For example, table 4.5.1.3-1, page 4-38, lists 37 sites that have been affected by "burning ground." What is the size of each of these sites?

Response:

Details about each site at Pantex Plant are not included in the EIS. Each grouping of sites is described in general. The decisions being evaluated in this EIS neither affect nor are affected by the environmental restoration program that is addressing the contamination at these sites. The RCRA Facility Investigation (RFI) reports that are being drafted concerning these sites will include tremendous detail concerning these sites. These reports will be available to the public after approval by TNRCC. The amount of detail requested by the commentor is inappropriate to include in the EIS for each group of sites. The information is provided below in response to the comment but will not be included in the main text.

The Burning Ground Assessment includes the Burn Pads (SWMUs 14-27), the Burn Trays (SWMUs 28-36), Landfills (SWMUs 37-44), the Burn Cages (SWMUs 45-46), the Solvent Pit (SWMU 47), the Solvent Pans (SWMUs 48-51), the Burn Rack, and Flashing Pits (SWMU 52). The individual Burn Pads were constructed of a 1-foot thick clay layer over an approximate 15 by 15 feet area, and are approximately 75 feet apart. The Burn Trays are approximately 75 feet long by 10 feet wide by 1 foot deep, and are raised 2 feet above the ground. The landfills associated with the Burning Ground exist as cells, and are approximately 100 to 200 feet long by 20 to 30 feet wide and range from 6 to 23 feet deep. Per the RFI, report the estimated volume of soils that have constituents above the decision criteria set forth for Risk Reduction Standard 2 is approximately 86,000 cubic yards. (Risk Reduction Standard 2 requires removal and/or decontamination of all waste, waste residues, leachate, and contaminated media to standards and criteria such that any substantial present or future threat to the human health or environment is eliminated.) The area of soils around the Burn Pads, Burn Cages, and Burn Racks with the constituents potentially above the decision criteria was defined by a 40 feet radius. The distribution of contaminants present at the Burning Ground vary to depths greater than 20 feet below ground surface.

RC: 05.002
Doc: CO-008/33

Page 4-41, Paragraph 2. This paragraph states that the soil had been contaminated to a depth of 20 feet. It would be very useful for the report to indicate, if the information is available, how the amounts of contamination are changing with time. For example, the amount at 20 feet may be increasing if downward movement from the surface is occurring, or it may be decreasing if degradation is occurring. What are the trends?

Response:

Given the environmental conditions and chemical factors at the Burning Ground, the amount of infiltration, and the sorption capabilities of the *contaminants of potential concern (COPCs) and their degradation products, vertical migration of the COPCs in soils and sediments identified at the Burning Ground can be expected to be limited. It is unlikely that COPCs will migrate laterally or vertically much farther than the current extent. With recharge up to 3.24 in/yr possible below playas, from an annual precipitation of 19.1 inches near Amarillo, RDX would travel approximately 27 feet per 100 years. Considering the above playa infiltration rate exceeds the higher-ground recharge rate, migration could be expected to be even less in nonplaya areas. Biodegradation will lessen transport of the organic COPCs as well. Present conditions affirm the fact that contaminants have not typically traveled more than 10 or 20 feet from their source, and they have had up to 45 years to migrate.*

RC: 05.003
Doc: CO-008/34

Page 4-41, Paragraph 2. There was no mention of soil remediation processes. Please describe the number of processes that have been undertaken, or planned, for soil remediation that could be used to enhance the natural degradation processes of the contaminants present in the soil. Although extensive monitoring has occurred there seems to be a minimum number of restoration studies.

Response:

The environmental restoration process at Pantex Plant is still mostly in the investigation phase. Subsequent to this phase would be the remediation phase. Currently, potential remediation activities are being developed and recommended to TNRCC, which has the approval authority.

RC: 05.004
Doc: CO-008/35

Page 4-29, Paragraph 1. Please provide a citation for "Caprock Caliche."

Response:

The citation to the reference (Pantex 1996) has been added to volume I, section 4.5.1.

RC: 05.005
Doc: CO-008/71

Page 4-37, Paragraph 2. The letters from EPA and TNRCC documenting their approval for the RCRA methodology undertaken by Pantex Plant should be cited.

Response:

The approval of the methodology is through the issuance of the hazardous waste permit. This language has been incorporated into volume I, section 4.5.

RC: 05.006
Doc: CO-008/72

Page 4-41, Paragraph 2. Please correct typographical error, next to last sentence: "Phase II characterization data is (are)..."

Response:

Correction has been made.

RC: 05.007
Doc: CO-008/73

Page 4-42, Paragraph 3. "The OSTP received waste water from Amarillo Air Force Base and Pantex Plant." Did it also receive waste water from Bell helicopter and the Amarillo Airport?

Response:

The Old Sewage Treatment Plant (OSTP) did receive wastewater from both Bell Helicopter and the Amarillo Airport. The sewer pipeline was then cut so that *effluent from the Amarillo Airbase complex flowed into Playa 5. A pump or lift station sent the wastewater on to the OSTP. This continued until approximately 1987 when the newer Wastewater Treatment Plant was brought on-line and the previous agreement maintained by the DOE with the City of Amarillo was discontinued. The EIS has been amended to include this information.*

RC: 05.008
Doc: CO-008/74

Page 4-43, Paragraph 2. Potential sources of contamination to Zone 12 groundwater includes the Burning Ground. It would seem that the Burning Ground is too distant to the Zone 12 groundwater location. Please clarify.

Response: *The Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant identified the Burning Ground as a potential source of contamination to Zone 12 Groundwater. This is based on the presence of contaminants at depth in soil borings which potentially could leach into the perched aquifer with time. However, to date, groundwater investigations as discussed in volume I, section 4.6, Water Resources, indicate that there is no evidence of hydraulic connection between the perched aquifer in the vicinity of the Burning Ground and the perched aquifer under Zone 12.*

RC: 05.009
Doc: CO-008/75

Page 4-43, Paragraph 3. Please provide a map of the landfills locations. Please correct typo in sentence "Characterization data indicates (indicate)..."

Response: *A map of landfill locations has been provided in volume I, section 4.5.1. The typo has been corrected.*

RC: 05.010
Doc: CO-008/76

Page 4-43, Paragraph 3. "However, maintenance caps will be placed as needed over selected landfills as a voluntary measure to prevent potential water infiltration." If they are needed, would it be voluntary?

Response: *The term "voluntary" has been replaced by the term "proactive" to clarify that these actions are taken in advance of any possible direction from the regulator.*

RC: 05.011
Doc: CO-008/77

Page 4-43, Paragraph 4. Inaccurate descriptions should be corrected: "The ditches also receive untreated industrial waste waters from Zones 11 and 12."

Response: *All available references state that only treated wastewaters for Zones 11 and 12 are placed in the ditches.*

RC: 05.012
Doc: CO-008/78

Page 4-43, Paragraph 4. Inaccurate descriptions should be corrected: Playa 4 also receives industrial and storm water effluent from Zones 11 and 12. Playa 2 receives industrial and storm water effluent from Zone 11. All of the playas receive storm water from agricultural areas.

Response: *Pantex Lake and Playa 4 do not currently receive industrial wastewater discharges nor does Pantex Lake receive storm water runoff from Pantex Plant.*

RC: 05.013
Doc: CO-008/79

Page 4-44, Table 4.5.1.3-2. Inaccurate descriptions should be corrected:

Flow system 1 consists of Playa 1 and the unlined man-made ditches that direct runoff and waste water discharge away from Zones 4, 11, and 12 to this playa.

Flow system 4...away from Zone 11 and Zone 12 south (insert) to playa 4.

Flow system 5 also includes Pantex Lake (which received effluent from OSTP via pipeline in prior years).

Response: *According to the September 1995 Ditches and Playas RFI (USCOE 1995f), Flow System 1 does not include direct runoff from Zone 4. The inconsistency of not stating that the ditches are man-made and that they direct runoff and wastewater discharge away from Zones 11 and 12 has been corrected. In regard to Flow System 5, page ES-3 of the September 1995 Ditches and Playas RFI indicates that Pantex Lake is a part of Flow System 5. This has been added to volume I, Table 4.5.1.3-2.*

RC: 05.014
Doc: CO-008/80

Page 4-45, Paragraph 3. Statements are not clear. "Characterization data indicated that contaminant levels were below remediation goals for all but two sites." Does this refer to 2 of the 12 sites in the AL-PX-11 group, or 2 locations within the HE burn site discussed in greater detail? If the 2 sites excepted are indeed 2 of the 12 sites, then they should be described and discussed, at least in the same detail as was the HE burn site.

Response: *This reference is to 2 of the 12 sites in the AC-PX-11 grouping. Additional discussion of the status of these 2 sites has been added to volume I, section 4.5.1.*

RC: 05.015
Doc: CO-008/81

Page 4-45, Paragraph 4. Please correct typo. "Characterization data is (are)..."

Response: *Correction has been made.*

RC: 05.016
Doc: CO-008/82

Page 4-45, Paragraph 4. What location was selected for environmental sampling for the DDT spill? At the building or at the playa?

Response: *According to Figure 25-1 of the August 1995 Miscellaneous Chemical Spills and Release Sites RFI (USCOE 1995e), samples for the Building 12-35 DDT release were taken to the north and west of the building, and not at the playa.*

RC: 05.017
Doc: CO-008/83

Page 4-46, Paragraph 1. Where is "the denuded [area] near Playa 1" located and what is the cause of its being denuded?

Response: *The denuded area is the former location of an electrical transmission line pole, where annual hand-applied herbicides were reportedly applied for weed control. The site is circular in shape and covers an area of approximately 0.90 acres. The term "denuded" has been clarified by replacing it with "a somewhat barren area where herbicides were applied".*

RC: 05.018
Doc: CO-008/84

Page 4-47, Table 4.5.1.3-3. Under SWMU #143 Recommendations: "This area has not been characterized to background for several analytical groups, including pesticides, PCBs, and metals." Please clarify. Does this mean that sampling and analyses have not disclosed concentrations that are consistent with background concentrations (i.e., have exceeded background values), or that sampling and analyses have not been done for these groups of constituents?

Response: *According to page 6-18 of the August 1995 Miscellaneous Chemical Spills and Release Sites RFI (USCOE 1995e), the nature of contamination has been identified on the basis of detected constituents and Risk Drivers. However, the extent of contamination has not been fully defined. Data collected during the RFI indicate that concentrations are now below their Practical Quantification Limits (PQLs). This conflicts with the results of past investigations. It is for this reason that further sampling is recommended to define the extent of constituents identified as contaminants of concern.*

RC: 05.019
Doc: CO-008/85

Page 4-49, Table 4.5.1.3-3. Under AOC #15, DDT release at Bldg. 12-35, exactly where did the sampling take place?

Response: *According to Figure 25-1 of the August 1995 Miscellaneous Chemical Spills and Release Sites RFI (USCOE 1995e), samples for Building 12-35 DDT release were taken to the north and west of the building.*

RC: 05.020
Doc: CO-008/86

Page 4-49, Table 4.5.1.3-3. Please correct typo, Building 12-5 sump Recommendations: "Additional data is (are)..."

Response: *Correction has been made.*

RC: 05.021
Doc: HT13/4

In the EIS, it doesn't show that there are the three faults that go through this stupid mountain, and yet, it is well documented on many geologic reports that there are three major faults that go through the Manzano weapons storage facility.

My question...is if these facilities are 45 years old, they obviously were not built with the current technological skills that go along with earthquake-type design. To me, that is a major concern.

Response: *According to our references, there is no evidence that indicates that any of the three faults in the vicinity of the Manzano Storage Facility are capable faults. A capable fault has one or more of the following characteristics (c.f., 10 CFR 100 Part A): 1) Any movement in Holocene time in the last 10,000 years, 2) more than one movement in the last 500,000 years, 3) demonstrably associated with seismic activity, and, 4) structural relation to another structure shown to be capable.*

RC: 05.022
Doc: HT17/25

There is no such thing as nonhazardous seismic hazards. My research into the geological aspects of the Pantex Plant have uncovered some alarming assumptions made by past experts under contract for the DOE. Because a list of specifics is rather long, I have prepared a separate report for your review that will be included in my written comments. The 1995 fault study submitted by the DOE basically suggests that local underground erosion is a primary feature at the Pantex Plant and doesn't delve very deeply at all into the primary feature that occasionally rocks with earthquakes three states at a time. That Pantex is magically divorced from this phenomenon at its property lines and the Whittenburg trough is all but ignored.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.023
Doc: HT17/26

The secrets and lies concerning geology, hydrology, past contamination, current contamination, current pathways, future protections continue. I am willing to go along with the Save the Ogallala Folks, for what good is it to have an unsaved Ogallala, but I'm not going to pretend we have anything even remotely close to a pristine situation at the Pantex Superfund Site. We are already in a situation where we just have to drink our poison in small amounts and learn to like it. The massive amount of data contained within the studies done by the Texas Bureau of Economic Geology, the Argonne National Lab, and others prove this. The recent samples showing RDX hits in the Texas Natural Resource Conservation Commission lab test prove this. We would be ignorant to sight future emissions at Pantex without first reviewing the geological hazards truthfully and openly.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.024
Doc: HT17/70

... I understand that we may comment a bit on the cumulative impact from the three PEIS documents, and the Pantex Plant and associated storage of nuclear weapon components PEIS is one that I haven't taken as much note of as the other two PEIS documents, but I understand that in this document there...are some omissions [that] have been brought out. One of which, it has been noted that there's nothing said about the Superfund Site projects in the study, and it would seem that might be something important to look at. All of us around here notice the recognition of the Ogallala aquifer, as it is probably, in the United States, the largest fresh water aquifer.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.025
Doc: HT17/71

It's been said that Pantex is using some open and unlined ditches to dispose of waste water, and that should be addressed.

Response: *The use of unlined ditches and the impacts to the soils and groundwater are discussed, respectively, in volume I, sections 4.5.1 and 4.6.1.*

RC: 05.026
Doc: FG-003/10

A number of contaminants have been identified in the soil and groundwater (table 4.5.1.3.3-3) at the existing site. The Final EIS should document what measures have been taken to avoid potential contamination by the sources identified.

Response: *The sources identified in the subject table are solid waste management units (SWMUs). Under RCRA most SWMUs are inactive sites and are not, therefore,* *active sources. However, contamination in the soil could act as a source for groundwater contamination. Therefore, these sites are under the environmental restoration program's scrutiny. See discussion in section 1.3.4 in this volume.*

Recommendations have been made to the regulator as to potential remedial actions. These recommendations have been summarized in volume I, section 4.5.1. These recommendations are still in draft stage and have not been approved by the regulator. Active sources operate under permits and are monitored for compliance.

RC: 05.027
Doc: FG-003/12

The DEIS (volume I, p.5-16) states that earthquakes pose the greatest natural threat to storage of plutonium pits at NTS. The Cane Springs Fault was identified as the most significant seismic risk. However, the DEIS indicates that four faults in the NTS vicinity (Mine Mountain Fault) "are capable of generating earthquakes of up to 0.85g," which is an 8.5 quake on the Richter scale. According to the Tritium FEIS (volume I, p. 4-117), the maximum credible earthquake on the Cane Springs Fault is three to five miles from the Device Assembly Facility.

The FEIS should recognize that the P-Tunnel at the NTS is due west of two parallel faults, the Carpetbag Fault approximately five miles away and the Yucca Fault approximately seven to ten miles away. The Tritium FEIS (volume I, p. 4-117) describes both the Yucca and Carpetbag Faults as "capable faults," as defined by the Nuclear Regulatory Commission regulations 10 CFR Part 100, Appendix A. However, the Tritium FEIS reported that the "possible magnitude, intensity, and acceleration of earthquakes along the Yucca and Carpetbag faults have not been estimated." The DEIS gives the impression that quakes along any of the four faults in the NTS area could have an 8.5 magnitude on the Richter scale (volume I, p. 5-16).

Response:

When a facility specific study of all faults in the region has not been made, the DOE Standard for Natural Phenomena Hazards Design and Evaluation Criteria for DOE Facilities (DOE 1994u) dictates using the largest earthquake expected in the region and assume it can happen anywhere in the region.

RC: 05.028
Doc: PC-025/21

On page 4-39. Drop figure and place more detailed maps in appendix. Recommend using an example map in its place and refer to the appendix. The figure is silly. Otherwise include the location of the ditches and groundwater for completeness. Where is a comprehensive list of titled SWMUs in this EIS?

Response:

A figure detailing the ditches and playas flow system at Pantex Plant has been added to volume I, section 4.5.1, for completeness. A comprehensive listing of titled SWMUs is located in the Pantex Plant Environmental Information Document (Pantex 1996).

RC: 05.029
Doc: PC-025/22

On Page 4-51, Environmental Restoration Activities. Question, "completed by 2000" is not consistent with other statements in the document.

Response: *The year 2000 is correct and has been made consistent throughout the document.*

RC: 05.030
Doc: PC-025/23

On Page 4-51, Waste Management Activities. The burning ground is an open area where fumed materials including metals, radioactive elements, etc. are released to the atmosphere and settle to the ground in the form of dust, water vapor, etc. and you state you do not expect impacts to the soil. How can that be...?

What is the representative contaminant deposition rate to the playas and burning ground?

Does HE explode while being burned and chunks of things get spread about?

Is it possible pieces sit around for years?

Further, you state on page 4-52 the material is typically nonhazardous, how did the burning ground get contaminated? Please state you do not know or what the facts are.

Page 4-52, what is the source of the table?

Response: *Volume I, section 4.2, where the assessment methodologies for Geology and Soils are discussed, has been clarified to better illustrate how impacts to geology and soils were assessed. Geological impacts consist of impacts to geological features from plant operations and impacts to the plant operations from geological conditions or events. The search for geological features that could have been affected by plant operations identified only surface water and groundwater. These are discussed in volume I, section 4.6, Water Resources. Seismic events and salt dissolution are the only identified geologic features that could affect plant operations. These issues are discussed in volume I, section 4.5, Geology and Soils. Discussion of soils includes impacts to the soil and impacts to humans from the soil. Potential impacts to the soil included any activities that would result in erosion or removal of valuable soils from agricultural production. These issues are discussed in volume I, section 4.4, Land Use. Impacts from contaminated soil included potential affects on human health.*

Contaminated soil within the Burning Ground is discussed in volume I, section 4.5.1.3. There are three potential pathways for any contamination in the soil to affect human health: getting into groundwater, blowing as dust, and uptake by crops. Volume I, section 4.6, Water Resources, describes contaminated groundwater, and volume I, section 4.7, Air Quality, describes the levels of contaminants detected. Crops outside the Burning Ground have shown no contaminants at or above levels of concern. No crops are grown on the Burning Ground.

Contaminant deposition rates were not modeled. The air quality modeling of Pantex Plant activities, including the Burning Ground, was performed to *evaluate inhalation which is the overwhelmingly risk-significant pathway. Please refer to volume I, section 4.7, Air Quality, for further information.*

When high explosives (HE) is burned it does not generally explode; however, it is known to happen. Safety procedures at the Burning Ground take the risk of explosion into account. When the HE does explode some chunks can get dispersed within the Burning Ground.

The statement made on page 4-52 was incorrect. This section has been modified to read, "These wastes include treated wastewater from the Wastewater Treatment Facility, and construction debris located onsite in a Class 3 landfill. Residuals from the Burning Ground are disposed of in accordance with the specifications of the hazardous waste permit."

The source for each facilities area (PC 1995g) is given in volume I, Table 4.4.2.2–1. Additionally, this source has been added to the table.

RC: 05.031
Doc: PC-025/91

Geology and soils methodology is flawed since it does not describe what the assessment process is for the assessment. The section dictates what the impacts are. Thus DOE has prejudged the results. The assessment does not address the decontamination and decommissioning program, as stated.

Response:

See response to comment 05.030. At this time no plans have been made for the decommissioning of any facilities at the plant. Any future plans would have to undergo cultural resource and NEPA review before implementation. More detail can be found in volume I, section 1.2.2.1.

RC: 05.032
Doc: PC-016/1

In April of 1995, a study concerning fault identification at the Pantex Plant was sponsored by Mason & Hanger-Silas Mason Co., Inc. (M & HSM), a contractor for the Department of Energy (DOE), in order to satisfy a Note of Deficiency pertaining to a hazardous waste permit application for the Pantex Plant located near Amarillo, Texas. Unfortunately, because this study was under an important deadline to satisfy a requirement of a vital permit for continuing operations, it lacks the benefit of having undergone critical peer review. The data is interpreted and a conclusion is drawn using the opinion of only one expert: Daniel McGrath. The other experts mentioned in reference are not on record as sharing the conclusion he reaches. In fact, one of the geologists mentioned in reference has gone on public record supporting a totally opposite conclusion from the one reached in this study. The DOE fault study is also: incomplete, poorly argued, erroneously formatted, concluded in haste, and thus; invalid.

The Fault Study contains multiple references to an investigation carried out by a team from the Argonne National Lab. The use of references attempts to support the conclusion that Pantex does not sit on top of a fault. Yet, in an apparent contradiction, the Draft RCRA Zone 12 Groundwater Assessment, dated November 1995, and prepared by Argonne, clearly addresses the existence of a major fault beneath the Pantex Plant. The Argonne report includes a powerful [visual] aide that depicts a deep, substantial fault they identify as the Whittenburg Trough. It would seem to be obvious even to the most uninformed person that the experts from Argonne wished to draw attention to this feature. The expert for the DOE correctly states that hydrogeological characterization studies conducted by the Texas Bureau of Economic Geology (TBEG) have focused on mechanisms that would allow for rapid transport of contamination to the Ogallala aquifer. He also includes the fact the faults would provide such a mechanism for the rapid transport of water. But the TBEG reports are oddly silent concerning the word faults, and do not directly address any argument for or against the existence of a fault at Pantex.

Do we have movement in the Holocene time in the last 10,000 years? Answer: Yes. "Holocene faulting has occurred on one portion of the Amarillo Uplift-Wichita Uplift structure and may have occurred on another part of the same structure in Potter County." And: "USR/Blume (1976) cite a Holocene (last 10,000 years) fault scarp 4 miles long, 20 miles northwest of Pantex Plant, on the Amarillo Uplift. Where the Amarillo Uplift extends into Oklahoma, about 150 miles from Pantex Plant, the Meers Fault also has a Holocene scarp. These two examples of Holocene faulting along the Amarillo Uplift structure show the presence of some level, although clearly not intense, of the tectonism along this Paliozoic uplift."

Do we have more than one movement in the last 500,000 years? Answer: Yes. As stated above, "...a Holocene fault scarp 4 miles long, 20 miles northwest of the Pantex Plant, on the Amarillo Uplift...within the last 10,000 years..."

Do we have demonstrated associated [seismicity]? Answer: Yes. "...recent 11-year span, from January 1, 1977 to March 31, 1988, more than two dozen quakes measuring 2 or higher on the Richter scale were detected in the Texas Panhandle and South Plains, Oklahoma Panhandle and far Western Oklahoma, and the southernmost strip of Kansas...quakes estimated to be 4 to 4.5 on the Richter scale occurred on March 27, 1917; July 30, 1925; July 20, 1996; February 20, 1974;...and others during 1934, 1948, and 1959..." And: "... Since local records began in 1882, there have been four earthquakes in the Plant area. These occurred on March 27, 1917; July 30, 1925; June 19, 1931; and July 20, 1966..."

Do we have a structural relationship to another structure that has been shown to be capable? Answer: Yes. "... Holocene faulting has occurred on one portion of the Amarillo Uplift...and may have occurred on another part of the same structure in Potter County." And: "An assessment of natural hazards at Pantex Plant (Jacobs 1993) lists "three major subsurface faults and minor surficial fault" in the area of the Plant, as follows: (1) 155 miles long, about 25 miles north of site, (2) 43 miles long, [about] 5 miles [south] of site, (3) 40 miles long, about 7 miles north of site, (4) 4 miles long, about 20 miles northwest of site, surficial, USR/Blume (1976) have suggested that faults (3) and (4) may connect."

If a capable fault must show one or more of the above [characteristics], and we have just shown that all four characteristics are demonstrated, then it stands to reason that we have a capable fault. Fortunately for all of us, recent seismic

	activities at and near Pantex have been light to moderate. Pantex is currently classified as being in Earthquake Zone Number 1. Ponder the very wise message contained within the following quote: "Seismic hazards, most notably active faults, are considered unacceptable for [nuclear] facilities such as the Pantex Plant"- Daniel McGrath, Soil Scientist April 1995.
Response:	*See discussion in section 1.3.4 in this volume.*
RC: 05.033 **Doc: PC-016/2**	"Do we have earthquakes here?" Answer: Yes. (Page 3.) "Do our core samples at the Pantex Plant show contrasting vertical and horizontal layers?" Answer: Yes. (TBEG, Argonne, McGrath.) "Do we have evidence that the Pantex Plant is near an epi-center for earthquakes?" Answer: Yes. The only local quake on record during this century that successfully damaged a man-made structure occurred in Panhandle, Texas. Panhandle is the closest town to Pantex. The strongest local quakes occurring during this century are said to have had epi-centers located about 10 to 20 miles from the Pantex Plant. (Page 3.)
Response:	*See discussion in section 1.3.4 in this volume.*
RC: 05.034 **Doc: PC-016/3**	"Do we have groundwater samples showing differences that can sometimes indicate a fault?" Answer: Yes. According to the DOE expert, water in the [Dockum] group beneath the Pantex Plant is significantly better than the water found in other area [Dockum] wells. This fact indicates that the Ogallala aquifer is not a confined aquifer. The Ogallala aquifer may be contributing to a more rapid recharge to the [Dockum] waters beneath the plant due to a fracture or fault. The TBEG report of May 1995 describes a large "channel" that is allowing water to flow faster near the top of the "middle Ogallala perching horizon." Further studies would tell us more about the lower horizons.
Response:	*Though the water quality in the Dockum Group aquifer beneath the Pantex Plant is relatively good, this does not necessarily indicate a fault, but it points to the intermixing of waters from the Ogallala aquifer and the Dockum Group aquifer. This intermixing could result from the movement of water as it is pumped from the Ogallala aquifer. For more detail about the faults see discussion in section 1.3.4 in this volume.*
RC: 05.035 **Doc: PC-016/4**	"Did the 'ground radar' type of studies confirm that we have sharply tilted vertical soil layers beneath the Pantex Plant?" Answer: Yes. And further study would provide more description of these layers.
Response:	*This does not necessarily mean that there is a fault or tectonic activity. Subsidence can cause deformation below the surface of the strata layers which can complicate reaching conclusions about tectonic deformation. The commentor suggests further study of the deformation to further define the seismic risk to Pantex Plant. DOE's current conservative assessment of seismic*

risk does not require this specific information. The current risk assessment is discussed in volume I, section 4.14, Human Health.

RC: 05.036
Doc: PC-016/5

"Do we have sink spots (subsidence) at the Pantex Plant?" Answer: Yes. The playas at Pantex are "sinks". Subsidence has influenced the development of many of the larger playa basins at the Pantex Plant.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.037
Doc: PC-016/6

"Did the expert for the DOE overlook the fact that he proved the case demonstrating the characteristics of a capable fault?" Answer: Yes. Unfortunately, when scientific papers are not shared with other experts, even a good scientist can make a big mistake. A process called "peer review" involves many experts getting together to see if somebody's idea is right or wrong. "Peer review" is pretty important to scientists, because they can look [a little] silly if they go on record with bad information or wrong ideas. Because we cannot control earthquakes, experts try to look very hard to identify the safest places to build important buildings such as the ones at the Pantex Plant. Experts agree that geological faults are not the safest places to build important buildings on. Buildings that handle very dangerous nuclear materials and hazardous chemicals are not supposed to be built on a capable fault.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.038
Doc: PC-016/7

"Do we have experts who have indicated that the Pantex Plant was built on a geological fault?" Answer: Yes. On January 8,1994, a [petroleum] geologist named Greg Wilson talked about his studies into the High Plains area. He indicated that Pantex was on a fault, and thought more studies should be done to prove this. Other experts from the Argonne National Lab have included maps in their studies that show a picture of a deep fault beneath the Pantex Plant. An expert from TBEG has shown that subsidence has played a part in the formation of playas on the High Plains. Some experts use very clear language to explain their positions, and some do not. Sometimes experts like to use very big, difficult words if they don't want to answer a question. We need to be careful about becoming confused when experts talk, and learn to look more carefully at the facts.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.039
Doc: PC-016/8

A hard look at the facts concerning the sub-surface surface conditions at the Pantex Plant, in the present (here and now) time is in order. Nearly every branch of specialized investigation is required to do this. Capable engineers, physicists, geologists, hydrologists, chemists, biologists seismologists, and [historians] all need to be consulted to clarify the current situation.

If academia chooses to mismanage the vast body of information that has been generated in recent investigations into the Pantex Plant, and deliberately presents a false model of the circumstances beneath the Pantex Plant, then they will also predict a false outcome. Anticipating change and predicting outcomes was once solely the responsibility of "seers" and prophets. But science, of its own [curiosity], evolution, and arrogance now shares a responsibility for predicting accurate outcomes. The genie cannot be put back into the bottle, but perhaps the genie can be better understood and better [disciplined]. If each branch of the sciences now met openly to discuss and review the current information generated by the investigations conducted recently at the Pantex Plant, a more useful "band-aid" might be applied to the wound.

Neither the expert or the non-expert should become "lulled into complacency" just because the strength of local earthquakes during this century have been light to moderate. Geological fault-science has proven that the ground shakes hardest along fault lines. Although new or unknown faults can also surprise experts by suddenly becoming seismically active, known faults simply should not be ignored. If the tectonic activity continues to increase substantially along the Pacific Rim, it could affect tectonic activity as far away as places like the Panhandle of Texas. Assessing geological sensitivity for the purpose of siting work with dangerous actinides is urgent and vital. Earthquake activity both at and around the Pantex Plant has been fairly consistent since records started a century ago. Not a single decade has passed in the Panhandle that some amount of seismic activity has not occurred. Above all, the contamination concerns may become secondary to criticality concerns, as a chain reaction in a geological setting would generate radiation and extreme heat in addition to releasing fission product contamination. As some experts very well know, it only takes small amounts of certain actinides suspended in water to achieve criticality. Because of the instability of the Amarillo Uplift/Whittenburg Trough/Potter County Fault connection to the Pantex Plant, and the threat the surface and groundwater may present to certain actinides indicated to already be trapped in the soil, appropriate actions need to be taken promptly.

Response: *The EIS has examined the affected environment and the environmental consequences at Pantex Plant. This examination was completed by a broad range of professional disciplines (please see volume I, chapter 8, List of Preparers, for further information).*

RC: 05.040
Doc: SG-003/25

Page 4-3, section 4.2, Impact Assessment Methodologies, geology and soils: Impacts should be assessed on the destruction of any geologic feature, not just those specified unique.

Response: *The Impact Assessment Methodologies for Geology and Soils has been clarified. The uniqueness of a feature is taken into account in assessing the significance of any potential impacts. See response to comment 05.030.*

RC: 05.041
Doc: SG-003/65

Sections 4.5 and 4.6, which describe water resources and geology and soils, do not provide sufficient information for the reader to determine if environmental impacts could result from continued operations and storage of nuclear weapons at Pantex.

Response: *Sections 4.5 and 4.6 in volume I have been updated with additional data, new permit requirements, and descriptions of corrective action measures.*

RC: 05.042
Doc: SG-003/67

Some of the maps in this document are used without referencing or obtaining permission of the author. Figure 4.5.1.2-1 was published by Gustavson (1981), but attributed to DOE (1981). Figure 4.5.1.2-2 was prepared by Davis, Pennington and Carlson (Davis 1989), but attributed to DOE 1995.

Response: *The citations for both figures have been revised to give credit to the primary authors.*

RC: 05.043
Doc: SG-003/68

Page 4-27, Geomorphology, para. 1, ln 13. It is inaccurate to state that playa could play a role in the contamination of groundwater at Pantex Plant. Playa basins and ditches have been shown to be the sites where contaminated surface water is recharged to the subsurface (Gustavson and others, 1995).

Response: *The sentence in question has been revised in volume I, section 4.5.1.1. Neither the original nor the current statement implied that contaminated surface water is recharged to the subsurface. However, noncontaminated water applied over areas of contaminated soil have the potential to pick-up contamination from the soil and transport the contamination to groundwater.*

RC: 05.044
Doc: SG-003/69

Page 4-27, Stratigraphy. para. 1, ln 4. The Blackwater Draw and Ogallala Formations beneath the Pantex Plant are not lithified and therefore are not rocks. The correct term is sediments. Rephrase sentence to "The stratigraphy of the sediments and rocks..."

Response: *Sentence has been modified to read: "The stratigraphy of the sediments and rocks beneath Pantex Plant is discussed in descending chronological order from more recent layers (surface deposits) to Permian -age layers (salt deposits)."*

RC: 05.045
Doc: SG-003/70

Page 4-27, Stratigraphy, para. 2, ln 6. The upper unit of the surface Soil (Pullman clay loam) of the Blackwater Draw Formation is the A horizon and it contains no caliche. The first soil carbonate is found at a depth of about 24 inches in the upper part of the B horizon (US Department of Agriculture, Soil Conservation Service, 1972, Pullman Series: Established Series, 4 p).

Response: *The information has been incorporated into volume I, section 4.5.1, and the sentences have been revised accordingly.*

RC: 05.046
Doc: SG-003/71

Page 4-29, Stratigraphy, para. 1. The variable lithologies of the Ogallala and Blackwater Draw Formations are not described. These descriptions should include a brief discussion of the complex heterogeneity of the Ogallala and Blackwater Draw because the variation in sediment types controls groundwater flow in the formation.

Response:	*A more detailed discussion of the variable lithologies of the Ogallala and Blackwater Draw Formations has been incorporated into volume I, section 4.5.1.*
RC: 05.047 **Doc: SG-003/72**	Page 4-29. Sentence describing the lower part of the Ogallala implies that the fine-grained zone is the base of the lower Ogallala and generally confuses channel deposits above the fine-grained zone (which actually falls within the middle part of the Ogallala) with predominantly fluvial Ogallala sediments within the lower part of the Ogallala [from] below the fine-grained zone.
Response:	*See response to comment 05.046.*
RC: 05.048 **Doc: SG-003/73**	Page 4-29, Stratigraphy, para. 1, ln 29. The fine-grained zone is not a sandstone. Limited available core from the fine-grained zone shows interbedded sands, silty sands, and muds. Because of the variability of sediments in this unit, the vertical hydraulic conductivity varies by 3 orders of magnitude. Geophysical logs and core show that at least part of the fine-grained zone consists of fining upward sequences of fine sand, silty to clayey sand, and mud. Furthermore, these sediments are not lithified; thus, they are not sandstones.
Response:	*See response to comment 05.046*
RC: 05.049 **Doc: SG-003/74**	Page 4-30, Figure 4.5.1.1-2. Well PXSB-03 is not just coarse sand. There are about 50 feet of sand and gravel near the bottom of the well.
Response:	*This map has been deleted. A sentence has been added which refers readers to Figure 4.6.1.2–3 in volume I, section 4.6.1. This figure is a geologic cross-section of the lithology beneath Pantex Plant.*
RC: 05.050 **Doc: SG-003/75**	Page 4-31, para. 3, ln 1. Salt dissolution and accompanying subsidence or collapse are rapid processes on a human time scale. More than 2,000,000 tons of salt are dissolved each year along the eastern margin of the High Plains in the Texas Panhandle. Furthermore, about 2 years ago a very large sinkhole (250 ft wide and more than 60 ft deep) formed in northeastern Hall County, which like the Pantex Plant lies in the salt dissolution zone shown in figure 4.5.1.2–1. Development of this sinkhole was described in the Amarillo newspaper.
Response:	*Estimates of salt dissolution rates along the eastern escarpment of the Southern High Plains were tabulated in Regional Dissolution of Permian Salt in the Anadarko, Delhart and Palo Duro Basins of the Texas Panhandle (Gustavson, et al, 1980). Although no estimates were provided for Carson County, mean salt dissolution rates ranged from 1.0312 x 10^{-5} feet per year for a site in Potter County to 5.6674 x 10^{-5} feet per year for a site in Armstrong County. Assuming that this range is applicable to salt dissolution rates at Pantex Plant, then approximately 0.002 to 0.006 of one inch of salt dissolution would occur during the entire 10-year time frame covered by this site-wide EIS. For additional discussion of salt dissolution, please refer to section 1.3.4 of this volume.*

RC: 05.051 **Doc: SG-003/76**	Page 4-31, para. 3, ln 1. No attempt is made to describe the role of salt dissolution and subsidence in the formation of playa basins. High solute loads in streams draining the region indicate that these processes are active regionally. No mention is made of the potential effects, if any, of dissolution-induced subsidence at the plant.
Response:	*See discussion in section 1.3.4 in this volume.*
RC: 05.052 **Doc: SG-003/77**	Page 4-31, para. 3, ln 11. While it is true that sinkholes or fractures associated with salt dissolution have not been described in Carson County, several playas on or near the Pantex Plant have been associated with dissolution induced subsidence. Furthermore, sinkholes or fractures have been identified in adjacent Armstrong and Donley Counties to the south, in Potter County to the west, and in...
Response:	*See discussion in section 1.3.4 in this volume.*
RC: 05.053 **Doc: SG-003/78**	P. 4-32, Figure 4.5.1.2-1. Gustavson (1981) who compiled the information on which this map is based, showed that sinkholes or fractures have been recognized in Oldham, Potter, Donley, Briscoe, Motley, and Dickens Counties in addition to the counties shown here.
Response:	*The referenced figure, Figure 4.5.1.2–3 (formerly Figure 4.5.1.2–1 in the Draft EIS) "Zones of Active Salt Dissolution and Counties in which Sinkholes and Fractures Were Identified (DOE 1981)", was checked for accuracy against the original figure contained in the reference document, "Impact of Evaporite Dissolution and Collapse on Highways and Other Cultural Features in the Texas Panhandle and Eastern New Mexico (Gustavson 1981)." There were no mistakes in the translation of this figure. Another figure in this reference cites that there are no sinkholes, collapse depressions, or fractures/faults in Donley, Motley, or Dickens counties. This document did not contain additional information in the text to say that there were sinkholes or fractures in any of the counties mentioned in the comment (i.e., Oldham, Potter, Donley, Briscoe, Motley, and Dickens counties).*
RC: 05.054 **Doc: SG-003/79**	Page 4-33, para. 2. Davis, Pennington, and Carlson (1989) reviewed in considerable detail the history of earthquakes in the Texas Panhandle. Events are shown using the Richter scale.
Response:	*The commentor is correct when citing that Davis, Pennington, and Carlson (1989) reviewed the history of earthquakes in the Texas Panhandle in detail. These authors wrote a document, "A Compendium of Earthquake Activity in Texas," which was referenced in the Pantex Plant Environmental Information Document (Pantex 1996).*
RC: 05.055 **Doc: SG-003/80**	Page 4-33, Soil Types, para. 2 or 3. No attempt is made to point out that Randall clay soils are Vertisols and that deep desiccation cracks and root tubules, which

are potential pathways for recharge, are characteristic of these soils. Furthermore, these soils have a udic moisture regime, which means that water moves down through the soil at some time in most years. That is, recharge occurs through even these clay soils.

Response: *Further detail on Randall and Pullman soils has been incorporated into volume I, section 4.5.1. The following text has been added about Pullman soils, "This soil is classified as a Mollisol, which is noted by wide deep cracks throughout the year. These cracks aid in groundwater recharge. The major uses for these soils are grazing and dryland farming." The following text has been added about Randall soils, "This soil is classified as a Vertisol, which contains a large amount of clay and has cracks at some time of the year."*

RC: 05.056
Doc: SG-003/81

Page 4-33, Soil Types. In the discussion of soil sampling activities, there is no mention of the preliminary soil sampling that took place as a result of the May 1989 tritium release. This is a significant problem resulting from this omission for two reasons. First, there is no mention of this event or the known areas of contamination within these report. Second, there have still not been any characterization efforts completed beyond the initial preliminary assessment, to determine the amount of contamination from this tritium release. This lack of characterization continues despite, at least using one data set, the apparent increasing tritium levels in perched groundwater in the area of playa 1.

Response: *Soil sampling took place as the result of the tritium release at cell 12-44-1. This sampling was nonroutine and was reported in the Annual Site Environmental Reports (ASERS).*

This incident is not discussed in the Geology and Soils section, but it is discussed in the Human Health section.

There have been three types of prior evaluations of cell 12-44-1 and its releases. The first evaluation was to calculate offsite doses to a maximally exposed individual, as required by both DOE 5400.1 and 40 CFR 61. The second type of evaluation was to characterize the contamination of the cell to plan for radiation protection measures during decontamination activities. The third type of evaluation was to implement routine air monitoring and conduct special purpose soil and vegetation sampling in the vicinity of cell 12-44-1.

Volume II, appendixes C and I incorporate water and soil sampling information. For more information regarding radionuclide sampling, please see these sections.

RC: 05.057
Doc: SG-003/82

Page 4-35, Figure 4.5.1.2-2. Pantex is incorrectly located on the map. The correct location is approximately 1/4-inch to the northeast of the center of the black square or immediately adjacent to the system of faults and earthquake locations that mark the buried Amarillo Uplift. The city of Amarillo is not located on the map.

Response: *Corrections have been made to volume I, Figure 4.5.1.2–2.*

RC: 05.058
Doc: SG-003/83

Page 4-50. The statement is made that there is no surface expression of sinkholes or fractures associated with salt dissolution in Carson County. We argue that, based on seismic data at the plant, the playas themselves are a sinkhole-like expressions of salt dissolution.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.059
Doc: SG-003/84

Page 4-50, [Weapons] Related Activities, para. 2, ln 2. The statement is made that the "potential impacts due to subsidence (resulting in sinkholes and/or surface rupture) are considered negligible because salt dissolution is a slow process relative to human activities." While the rate of salt dissolution may be slow relative to geologic time, the surface expression of salt dissolution can be catastrophic and result in the loss of life and property. Another inaccurate statement in this same paragraph refers to the absence of sinkholes in Carson County. Paine (1994) demonstrated that many playa basins in the vicinity of the Pantex Plant formed as a result of surface subsidence over areas of salt dissolution. In this context playa basins are similar to sinkholes found elsewhere in the salt dissolution zone. Thus, it is inaccurate to imply that there are no subsidence features in Carson County by simply stating that there are no sinkholes. A better approach would be to explain that sinkholes are the product of catastrophic, rapid collapse into an underground cavern. Playa basins on-the-other-hand formed in part as the result of relatively slower surface subsidence over areas of salt dissolution.

Response: *See discussion in section 1.3.4 in this volume.*

RC: 05.060
Doc: PC-030/4

The contaminated soil should be cleaned as soon as possible to mitigate flushing caused by storm run-off.

Response: *Investigations of the ditches and playas, related to the potential for contamination, and the development of remediation plans are ongoing through the Pantex Plant environmental restoration (ER) program (Pantex 1996: 5.2). Volume I, section 4.5.1.1, has been revised to incorporate this information.*

RC: 05.061
Doc: PC-033/4

In the Draft [EIS] I did not find the impact on area farmers when they are plowing, planting, or harvesting the crops in the possibly contaminated soils of the Pantex Plant property. If this information is available, I would like a copy please, and if it is not, I would like to have this included in the Final EIS.

Response: *Volume I, section 4.5.1.3 discusses the soil and sediment quality as a result of the sampling at the Pantex Plant. The sampling that took place occurred on the property belonging to the Pantex Plant not Texas Tech University. Agriculture activities, as related to soil quality, would not impact the health of the farmers who work the land.*

3.6 Water Resources

RC: 06.001
Doc: HT11/26

Can you talk at all about water usage...for the dismantlement of the 20,000 pits at Pantex?

Response:

To elaborate on the response given at the public hearing, this information on weapons dismantlement is summarized in volume I, section 1.2.2.1. Volume I, section 4.6.2.3, has been modified to include this detailed information for clarification purposes.

RC: 06.002
Doc: HT11/27

But the Pantex Plant feels that there is enough water to disassemble the entire 20,000?

Response:

Yes, groundwater resources are available for continued operations at Pantex Plant. The plant uses only a small percentage of the groundwater resources of Carson County. See discussion in section 1.3.5 of this volume for details.

RC: 06.003
Doc: HT05/1

On page 4-13 it's stated, and I quote, that the City of Amarillo has pledged 5,526 million liters of water, or 1.6 million gallons per year as a potential part of the Pantex expansion.

a. All my questions are [on] the disposition issues considered expansion missions and,

b. Where is the City of Amarillo planning to withdraw that amount of water from?

Response:

To elaborate on the response given at the public hearing, the City of Amarillo pledged 5,526 million liters of treated wastewater per year for the tritium supply mission, which required large quantities of water in excess of the plant's production capacity. However, the decision has been made not to locate the mission to Pantex Plant. The tritium supply mission has since been assigned to the Savannah River Site.

a. Disposition missions were not part of the tritium supply mission for which the pledge was made. However, the City of Amarillo would likely extend the same pledge for any new, large missions that might need such quantities of water. The continued operations discussed in the Pantex EIS would not require the quantities of water discussed for the tritium supply alternative and, therefore, would not require the use of the pledged water.

b. If there were a mission that required large quantities of treated wastewater, the City would develop reclaimed wastewater from the City of Amarillo Hollywood Road Wastewater Treatment Plant. The use of reclaimed wastewater could curtail the annual withdrawal rate from the Ogallala aquifer.

RC: 06.004
Doc: HT05/2

And, if...[pledged water] were to come from Carson County, where we already experience significant groundwater declines, it would mean that, if this total

	amount was used,...a 23 percent increase in groundwater withdrawals from that area.
Response:	*The pledged water would come from treated wastewater, not groundwater. See response to comment 06.003 for additional details.*

RC: 06.005 **Doc: HT05/3**	I know the City has extensive groundwater rights. My main question is whether and what criteria and how long is the pledge good for and those kind of things?
Response:	*See response to comment 06.003.*

RC: 06.006 **Doc: HT05/4**	So it's an ongoing offer? So there's no time frames?
Response:	*See response to comment 06.003. We understand that the offer is only contingent upon new work (jobs) being brought to the plant.*

RC: 06.007 **Doc: HT05/5**	... I think it's...a typographical error or something. But, in reading on Page 4-78, it was going into the agricultural uses in Carson County. And they had stated in that that there [were] 8,550 acres of irrigated agriculture in Carson County. And a check with the Farm Service Agency, which is a Federal regulatory agency, on the amount of acres in 1995 was 63,500 acres. Your withdrawal figure seems to be somewhat within range, but your acres are quite a bit off. It's the Farm Service Agency [that] used to be ASCS. It's the government's regulatory agency for the Federal Farm Program. And they keep it down to the 10th of acres, so I know that they're correct.
Response:	*On May 30, 1996, we received updated (1995) data from the Panhandle Ground Water Conservation District (PGWCD) and the Farm Service Agency, which reported a total of 63,629 acres were irrigated in Carson County in 1995. PGWCD estimated a corresponding total irrigation pumpage of 81,702 acre-feet (26.6 billion gallons) in Carson County in 1995. Volume I, section 4.6.1.2, has been updated with this information.*

RC: 06.008 **Doc: CO-008/62**	Page 4-234, Paragraph 4. In light of the BEG study, please define the statement, "hypothetical plutonium dispersal accident does not pose a significant threat to the Ogallala aquifer."
Response:	*Accident scenarios meet the risk limitation criteria discussed in volume I, section 4.14. The source of the referenced Bureau of Economic Geology (BEG) study are stakeholder comments, submitted by BEG through the State of Texas (February 25, 1993), in an Environmental Assessment describing current weapon staging and proposed component interim storage operations in Zone 4 of Pantex Plant and a related supplemental report entitled "Potential Ogallala Aquifer Impacts of a Hypothetical Plutonium Dispersal Accident in Zone 4 of the Pantex Plant" (LANL 1992). The Los Alamos National Laboratories (LANL)*

report assumed an average recharge rate of 3 centimeters per year. In their stakeholder comments on the LANL report, BEG commented that recharge rates ranging from 1.3 to 8 centimeters per year may be more applicable for the LANL study. BEG also raised additional questions regarding travel time estimates calculated in the LANL study including, the effects of focused recharge, recharge rate estimates of 15.2 to 63.3 centimeters per year based on dating tritium concentrations in groundwater, and calculation of a "conservative" velocity for determining contaminant transport. DOE's responses to BEG's and other stakeholder comments are provided in the "Environmental Assessment for Interim Storage of Plutonium Components at Pantex and DOE Response to Comments on the Pre-approval Environmental Assessment and the Revised Pre-approval Environmental Assessment and Public Meeting," volume I, section E, (DOE 1994w). This document is available for review in area public reading rooms.

RC: 06.009
Doc: CO-008/87

Page 4-55, Paragraph 6 (last paragraph and continuation on page 4-57). Treated and untreated industrial discharges and stormwater, from both agricultural and industrial areas, are directed to Playas 1, 2, and 4. [See Table 4.6.1.1-2 page 4-59....]

Response:

According to the 1995 Environmental Report for Pantex Plant (DOE 1996f:111), all effluents from plant operations are treated and, along with some noncontact industrial discharges (e.g., steam condensate), are directed into ditches that drain to Playas 1, 2, and 4. Runoff from the southern portions of Zones 11 and 12 flow into Playa 4. Volume I, section 4.6.1.1, and volume I, Table 4.6.1.1–2, have been modified to reflect this updated information.

RC: 06.010
Doc: CO-008/88

Page 4-56, Figure 4.6.1.1-1. Please check figure for Pantex Lake. The figure provided does not appear to be Pantex Lake. Please show full extent of Pantex Lake.

Response:

The referenced figure includes only the western portion of the Pantex Lake floodplain, set to scale. There are no current or proposed activities to be conducted at Pantex Lake. Therefore, the full extent of Pantex Lake was not included in the figure in the Draft EIS. Figure 4.6.1.1–2, showing the full extent of Pantex Lake, has been added to volume I, section 4.6.1.1.

RC: 06.011
Doc: CO-008/89

Page 4-57, Paragraph 5 "Flow from the WWTF is small but continuous." What quantity is "small?" This term seems inappropriate and subjective. Please quantify.

Response:

The National Pollutant Discharge Elimination System (NPDES) Permit (No. TX-0107107) specifies a 0.65 million gallons per day daily average discharge limitation for Outfall 001. This permitted average daily discharge has been included in volume I, section 4.6.1.1.

RC: 06.012 **Doc: CO-008/90**	Page 4-60, Paragraph 2. At what cost is potable water provided to TTU?
Response:	*The Pantex Plant provides Texas Tech University (TTU) with water for grazing cattle under a service agreement with TTU. Water is sold to TTU at a negotiated price per the interagency agreement between DOE/AAO and TTU.*
RC: 06.013 **Doc: CO-008/91**	Page 4-61, Paragraph 6. Requirements provided for the "TNRCC draft permit" seem unusually similar to the current permit. Please provide updated permit information.
Response:	*A summary of requirements of the Final NPDES Permit (No. TX-0107107) have been discussed in volume I, section 4.6.1.1, and are provided in volume II, appendix C.*
RC: 06.014 **Doc: CO-008/92**	"As discussed in section 4.6.1.1, surface water discharge permits have been in effect since the late 1980's..." According to information you provided, a permit was first issued in 1980 (which is not "late").
Response:	*The sentence has been modified to state, "surface water discharge permits have been in effect since 1980...".*
RC: 06.015 **Doc: CO-008/93**	Page 4-58, Table 4.6.1.1-1. Why were Burning Ground structures not considered?
Response:	*The Natural Phenomena Hazards Modeling Project: Preliminary Flood Hazards Estimates for Screening Department of Energy Sites: Albuquerque Operations Office, (LLNL 1988), states that there are no structures located near Playa No. 3. Structure elevations are not referenced in the Pantex Plant Floodplain Delineation Report (DOE 1995c). Although the elevations of Burning Ground structures were not included in these floodplain studies, they have been added to volume I, Table 4.6.1.1–1, as requested. The only structures that currently exist above ground at the Burning Ground are the Explosive Burn Trays. These structures have a height of 2 feet above ground surface and an approximate surface elevation of 3,572 feet above mean sea level. The Explosive Burn Trays are outside of the 100- and 500-year delineated floodplains for Playa 3, and are therefore in compliance with 40 CFR 264.18, location standards for floodplains.*
RC: 06.016 **Doc: CO-008/94**	Page 4-13, Paragraph 4, "The City of Amarillo has pledged 5,526 million liters per year (1,460 million gallons per year) as a part of potential plant expansion." Are disposition missions considered expansion? Where is the City planning to withdraw this amount of water? If it were to come from their Carson County Well Field, it would be a 23 percent increase in current pumping and would significantly add to the excessive drawdown problem in that area.

	What are the timeframe and conditions of the pledge?
Response:	*See response to comment 06.003.*
RC: 06.017 **Doc: CO-008/95**	Page 4-78, Paragraph 2. "In 1989, 760 irrigation wells in Carson County pumped 115 billion liters (30.5 billion gallons) to irrigate approximately 3,460 hectares (8,550 acres). This is incorrect. A check of Farm Service Agency irrigated acres in Carson County revealed 63,500 acres in 1995. PGWCD estimated irrigation pumping of 26.3 billion gallons of water pumped in 1995.
Response:	*See response to comment 06.007.*
RC: 06.018 **Doc: CO-008/96**	Page 4-78, Paragraph 4. "Pantex Plant is located [in] Panhandle Groundwater Conservation District No. 3, which has the authority to require permits and limit the quantity of water pumped. Presently, the Panhandle Groundwater District does not limit the quantity of water pumped." That statement is true for wells drilled and in use prior to July 19, 1995. For new wells, drilled after July 19, 1995, a landowner whose well produces annually more than 350,000 gallons of water per acre owned, on a section by section basis, will be required to obtain a High Production Permit from the District.
Response:	*The sentence, "Presently, the Panhandle Groundwater Conservation District does not limit the quantity of water pumped" has been modified to state, "Historically, the Panhandle Groundwater Conservation District...". Another sentence has been added that states, "However, for new wells drilled after July 19, 1995 that produce annually more than 1.3 million liters (350,000 gallons) of water per acre owned, on a section by section basis, landowners will be required to obtain a High Production Permit from the Panhandle Groundwater Conservation District."*
RC: 06.019 **Doc: CO-008/97**	... Please define the extent and migration of the contamination. More information is needed to define the extent of the perched aquifer and whether it is in communication with the Ogallala aquifer.
Response:	*Discussion of the extent and migration of contamination in the perched aquifer has been updated to reflect the most recent data available at the time of publication. Additional information, discussed in section 1.3.5 of this volume, has also been included in volume I, section 4.6.1.2.*
RC: 06.020 **Doc: CO-008/98**	... Are fissures present that would allow movement of the perched water to enter the Ogallala aquifer?
Response:	*The term "fissure" refers to cracks, breaks, or fractures in rock. The Ogallala aquifer consists primarily of unconsolidated sand, silt, clay, and gravel. Unconsolidated materials are not prone to the development of fissures. However, there is the potential for groundwater from the perched aquifer to move downward toward the Ogallala aquifer through voids between*

unconsolidated sand, silt, clay, and gravel particles. Coarse-grained gravels and sands transmit water faster than fine-grained silts and clays. Fine-grained material creates localized perching zones that limit the downward vertical movement of infiltrating groundwater, as discussed in volume I, section 4.6.1.2.

RC: 06.021
Doc: HT02-04/4

Records show that Pantex is monitored for some 160 different contaminants. And why is it being monitored for these contaminants? Because they didn't know it, but they sent it into the groundwater. And I am addressing you as Pantex, but this forum also needs to address the fact that these discharges are only monitored, contaminant by contaminant.

Response:

Pantex Plant has several ongoing routine and non-routine monitoring programs to identify the contaminants of air, soil, surface water, and groundwater.

Volume I, section 4.5.1.3, and volume II, appendix I, discuss the surveillance programs for soil and environmental restoration activities. Volume I, Table 4.5.1.3–3, and Table I.1.2.1–3, volume II, Table I.1.2.1–3 characterize the soil contaminations and quantify them.

Volume I, sections 4.6.1.1 and 4.6.1.2, and volume II, appendix C, discuss and quantify the chemical constituents that exceed surface water and groundwater quality decision criteria.

Ambient air quality is described in volume I, section 4.7.1.3 and volume II, appendix B. Volume I, Tables 4.7.1.3–4 and 4.7.2.1–2, identify the air pollutants emitted from site-wide Pantex Plant operations and quantify them, contaminant by contaminant.

RC: 06.022
Doc: CO-008/99

Page S-15, Table S-1. The table on page S-15 should show percentages, to give the reader perspective on water use.

Example:

a. Plant used 230 million gallons in 1995.

1. Texas Tech Farms used 66 million gallons (29%) of the total usage.

2. Nuclear weapons operations used 163 million gallons (71%).

b. City of Amarillo consumed 16 billion gallons of water in fiscal year 1995.

c. Pantex Plant including Texas Tech Farms used 1.4% as much as the City of Amarillo and 1% of water use went for nuclear weapons.

d. Considering the water also used for irrigation, the plant withdrew 0.6% of the regional withdrawal from the Ogallala aquifer. Nuclear weapons operations consumed 0.43% of the regional withdrawal.

Pantex 1995 Water Usage, Reference: Draft EIS for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, March 1996, page S-15.

Response: *Table S–1 is intended to be a summary comparison of environmental impacts at Pantex Plant. It is not a summary of baseline conditions for the various resource areas. As a result, the recommended change to Table S–1 is not applicable to the intended purpose of the table. However, this recommendation has been applied to the information presented in volume I, Table 4.6.1.2–3. Information in volume I, Table 4.6.1.2–3, has been updated with available data and percentages for 1995.*

RC: 06.023
Doc: CO-008/100

Page 4-63, Figure 4.6.1.2-1. Why are drinking water sampling locations (at the tap) provided on a figure titled to depict monitoring wells?

Response: *Drinking water locations have been omitted from the referenced figure (Figure 4.6.1.2–2) in volume I. In addition, this figure has been retitled, "Groundwater Monitoring Locations, Pantex Plant Site".*

RC: 06.024
Doc: CO-008/101

Page 4-65, Paragraph 2. "The complete lateral and vertical extent of perched aquifers are being defined." Please clarify.

Response: *The "lateral and vertical extent" refers to the aquifer's location, shape or geometry, and depth. An expedited site characterization for the Pantex Plant Zone 12 groundwater was conducted to develop a working model of the perched aquifer. Specific objectives included characterizing the extent of the perched aquifer, nature of groundwater recharge, direction of groundwater flow, groundwater contamination, and identification of potential receptors. The findings of the expedited site characterization are presented in the Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant (Argonne 1995a). The word "complete" has been omitted from the referenced sentence in volume I, section 4.6.1.2.*

RC: 06.025
Doc: CO-008/102

Page 4-69, Paragraph 2. Please correct typo, "the conclusion drawn from this (these) data..."

Response: *Correction has been included in volume I, section 4.6.1.2.*

RC: 06.026
Doc: CO-008/103

Page 4-69, Paragraph 6. Concerning the depth to groundwater calculations, were calculations made on the leased and owned land or just owned land?

Response: *Depth to groundwater calculations included the available data for owned land (i.e., the main Pantex Plant).*

RC: 06.027
Doc: CO-008/104

Page 4-69, Paragraph 4. "Although the effectiveness of the fine-grained zone to act as a barrier to vertical groundwater movement is not fully understood,..." The word "barrier" should be changed to "retardant," to more correctly describe movement.

Response: *The text in volume I, section 4.6.1.2, has been revised.*

RC: 06.028 **Doc: CO-008/105**	Page 4-71, Paragraph 1. What does the statement, "In 1990, the recoverable volume of water in storage and available for use in the Ogallala aquifer was estimated at approximately..." refer to? Does it refer to that volume beneath Pantex, contained in the High Plains Aquifer, or the entire multi-state regional "Ogallala" aquifer? Please clarify.
Response:	*The estimate refers to the recoverable volume of water in storage in the Ogallala aquifer in the High Plains Aquifer System. The estimate was calculated using an aquifer simulation model of the High Plains Aquifer System, originally constructed in the early 1980's and updated and revised in 1990, to predict future aquifer conditions. Additional information is provided in Peckham and Ashworth, 1993, "The High Plains Aquifer System of Texas, 1989 to 1990 Overview and Projections." The phrase "in the High Plains aquifer system (TWD, 1993)" has been added to the end of the last sentence in the above-referenced paragraph in volume I, section 4.6.1.2.*
RC: 06.029 **Doc: CO-008/106**	Page 4-75, Paragraph 1. "It is highly likely that this and other earlier releases contributed to the high concentrations of chromium..." (1976-1986). Are further investigations to be done to identify the source, or is it to be accepted as is? 1976-1986 seems rather recent to be the major contributor to the perched aquifer contamination problem. Verify dates and any other sources of chromium.
Response:	*Ongoing chromium investigations include determining whether elevated chromium levels could have been caused by the amount of chemicals used for conditioning cooling water during the tower's operational period (1950 to 1964), conducting chromium anion exchange and column studies to determine whether ion exchange resins would be an effective treatment technology, and geochemical modeling to predict the fate and transport of chromium species in groundwater. This information has been added to volume I, section 4.6.1.2.*
RC: 06.030 **Doc: CO-008/107**	Page 4-77, Paragraph 2. "Investigations to determine the potential for contaminant migration to the Ogallala aquifer from Pantex Plant are ongoing." Please provide more specific information as to what investigations are ongoing or planned.
Response:	*DOE has investigated the potential for contaminant migration to the Ogallala aquifer from Pantex Plant in homestead wells that are located southeast of the plant boundary. Seven abandoned homestead wells have been sealed in order to prevent potential pathways of contamination into the Ogallala aquifer under the Groundwater Protection Project. A summary of the purpose and scope of the Groundwater Protection Project has been provided in volume I, section 4.6.1.2.*
RC: 06.031 **Doc: CO-008/108**	Page 4-77, Table 4.6.1.2.-3.

a. Under "Source," the Carson County Well Fields should be clearly identified as "City of Amarillo's Carson County Well Fields."

b. Does Carson County irrigation use (1989) include gallons used by TTU for irrigation at Pantex?

Response: *a. Correction has been included in volume I, section 4.6.1.2.*

b. Updated information has been provided in volume I, section 4.6.1.2. The totals for water use in the county do not provide a list of individual uses so it is unknown whether TTU usage is included.

RC: 06.032
Doc: CO-008/109

Pages 4-78, 79, Paragraph 5. Because the TNRCC and EPA requirements in the new permits will be quite different from the requirements of the permit complied with in 1994, it seems that the logic in this paragraph may be faulty. A statement that all parameters in the proposed draft permit have been met for x-number of years would be more persuasive. Please update with current permit information.

Response: *Information from the Final NPDES (June 1996) has been summarized in volume I, section 4.6.1.1, and is presented in volume II, appendix C. Surface water decision criteria have been revised in accordance with the required permit limits for the Final NPDES and TNRCC Wastewater Discharge Permits. The referenced text in volume I, section 4.6.2.1, has been omitted from the paragraph.*

RC: 06.033
Doc: CO-008/110

Page 4-79, Paragraph 4. The statement "Groundwater contamination has occurred in the perched aquifer as a result of past site-related activities, primarily through spills and unintentional releases," is not consistent with information provided by Pantex Plant. Past practices were past practices. Rather than try to explain them as spills and accidents, a more positive statement would be to provide some of the great strides that Pantex Plant has made in the past seven years to correct these practices and investigate and begin to correct the extent of problems created by past practices.

Response: *The text has been modified to state, "Groundwater contamination has occurred in the perched aquifer as a result of past site-related activities. For the past seven years, the Pantex Plant Environmental Restoration Program has assessed inactive sites, conducted investigations to determine the nature and extent of contamination, and implemented remediation strategies to eliminate any present or future threat to human health and the environment. These activities to investigate historical sources of contamination and correct the extent of problems created by past practices will continue in the future."*

RC: 06.034
Doc: CO-008/111

Page 4-80, Paragraph 6. Please specify the "current activities" of UT Austin, TBEG, and TTU Water Resources Center.

Response: *The "current activities" of University of Texas at Austin, Bureau of Economic Geology, and Texas Tech University Water Resources Information Center that are being referred to in the subject text include:*

- *Conducting a perched aquifer tracer test at the Pantex Plant Zone 12 treatability site to evaluate the efficiency of groundwater recirculation for remediation, determine potential retardation effects on high explosives from the injection of treated wastewater, and to predict long-term performance of the remediation system.*
- *Soil vapor extraction modeling and conducting a tracer test in unsaturated sediments above the perched aquifer to predict the efficiency of soil vapor extraction.*
- *Investigating microorganisms for high explosives degradation.*
- *Bioremediation investigations and ecological risk assessments.*
- *Chromium investigations that include determining whether elevated chromium levels could have been caused by the amount of chemicals used for conditioning cooling water during the tower's operational period (1950 to 1964), chromium anion exchange and column studies to determine whether ion exchange resins would be an effective treatment technology, and geochemical modeling to predict the fate and transport of chromium species in groundwater.*

Volume I, section 4.6.1.2, has been updated accordingly.

RC: 06.035
Doc: CO-008/112

Page 4-82, Paragraph 7. Is the effluent volume a condition of the proposed draft permits?

Response: *The NPDES permit has daily average and daily maximum effluent volume limitations of 0.65 and 0.82 million gallons per day respectively for Final Outfall 001. The permit also has reporting requirements for daily effluents at other outfalls. Specific Pantex Plant NPDES permit requirements are tabulated in volume II, appendix C.*

RC: 06.036
Doc: CO-008/113

Page 4-83, Paragraph 1. "Since about 82% of the groundwater withdrawal in Carson County is for irrigation, conversion to dryland farming could have a major beneficial effect on the current rate of aquifer drawdown." Under Texas Law, groundwater is private property. This statement refers to property owned by others and is inappropriate and irrelevant to the SWEIS. Please withdraw this statement.

Response: *Statement has been omitted from volume I, section 4.6.1.2.*

RC: 06.037
Doc: HT02-04/2

We cannot fix a problem we are not permitted to face. I call on the DOE, Mason & Hanger, the unions, the DOD, the City of Amarillo, and the State of Texas to correct, once and for all, this unethical situation that prohibits documents such as the Zone 12 Groundwater Assessment proposed by Argonne National Lab from being easily available to the general public as well as to our civic leaders.

Response: *The Environmental Restoration program or cleanup process is governed by Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or both, and their associated regulations. Both sets of regulations govern how environmental contamination is defined, characterized, and remediated. Following sampling, analysis, and characterization, a draft report that describes the data, analysis, and cleanup recommendations is sent to the regulator. After review by the regulator, subsequent revision of the report, and final approval by the regulator, the final report is made available to the public. The approval of the report includes approval of the recommendations.*

The RCRA Facility Investigation (RFI) for groundwater in Zone 12 at Pantex Plant is not currently available to the public and there is no timeframe for providing this document to the public. The State of Texas is reviewing this document and has yet to respond. DOE will not release the RFI until receiving State approval.

RC: 06.038
Doc: HT13/7

Another thing is the water and the springs in the mountain. Dry as it seems all around here, particularly when we don't have any rain, there is actually water in the mountain. There is an intriguing sentence on page 5-59 in the document that says some magazines show evidence of water intrusion.

I am interested in knowing to what extent the water intrusion affects any of the 41 in the mountain and how many of the ones that potentially -- well, let's start with that. How many of the 41 are affected by water intrusion?

Response: *A survey of unlocked magazines was conducted at the Manzano Weapons Storage Area at Kirtland Air Force Base in March 1993 to identify magazines that exhibited evidence of water intrusion. The survey revealed that 41 magazines were found to be dry, 21 showed at least some evidence of water intrusion from leaks or seeps, 59 were locked, and 1 was sealed. It should be noted that the degree of water intrusion is characterized more accurately as small, shallow puddles rather than flooding.*

RC: 06.039
Doc: HT13/8

Do you know what the causes of the water intrusion in the two were? Is it [a] water source? Is it flaws, engineering flaws, or cracks in the facility, or why is it and how is it that the water came in? The obvious follow-up is how do you know that there won't be similar problems in any or all of the other 39?

Response: *The exact cause of a small amount of water in storage magazines at the Manzano Weapons Storage Area at Kirtland Air Force Base was not determined. The water could have seeped in through small holes in the roof, walls, or floor joints, or through the chimneys which vent the magazines to the atmosphere. In any event, the obvious excellent condition of the visible interior of the magazines (walls, ceilings, floors) and the very small water puddles observed on the* *otherwise dry floors suggest that very little work would likely be required to make the magazines suitable for pit storage. The magazine interiors actually look much younger than their actual age.*

RC: 06.040
Doc: PC-011/1

To expand Pantex's role to accommodate any or all of the above is to me grossly irresponsible in view of the fact that the plant lies above the largest fresh water aquifer in the U.S., and that said aquifer is the lifeblood of this area's agriculture industry. Why the Ogallala aquifer has not been classified as a Class 1 water source is a puzzlement to me.

Response:

Texas enacted a groundwater law in 1949 that authorized the formation of local districts having the power to make and enforce regulations governing groundwater withdrawal. By virtue of this law, Texas has given the power of regulation to local groups, thus placing the responsibility for regulation at the lowest possible governmental level capable of performing the desired functions (USGS 1976). The Texas Water Code section 52.024 grants the Texas Water Commission (predecessor to the TNRCC) the authority to designate Underground Water Management Areas in the State of Texas in the form of a rule to protect groundwater resources. Groundwater resources in the area governed by the Panhandle Groundwater Conservation District, including the Pantex Plant area, have not been designated as Class I or a critical area. This text has been added to clarify volume I, section 4.6.1.2.

RC: 06.041
Doc: PC-011/3

It is a further contention by Pantex boosters that no substantial water pollution has occurred except for the perched water above the Ogallala aquifer. On June 27, 1995, a water sample was taken from one of my windmill wells and submitted for analysis. The results yielded the following information:

For 16 high explosives tested for, results were below PQL [Practical Quantification Limits]. For gross alpha, gross beta, Pu 239/240, Ra 226/228, Sr-90, tritium U 234/238 -- detected, but below Safe Drinking Water Act maximums.

How much will these levels rise if Pantex's role is expanded? Is it something we are willing to risk? Is it truly necessary for the viability of Amarillo's or the Panhandle's economy? Is short term economic prosperity worth eternal contamination?

Response:

The TNRCC detected low levels of high explosive contamination in a domestic Ogallala well located southeast of the Pantex Plant boundary; however, efforts to mitigate further contamination have been completed as discussed in section 1.3.5 of this volume. The well in question has been properly plugged and abandoned under the supervision of the TNRCC and a replacement Ogallala well has been drilled and completed in order to prevent further potential cross-contamination of the Ogallala aquifer. Pantex Plant's Groundwater Protection Project addresses these and future steps to assure the integrity of offsite groundwater quality. Volume I, section 4.6.1.2, has been updated and includes *additional information regarding the Groundwater Protection Project. The scope of this EIS does not include expansion of Pantex Plant's role.*

RC: 06.042
Doc: TG-001/1

There should be an addition to Table 6.5-4 in the Water Resource row. This table in the Draft EIS has only the New Mexico State environmental statutes. Of these 19 Pueblo Indian Tribes, six have received EPA approval for water quality standards under the treatment of State designation. These six are Isleta Pueblo, Sandia Pueblo, San Juan Pueblo, Santa Clara Pueblo, Picuris Pueblo, and Nambe Pueblo. And of the six, Isleta Pueblo is the closest in proximity and downstream on the Rio Grande river from the Manzano Weapon Storage Area at the Kirtland Air Force base, which is one of the alternative sites. Other Pueblo tribes have draft water quality standards that they anticipate approval [for] soon.

Response:

Thank you for your observation. Table 6.5–4 in volume I, has been modified accordingly.

RC: 06.043
Doc: PC-034/12

... In volume I,...4.6, Water Resources (p.4-57) it is stated that "Playas have also been identified as possible sources of focused recharge to the groundwater flow system at Pantex Plant. Unlined ditches have been used to dispose of wastewater and stormwater in the past."

As written, the implication is that the Pantex playas recharge the total groundwater system, which includes the Ogallala aquifer. This is not true. At Pantex Plant the playas have been identified as...possible [sources] of focused recharge to the perched aquifer, and unlined ditches have been used to convey wastewater and stormwater.

Response:

Volume I, section 4.6.1.2, has been modified accordingly to state, "At Pantex Plant the playas have been identified as a possible source of focused recharge to the perched aquifer and unlined ditches have been used to convey wastewater and stormwater."

RC: 06.044
Doc: PC-034/13

... In August 1995, EPA issued a draft NPDES permit for the Pantex Plant, yet in volume I (pp. 4-61 and 4-62) very little information regarding the substance of this draft NPDES Permit is presented.

Question: Why? And why does this section on NPDES Permits contain superfluous information about three-year old TNRCC draft permits on surface water discharges?

Response:

Volume I, section 4.6.1.1, and volume II, appendix C, have been updated to present information from the Final NPDES and TNRCC Wastewater Discharge permits.

RC: 06.045
Doc: PC-024/14

Page 5-12, left column, "Impacts of Facility Upgrades," last five lines. No mention is made, in this report, concerning the radioactive trititated water that drains out of some of the tunnels and collects in ponds outside the tunnel entrances. Nor is there any mention of the possible collection of gaseous radionuclides in the tunnels that could originate from the waste in the expended test cavities.

Response: *With respect to the tunnels at Nevada Test Site, the only tunnel that is being considered for storage of plutonium pits is P-Tunnel. There is no drainage out of P-Tunnel. Upon completion of a weapons effects test, and the recovery of the data, the area is sealed to prevent radionuclide migration.*

RC: 06.046
Doc: PC-023/2

With respect to water resources and water quality, I understand that groundwater and surface water contamination has been attributed to past activities at Pantex Plant. Heavy metals, solvents, etc. found in excessive concentrations in the perched groundwater can be linked to poor disposal practices in the past, and improved waste handling should limit future contamination. However, since soils in recharge areas (including playas and ditches) are contaminated, the contaminants can continue to move to the perched aquifers. I am concerned about the quality of water in some relatively shallow domestic wells in the vicinity. Your report states that at least two domestic wells draw water from perched groundwater.

Response: *Pantex Plant has worked very closely with EPA Region VI and the TNRCC to produce wastewater discharge permits (EPA NPDES Permit No. TX-0107107 and TNRCC Wastewater Discharge Permit No. 02296) that provide stringent wastewater discharge requirements that are protective of human health and the environment. An additional condition of the TNRCC requires Pantex Plant to conduct a study to determine the feasibility of eliminating or minimizing discharges to playa lakes and open ditches or improving the quality of discharge. In addition, DOE is conducting a Groundwater Protection Project to alleviate the potential for groundwater contamination.*

RC: 06.047
Doc: PC-023/3

... It is possible that the water in the perched sources can move to the Ogallala aquifer. The hydraulic gradient of the Ogallala in the vicinity of Pantex indicates well drawdown under Pantex Plant toward the City of Amarillo well fields in Carson County northeast of the plant. In other words, contaminants that leach to the Ogallala under Pantex will likely move toward the wells supplying water to the City of Amarillo. The City of Amarillo has pledged up to 1,460 million gallons per year to Pantex Plant, up from the 221 million gallons used in 1994. If pumping rates from these well fields increase, the well drawdown will increase, thereby increasing the hydraulic gradient and increasing the rate of movement of these contaminants toward the city's water supply.

Response: *The 1,460 million gallons per year of water that was offered by the City of Amarillo refers to reclaimed wastewater from the Hollywood Road Wastewater Treatment Plant, not groundwater supplied from the Carson County wellfield, as discussed in the response to comment 06.003.*

RC: 06.048
Doc: HT16/16

My main concerns about the discussions of the perched aquifer and the Ogallala aquifer have to do with the limited amount of information that is available describing the limits of the perched aquifer to the south and southeast. And I'm also concerned about the lack of discussion of leakage of perched aquifer waters through the perching horizon. In my reading of the Draft EIS, these two issues are not treated with any...kind of detail. And I would like to know if there's any additional information available that may be added into the final statements. We don't know for sure, for example, what happens to perched...aquifer waters when they reach towards the limit of the perching horizon. Are they simply flowing off the edge of the perching horizon and then into the Ogallala aquifer, or is it possible in some cases that the southern margins of the perched horizon are more or less continuous or sort of flow into the Ogallala aquifer.

Response: *An expedited site characterization was conducted in 1994 and 1995 to characterize the extent of the perched aquifer, nature of recharge, and direction of groundwater flow. The results of the investigation are included in the Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant (Argonne 1995a). Data collected during the expedited site characterization were used to predict contaminant movement and to evaluate cleanup options for perched groundwater; the results of this study are reported in Two-dimensional Groundwater Flow Model and Design Tool for Evaluation of Remedial Options for Perched Groundwater at Pantex Plant (Battelle 1996a). Additional investigations are being conducted on private property south and southeast of Pantex Plant. The primary area of concern in this modeling effort is the perched aquifer underlying Zones 11 and 12 and the area east and southeast of the plant boundary.*

The perched aquifer occurs as a result of localized groundwater mounds that form beneath the playas from focused surface water recharge. The existence of the perched aquifer is also dependent on the occurrence of a fine-grained zone, reported to be approximately 30 to 110 feet thick. This fine grained zone impedes the downward movement of infiltrating groundwater. The fine-grained zone has an irregular surface, and generally occurs 300 feet below land surface. Where the fine-grained zone is present, perched groundwater collects in sand and gravel deposits that form subsurface channel features. The perched aquifer is thickest beneath Playa 1, which is considered to be a source of focused recharge to the perched aquifer. Groundwater in the perched aquifer is considered to flow radially away from Playa 1. Recharge varies laterally between playa, interplaya, and drainage ditch environments.

It is important to note that the perched aquifer is stratigraphically higher (closer to the surface) and not directly hydraulically connected with the underlying Ogallala aquifer. The depth to groundwater ranges from 210 to 290 feet below land surface in the perched aquifer and from 340 to 460 feet in the underlying Ogallala aquifer.

The information provided in this response has been added to volume I, section 4.6.1.2, for clarification.

RC: 06.049
Doc: HT16/23

On Page 4-57, the first paragraph is somewhat confusing. We'd like to see a statement [that] clearly states that Pantex did at least historically discharge [to] Playa 5. It's implied in the statement they have in the first paragraph. We would like to see it just a little more clear cut. With regard to Ogallala contamination, I understand the EIS had been written before we discovered some slight amount of contamination in the Ogallala proper. Since the EIS hasn't come out in its final version, I think it ought to be revised to go ahead and reflect the conditions we know about now.

Response:

According to the Pantex Plant Environmental Information Document (Pantex 1996), no industrial discharges from Pantex Plant have ever entered Playa 5.

Discussion of contaminants of concern detected in the Ogallala aquifer has been addressed in the Final EIS.

RC: 06.050
Doc: HT16/24

With regard to the Ogallala, the homestead wells, the EIS should note that the low vertical permeability of the fine-grained zone may be compromised by these abandoned homestead wells that have been found on the Pantex site. These wells could provide contaminant pathways through the fine-grained zone to the Ogallala.

Response:

See discussion in section 1.3.5 in this volume regarding the efforts concerning the homestead wells in the Pantex Plant groundwater protection program.

RC: 06.051
Doc: HT16/25

With regard to the facility boundary, the EIS should mention that DOE will take whatever action is practicable to clean up the groundwater to residential drinking water standards beyond the facility boundary. ...On Page C-2 there's a statement that...the Texas State Surface Water Quality Criteria do not apply to Pantex playas. But if you go through the Risk Reduction Rules, 30 Texas Administrative Code, Subchapter S, Chapter 335, you'll note that Texas Surface Water Quality Criteria [do] apply to the Pantex playas surface water quality values. The surface water quality determined in accordance with Risk Reduction Rules [takes] precedence over the risk based concentration guidelines from EPA Region 3, which was cited on section C.1.2. The list of decision criteria doesn't list the Texas Risk Reduction Rules, which also include Texas Surface Water Quality Criteria and drinking water standards and so forth. ...Since the EPA Region 3 guidelines don't apply to Pantex, which is in EPA... Region 6...and we have the Texas Risk Reduction Rules and the Texas Surface Water Quality Criteria, all of which do apply, we'd just as soon you drop the EPA guidelines and substitute the Risk Reduction Standards. This gets to be a problem later on.

In Table C.1.2-1, some of the values cited apparently cite the EPA Region 3 guidance. For instance, the standard for antimony should be 0.006 milligrams per liter, based on the Risk Reduction Rules, which refers it back to the Safe Drinking Water Act, rather than the 0.15 milligrams per liter cited by EPA Region 3 guidance. So, because we're using the wrong guidance, we're getting the wrong numbers cited in the EIS. Standards for gross alpha activity, according to the Risk Reduction Rules, should be 15 picocuries per liter rather than...N/A—not applicable. That was cited in the table. No water quality standard is provided by the Texas Surface Water Quality Criteria; therefore, the Risk Reduction Rules specify use of drinking water standards which are based on the Federal Safe Drinking Water Act. Proposed drinking water standards should be 50 picocuries per liter or 4 millirems per year for beta particle activity....

And the TNRCC requests that DOE revise Table C.1.2-1 to cite the more stringent surface water quality standards for radionuclides that are developed in accordance with the Risk Reductions Rules. As such, the standard for plutonium-239/240 would be 2 x 10^{-8} microcuries per milliliter, based on the TRCR standards. ...they come out of the Bureau of Radiation Control, Texas Department of Health. Radium-226 and -228 should be 6 x 10^{-8} microcuries per milliliter, again, based on the drinking water standards, Federal drinking water standards. Tritium should be 1 x 10^{-3} microcuries per milliliter, based on the TRCR standards. Uranium-234 and -238 would be either 3 x 10^{-7} microcuries per milliliter, which is a TRCR standard, or 20 milligrams per liter, proposed drinking water standard, whichever is more stringent.

Response: *DOE has completed a Groundwater Protection Project to cleanup the groundwater to residential drinking water standards beyond the facility boundary, as discussed in section 1.3.5 of this volume. The purpose and objectives of the Groundwater Protection Project have been addressed in volume I, section 4.6.1.2.*

Surface water quality decision criteria issues are summarized in section 1.3.5 of this volume. In the Draft Pantex Plant EIS, EPA Region III Risk Based Concentrations (RBC) Guidelines were used as a surface water quality decision criteria only for those constituents that did not have established surface water quality standards, Pantex Plant wastewater discharge permit limits, or DOE Derived Concentration Guides (DOE Order 5400.5) for radionuclides. As a result, EPA Region III RBC Guidelines were used as decision criteria for the following constituents: antimony, beryllium, boron, cobalt, molybdenum, nitrite, strontium, tin, vanadium, 3,3'-dichlorobenzadine, 4-methylphenol, acetone, benzoic acid, chloroform, ethylbenzene, methylene chloride, phenol, toluene, total xylenes, HMX, RDX, and ammonia. Of these constituents, the following are now regulated in the NPDES and TNRCC Wastewater Discharge Permits: antimony, beryllium, cobalt, molybdenum, HMX, RDX, and ammonia. EPA and TNRCC determined which constituents would have recording requirements and/or permit limits specified in the NPDES and Wastewater Discharge permits based on a review of the most recent surface water quality data available for the main outfalls and internal outfalls. The most recent analytical data at the time of regulatory review were from 1993. The TNRCC calculated effluent limitations that were based on the Texas State Water Quality Standards (30 TAC 307). The actual effluent limitations, cited in the permits, are more stringent that those calculated by the TNRCC and reported in its Fact Sheet. As stated in the NPDES Permit, EPA has accepted the statistical calculations provided by Pantex Plant and has established metal limitations on *case-by-case basis through best professional judgment under 402(a) of the Clean Water Act for best available technology economically available. In addition to the constituents that are regulated in the permits, the Pantex Plant Environmental Protection Department also has conducted analyses for the following constituents that were not specified in the permit: nitrite, strontium, vanadium, 4-methylphenol, 3,3'-dichlorobenzadine, chloroform, ethylbenzene, methylene chloride, phenol, toluene, acetone, benzoic acid, xylene, boron, and tin. By monitoring for these additional constituents, Pantex Plant is providing additional assurance that any changes in chemical constituents and their relative concentrations are protective of human health and the environment.*

NPDES and Wastewater Discharge permit requirements have replaced RBC Guidelines from EPA Region III as decision criteria. Refer to volume I, section 4.6.1.1, and volume II, appendix C.

The Atomic Energy Act authorizes DOE to protect public health and safety and the environment in conducting programs, such as Pantex Plant operations. The purpose of DOE Order 5400.5 is "To establish standards and requirements for operations of the DOE and DOE contractors with respect to protection of members of the public and the environment against undue risk for radiation...." It is DOE's objective to operate its facilities and conduct its activities so that radiation exposures to members of the public are maintained within the limits established in this Order and to control radioactive contamination through the management of real and personal property. It is also a DOE objective that potential exposures to members of the public are as far below the limits as is reasonably achievable and that DOE facilities have the capabilities, consistent with the types of operations conducted, to monitor routine and non-routine releases and to assess doses to members of the public. In addition to providing protection to members of the public, it is DOE's objective to protect the environment from radioactive contamination to the extent practical." As a result, the Risk Reduction Rule and drinking water standards are not applicable decision criteria for surface water quality at Pantex Plant. The TNRCC Permit Fact Sheet (TNRCC, 1995a) states that the known uses of the receiving waters are high quality aquatic life use and contact recreation. The uses for the unclassified waters are intermittent playa lakes with no significant aquatic life uses. Acute aquatic life criteria apply. There is no reference to drinking water standards or Risk Reduction Rules being applicable criteria for Pantex Plant surface water in either the TNRCC or EPA permits or their respective Fact Sheets.

RC: 06.052
Doc: HT16/26

My question refers to -- it's on Page 4-78. And you recognize, and I quote, groundwater management is a responsibility of local jurisdictions through groundwater management districts. The Pantex Plant is located in Panhandle Groundwater Conservation District Number 3, which has authority to require permits and limit the quantity of water pumped. And, in view of this statement in the document, why have you chosen not to register the perched water production wells and the monitoring wells in compliance with Rule 4 of the Panhandle Groundwater Conservation District? It does not require permitting,

	but it does require registering and a semiannual report of any water quality analysis that were taken from the monitoring wells.
Response:	*DOE is working with the Panhandle Groundwater Conservation District Number 3 to resolve this issue.*
RC: 06.053 **Doc: HT16/27**	... I'd like for one of the DOE people to characterize to me how the system failed when, on a meeting on May 13th with Johnny Bolin [Guelker] and Danny [Dan] Ferguson of DOE, Boyd Deaver from the TNRCC here in Amarillo and myself, agreed that it was in everyone's best interest to not plug the Lee Cockrell windmill located off site. And then, two days later on May 15th, it was related to me that that well was plugged. And I just wondered where the system failed and what has done to correct it.
Response:	*The windmill well was plugged by mistake. It has been redrilled and sampled for chemical analysis.*
RC: 06.054 **Doc: HT16/28**	When you were making the presentation on the water, you said that radionuclides were significantly below DOE standards. Does that mean that they are detectable?
Response:	*Many radionuclides are naturally occurring in soils and groundwater. Activities of radionuclides detected in Pantex Plant groundwater samples were within the range of natural background water chemistry.*
RC: 06.055 **Doc: HT17/19**	... I'm concerned, as Ms. Smith is, with the threat that I see to the farmer in this community. When we see already that some of this stuff has leached down into the Ogallala aquifer, and people...keep shooting off them test things out there and all that, and they have all them cracks and stuff in the ground.
Response:	*Pantex Plant is currently conducting groundwater treatability investigations in conjunction with their ongoing environmental restoration program efforts. Contaminated groundwater is pumped out of the perched aquifer, treated in a carbon-filtration system to remove high explosive contamination, and then pumped back into the perched aquifer. When the treated groundwater is reintroduced into the perched aquifer it flushes and displaces the existing contaminated groundwater, moving it toward the treatment system wells for cleanup. As stated in comment 06.020, the subsurface sediments in the Ogallala Formation consist of unconsolidated sand, silt, clay, and gravel; there are no cracks or fractures. Groundwater moves through void spaces between unconsolidated sand, silts, and gravels, and is being treated at an approximate rate of 42,000 gallons per day.*
RC: 06.056 **Doc: HT17/40**	Pantex is a Superfund Site. We now have confirmed contamination in the Ogallala Aquifer. It would seem that before we rush headlong into new missions, bringing new waves of radioactive pollution to this plant, that the document should at least address the effort to mitigate pollution already onsite. It really doesn't.

Response: *Additional information, including a description of the Groundwater Protection Project and Corrective Action Plan for ditches and playas has been added to volume I, section 4.6.1.2. For additional detail, see discussion in section 1.3.5 of this volume.*

RC: 06.057
Doc: HT17/56

... There is no recognition that the Ogallala aquifer is the only source of groundwater for the entire Texas Panhandle, the South Plains, and parts of seven other Midwestern states. The siting of hazardous and radioactive operations over this finite water source is totally unacceptable. There is no substitute for water.

Response: *See discussion in section 1.3.5 of this volume. The following sentence has been added to the description of the Ogallala aquifer: "The Ogallala aquifer underlies the whole of the Texas Panhandle, the South Plains as well as parts of New Mexico, Oklahoma, Colorado, Kansas, Nebraska, Wyoming, and South Dakota."*

RC: 06.058
Doc: PC-017/10

There are at least seven playa lakes just off the Pantex site on all sides of the plant. Rainwater runs off the plant site into barrow ditches around the plant and drain into those offsite playas. This drainage is not addressed in the PEIS. The Pantex lake receives none of the runoff. Why were the other playas excluded? The watershed on the south of Lake Meredith, a reservoir for 13 cities, begins on the northwestern corner of Pantex. Water from that section of the plant (where the various EIS's show a nuclear reactor or two may be constructed) runs into Lake Meredith.

Response: *EPA Region 6 NPDES Permit No. TX-0107107 authorizes Pantex Plant to discharge to the waters of the United States, under specified effluent limitations and monitoring requirements. According to this permit, the discharge from Pantex Plant is directed into four playa lakes, located adjacent to the waterbody of McClellan Creek, which flows into the North Fork of the Red River (Waterbody Segment Code No. 0224 of the Red River Basin). There are no known surface water connections that could transport potential contaminants from Pantex Plant into the Canadian River. Due to the flat, level topography of the Pantex Plant, streams are not well developed on the landscape and surface waters drain to the playa basins, as discussed in volume I, section 4.6.1.1. In the event that contaminants were transported by surface runoff, the contaminants would remain within the designated watershed (Pantex 1996).*

RC: 06.059
Doc: PC-017/11

Page 4-79. Use of water from the perched aquifer and also the Ogallala aquifer is just not true, as contamination is in the domestic wells of a neighbor to the east of the plant and a well to the south of the plant. Why are false statements being made? What measures are being taken to clean up the water offsite? This contamination must be coming from the "Pantex AQUIFER." Pantex aquifer is a result of the waste being run into on site playas. How will the contamination of the Ogalala be cleaned? How do you determine "insignificant" amounts? Does DOE define "insignificant" as anything or amount the DOE does not want the public to believe may be harmful? Can "insignificant" amounts become "significant" if ingested or exposed over long terms? What is the long-term effect on health and safety?

Response: *Minute traces of high explosive contaminants were detected in the Ogallala aquifer after publication of the Draft Pantex EIS. Volume I, section 4.6.1.2, has been amended to provide the updated information. The relation between the past practices and contamination of the perched aquifer is discussed in detail in section 1.3.5 of this volume. The significance of the amounts of any contaminants is considered by comparing the concentration to regulatory standards which are based, in part, on health effects. Five years of surface water and groundwater quality data have been compared to site-specific permit limits, DOE derived concentration guides for radionuclides and Federal and State decision criteria. Concentration limits have been based on State and Federal drinking water regulations and health advisories.*

RC: 06.060
Doc: FG-003/4

Page 4-57, second paragraph: In this paragraph and at other places in the text it is asserted that the discharge water from the plant meets the surface water quality permit requirements. Because it is acknowledged in the document that leakage from waterways and playas enters the ground, EPA guidelines for groundwater quality are of concern here. Under EPA's "Strategy for the 90's" report of the Ground Water Task Force, the Maximum Contaminant Levels (MCLs) established under the *Safe Drinking Water Act* (SDWA) are to be used as reference points in evaluating groundwater quality. This Draft EIS also recognizes the significance of these MCLs when it lists them as "decision criteria" for ground water analyses presented in volume II. The requirements under the National Pollutant Discharge Elimination System (NPDES) do not include all of the contaminants for which MCLs have been set for public water supply systems under the *Safe Drinking Water Act* and in many cases the limits set under NPDES are higher than those under the SDWA. Under these circumstances, we recommend that Pantex consider protecting the groundwater by either lining the ditches and playas with the level required to maintain, or restore to, SDWA MCLs in the groundwater. Discussion on this matter should be included in the Final Statement.

Response: *Detailed information regarding the status and conditions of wastewater discharge permit limits is provided in section 1.3.5 of this volume. TNRCC Wastewater Discharge Permit No. 02296 (as amended) requires that within one year of the effective date of the permit (June 14, 1996), Pantex Plant must conduct a study that determines the feasibility of eliminating or minimizing discharges to playa lakes and open ditches or improving the quality of discharge. The study should, at a minimum, include the following proposals:*

(1) upgrading existing treatment facilities or constructing new treatment facilities to ensure no groundwater quality effects from discharges to playa lakes and ditches,

(2) construction of synthetically-lined impoundments to confine treated effluent and a closed collection system from all process areas to the treatment facilities,

(3) establishment of an irrigation disposal site and accompanying disposal practices plan to eliminate discharges to the playa lakes,

(4) establishment of a reuse and conservation program for all process wastewaters, thereby eliminating any industrial effluent discharge to the playa lakes and ditches, and

(5) development of a schedule for completion of proposals or any other proposals deemed feasible by the permittee.

A Groundwater Contamination Assessment Report is being developed as part of the RCRA Facilities Investigation Work Plan, in association with the Draft RCRA Permit. Discussion of the requirements of the applicable wastewater discharge permits has been updated in volume I, section 4.6.1.1, and volume II, appendix C.

RC: 06.061
Doc: FG-003/5

Page 4-62, last paragraph: The first bullet describes "unsaturated sands of the Blackwater Draw Formation and upper Ogallala" at the surface, but the diagram on page 4-64 indicates that the Blackwater Draw Formation consists of clay. This inconsistency should be clarified in the Final Statement.

Response: *The referenced discrepancy has been clarified by referring to "Unsaturated sands and clays..." in volume I, section 4.6.1.2.*

RC: 06.062
Doc: FG-003/6

Page 4-65, third paragraph: It is stated that the perched aquifer "exhibits radial flow." By way of clarification, the Final EIS should note that the flow is radial from Playa #1, suggesting that the playa is a major source of recharge locally.

Response: *Comment noted. The phrase "from Playa 1" has been added to the referenced text in volume I, section 4.6.1.2.*

RC: 06.063
Doc: FG-003/7

Page 4-67: The map illustration depicts a domestic water well to the southeast of the Pantex property, just outside the area of the perched aquifer. The well appears to be in the flow area of the perched aquifer. The well appears to be in the flow direction of the groundwater in the perched aquifer and may be in danger of contamination from groundwater in the perched aquifer. The Final EIS should identify the boundaries of the contaminated perched aquifer and establish what risk may exist, if any, for the potential contamination of the Ogallala aquifer.

Volume I, section 4.6.1.2, has been updated with the most current information available.

RC: 06.064
Doc: FG-003/8

Page 4-71, third paragraph: It is indicated here that the quality of surface water being discharged is described earlier at section 4.6.1.1. However, there is no description of the discharge water quality at the point cited. It would be helpful if the FEIS could provide a complete description of the discharged water chemistry within the text.

Response:	*A comprehensive description of the discharged water chemistry is provided in volume II, appendix C. The referenced text has been modified to refer the reader to volume I, section 4.6.1.1, and volume II, appendix C, where descriptions/ tabulations of the discharge water chemistry are provided.*

RC: 06.065 **Doc: FG-003/9**	Page 4-72, second paragraph: It is difficult to visualize all the information about water quality and contaminant locations described here. [It] would be helpful to have one map to display this information in the Final Statement. It would also be helpful if the FEIS could have a section describing the past and current chemical quality of discharges. Section 4.6.1 makes a general attempt at this goal but is too generalized. The Final Statement should list specific contaminants and major components of water chemistry, and describe any changes through time. A table showing concentration ranges, averages, etc., would be appropriate for this discussion.
Response:	*This type of information (specific contaminants and major components of water chemistry, source areas, and changes in concentrations through time) is compiled in the Draft RCRA Facility Investigation (RFI) and will be available to the public upon final regulatory approval. Figure 4.6.1.2–7 has been added to volume I, section 4.6.1.2 to show the distribution of RDX concentrations in the perched aquifer. Information regarding past chemical discharges are discussed in volume I, sections 4.5.1.3 and 4.6.1. Table 4.6.1.2–2 in volume I lists source areas of suspected contaminants of concern to groundwater resources. Water quality summary tables that show average and maximum concentrations for a 5-year timeframe are provided in volume II, appendix C.*

RC: 06.066 **Doc: FG-003/11**	Two sites at the Nevada Test Site (NTS) were assessed for the interim storage of plutonium pits, the P-Tunnel area and the Device Assembly Facility area. The Pantex DEIS (volume I, p. 5-8) indicates that groundwater at the two NTS sites is characterized by a "deep water table," although depth to groundwater is not specifically quantified in the DEIS. A prior Department of Energy EIS reviewed by EPA Region 9 (FEIS, Tritium Supply [and] Recycling, October 1995, volume I, p. 4-114) stated that the depth to groundwater at NTS ranges from 500 to 2,400 feet. The tritium FEIS also indicated that "there are...areas of perched water that lie at considerably shallower depths" at NTS.
Response:	*The referenced sentence in volume I, section 5.2.1.4, has been modified to give the range of depths to groundwater. The Pantex EIS only deals with the interim storage of pits at the Device Assembly Facility, located adjacent to Yucca Lake, and P-Tunnel at Ranier Mesa. The plutonium pits would be containerized and stored in these existing facilities. As a result, groundwater resources would not be affected by these storage activities.*

RC: 06.067 **Doc: FG-003/14**	The Pantex FEIS should discuss whether either of the areas is characterized by "perched water...at considerably shallower depths..." as described in the Tritium FEIS. If so, the groundwater impacts that are reasonably foreseeable should the plutonium pits be damaged in a quake.

Response: *Plutonium pits would be placed in sealed containers that are designed to withstand impact. Thus, the contents are not expected to come into contact with groundwater.*

RC: 06.068
Doc: HT17/69

... I understand that...in this [the Pantex EIS] there...are some omissions which have been brought out. ...It has been noted that there's nothing said about the Superfund Site projects in the study, and it would seem that that might be something important to look at. All of us around here notice the recognition of the Ogallala aquifer, as it is probably, in the United States, the largest fresh water aquifer.

Response: *As stated in volume I, section 6.4, Pantex Plant is working with the EPA and TNRCC to develop a tri-party Federal Facility Agreement to outline reporting requirements, schedules, and funding for the Environmental Restoration Program. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) efforts are being integrated into the existing Resource Conservation and Recovery Act (RCRA) Facility Investigations, corrective measures studies, and corrective measures implementations that are described in volume I, sections 4.5.1.3, 4.6.1.1, and 4.6.1.2. Language describing the extent of the Ogallala aquifer has been added to volume I, section 4.6.1.2.*

RC: 06.069
Doc: PC-025/24

On Page 4-56, buildings listed do not appear to match diagram on page 4-243. Figure appears to be crowded with information. Recommend simplification.

Response: *Figure 4.6.1.1–1 in volume I has been revised and simplified.*

RC: 06.070
Doc: PC-025/25

On Page 4-60. Please explain. If a playa is a wetland [and] a wetland is considered waters of the United States...why is a playa not [considered] waters of the State?

Response: *In 1990, Pantex playas 1 through 4 and Pantex Lake were determined to be jurisdictional wetlands by the U.S. Army Corps of Engineers, and are therefore considered to be waters of the United States subject to protection by the National Pollutant Discharge Elimination System (NPDES). TNRCC Permit No. 02296 has been amended (effective June 14, 1996) in accordance with the EPA Region VI NPDES Permit No. TX-0107107 that became effective on June 1, 1996. Volume I, section 4.6.1.1, has been updated to discuss the terms and conditions of these new permits.*

RC: 06.071
Doc: PC-025/26

... Do the number of wells located on the Pantex site represent significant pathways to increased groundwater contamination? What measures are taken to control this pathway? In the event of a plutonium accident what is the possibility that the well is open and plutonium enters the groundwater through the monitoring system? Assuming the well was open during an accident, what is the release to the groundwater? What is the impact if Pantex loses groundwater usage? Adjacent land owners?

Response: *The low vertical permeability of the fine-grained zone could potentially be compromised by abandoned homestead wells that could provide contaminant pathways through the fine-grained zone to the Ogallala aquifer. As a precautionary measure, DOE has identified and sealed abandoned homestead wells in order to prevent potential pathways of contamination into the Ogallala aquifer under the Groundwater Protection Project. These precautionary measures and other key aspects of the Groundwater Protection Project are discussed in volume I, section 4.6.1.2. In the event of plutonium accident, the plume would have to pass over the open well at the times it was open. This probability would be an order of magnitude less than the probability of a plutonium accident (see volume I, section 4.14). The amount of plutonium that could get into an open well is difficult to predict. Based on the small cross-section of the well and the large area over which plutonium would be spread in an accident, the amount would be very small.*

RC: 06.072
Doc: PC-025/27

On page 4-63, why was OW-WR-20 utilized in cross section when the cross section should go from 6-1003 to 6-1004 to 6-1005? Why was 6-1015 left out? What are the impacts if these wells are utilized? What is the quality of the hydrostatic cross section input data (i.e. well logs)?

Response: *The referenced cross section was taken from DOE 1994nn. OW-WR-20 was utilized because the water quality of this well is discussed in volume I, section 4.6.1.2. Perched monitor well 6-1015 was not included in the cross section on the original reference and was not available at the time of publication of the Draft Pantex EIS. The referenced cross section has been replaced with an updated north-south trending cross section (Figure 4.6.1.2–3) that shows the axis of the paleochannel.*

RC: 06.073
Doc: PC-025/28

On Pages 4-66 and 4-67. Why did you change nomenclature on PM-21 (466) and OW-WR-21 (467)?

Response: *Figure 4.6.1.2-3 in volume I has been revised to refer to OW-WR-21, rather than PM-21.*

RC: 06.074
Doc: PC-025/29

On Pages 4-66 and 4-67, why aren't wells PXSP-OIA, PXSP-03, PXSP-04, etc. listed in appendix C, table C.2.1-1? What level of QA has been completed on this section? Please include QA/QC certification documentation in appendix including signatures of key QA/QC personnel. Please provide documentation assuring QA/QC measures were implemented, met established goals, and necessary certification exists.

Response: *The Draft Pantex EIS was prepared with available information supplied by Pantex Plant. The references for Figures 4.6.1.2–3 and 4.6.1.2–4 in volume I are provided in the referenced text. Data from all referenced well logs that were made available by the time of publication were utilized and included in volume II, appendix C. The administrative record includes files that provide QA/QC certification documentation. Volume II, appendix C has been updated with* *additional information that has become available since the publication of the Draft Pantex EIS.*

RC: 06.075
Doc: PC-025/30

On page 4-67, why are wells off the Pantex Plant lacking well numbers?

Response:

The locations of offsite wells are shown. These wells are on private land and data from these specific wells are considered private. Data have been provided to the extent practicable. Well numbers are provided for all onsite wells that are monitored by the Environmental Protection Department or by the Environmental Restoration Program. Inclusion of well numbers would not serve any purpose for this document. Please note that a map showing all vicinity wells has been added to volume I, section 4.6.1.2 (Figure 4.6.1.2–1).

RC: 06.076
Doc: PC-025/31

... Table 4.6.1.2-1, page 46-8. What is the reason the realistic estimate is an order of magnitude larger than the most conservative?

Response:

Aquifer performance tests were used to estimate groundwater velocities. The results of these aquifer tests are highly variable and are dependent on the testing location and relative heterogeneities in the subsurface sediments from one location to another, the duration that the test is run, variations in testing procedures, and the method of analysis. These variations in aquifer performance testing lead to differences in groundwater velocity estimates.

RC: 06.077
Doc: PC-025/32

... What is the source of the statement "These perched zones are believed to be hydraulically separate from the perched aquifer in Zone 12 at Pantex Plant?"

Response:

The referenced statement was provided as a personal communication (February 1996) from the Pantex Environmental Restoration (ER) Department, based on the best available information at the time of publication of the Draft Pantex EIS. Volume I, section 4.6.1.2, has been updated with additional information that has been provided by the Pantex ER Department since February 1996.

RC: 06.078
Doc: PC-025/33

And Page 4-69 in Ogallala aquifer section. Vicinity of ROI, more accurate?

Response:

The referenced text has been modified to state, "The Ogallala aquifer is the principle aquifer and major source of water in the vicinity of Pantex Plant and surrounding region of influence," and "The Ogallala aquifer underlies the Texas Panhandle and the South Plains, as well as parts of New Mexico, Oklahoma, Colorado, Kansas, Nebraska, Wyoming, and South Dakota."

RC: 06.079
Doc: PC-025/34

... Why aren't wells OW-WR-23, and 28 listed in Table C.2.1-1? Does OW-WR-40 leak water to the perched from the contaminated Playa 1? Is OW-WR-40 above or below the floodplain? Are any of the well heads located in the Pantex Plant or vicinity below any floodplain? What are impacts if there are [any]?

Response:	*OW-WR-23 and OW-WR-28 are not wells. They are drinking water sampling locations at Buildings 12-2 and 12-6 Cafeteria respectively. The referenced figure has been corrected. Monitoring well OW-WR-40 is screened (or open to groundwater flow) from 580 to 610 feet below ground surface, within the Ogallala aquifer. The fine-grained zone occurs well above the screened interval at a depth of 252 to 356 feet below ground surface. Because the well is only screened in the Ogallala aquifer, the thickness of the fine-grained zone, and the vertical distance (over 200 feet) between the perched aquifer and the Ogallala aquifer, OW-WR-40 does not leak water to the perched aquifer from Playa 1. Based on our review of five years of data, Ogallala monitor well OW-WR-40 only exceeded decision criteria for one constituent, iron, during 1990, 1991, and 1993. However, no contamination from high explosives, organic compounds, or radionulcide contaminants of concern have been detected in this well. According to the 1995 Environmental Report for Pantex Plant (Pantex, 1996c:87), "There was no indication of contamination by radiological constituents, metals, explosives, or organic compounds in Ogallala monitoring wells, and there was no evidence of contaminated groundwater from the overlying perched zone reaching the aquifer." Details regarding the protection of cross-contamination from homestead wells are addressed in section 1.3.5 of this volume.*

RC: 06.080 **Doc: PC-025/35**	Page 4-76. I'm confused, how can a zone be a source but a landfill is a location? What does 12-5W, etc. mean? What is OSTP?
Response:	*The "source" refers to the particular area of the plant where contaminants of concern potentially originated. The "location" refers to the specific building, landfill, leach bed, etc. within that source area. Designations such as 12-5W refer to specific buildings within the respective zone, (e.g., Building 5W in Zone 12). OSTP is the acronym for the Old Sewage Treatment Plant. Acronyms are defined in the EIS with their first usage and in the list of acronyms and abbreviations.*

RC: 06.081 **Doc: PC-025/36**	Appendix C is difficult to review in support of section 4.6 because DOE flip-flops the nomenclature for well numbers. As an example, table C.2.1-1 [has the] well ID as 15-20, but C.2.2-3 [has] PR-16, please standardize. On page 4-77 isn't it three wells for lead: PR-16, OM-39, and PR-41?
Response:	*Primary well numbers have been standardized for clarification. The referenced text in volume I, section 4.6.1.2, has been modified to state "...and lead in three wells...".*

RC: 06.082 **Doc: PC-025/37**	Page 4-78. What is the source of the 704 million liters? What is the source of the 760 irrigation wells? What is the source of the two private wells? Do you suspect more? What would be the impact of more perched wells?
Response:	*The referenced text has been updated and revised. The updated source of data for Pantex Plant wells is the 1995 Environmental Report for Pantex Plant (Pantex, 1996c). Updated irrigation well data was provided by Panhandle*

Groundwater Conservation District No. 3 and the Farm Service Agency. The impact of more perched wells would be dependent on the well's intended use. Perched monitoring wells provide additional sources of information about the water quality, potential contaminants of concern, and changes in chemical concentrations with time. Recovery wells are being used to pump contaminated groundwater out of the perched aquifer for treatment. However, if contaminated groundwater within the region of influence were used for domestic or agricultural uses, several potential pathways of exposure (e.g., ingestion, bathing, other potable water or agricultural uses) could result. DOE has conducted a Groundwater Protection Project as a mitigation measure. For additional information about private perched wells, see discussion in section 1.3.5 of this volume.

RC: 06.083
Doc: PC-025/38

Page 4-79, "the quality of the wastewater discharge is such that it will not degrade..." What is the source of the statement? Please explain position in greater detail. Doesn't the playa carry contaminants to the Ogallala? If (regionally) perched water is used to supply cattle with water, would WWTF water be used as cattle drinking water. If not, how can the above statement be true?

Response:

The quality of wastewater discharge will not degrade the perched and Ogallala aquifers, because the wastewater discharge is regulated through the EPA Region VI NPDES Permit and TNRCC Wastewater Discharge Permit. For additional information regarding these permits refer to section 1.3.5 of this volume and the updated discussion in volume I, section 4.6.1.1. Surface water outfalls are monitored to assure that the discharge water quality is within the specified permit limits. Similarly, perched and Ogallala groundwater is monitored in onsite and offsite locations to assure that human health and the environment are being protected. The hydrology and recharge of the perched aquifer is very complex and the effects upon the vadose zone from continual discharge of water into the existing lakes and drainage ditches does not necessarily result in contaminated groundwater being driven into the Ogallala. The trace levels of high explosive constituents that were detected in an offsite private well were believed to be due to special circumstances; see discussion in section 1.3.5 of this volume. Environmental Restoration (ER) investigations, conducted at or before the time of publication, have indicated that the extent of offsite contamination detected in the perched groundwater has been limited to within one-half mile southeast of the main Pantex Plant Site boundary. The ER program is currently conducting corrective actions, such as interim measures to remove "hot spot" areas of contaminated soils, to protect human health and the environment as discussed in section 1.3.5 of this volume.

RC: 06.084
Doc: PC-025/39

In Table 4.6.2-1, are margins included? Why is the liter conversion included?

Response:

The annual rates referenced in volume I, Table 4.6.2–1, include a 10 percent margin. Liter conversion is included to comply with DOE policy.

RC: 06.085
Doc: PC-025/40

Table 4.6.2.2-1 and Table 4.3.2.2-1 have different sources.

Response:

No, both tables have a common source: Banner, E., Data Needs for the New Projects at Pantex Plant SWEIS request for information supplied by M. Lincoln, Battelle Pantex, Amarillo, TX, May 17, 1995 (PC 1995g).

RC: 06.086
Doc: PC-025/41

In section 4.6.2.2, starting on page 481: What are the sources of water use in each of the 6 projects?

Response:

The source of water for the new facility construction and upgrades, discussed in volume I, section 4.6.2.2, would be Pantex Plant wells. As stated in section 1.3.5 of this volume, the upper bounding conditions (i.e., 2,000 weapons level) would result in a projected annual groundwater withdrawal of 1,011 million liters (267 million gallons), or an increase of 64 percent over FY 1995 water use. Furthermore, under the 2,000 weapons scenario, Pantex Plant groundwater withdrawals would only account for 0.8 percent of the total estimated annual groundwater withdrawals in Carson County.

RC: 06.087
Doc: PC-025/92

Water resources methodology is flawed since the analysis is based on examining permitted discharges of the NPDES system for which Pantex does not have a permit (the permit is pending). Groundwater analysis is flawed since groundwater quality within the [region of influence] ROI [is analyzed] but the analysis does not include other industrial, commercial, petroleum exploration (especially saltwater intrusion, and secondary recovery impacts), CERCLA and RCRA sites contaminating the groundwater. The analysis does not analyze the contamination of the groundwater by underground storage tanks or agriculture nitrates. This information is readily available through the State of Texas. Your methodology specifically calls for ROI analysis of readily available information. The analysis is further flawed because of the lack of analysis of playas within the ROI. Finally the analysis ignores the number of wells located in the ROI as potential contamination pathways to the Ogallala or whether any of these wells [are] resident in a floodplain. The analysis does not include ROI damage from farming and livestock (e.g., nitrogen, pesticides, herbicides, insecticides).

Response:

Impact Assessment Methodologies are provided in volume I, section 4.2. Cumulative impacts include impacts of continued operations at Pantex Plant combined with other reasonably foreseeable projects that could impact the environment at the plant site or in its region of influence (ROI). These include programs examined in Programmatic EISs for waste management, stockpile stewardship and management, and the storage and disposition of weapons-usable fissile materials. Information about new Federal proposed projects was sought, however, no information was forthcoming. The ROI for water resources includes Pantex Plant and the surrounding area that could potentially be impacted by plant operations. The ROI for surface water is the onsite playas and ditch system, and floodplains delineated by the Army Corps of Engineers, as *discussed in volume I, section 4.6.1.1. The ROI for the perched aquifer is based on the extent and migration of contaminants, and is discussed in detail in volume I, section 4.6.1.2. Although the ROI for the Ogallala aquifer has not been quantifiably defined, it is limited to the extent of drawdown in Pantex Plant wells. The quantity of groundwater pumped from Pantex Plant wells is significantly less than for irrigation and for municipal water use, as discussed in section 1.3.5 of this volume. Volume I, section 4.6.1.2, has been updated to address sealing homestead wells located in the ROI that could provide potential contamination pathways to the Ogallala. Damage from other land and water applications outside of the ROI is beyond the scope of this document.*

RC: 06.088
Doc: CO-008/114

C-6, Table C.1.2-3. Results from sampling and analyses from Bushland are provided as "background". Because some concentrations of analytes from Bushland samples exceed those measured in Pantex samples, how do you justify presenting these data as "background"?

Response: *The control well at Bushland is completed in the Ogallala aquifer upgradient from Pantex Plant and is, therefore, unaffected by plant operations (Pantex 1995c:82).*

RC: 06.089
Doc: CO-008/115

C-11, Table C.1.2-3. Provide a table that cross-references location descriptions for surface water. This would allow readers to recognize the locations at which samples reportedly exceeded or lacked water quality criteria (this table). (Table C.2.1-1 on page C-21 provides similar cross-reference information for the water wells.) Some of these locations appear to be playas, waters of the U.S., but it is difficult to tell from the descriptions.

Response: *The requested information is provided in volume I, Table 4.6.1.1-2.*

RC: 06.090
Doc: CO-008/116

C-13, Table C.1.2-3. Hexavalent chromium is shown to exceed the "standard" for 12-17 N, OW-WR-34, and Z-12-S. What was the total chromium for these same samples (i.e., did the concentrations of hexavalent chromium in these samples exceed the measured concentrations of total chromium in the same samples? [in which case the reported concentrations of hexavalent chromium may be exaggerated].)

Response: *Average hexavalent chromium concentrations that exceeded the decision criteria (and year of exceedance) are listed below:*

- *12-17-N - 0.12 mg/L (1990)*
- *OW-WR-34 - 0.20 mg/L (1994) Bushland control sample.*
- *Z-12-S - 0.2 mg/L (1990)*

The following are corresponding average total chromium concentrations:

- *12-17-N - 0.12 mg/L (1990)*
- *OW-WR-34 - 0.009 (1994) Bushland control sample.*
- *Z-12-S - 3.5 mg/L (1990)*

Note that the hexavalent chromium concentration appears to be exaggerated on the Bushland control sample.

RC: 06.091
Doc: CO-008/117

C-28, Table C.2.2-1,...third line up from the bottom. The line reads "Parameter Units STD RRS." Is this an error?

Response:

Yes, this was an error and the referenced line has been deleted in volume II, Table C.2.2–1.

RC: 06.092
Doc: PC-026/1

Evidently Pantex continues to use open, unlined ditches to dispose of wastewater and storm water [that] discharges into the playas onsite. ...They are contaminated, and the Ogallala aquifer can also become contaminated. This is very scary.

Response:

Wastewater discharge permit requirements, upcoming investigations, and interim corrective action measures are summarized in section 1.3.5 of this volume. The EIS has been updated accordingly.

RC: 06.093
Doc: PC-029/1

It seems to me that storing radioactive substances over the Ogallala aquifer is not a good idea. Is it true that high explosives from Pantex have been found in the Ogallala? Have wells in the area been contaminated with plutonium?

Response:

See discussion in section 1.3.5 of this volume.

RC: 06.094
Doc: SG-002/1

The TNRCC is concerned that contamination in the perched aquifers beneath the site indicates that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. The DOE should [ensure] that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

Response:

See discussion in section 1.3.5 of this volume and response to comment 06.051.

RC: 06.095
Doc: SG-003/18

The TNRCC is concerned that contamination in the perched aquifers beneath the site indicates that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. The DOE should insure that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

Response:

See discussion in section 1.3.5 of this volume and response to comment 06.051.

RC: 06.096
Doc: SG-003/21

The Trustees do not oppose the DOE plan to construct an expanded Hazardous Waste Treatment and Processing Facility (HWTPF). However, contamination in the perched aquifers beneath the site [indicates] that past and present industrial discharge practices at the Pantex facility have not been fully protective of natural resources at the site. A treatment facility that is constructed and maintained properly will prevent further injury to natural resources. In addition, the increase of industrial discharge volume to 2.9 million liters may exacerbate contamination problems if additional measures are not taken by DOE to protect valuable groundwater resources. DOE should [ensure] that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical.

Response: *A treatment facility, such as the HWTPF, that is constructed and maintained properly will prevent further injury to natural resources. Additional measures that are being taken to ensure that the threat of increased contamination to the Ogallala aquifer and contaminant exposure to ecological receptors is limited to the maximum extent practical are discussed in section 1.3.5 of this volume.*

RC: 06.097
Doc: SG-003/24

Page 4-2, Affected Environment. The document states that an area of 50 miles surrounding the Pantex site will be considered the region of influence. The Trustees are concerned that this area will not encompass the potential area of natural resources that could be impacted since: a) the lateral extent of the perched aquifer has not been determined, and b) documented contamination in the Ogallala and its flow direction provide the potential for this contamination to impact various environmental receptors outside this radius.

Response: *Environmental restoration investigations, conducted at or before the time of publication, have indicated that the extent of offsite contamination detected in the perched groundwater has been limited to within one-half mile southeast of the main Pantex Plant site boundary. The distance of 50 miles is traditionally used as the maximum extent of a region of influence for NEPA documents.*

See response to comment 06.087.

RC: 06.098
Doc: SG-003/26

Page 4-3, Section 4.2 Impact Assessment Methodologies, water resources: The qualitative assessment of water quality impacts from wastewater and stormwater runoff does not adequately address potential impacts to surface water and groundwater resources at the Pantex Plant. Furthermore, it does not consider existing contamination in the sediments, surface water, and groundwater and their cumulative impacts. The text should be corrected to reflect what actions would be necessary to thoroughly address the potential impacts to these natural resources.

Response: *Volume I, sections 4.5 and 4.6, have been updated with additional data, new permit requirements, and descriptions of corrective action measures.*

RC: 06.099
Doc: SG-003/29

Page 4-55, Affected Environments. The text states that there is [no] evidence that contaminants found in the perched zone have migrated to the Ogallala aquifer. This is inaccurate and should be corrected to reflect that there is documented contamination in the Ogallala aquifer.

'esponse: *Groundwater quality sampling that was conducted after the publication of the Draft Pantex EIS indicated that contaminants found in the perched zone had* *been detected (in small amounts) in the Ogallala aquifer. Volume I, section 4.6.1.2, has been updated to report potential contamination in the Ogallala aquifer. For additional information, refer to the summary provided in section 1.3.5 of this volume.*

RC: 06.100
Doc: SG-003/30

Page 4-62, Section 4.6.1.2 Groundwater. While the discharges that are permitted by EPA and TNRCC have protective standards [that] presently do not allow excessive levels of contaminants, existing contamination is already present in the perched aquifer and the playas. Therefore, the continual discharge of wastewater provides a hydraulic head potentially driving those contaminants into the Ogallala. Contamination in the Ogallala has been documented and more stringent actions are required in order to prevent further migration of contamination [that] could result in greater injury to an extremely valuable groundwater resource.

Response:

We disagree. The hydrology and recharge of the perched aquifer is very complex and the effects upon the vadose zone from continual discharge of water into existing playa lakes and drainage ditches do not necessarily result in contaminated groundwater being driven into the Ogallala. The Ogallala contamination which is referenced is believed to be due to special circumstances (cross-contamination through an open bore homestead well). This well and six other homestead wells have been sealed under the Groundwater Protection Project. See discussion in section 1.3.5 of this volume and section 4.6.1.2 of volume I for additional information.

RC: 06.101
Doc: SG-003/31

Page 4-69, Section 4.6.1.2 Groundwater, Perched Aquifer portion. See comment #9.

Response:

See response to comment 06.099.

RC: 06.102
Doc: SG-003/32

Page 4-72, Groundwater Quality. The absence of trinitrotoluene in the perched aquifer may not be due to a reduction in the discharge of this contaminant, but rather an indication of it breaking down to degradation compounds in the environment. Also, the text states that levels of trichloroethene occurring at the site barely exceed the Risk Reduction Standards (RRS) decision criteria of 5 micrograms per liter. Data used to make this determination may not be representative of actual levels of contamination at the site. To accurately determine what is occurring at this site, properly screened intervals in groundwater monitoring wells to accurately measure "sinking chemicals, metals, radionuclides and high explosives," as well as the proper suite of analyses, should be employed for all potential contaminants of concern.

Response:

Concur, evidence of natural attenuation and degradation of high explosive compounds including trinitrotoluene has documented during the treatability studies. The maximum concentration of trichloroethene (i.e., trichloroethylene) has consistently occurred in the perched aquifer south of Zone 11 in monitoring well PTX08-1005 as discussed in the Draft RCRA Facility Investigation Report for Groundwater in Zone 12 at the DOE Pantex Plant (Argonne 1995a). In *order to define the stratification of contaminants within the perched aquifer, due to different densities of the contaminants, it is necessary to sample at discrete intervals and depths. Volume I, section 4.6.1.2, has been revised accordingly.*

RC: 06.103
Doc: SG-003/33

Page 4-78, Section 4.6.2.1 Impacts of Continued Operations, Weapon-Related activities, Surface water. A thorough evaluation and consideration of existing contamination in surface water and sediments of receiving waters at the Pantex site is needed to adequately assess the potential impacts of wastewater discharges. Cumulative impacts of preexisting contamination and projected waste loads must be considered.

Response: *See discussion in section 1.3.5 of this volume.*

RC: 06.104
Doc: SG-003/34

Page 4-80, Section 4.6.2.1, Groundwater. The TNRCC permit does not include radionuclide parameters. In order to prevent further injury to natural resources, DOE regulatory oversight should be shared with another appropriate agency....

Response: *See discussion in section 1.3.5 of this volume and response to comment 06.051.*

RC: 06.105
Doc: SG-003/35

Ogallala Contamination—The EIS should be revised to reflect that the Ogallala has been impacted by Pantex operations, as evidenced in recent contaminated samples obtained from Mr. Cockrell's private off-site wells.

Response: *Although low levels of high explosive contamination have been detected in a domestic Ogallala well located on the Cockrell ranch, efforts to mitigate further contamination have been completed. The well in question has been properly plugged and abandoned under the supervision of the TNRCC and a replacement Ogallala well has been drilled and completed in order to prevent further potential cross-contamination of the Ogallala aquifer. Additional information regarding the Groundwater Protection Project has been included in volume I, section 4.6.1.2.*

RC: 06.106
Doc: SG-003/36

Homestead Wells—The EIS should note that the low vertical permeability of the fine-grained zone may be compromised by abandoned homestead wells. These wells could provide contaminant pathways through the fine grained zone to the Ogallala. The potential for this to occur has been demonstrated at the Cockrell farm east of the Pantex Plant.

Response: *Efforts to identify and evaluate abandoned homestead wells in order to prevent potential pathways of contamination into the Ogallala aquifer have been completed under the Groundwater Protection Project.*

RC: 06.107
Doc: SG-003/37

Facility Boundary—The EIS should mention that DOE will take whatever action is practicable to clean contaminated groundwater to the residential drinking water standards beyond the facility boundary (page 4-69).

Response: *See discussion in section 1.3.5 of this volume and response to comment 06.051.*

RC: 06.108 **Doc: SG-003/40**	Pantex Plant Playas—The Risk Reduction Rules (RRR) (30 Texas Administrative Code (TAC),...335, Subchapter S), which include references to the Texas State Water Quality Criteria (30 TAC...307), do apply directly to the Pantex Plant Playas, contrary to the statement on page C-2.
Response:	*Refer to the discussion of surface water quality decision criteria presented in section 1.3.5 of this volume.*
RC: 06.109 **Doc: SG-003/41**	Surface Water Quality Values—The surface water quality values determined in accordance with the RRR take precedence over the Risk Based Concentration Guidelines from EPA Region 3 (Section C.1.2). The EPA Region 3 Guidelines are not appropriate standards to apply when values are available in the Texas Surface Water Quality Criteria, the *Federal Safe Drinking Water Act*, or the Texas Regulations for Control of Radiation (TRCR) (30 TAC...336).
Response:	*Refer to the discussion of surface water quality decision criteria presented in section 1.3.5 of this volume.*
RC: 06.110 **Doc: SG-003/42**	Tables C.1.2-1 through C.1.2-3—the standards listed in Table C.1.2-1 should cite values based on the RRR, rather than EPA Region 3 Guidance. For instance, the standard for antimony should be 0.006 milligrams per liter (mg/L), based on the RRR, rather than 0.015 mg/L cited for EPA Region 3 Guidance. The standard for gross alpha activity, according to the RRR, should be 15 picocuries per liter (pCi/L), rather than N/A. No water quality standard is provided by the Texas Surface Water Quality Criteria; therefore, the RRR specify use of the drinking water standard. The proposed drinking water standard of 50 pCi/L (4 millirems per year) should also be cited for beta particle activity. The TNRCC requests that DOE revise Table C.1.2-1 to cite the more stringent surface water quality standards for radionuclides that are developed in accordance with the RRR. As such, the standard for plutonium-239/240 would be 2E-8 microcuries per milliliter (µCi/ml), based on the TRCR standards. Radium-226 and Radium-228 would be 6E-8 µCi/ml, based on proposed federal Drinking Water Standards. Tritium would be 1E-3 µCi/ml, based on the TRCR standards. Uranium-234 and Uranium-238 would be either 3E-7 µCi/ml, the TRCR standards, or 20 mg/L, the proposed Drinking Water Standard, which ever is more stringent.
Response:	*Refer to the discussion of surface water quality decision criteria presented in section 1.3.5 of this volume and the response to comment 06.051.*
RC: 06.111 **Doc: SG-003/43**	Constituents of Concern—The constituents of concern for groundwater should not be limited to those constituents that exceed risk based concentrations (Section C.2.2, page C-4). In addition, the nature and extent of contamination must be based on background values or laboratory Practical Quantitation Limits (PQL), rather than risked based values. These issues were addressed in DOE's revised Sampling and Analysis Plan and the TNRCC's subsequent approval with modification.

Response: *Water quality data from an Ogallala water supply well at Bushland provides regional background groundwater quality data, as discussed in volume II, appendix C, section C.2.2. Volume II, Table C.2.2–3, presents a tabulation of water quality sampling data collected from Pantex Plant Ogallala aquifer wells that exceed decision criteria. TNRCC and EPA Drinking Water Standards and DOE Derived Concentration Guidelines were used as the decision criteria, rather than background values or laboratory Practical Quantitative Limits because the Drinking Water Standards and DOE Derived Concentration Guidelines are regulated to be protective of human health.*

RC: 06.112
Doc: SG-003/62

The sections that deal with Geology and Soils and with Water Resources are generally well done. One issue that is still not adequately covered relates to the perched aquifer. The extent of the fine-grained zone which forms the perching layer is not known. The question of what happens to the perched aquifer is not discussed. Does the fine-grained zone pinch out with the perched aquifer groundwater flowing off the side, down to the Ogallala? Alternatively, will [groundwater in] the perched aquifer eventually migrate through the fine-grained zone and down to the Ogallala? All that the Draft EIS acknowledges is "Recharge to the area aquifers is not fully understood."

Response: *Additional updated information regarding the nature and extent of groundwater contamination in the perched and Ogallala aquifers is presented in section 1.3.5 of this volume. Discussion in volume I, section 4.6.1.2, has been revised for clarification.*

RC: 06.113
Doc: SG-003/63

Groundwater was not considered as a pathway for exposures potentially impacting human health. An obvious concern of some people in the area is contamination of the Ogallala from plant activities. In what way were groundwater scenarios considered, and what pathway assumptions were used?

Response: *Groundwater as a potential pathway for exposure was discussed in volume I, section 4.14.2.1. Potential consequences to the Ogallala aquifer from an accidental plutonium release were investigated in conjunction with a Safety Analysis Report and an Environmental Assessment, which included a study by Los Alamos National Laboratory (LANL 1992). The hypothetical accident was assumed to be a high-temperature fire caused by a jet plane impact into a Zone 4 storage magazine containing nuclear weapons components, and the subsequent release and ignition of jet fuel, leading to dispersal of plutonium. Four potential elements of concern were identified: plutonium, americium, neptunium, and uranium. Of these four, plutonium was determined to pose the greatest risk. Los Alamos National Laboratories used the conservative assumption that the hypothetical jet fuel fire could disperse fine particulate plutonium downwind of Pantex Plant for a maximum distance of 50 miles. Prompt decontamination efforts could reduce radiation levels to 0.2 microcuries per square meter. Plutonium and decay products could infiltrate downward toward the Ogallala aquifer. The model assumed an average recharge rate of 1 inch per year (10 times the High Plains average), and that infiltrating recharge* *water would reach the Ogallala aquifer at depths ranging from 50 to 400 feet. These analyses were conservative because the "worse-case" scenarios were based on a depth to the water table of 50 feet whereas, at Pantex Plant, the typical depth to the top of perched groundwater is approximately 270 feet and the depth to the Ogallala aquifer ranges from 340 to 460 feet. For water table depths of 200 and 400 feet, LANL calculated plutonium travel times of 305,000 and 610,000 years, respectively. Interactions with both surficial materials and the unsaturated portion of the Ogallala Formation would be expected to make the plutonium move at a rate slower than the infiltrating water. During the transport time, radioactive decay would be expected to further reduce plutonium concentrations. Current knowledge of the perched aquifer leads to the expectation that where the perched aquifer is present, the downward movement of plutonium would be further reduced, because the low permeability fine-grained zone would impede downward flow and potential contamination would be more likely to move horizontally in the perched aquifer.*

RC: 06.114
Doc: SG-003/64

Table C.2.2-2 in volume II provides data on chemical concentrations measured in the perched aquifer. A great deal of data is here, but I do not believe that it represents all available data. The Draft EIS should explain what data was used and what data was not used, and why.

Response:

Evaluation of baseline surface water and groundwater quality is based on a review of all available data tabulated in the Pantex Plant annual site environmental reports (ASER) for a five-year period, from 1990 through 1994. Surface water quality data were collected from 29 onsite sampling locations from 1990 to 1993; surface water samples were collected from only 17 of these sampling locations in 1994. The surface water data collected over the past five years does not include every sampling location each year, because some locations only have sufficient water to sample during storm events. Groundwater quality monitoring data were collected from over 20 onsite sampling locations, including wells completed in the perched and the Ogallala aquifers. It should also be noted that the groundwater data collected over the four years do not include every sampling location each year. In 1995, 78 groundwater monitoring wells were sampled. In addition to the ASERs, available U.S. Corps of Engineers (COE) quarterly groundwater monitoring reports were reviewed. Quarterly groundwater monitoring was conducted to characterize the groundwater quality and extent of contamination in the perched aquifer, in association with the Ditches and Playas RCRA facility investigation for Flow System 6. It should be noted that the water quality constituents that were analyzed for the COE investigation are not always the same constituents that are analyzed for the ASERs. One offsite location, Bushland Playa at the USDA Agricultural Experimental Station west of Amarillo, was used as a control sample to give some insight on background surface water and groundwater quality.

All available surface water and groundwater data from the ASERs were compiled into two cumulative data tables, one for surface water quality data, and the other for groundwater quality data. The data were evaluated through a *process of elimination whereby all parameters with values below the detection limits or those reported as not sampled, not presented, or holding time exceeded were omitted from the water quality data under consideration. For the radionuclides, levels of uncertainty (reported +/- the measured value) were omitted so the data could be processed. The remaining data were then exported into a data management system to speed data manipulation and to reduce the chance of human error. The surface water and groundwater quality data were then sorted by location, parameter, and average value. Contaminants of concern (COC) were determined by comparing tabulated annual average values to the decision criteria presented in volume II, appendix C. Volume II, Tables C.1.2–3, C.1.2–4, C.2.2–2, and C.2.2–3, present values that are greater than or without defined water quality criteria for the five years of water quality data.*

RC: 06.115
Doc: SG-003/66

Sections 4.5 and 4.6, which describe water resources and geology and soils, do not provide sufficient information for the reader to determine if environmental impacts could result from continued operations and storage of nuclear weapons at Pantex.

Response:

Volume I, sections 4.5 and 4.6, have been updated with additional data, new permit requirements, and descriptions of corrective action measures.

RC: 06.116
Doc: SG-003/85

Page 4-55, Affected Environment, para. 2, ln 19. The statement is made that there is no evidence that the contaminants found in the perched aquifer have migrated to the Ogallala aquifer. Only a few (2 or 3) Ogallala aquifer monitor wells are located in areas where there is perched groundwater present. There are no Ogallala monitor wells beneath badly contaminated areas such as Zone 12, so there are no data on which to base the conclusion that no contamination has occurred. Furthermore, the unsaturated zone between the Ogallala and perched aquifers has not been sampled so it is not known if these waters and sediments have been contaminated.

Response:

Volume I, section 4.6.1.2, has been updated with additional information regarding the perched and Ogallala aquifers. For additional information, see discussion in section 1.3.5 of this volume.

RC: 06.117
Doc: SG-003/86

Page 4-62, Groundwater, para. 1: There is no discussion of sediment heterogeneity, which strongly affects groundwater flow rates.

Response:

Discussion of the effects of heterogeneous sediments on groundwater flow rates has been added to volume I, section 4.6.1.2. See response to comment 06.076.

RC: 06.118
Doc: SG-003/87

Page 4-63, Figure 4.6.1.2-1. Why are there no monitor wells in the area of Playa 4? Considering all of the discharge that has occurred from Zone 12 south to Playa 4, it would seem appropriate to determine the nature of the hydrogeology in this area.

Response:

Playa 4 and the majority of its watershed are located on property owned and managed by Texas Tech University. DOE has no jurisdiction to place *monitoring wells near Playa 4. There are monitoring wells in place on the DOE owned property north of Playa 4. Additionally, the Ditches and Playas Solid Waste Management Unit process is currently collecting samples from the area of concern noted in this document. Soil and water characterization of the ditches on DOE owned property that leads to Playa 4 are ongoing (PC 1996x).*

RC: 06.119
Doc: SG-003/88

Page 4-65. Perched Aquifer, para. 2, ln 1: Contrary to this confusing statement, there are areas at Pantex where perched groundwater is present, but where gravel channels are not present and vice versa. The presence of gravel channels does not control the presence of perched aquifers; it is the presence of a stratigraphic horizon (in this case the fine-grained zone) with a vertical hydraulic conductivity lower than the flux of recharge water moving through the unsaturated zone. It is quite obvious that if the gravel channel were underlain by a coarse sand then no perched aquifer would have formed.

Response:

A stratigraphic horizon with a low vertical hydraulic conductivity, such as the fine-grained zone, is necessary for formation of a perched aquifer. This clarification has been made in volume I, section 4.6.1.2.

RC: 06.120
Doc: SG-003/89

Page 4-69, para. 4, line 6. If the spread of contaminants in the perched aquifer is limited to the confines of perched aquifer in buried channel deposits, then why are there so many perched aquifer monitor wells in Zone 12 with contaminants, but located outside the gravel channel as mapped on page 4-66? It seems obvious that something other than gravel channels is, at least in part, controlling flow in the perched aquifer and that contaminants are present in perched aquifer water outside the gravel-filled channel.

Response:

There are heterogeneities in the subsurface sediments that result in preferencial subsurface flow. The horizontal flow of perched groundwater is controlled by the fine-grained zone that limits the downward movement of groundwater, as briefly discussed in section 1.3.5 of this volume and in the response to comment 06.119.

RC: 06.121
Doc: PC-028/2

Page 5-8, 2nd column, 3rd paragraph:...The water usage and wastewater production are of a major concern in New Mexico and Albuquerque. The State is experiencing a major drought along with Albuquerque. Any additional water usage by KAFB drains the already lowering aquifers in Albuquerque. Go elsewhere!

Response:

The Pantex EIS only deals with the interim storage of containerized pits at the Manzano Weapons Storage Area at Kirtland Air Force Base. As a result, groundwater resources would not be affected by these interim storage activities. Only the guard force and operations personnel (about 150 people) would need water.

RC: 06.122
Doc: PC-028/4

Page 5-58, para 5.5.1.4: Any additional water usage, by any operation puts additional demands on a drought ridden state. Additionally, Albuquerque is

	experiencing dwindling water supplies in their aquifers to include KAFB. Any additional water usage, even for pit operations, is not necessary since DOE can select on the other alternatives and should.
Response:	*See response to comment 06.121.*
RC: 06.123 **Doc: HT17/73**	It would be IGNORANT to site future missions at Pantex without first reviewing the geological hazards truthfully and openly. It would be doubly ignorant to continue trying to hide contamination facts as they relate to the Ogallala today. The recharge rate is MUCH faster than folks believed it to be a few years ago, and MUCH faster than what is being publicly acknowledged today.
Response:	*Numerous scientific investigations have been conducted to determine the geologic and water resource characteristics at and in the vicinity of Pantex Plant. Volume I, section 4.5, addresses the geologic conditions and potential for seismic activity. Volume I, section 4.6.1.2, discusses the hydrogeologic conditions, including ranges of groundwater velocity and recharge estimates, based upon the most up-to-date information available at the time of publication. The Environmental Restoration Protection Program will continue to monitor existing conditions and perform corrective actions as needed.*
RC: 06.124 **Doc: CO-007/1**	... Two very important negative impacts—the drawdown from the already dropping water reserves and the contamination into it. The proposal gives inadequate information and inadequate protection of the crop-feeding resource in the agriculturally rich eight state region where the Ogallala is located—not to mention the water supply for Amarillo.
Response:	*The importance of the Ogallala aquifer as a valuable regional groundwater resource supply is discussed in section 1.3.5 of this volume.*
RC: 06.125 **Doc: PC-030/3**	No additional water should be channeled to the open ditches and playas at Pantex because it will accelerate the flushing of contaminants into the soil and eventually into the aquifer.
Response:	*See discussion in section 1.3.5 of this volume and response to comment 06.060.*
RC: 06.126 **Doc: CO-005/4**	A second major flaw in the document is the omission of the importance of the Ogallala aquifer to this area. As the single groundwater supply for 46 counties in the Texas Panhandle and the source of water for parts of seven midwestern states, it is paramount that nothing be done to damage this priceless resource. What could be more important in an environmental document than a detail analysis of the water source, the future supply and the impacts to this source from present activities at Pantex. To ignore the tremendous impact that Pantex has already induced on this finite water source is inadmissible. We ask that you provide detailed analysis on the effects of Pantex activities on the Ogallala (which includes the perched layer), the complete scope of contaminants, the

combined effects of these contaminants and how different constituents react in varying soils and water.

Response: *See discussion in section 1.3.5 of this volume. Additional information has been included in volume I, section 4.6.1.2.*

RC: 06.127
Doc: CO-005/5

We ask that the studies from the Bureau of Economic Geology (BEG) be included as part of the Pantex EIS. Why were the results of the years of work done by BEG not included in the draft document? These are valuable studies with extremely telling results. Provide the reports, analysis and statements produced by BEG in their study at Pantex in the final document.

Response: *Many of the Bureau of Economic Geology (BEG) reports have been cited in the Pantex Plant EIS. BEG reports are included in the administrative record and are available to the public.*

RC: 06.128
Doc: PC-008/3

Plant used 230 million gallons in 1995.

- Texas Tech Farms used 66 million gallons (29%) of the total plant water usage.
- Nuclear weapons operations used 163 million gallons (71%).

Amarillo Water District consumed 16 billion gallons in FY 1995.

Pantex Plant including Texas Tech Farms used 1.4% as much water as Amarillo District. Nuclear weapons operations used 1% of the water used by Amarillo. Considering the water also used for irrigation, the Plant withdrew 0.6% of the regional withdrawal from the Ogallala aquifer.* Nuclear weapons operations consumed 0.43% of the regional withdrawal.

*Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, March 1996, page S-15.

Response: *Comment noted.*

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3.7 Air Quality

RC: 07.001
Doc: HT02-05/1

[The Proposed Action] is inappropriate for the reasons that winds and storms here are very strong and tend to have...more far-reaching effect[s] than they do in other parts of the country.

Response:

This EIS only assesses the impacts of relocating interim pit storage. The potential relocation of other Pantex Plant operations is assessed in the SSM PEIS. The meteorology and climate (regional and local) at Pantex Plant are discussed in volume I, section 4.7.1 of this EIS. The climatic characteristics of the Pantex Plant area were taken into account in assessing the impacts of air pollutants from normal operations (see volume I, section 4.7) and from accidents (see volume I, section 4.14). The climactic characteristics of each of the other sites being considered for interim storage of pits were also taken into account in assessing impacts (see volume I, chapter 5).

RC: 07.002
Doc: HT02-04/5

The use of strontium-90 to test containment at the Firing Sites is an unacceptable, unpleasant fact to me. Please tell me more about this, as well as the other open air experiments conducted at the site.

Response:

In 1977, one test at Firing Site-15 involved the use of high explosives containing strontium-90 as a tracer. It was later determined that the lagoon was contaminated with strontium-90. During a 1987 study, grab samples were collected in the potentially affected area around the site. Strontium-89/90 averaged 0.398 pCi/g. Another investigation was conducted at the site in 1995 (PC 1996w). All potential radioisotopes were analyzed for, including uranium (U), thorium (Th), beryllium (Be), cesium (Cs), and strontium (Sr). These concentrations were found to be well below the Nuclear Regulatory Commission (NRC) and Texas Department of Health (TDH) soil contamination limits. Detected activities ranged from 0.43 to 1.8 pCi/g for Be-7; from 0.34 to 0.01 pCi/g for Cs-137; and from 0.14 to 0.86 pCi/g for total Sr isotopes. The NRC criteria for no further action were used for thorium, uranium, cesium, and strontium.

RC: 07.003
Doc: HT02-04/6

[Depleted Uranium] DU particles from test explosions at the Firing Site spread into the air, land, and water offsite. DU is toxic and radioactive. While I thank you for starting to clean it up, once again, I must say, tell us more.

Response:

Up until the mid 1980s, test firings were performed in the open areas at the firing ranges, resulting in the dispersion of DU in the immediate area of the firing sites.

Soil and Sediment Quality, volume I, section 4.5.1.3, discusses the general environmental restoration process. Volume I, section 4.5.1, discusses the DU contamination at Firing Sites 4, 5, and 10. A request has been submitted to TNRCC to remove the four currently active Firing Sites from the Pantex Plant Environmental Restoration program. Firing Sites 4, 5, and 10 have a low uranium-234 to uranium-238 ratio. An interim corrective measure is being conducted on Firing Site-5 to remove surface DU contamination. Subsequent confirmation sampling and risk assessment will be conducted at Firing Site 5.

Confirmation sampling will be conducted to confirm that protective levels have been attained and no further action will be required.

For further information see volume II, section I.1.2.4 and Table I.1.2.1–1.

RC: 07.004
Doc: HT16/17a

One of the items that [was] mentioned was that one of the pollutants that we monitor for is [total] suspended particulates, which is no longer true because there is no standard for total suspended particulates, so we stopped monitoring for [them]. Although we take samples, those filters are forwarded to the Bureau of Radiation Control for radionuclide analysis.

Response:

The language in volume I, section 4.7.1 has been revised to say that TNRCC no longer monitors for total suspended particulates.

RC: 07.005
Doc: HT16/17b

And the other item that was mentioned was that we monitor for metals. Again, we don't on a regular basis analyze for metals. We did take a sample in 1993 for about 30 days—30 samples. And then we analyzed for about 20 different metals through kind of a screening method. There aren't any concerns there or we haven't been able to identify any. So we have not done any additional analysis for metals.

Response:

Text in volume I, section 4.7.1 has been revised to reflect that metals are not routinely monitored.

RC: 07.006
Doc: HT16/18

And with regard to air quality impacts, both for No Action Alternative or the consolidation alternative, the non-radiological air quality impacts will be minimal. Only potential is for particulates if more construction activity takes place due to consolidation alternative. And, as the EIS mentions, that if that happens, that mitigation measures will be used to control the particulate emissions. And I think that is a TNRCC-accepted method of control for particulate emissions.

Response:

Volume I, section 4.7.2.2 discusses the emissions from construction activities and volume I, section 4.7.6 discusses the potential mitigation measures to reduce emissions. Regarding the variance between monitoring data and modeling results, see discussion in section 1.3.6 of this volume.

RC: 07.007
Doc: HT16/19

I would like to bring up some inaccurate statements in the EIS that need to be corrected. In Table 4.7.1.3–1 there's a footnote discussing the National Ambient Air Quality Standards, and I think that statement is not accurate, because for ozone and PM_{10} the standard...is determined by statistical methods. And that is based on expected exceedances over a 3-year period. And if...in a 3-year period, the number of exceedances or expected exceedances, averaged over the 3-year period has to be one or less, otherwise that area is considered non-attainment for that pollutant. For sulfur dioxide and nitrogen oxide annual standards and for lead, the quarterly standard, are not to be exceeded. And carbon monoxide, there are two standards, the 1-hour standard and the 8-hour standard. And [for] sulfur dioxide, a 3-hour standard and a 24-hour standard can be exceeded only once per calendar year. And the statement in the EIS does not make that clear. And on page 4–93, there is a statement that says that Air Quality Control Region 211 is designated by EPA as better than National standards for total suspended particulates. That statement is incorrect because when EPA established new standards for PM_{10} for (inaudible) particulates, the standards for PM_{10} were taken out. So there is no more National standard for TSP. On the same page, 4–93, there is a discussion about methylene chloride found in our monitoring at 213 parts per billion by volume on July 6th, 1993. But there is no mention made that this concentration was seven times the effects screening level established by TNRCC. Although, further review and analysis by our staff, toxicology and risk assessment staff, concluded that this one-time health episode would not result in any long-term health effects. There is greater discussion about the slightly above ESL concentration of dichloroethane, whereas the discussion on methylene chloride was left out. Another point I want to make is that in our four years of monitoring at Pantex we have found a number of exceedances of PM_{10} National Ambient Air Quality Standards. Although the modeling done by both TNRCC and the EIS staff did not predict any possible PM_{10} violations, actual exceedances happened. They could be due to blowing dust or localized earth-moving activities. But that is precisely the kind of scenarios anticipated in the consolidation alternative if additional construction activity takes place. The EIS addresses this issue in section 4.7.6.

Response:

This comment discusses four individual points. Each of the points is addressed in turn.

1) The footnotes containing the discussions of the standards associated with each of the pollutants have been revised in accordance with the comment and the TNRCC Monitoring Operations Division reference "Smarter Air Monitoring for Texas" (TNRCC 1994b).

2) The text discussing the standard for TSP has been deleted.

3) The discussion of the methylene chloride exceedance in section 4.7.1 in volume I has been amended. The following sentences have been added. "The concentration was approximately seven times the ESL (30 ppbv) established by TNRCC.... In the case of the 1993 methelyne chloride exceedance, the TNRCC Toxicology and Risk Assessment Section stated that the one exceedance was not expected to result in any long-term health effects."

4) See section 1.3.6 of this volume for a discussion of the variance between PM_{10} monitoring data and modeling results.

RC: 07.008
Doc: HT16/20

Our modeling staff reviewed the modeling results that [were] given in the EIS. The TNRCC did clean air modeling in 1995 under the agreement in principle. And our staff used a different methodology to do the modeling for [the] Pantex site-wide modeling. And the EIS staff...use the same model, the Industrial Source Complex model, but they used a different methodology to do the modeling. But the conclusions that were arrived at by both models were the same, that only alcohols exceeded the effects screening levels. And when it was modeled for outside the Pantex boundary, there was no exceedance of the standard or the guideline ESL. So that sort of validates the model, that two different groups of people modeled the same emissions using different approaches, but [came] up with the same conclusion. However, by reviewing the input into the models our staff found that a number of emission points were left out in the modeling that the EIS staff conducted, like the carbon monoxide emissions from emission points 54, 85, and 160. Some of them are very minimal emissions. But, for example, emission point 160 is a natural gas boiler. It has the emissions of 13,000 pounds per year, which was not included in the EIS modeling. The same thing, from the same boiler, the NO_x emissions, the nitrogen oxide emissions, 53,000 pounds a year, that was not included in the EIS model.

Response: *Emission points 54, 85, and 160 were active at the time TNRCC performed their modeling, but had become inactive by the time the modeling was performed for this EIS. For a general discussion of the differences between the two modeling efforts, see section 1.3.6 in this volume.*

RC: 07.009
Doc: HT16/21

... There were a number of hazardous air pollutants that were left out in the EIS modeling, which the TNRCC staff used in their modeling.

Response: *The air quality modeling for this EIS included all current and future hazardous air pollutants. However, some of the pollutants had such negligible concentrations that they were screened out of the tables placed in the Draft EIS. In the Final EIS the tables have been expanded to include all of the hazardous air pollutants. See also the discussion in section 1.3.6 of this volume.*

RC: 07.010
Doc: HT16/22

... We have had some PM_{10} exceedances, although [they] happened at the property, they are not considered a violation of the National Ambient Air Quality Standards. But that is one thing that needs to be taken into consideration when this expansion or consolidation alternative is considered, that some mitigation measures will be employed to avoid exposure to the workers or even potentially to the neighboring residents.

Response: *See discussion in section 1.3.6 of this volume.*

RC: 07.011
Doc: HT16/29

Are all the known emissions for Pantex included in a list in this document, regardless of whether or not there's a standard that it was tested for, or do we only talk about things that there's a standard that applies that you pick up in monitoring? Or are they only monitored for if there's a standard and if there's no standard they're not tracked...? ...I would be interested, and would like even to request, it would be nice if this document gave us a good thorough picture of the plant, regardless of, perhaps, health effects or whatever, just what the emissions are. And, if there are no health effects attached to certain things, that's nice if you can specify that or just that there's not a standard, or whatever. But it would be nice to have a better picture, a clearer picture, of this plant as it currently operates.

Response: *See response to comment 07.009, and section 1.3.6 of this volume.*

RC: 07.012 **Doc: HT16/30**	... When we reviewed the emissions data that they have reported in Appendix B and the emissions inventory that was submitted to us for our AIP modeling, there were a number of hazardous air pollutants, about 50 of them, that were left out. And, as I said, they are not very high quantities, but they were mentioned in the emissions inventory that was submitted to us, but it is not included in the EIS.
Response:	*See response to comment 07.009 and discussion in section 1.3.6 of this volume.*

RC: 07.013 **Doc: PC-031/2**	Some of the most glaring deficiencies and omissions include the continuing use of the Burning Ground with no alternative examined. This facility is not technically acceptable and this document ignores the agreement with our citizen groups to analyze alternatives. The air modeling is inadequate, by the words of the document itself. How could DOE expect credible results with no modeling for residences on the south side of the Plant? There are still no monitors either at the perimeter or outside the plant measuring emissions that are not radiological.
Response:	*There are several misunderstandings revealed in this comment. The facts are that:* *1) Pantex Plant did conduct a Best Available Control Technology (BACT) of several existing or developmental alternatives to open burning/open detonation. The analysis concluded that controlled open thermal treatment with existing administrative controls constituted BACT. Thus, the plant proposes to continue that activity in this EIS. Since that study was completed, further development of procedures for chemical treatment has warranted further investigation of a base hydrolysis treatability study. Volume I, section 1.2.2 and volume II, section G.3.8 contain additional information on this subject.* *2) As stated above, the Burning Ground is not only technically acceptable, but technically the best available method of sanitizing HE components as well as for treating HE-contaminated waste material.* *3) The air modeling is not "inadequate, by the words of the document itself." The air modeling for this EIS was performed using EPA approved models, a TNRCC approved data set for meterology and mixing heights, and a comprehensive set of emissions sources and emissions rates. The conclusions of the air modeling are consistent with those of other modeling efforts independently conducted by another contractor and by TNRCC.* *4) The air quality modeling included analysis for receptor locations spaced at 100 meter intervals along the north, west, and east boundaries of Pantex Plant. On the south side of the plant, the receptor line was positioned to include most of the property leased from TTU. See Figure 4.7.1.3–1 in volume I for a graphical depiction of the "fence line" receptors. Any air pollutant concentrations emitted by the plant would have to cross these receptors before reaching an off-site residence. In addition, the modeling did include several residences on the south side of the plant. Some "residences" shown in Figure*

4.7.1.3–1 of the Draft EIS were inadvertently depicted at incorrect locations. This has been corrected in the same figure of the Final EIS. It should be noted, however, that the residence locations used in the actual computer modeling were correct and the analysis of concentrations at residences is valid.

RC: 07.014
Doc: PC-025/42

On page 4-94, The Target Range is where you explode nuclear devices?

Response:

Nuclear devices are not exploded anywhere at Pantex Plant. The Target Range indicated in volume I, Figure 4.7.1.3–1 is used to conduct live fire training for security personnel with duty sidearms, sub-machineguns, and shotguns.

RC: 07.015
Doc: PC-025/43

Pages 4-96 and 4-99. What are the sources of the information in the tables?

Response:

The sources of information for Table 4.7.1.3–3 are the Pantex Plant Environmental Information Document, Pantex Plant Emissions Inventory, and TNRCC Effects Screening Levels and the Clean Air Act.

For Table 4.7.1.3–4, the sources are TNRCC Air Quality Modeling Guidelines and calculations performed with ISCST2 and ISCLT2 models.

In the Final EIS both tables have been annotated to list these sources.

RC: 07.016
Doc: PC-025/44

General comment on section 4.7: Poor QA/QC of data has occurred in appendix B supporting section 4.7. Examples included below of showing incorrect data are as follows: page B-44, chromium, 45.4 kg, 1000, 1 hour; page B-44, chromium, 363 kg, 1 hour, page B-45, cresol, 1,000, annual, #11; page B-45, cresolic acid, annual, #11; page B-46, ethyl benzene; page B-48, HF, 363 kg, 24-hour, #3; page B-49, ketone, 363 kg, annual, 8, 10; ketone 363 kg, 1 hour, #2; Page B-50, methylene chloride, annual, #2; page B-50, naphthalene, 45.4kg, 1 hour, #5; page B-51, NO_2, 45.4 annual, is totally incorrect; page B-51, NO_2, 363 kg, #1, #2, #5, #9, #11; page B-5 1, NO_2 BGU, is totally incorrect. Page B-52, toluene, 500, I hour, #10; page B-52, trichloroethylene; annual, #8, #9, #10, #11. These are only examples determined by visual inspection of data presented in appendix B not actual calculations. What level of QA/QC was completed? What level is required? Please provide QA/QC documentation including signatures assuring certification of data quality. What proof does DOE give that the analysis is of good quality? I believe DOE will blow off my comments in SSM, S&D, and Pantex projects regarding QA/OC. I believe I am presenting evidence that the QA/QC is technically substandard. Prove I'm incorrect.

Virtually every page of the table is incorrect to some degree.

Table B.4.1–1 has numerous concentrations reported with identical roots but orders of magnitude difference. This is highly unlikely and points to poor QA/QC. Cresol residence #l is in error. HF exponents are in error. Ketone exponents are in error. Lead is incorrect in the 3rd quarter.

Response: *The QA/QC process used for the preparation of this EIS was conducted in accordance with a Quality Assurance Program Plan tailored for the preparation of this EIS and consistent with DOE Order 5700.6c. The process involved multiple levels of review, both internal and external to the team preparing the document.*

The specific section cited in your comment, appendix B, relates to air quality analysis. Preparation of that particular section entailed the analysis of 3.8 million data elements from which the tables you cited were prepared. During the preparation of those tables, there were typographical errors introduced due to misreading of the author's handwriting. The same misreadings that occurred during the word processing step occurred during the reviews, with the effect that the typographical errors in data were not caught by reviewers. Following the discovery of this problem with the particular author's handwriting, the review process was modified to ensure that the entries in the tables of the Final EIS were rechecked against the original data set.

It should be noted that while the Draft version of appendix B contained typographical errors in tables containing thousands of data entries, the air quality modeling and the analysis of modeling results as reported in both the Draft EIS and this Final EIS is still valid. Separate, independent modeling efforts by a different DOE contractor and by the TNRCC, using compatible, but slightly different methodologies, produced results in close agreement with the modeling performed for this EIS. None of the three independent modeling efforts found that any individual pollutant concentrations exceed air quality standards or Effects Screening Levels at the Pantex Plant boundary. The Draft EIS and TNRCC modeling did show that alcohols as a group would exceed a conservatively selected Effects Screening Level of 100 micrograms per cubic meter. Subsequent analysis to prorate the total alcohol concentration according to the quantity on hand of individual alcohols showed that none of the individual alcohols exceed their respective ESLs at the Plant boundary.

RC: 07.017
Doc: PC-025/45

Request extra public review time due to poor quality. I am concerned the input data to the modeling is questionable due to errors noted in tables above. What assurance does DOE provide to certify input data is accurate? What methods were used to qualify input data? What QA/QC documentation exists for input data? Specifically, what level of quality exists for estimated emissions rates?

Response: *Under regulations established by the Council on Environmental Quality, at least 45 days must be provided for public review of a Draft EIS (40 CFR 1506.10(c)). In response to stakeholder requests, DOE extended the public comment period for this EIS to 98 days.*

The models used for air quality analysis are the Industrial Source Code Models (ISC-ST and ISC-LT) developed and approved by the Environmental Protection Agency. The input data for air quality modeling was obtained from two sources. Input data for meteorology and mixing heights were standardized data sets approved by the TNRCC. The input data for emissions inventory was developed by Pantex Plant for use by TNRCC. These data were developed by Pantex Plant *under a DOE-approved, NQA-1 Quality Assurance Plan that meets requirements of DOE Order 5700.6c. The input data sets have been reviewed by TNRCC as well as by technical experts of Pantex Plant and DOE.*

RC: 07.018
Doc: PC-025/46

General comment for section 4.7. Tables lack sources.

Response: *Sources have been added to tables in the Final EIS.*

RC: 07.019
Doc: PC-025/47

Page 4-112. Please explain why the paper incinerator listed on page B-17, the wastewater treatment facility's SO_2, and landfill activities PM_{10} are not included?

Response: *The paper incineration emissions (CO, NO_2, and PM_{10}) were included within weapons related activities. Wastewater facility and landfill activities are not considered significant sources of pollutant emissions; hence, are not included.*

RC: 07.020
Doc: PC-025/93

Air does not assess methane releases from activities (oil, gas, and livestock industries) in the ROI. Air does not include SO_2 releases in the ROI.

Response: *Only the criteria pollutants (SO_2, CO, NO_2, PM_{10}, Ozone, and Lead) and some VOCs are regulated by EPA (Under the Clean Air Act) for Air Quality Control Region 211. Table 4.7.1.3–7 presents the SO_2 releases in the ROI. Methane is not listed under the Clean Air Act, but is listed under TNRCC's list. Modeling results for Methane have been added to the Final EIS.*

RC: 07.021
Doc: CO-008/137

Include a list of all air emissions onsite.

Response: *Volume I, section 4.7.1 (Table 4.7.1.3–3) has been expanded to include all chemical air emissions which are of potential significance in air quality analysis. The table shown in the Draft EIS omitted some of these emissions based upon modeling results which showed negligible emissions impacts. However, as a result of this and similar other comments, those chemicals are now shown in the tables.*

RC: 07.022
Doc: CO-008/138

Have all available emissions been used in the model?

Response: *Yes, all emissions sources have been modeled.*

RC: 07.023
Doc: PC-027/7

... Page 5-73, Air Quality. Albuquerque managed to get off the EPA air monitoring program—if we hadn't gotten off we would have been in trouble. All winter long, Albuquerque citizens are not free to build fires in their fireplaces or woodstoves any time they want to, we get fined for burning on a "No Burn" day. We have many "No Burn" days. Our houses are checked to see if smoke is coming out of the chimney on No Burn" days. There is a telephone number to call to get a recorded message about whether we can burn a fire or not. We have to buy special gasoline for our cars in the winter time and we are nagged constantly about car pooling, etc., to cut air pollution, [encouraged] to have "no drive" times in order to improve air quality. The information you present about the air in this area is not complete because it doesn't reflect the constraints we have to work at in order to achieve acceptable air. The city, county, and citizens work hard to get to this point. You plan to drive 120 vehicles 365 days a year and 30 vehicles 255 days a year making 30- and 50-mile trips and say that your contribution to bad air would be negligible. I don't know -- we're really borderline on meeting the clean air specs and have to work hard to hold the line.

Response: *DOE acknowledges the efforts of Bernalillo County citizens and government to control air pollution. The effectiveness of that effort has resulted in a change in status from "nonattainment for CO" to "maintenance for attainment."*

Volume I, Table 5.5.2.3–1 shows the comparison of the total pollutants (such as CO, NO_2, VOC, SO_2, and particulates) that will be emitted from the vehicles related to pit storage along with the respective total pollutants emitted in the Bernalillo County. These data show that the pollutants emitted from these additional vehicles would be negligible.

RC: 07.024
Doc: SG-003/44

The footnote on National Ambient Air Quality Standards (NAAQS) in Table 4.7.1.3–1 in Volume 1 is inaccurate. Both ozone and PM_{10} NAAQS are based on expected exceedances, meaning that non-sampling days must be accounted for when calculating attainment determination. The NAAQS is attained when the expected number of days per calendar year, averaged over a 3-year period, with maximum hourly average concentration for ozone and 24-hour average concentration for PM_{10} above the standard is equal to or less than one. SO_2 annual, NO_2 annual, and lead quarterly NAAQS are not to be exceeded. CO 1-hour and 8-hour and SO_2 3-hour and 24-hour standards cannot be exceeded more than once per calendar year.

Response: *See response to comment 07.007.*

RC: 07.025
Doc: SG-003/45

In the discussion of air monitoring results on page 4-93 in volume 1, it is stated that methylene chloride was found at 213 ppbv on July 6, 1993. There is no mention that this concentration was 7 times the effects screening level (ESL). Further review and analysis of the methylene chloride data by Toxicology and Risk Assessment staff concluded that this one-time episode would not result in any long-term health effects. Although there is detailed discussion of slightly above ESL concentration of 1,2-dibromoethane, this additional discussion on methylene chloride is left out.

Response: *See response to comment 07.007.*

RC: 07.026
Doc: SG-003/46

TNRCC air monitoring at Pantex has found a number of exceedances of the PM_{10} NAAQS. Although modeling by TNRCC and the EIS staff did not predict possible PM_{10} violations, actual exceedances happened mainly due to blowing dust and localized earth moving activities. Precisely these kind of scenarios are anticipated in the Consolidation Alternative if additional construction activity takes place at Pantex. The EIS addresses this issue in section 4.7.6 on page 4-118 by stating that mitigation measures will be undertaken to alleviate temporary dust emissions from construction activities. These are standard TNRCC-approved mitigation measures for particulate emission control.

See discussion in section 1.3.6 of this volume for explanation of variance between PM_{10} monitoring data and modeling results.

RC: 07.027
Doc: SG-003/47

TNRCC Modeling staff reviewed Appendix B, Air Quality Analysis, of the Sitewide EIS and their comments are submitted separately. Additionally, the EIS used the same model, the Industrial Source Complex Model, that the TNRCC used for modeling Pantex emissions. EIS modeling was performed in accordance with the EPA guidance document, "Guidelines for Air Quality Models" (revised) and TNRCC guidance document, "Air Quality Modeling Guidelines." The modeling approach used by the EIS is different from the one used by TNRCC. However, both models arrived at the same conclusion.

Response:

See section 1.3.6 of this volume for a general discussion of the differences between the EIS and TNRCC modeling efforts.

RC: 07.028
Doc: SG-003/48

TNRCC used a tiered modeling approach that included a blend of screen and refined modeling techniques because of the large number of fugitive emission locations, buildings, and pollutants, whereas the EIS modeling used a refined dispersion model to accommodate the large number of emission sources and pollutants.

Response:

See section 1.3.6 of this volume for a general discussion of the differences between the EIS and TNRCC modeling efforts.

RC: 07.029
Doc: SG-003/49

In the TNRCC approach, the TNRCC modeling results were added to the results of the modeling conducted by Radian Corporation in support of a permit application. Radian modeling addressed predicted impacts of emissions from the burning ground and container storage area. Therefore, TNRCC used an additive modeling approach to account for emissions from some of the buildings to assess plant wide emission impact. Using this approach, TNRCC modeling concluded that no predicted exceedances of the criteria pollutant impact public health. The maximum concentrations of alcohols predicted at the property line was slightly above the ESL, but concentrations of alcohols predicted at the nearest residence was below the ESL.

Response:

See section 1.3.6 of this volume for a general discussion of the differences between the EIS and TNRCC modeling efforts.

RC: 07.030
Doc: SG-003/50

Using a different approach, EIS modeling also concluded that there would be no exceedance of the NAAQS for criteria pollutants and that the only hazardous air

	pollutant that exceeded its ESL was alcohols. Again, predicted maximum concentrations of alcohols for 11 residences located near Pantex were below ESL.
Response:	*See section 1.3.6 of this volume for a general discussion of the differences between the EIS and TNRCC modeling efforts.*

RC: 07.031 **Doc: SG-003/51**	The nonradiological air quality impacts due to the No Action Alternative and the Consolidation Alternative will be minimal, especially if mitigation measures are taken to control particulate emissions due to increased vehicular traffic and construction activity.
Response:	*Your observation is correct.*

RC: 07.032 **Doc: SG-003/52**	Data reviewed were contained in Tables B.3.6-1 through B.3.6-9 and Tables B.4.1-1 through B.4.2-3 of the EIS. Please note that no modeling input and output files were available to assist in our review. Therefore, a comparison was made of the emission rates and results presented in the EIS to the emission rates and results reported in the TNRCC's Modeling Analysis of the Pantex Plant Amarillo, Texas, dated June 1995.
Response:	*While the complete modeling input and output files are too voluminous to include in the EIS, the emissions rates are the key ingredient since the modeling equations and the meterology and mixing height data are identical to those used by TNRCC. As described in the response to comment 07.009, the emissions inventory displayed in the Final EIS has been expanded to include all pollutants emitted by Pantex Plant.*

RC: 07.033 **Doc: SG-003/53**	Some of the sources modeled by the TNRCC were not listed in Table B.3.6-1 of the EIS, so we assumed they were not modeled. However, in the TNRCC analysis the predicted concentrations for the pollutants emitted from the omitted sources, plus all other applicable sources, were less than the respective National Ambient Air Quality Standard (NAAQS). Following is a list of pollutants and omitted sources: CO emissions from EPNs 54, 85, and 160; NO_2 emissions from EPNs 85, 157 and 160; and PM_{10} emissions from EPNs 157 and 160.
Response:	*The cited sources are no longer active at Pantex Plant and were not included in the modeling. See response to comment 07.008, and for a general discussion of the differences between the two modeling efforts, see section 1.3.6 of this volume.*

RC: 07.034 **Doc: SG-003/54**	All predicted concentrations in the EIS were less than those reported by the TNRCC except for alcohols, hydrogen chloride, methylene chloride, and PM_{10}. Except for alcohols, the concentrations for all pollutants were below the respective Effects Screening Level (ESL) or NAAQS. The predicted concentration for alcohols was only slightly higher than the TNRCC-predicted value and less than twice the ESL.

Response: *See section 1.3.6 of this volume for a discussion of differences in the modeling efforts.*

RC: 07.035
Doc: SG-003/55

The EIS Tables B.4.2-1 and B.4.2-2 do not include all the pollutants reviewed by the TNRCC. Therefore, we assumed that the EIS did not include an evaluation for them. However, the TNRCC reported in its analysis that no concentrations for these pollutants were predicted to exceed an ESL or state standard. The omitted pollutants follow: 1,3,5-Trinitrobenzenel-Butanol, 2,4,6-Trinitrotoluene, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, 2-Nitronaphthalene, 2-Ethoxyethanol, Acetone, Acetylene, Aluminum, Ammonia, Barium, Benz(a), anthraceneBenz(a), pyrene, Bismuth, Butadiene, Butane, Butene, Calcium, Chlorinated Fluorocarbon, Copper, Cyanogen, Cyclohexane, Cyclohexanone, Dimethylformamide, Dioxane, Ethane, Ethyl Acetate, Ethyl Ether, Ethylene, Formic Acid, Iron, Isobutane, Isobutanol, Ketene, Lithium, Magnesium, Methane, Methane, dichloroN-Butyl, Alcohol, Non-F Solvents, Ortho-dichlorobenzene, Propane, Propene, Pyrene, Pyridine, Silicon, Tetrahydrofuran, Titanium, Total Suspended Particulate, Trichlorofluoromethane, Trichlorotrifluoroethane.

Response: *The maximum fenceline concentrations of the pollutants, both those listed in the Clean Air Act and those listed by TNRCC (as stated above in the comment) were modeled and compared to appropriate TNRCC ESLs. However, only the results for those chemicals that are listed under the Clean Air Act, as amended (Nov 1990), and alcohols, as a group, which exceeded its ESLs were reported in the Draft EIS. All of the maximum fenceline concentrations for all of the chemicals emitted by Pantex Plant, including those listed by TNRCC and used in its modeling, have been included in volume I, section 4.7 and volume II, appendix B of the Final EIS.*

RC: 07.036
Doc: SG-003/56.

On Page 4-93, Paragraph 2, 2nd Sentence: "AQCR 211 is designated by EPA as "better than national standards" for total suspended particulates..." To our knowledge there is no national standard for total suspended particulates. EPA replaced the Total Suspended Particulate standard with the particulate matter standard during the late 1980's.

Response: *Commentor is correct. The text in volume I, section 4.7.1 has been revised.*

RC: 07.037
Doc: SG-003/57

On page 4-95, paragraph 5, 2nd sentence, there is a typographical error: "TRNCC" should be changed to "TNRCC".

Response: *Correction has been made.*

RC: 07.038
Doc: SG-003/58

Page 4-95, Air Quality Modeling, corresponding tables. It is not clear in the narrative whether the air dispersion modeling referenced was conducted as part of the Agreement in Principle or as part of the permit application submitted by the DOE.

Response:	*Modeling was performed to fulfill the NEPA requirement to present impacts for current operations as well as predict those associated with the future operations being evaluated in the EIS. The monitoring data were not comprehensive enough to create a baseline or to estimate the potential impacts of future operations to the surrounding population.*

RC: 07.039 **Doc: SG-003/59**	Page 4-97, Table 4.7.1.3-4. The following ESLs need to be corrected: Ethene, Trichloro:135 ug/m^3 for the annual ESL1350 ug/m^3 for the 30-minute ESL.
Response:	*Table 4.7.1.3-4 in volume I of the Draft EIS has been expanded and appears as Table 4.7.1.3-5 in the Final EIS. The chemical "Ethene, trichloro-" in the Draft EIS appears as "Trichloroethylene" in the Final EIS. We have inserted the annual and 30-minute ESLs as requested.*

RC: 07.040 **Doc: SG-003/60**	Page 4-98, Table 4.7.1.3-4. The following ESLs need to be corrected: Methanol:262 ug/m^3 for the annual ESL2620 ug/m^3 for the 30-minute ESL.
Response:	*Methanol is listed in the TNRCC's ESL list as Methyl Alcohol, which has the same ESLs as mentioned above. The ESL for Methonol has been added as mentioned in the comment.*

RC: 07.041 **Doc: SG-003/61**	Page 4-99, Table 4.7.1.3-4. The format of the ESL should be converted to be consistent with the other ESLs represented in the table (e.g., 135 ug/m^3 should be 1.35 x 10E^2).
Response:	*Changes have been made as requested for consistency.*

RC: 07.042 **Doc: CO-008/136**	Are TNRCC air monitoring results included [in] the air quality calculations? If so, please cite.
Response:	*Air monitoring results of TNRCC are described in volume I, section 4.7.1.*

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3.8 Acoustics (Noise)

RC: 08.001
DOC: PC-023/4

The EIS reported that risks to the public from acoustics and natural seismic activity are low. However, the report does not address structural damage to homes and buildings on and offsite of the plant that have occurred due to explosions. One home offsite of the plant suffered significant damage to its foundation, walls, roof supports, and plumbing as a direct result of a planned explosion at Pantex Plant. The "shock" energy from the explosion which caused the damage is similar to energy associated with acoustics and seismic activity.

Response:

Volume I, section 4.8.1.3, describes the noise from high explosives detonation. During 1994, Pantex Plant detonated 60 charges of HE. The maximum charge exploded was 55 pounds. Noises from HE detonations were modeled by using the model BLASTO. The results are summarized in volume I, section 4.8.1, Table 4.8.1.3–1. Almost any wind speed from the south quadrants could be expected to give at least 140 dB overpressure from a 55-pound HE burst at Firing Site-4. The nearest residences, 1 and 2, which are both just north of the site boundary, can feel discomfort due to the noise created by this detonation. Window damage would rarely occur, but there could be interior plaster cracking depending on its age. Objects might occasionally be rattled from shelves, but damage to the foundation, roof supports, and plumbing will not occur due to this kind of explosion (55 pound HE detonation).

RC: 08.002
DOC: PC-017/6

Last October 4, 1995, a very large explosive charge was set off for an emergency management drill. Our home received major damages. We would have been better off to have torn our home down and rebuilt from the ground up. We were originally told that the charge was 110 pounds of explosive. Later, plant officials have said only 80 pounds of explosive was used. This was set off about one-half mile southwest of our home. We are now learning of other neighbors who have damages that possibly resulted from that explosion. Throughout the many years of living next to Pantex, the testing of high explosives probably caused damages to our homes resulting in cracking, breakage, etc. The regular shaking and jarring could not possibly do our homes and property any good.

Response:

In October 1995, a charge greater than 55 pounds of HE was detonated. Pantex Plant does not plan to explode charges larger than 55 pounds of HE in the future. Should a larger charge be exploded in the future, the plant would perform appropriate NEPA review for that charge.

RC: 08.003
DOC: PC-025/48

Page 4-125, what are the impacts to animals especially birds as a result of these detonations? [Aren't] detonations generally used by construction industry to chase off nesting birds?

Response:

Detonations have been shown to disperse animals from a given area. However, these dispersals and the impacts are usually considered temporary in nature.

Many devices (including detonation) have been used with various degrees of success for bird control by some firms and agencies. See section 4.9, Biotic Resources, for a discussion of animals at the Pantex Plant.

RC: 08.004
DOC: PC-033/2

... On page 4-122 the map shows a noise measurement location marked "B" that is fairly close to the target range. The table on page 4–126...lists these locations as having been tested on 9-9,15, and16, respectively. Could you please tell me if these were the times when qualifying was taking place at the target range, or were these just normal practice days? If the qualifying was taking place I would like to see earlier and later times of day for the readings. It seems very loud at my house when they are qualifying and they generally start very early in the morning, approximately 5-6 a.m. and sometimes are firing late at night, approximately 10 p.m. Could you please let me know also where that measurement location "B" is for certain? If it is close to my house, where it is located and what it looks like?

Response:

Volume I, section 4.8.1, Table 4.8.1.1–1 and Figure 4.8.1–1, show that noise measurements were made at location "B" (close to the target range). These measurements included the peak sound level from the vicinity of the target range. These measurements were made at 1:07 p.m. (9/9/94) and 8:40 a.m. (9/15/94). No noise measurements were performed on 9/16/94. The peak value of sound was 47 dB at 4,000 Hz. The locations A and E are also close to the target range (volume I, section 4.8.1, Figure 4.8.1–1). Sound measurements were made at location A, on 9/9/94, at 9:45 a.m., 10:05 a.m., and 1:40 p.m. The L_{eq} measurements were 42, 48, and 43 dB respectively. Sound measurements were also made at location E, on 9/15/94, at 9:45 a.m. and 10:00 a.m. The L_{eq} measurement at location E was 43 dB and the peak value of sound was 42 dB at 4000 Hz. The measurements were made with portable instruments. The measurements were made close to residences L4 and L5.

3.9 Biotic Resources

RC: 09.001
Doc: CO-008/19

Page 4-135, Paragraph 3: "Radiological surveys of beef cattle raised..." Please clarify this statement and provide the citation. What type of studies were done, when were they conducted, and by whom?

Response:

Radiochemical studies were conducted comparing cattle grazed on Pantex Plant Site with control cattle grazed at the Bushland Experiment Station west of Amarillo. The beef cattle food chain pathway was investigated by analyzing soil, native vegetation, grain, and cattle tissue samples. The study determined that meat (from cattle) grown on or near Pantex Plant did not represent a radiological hazard to the public because levels of these radionuclides were far below accepted guidelines.

The study was conducted in 1981 at three locations: a pasture 1-mile west of the Burning Ground at Pantex, the Texas Tech feedlot in the southwestern part of the Pantex Plant Site, and the Texas A&M Experiment Station at Bushland (west of Amarillo).

The study involved 11 scientists including L.C. Hollis (a veterinarian from the Texas A&M Veterinary Diagnostic Lab in Amarillo), J. M. Horton (Director of the Killgore Beef Cattle Center in Panhandle, Texas), and nine staff scientists from Los Alamos National Laboratory.

The statement in volume I, section 4.9.1.1, was based on a report entitled Supplemental Documentation for an Environmental Impact Statement Regarding the Pantex Plant, Agricultural Food Chain Radiological Assessment (LLNL 1982). This report, published in December 1982, was prepared in support of the 1983 Pantex EIS. Section 4.9.1.1 has been revised to reference this study and the following text has been added to this section in this EIS, "The study indicated that if beef consumption of 79 kg/yr is assumed then the 50-yr dose commitment to an adult from ingestion of ground beef at 1.6×10^{-4} pCi/g weight would be 0.2 mrem to bone, 0.01 mrem to kidneys, and 0.01 mrem to liver. These values are 500 times below the radiation dose each year from natural background."

RC: 09.002
Doc: CO-008/20

Page 4-139, Paragraph 1: Please clarify whether the type of "stock tank" is an earthen structure on one of the drainage-ways to the playa or is a galvanized or metal structure.

Response:

This stock tank is an earthen pit, approximately 5 to 6 feet deep.

RC: 09.003
Doc: CO-008/21

Page 4-139, Paragraph 2: "There are five playa Wetlands in the vicinity of Pantex Plant Site..." Do you mean 5 playas designated as wetlands? There are many more than 5 playas in the vicinity of Pantex.

Response:

Your interpretation is correct. The text in volume I, section 4.9.1.3, has been modified to read "There are six playas on DOE owned or leased land in the *vicinity of the Pantex Plant Site. Playas 1, 2, and 3 on the main plant; Playas 4 and 5 on land leased from Texas Tech University; and Pantex Lake". The statement in the Draft EIS was based on the Wetlands Delineation study by Herrera Environmental Consultants published in 1995 (MH 1995) which delineated Playas 1-4 and Pantex Lake in accordance with guidelines in the Army Corps of Engineers Wetlands Delineation Handbook* (USCOE 1987). *Playa 5 has not been delineated.*

RC: 09.004
Doc: CO-008/22

Page 4-140, Paragraph 2: Please correct typo "P. amphibum."

Response: *P. amphibum now reads P. amphibium.*

RC: 09.005
Doc: CO-008/23

Page 4-142, Paragraph 1: How do you explain the significant decline from the 1993 to the 1995 floristic survey in the *Echniocereus viridiflorus* population?

Response: *Dr. Marshall Johnson (who conducted these floristic surveys) noted a decline in all age classes of this cactus, from 200 in June 1993 to 50 in July 1995 and then an increase to approximately 75 in September 1995. He stated that the cause of the decline was unknown but said one could speculate that "(1) a high mortality rate prevails among the seedlings; (2) the greater luxuriance of the growth of HPG grass and forbs obscured the presence of the smaller plants as compared to their possibly higher level of visibility in June; or (3) a combination of (1) and (2) above."*

RC: 09.006
Doc: CO-008/24

Page 4-142, Paragraph 2: In the statement, "wetland resources would benefit from continued operations since officials are taking steps to...," what specific steps have been agreed upon?

Response: *A 29 May 1996 response from the U.S. Fish and Wildlife Service (FWS) stated the FWS "fully support Pantex's proposed plans to manage portions of plant property for the benefit of native resident and migratory wildlife species, including the proposed playa basin management plans. As described in the biological assessment, the Pantex Plant and surrounding area currently contains and supports significant wildlife resources, but with proposed management, the area has the potential to support an even higher diversity and number of native plant and animal species, to the mutual benefit of both humans and wildlife." Appendix E of the 1996 Biological Assessment for the Pantex Plant (DOE 1996d) includes the following management plans alluded to in the 29 May 1996 FWS letter that are being used to protect wetlands at Pantex Plant:*

- *Interim Guidance Document for Pantex Plant Playas.*
- *Management Plan for Playa 2 Management Unit: Phase One.*
- *Natural Resource Management Plan for Pantex Plant, Amarillo, Texas.*
- *Management Plan for Revegetation of Playa Buffer Areas and Formerly Cultivated Areas.*

- *Update for FY94, Groundwater Protection Management Program Plan, Pantex Plant.*
- *Land-Applied Chemical Use Plan for the Pantex Plant.*

RC: 09.007
Doc: CO-008/25

Page 4-142, Paragraph 5: Please correct typo, last sentence. "...but these impacts would not (insert "be") considered significant."

Response:

Suggested change has been made in the FEIS.

RC: 09.008
Doc: CO-008/26

Page 4-143, Paragraph 4: In the statement, "Environmental protection activities currently ongoing at the plant meet all regulatory requirements of FWS," please cite the letter from FWS.

Response:

Environmental protection measures currently ongoing at Pantex Plant support sections 2(b) and 7(a) of the Endangered Species Act (ESA) which requires protection of threatened and endangered species. A biological assessment submitted by Pantex Plant officials on 9 May 1996 fulfilled section 7 ESA requirements for Federal agencies to consult with the U.S. Fish and Wildlife Service (FWS). A 29 May 1996 response from the FWS commended "Pantex for developing a comprehensive and complete BA (biological assessment), and concur with your assessment that the proposed action is not likely to adversely affect any Federally listed threatened or endangered species." This letter is included in volume II, appendix J.

RC: 09.009
Doc: SG-009/1

While we recognize Pantex efforts to discover the amount and extent of the historical contamination and Pantex current contaminant reduction in progress, we are concerned about impacts to wildlife from historic contamination listed in the report. Due to the unknown extent of the historical contamination, TPWD requests Pantex continue to describe the extent of contamination and encourages efforts to clean up or rectify the contaminant impacts. Consider incorporating a timeline showing past efforts and future efforts in contaminant identification and cleanup. If available, please send Joan Glass of our staff copies of completed reports describing potential wildlife impacts.

Response:

The status of the contamination clean up effort is discussed in volume I, section 4.5.1.3 (Soil and Sediment Quality), with additional information provided in chapter 15 (Environmental Restoration) of the Environmental Information Document (EID) (Pantex 1996). A number of wildlife studies have been conducted at the Pantex Plant to identify resident and migratory species, in particular reptiles, birds, and mammals. Faunal studies summarized in volume I, section 4.9 (Biotic Resources), and chapter 7 (Ecology) and chapter 16 (Radiation and Hazardous Chemical Environment) of the EID, do not indicate significant contamination impacts to wildlife from Pantex operations. A time line has been added to volume I, section 4.5.1.3 summarizing previous and future clean-up activities. A copy of the Pantex Biological Assessment (DOE 1996d) is being sent to Ms. Joan Glass.

RC: 09.010
Doc: SG-009/2

TPWD is also concerned about the unidentified minnow species from Pantex Lake. Because there are 6 Federally listed Notropis with 2 additional State listed Notropis species, the minnow species should be identified by a competent scientist. You may request assistance in identification of the minnow by contacting the TPWD Freshwater Studies Program aquatic biologist, Kevin Mayes at (512)754–6844. Upon contacting Mr. Mayes for identification, a minimum of 5 specimens can be send to him at 300 C.M. Allen Parkway, Bldg. B, San Marcos, TX 78666.

Response:

Pantex Plant personnel re-sampled the stock tank near Pantex Lake. No specimens of Notropis were found, but a number of fathead minnows (Pimephales promelus) and one black bullhead (Ictalurus melas) were collected. It is unknown whether the identification referenced on page 4–139 of the Draft Pantex EIS was a misidentification, but that possibility is being investigated.

RC: 09.011
Doc: PC-034/11

Comment (and background information):

In Volume I, 4.2 "Impact Assessment Methodologies" (p. 4-4), under "Biotic Resources," it is stated that "Impacts to wetlands are mostly related to the potential discharge of contaminants to the playas."

Question:

How can impacts to wetlands be related to potential discharges of contaminants? Only actual discharges can have impacts!

Response:

The sentence has been revised to read "Impacts resulting from wastewater discharge into a wetland system are evaluated, recognizing the effluents would be required to meet Federal and state standards."

RC: 09.012
Doc: PC-025/49

Table 4.8.1.3–1, what is the impact to a human without ear protection over a 1/4 mile range? A lifetime for residents?

Response:

Airblast noise resulting from detonation of HE is impulsive in nature and generally less than a second in duration. Personal exposure to 140 dB (from 55 lb of HE) would not be anticipated to cause hearing damage from single impulse events. OSHA provides guidelines to ensure worker protection in elevated noise environments. Workers are not anticipated to have hearing impairment at a distance of 1/4 mile from Pantex activities. The modeling results provided in volume I, section 4.8.1, Table 4.8.1.3–1, were derived from data collected by Pantex personnel.

The OSHA 8-hour time weighted threshold limit value for a 140 dB exposure is 28 seconds. In 1994, 60 detonations of high explosives occurred from charges weighing 5 to 47 pounds. Due to the limited number of high explosive detonations done each year and the short duration of each (i.e., less than 1 second), lifetime residents are not anticipated to be adversely affected by high explosive detonations as currently conducted. As noted in volume I, section

4.8.1.3, additional NEPA review would be conducted if charges in excess of 55 pounds are detonated.

RC: 09.013
Doc: PC-025/50

Section 4.9. Given the semi-arid climate, what impacts have occurred as a result of fires in the recent past? If fires have occurred in the past why isn't it included in the affected environment? Does Pantex use controlled burns to control vegetation? What is the impact? Does the plant dredge the playa systems? What is the impact? Is there a need to dredge in the near future?

Response:

The commentor asked seven questions which are answered in order. Wildfires have occurred in the Pantex Plant vicinity in the past. Property owned or controlled by DOE has been burned by uncontrolled wildfires. There is no mechanism to assess the impacts of past burns. Controlled burning is not used for vegetation control on DOE-owned land. Playas on DOE-owned land are not routinely dredged. Playa 1 was deepened to increase water storage capacity before it was designated or delineated as a jurisdictional water of the U.S. (wetland).

RC: 09.014
Doc: PC-025/51

Page 4–139. There appear to be more than five playa lakes in the vicinity of Pantex Plant (see page 4-56 of this EIS). Pratt Lake, Pantex Lake, and several to the north and south of the site, please comment. Page 4–142. Pit Storage Activities. Please describe non-adverse impacts to biotic resources.

Response:

Only playas at the Pantex Plant Site and Pantex Lake were investigated under biotic resources. See response to comment 09.003. Pratt Lake is discussed in section 4.6 (Water Resources) and included in volume I, Figure 4.6.1.1–1 (Primary Outfalls and Floodplains at Pantex Plant Site). Also see response to comment 06.058.

RC: 09.015
Doc: PC-025/52

Page 4-142. ER activities. "...would not considered significant."?

Response:

The sentence has been revised to insert "be" between "not" and "considered."

RC: 09.016
Doc: PC-025/53

Page 4-142. Waste Management: "... will have a long-term beneficial impact on plant and animal species?" Landfills and an open burning activity that fumes metals and radioactivity are considered beneficial? Please provide documentation supporting statement. Any direct impacts to non-threatened, non-endangered species or non-wetlands? Please provide documentation supporting position.

Response:

Volume I, section 4.13 (Waste Management) summarizes waste management activities to collect and dispose of hazardous, nonhazardous, radioactive, low-level radioactive mixed hazardous wastes in accordance with the Pantex Plant's Resource Conservation and Recovery Act (RCRA) Part B Permit. Volume I (Air Resources), section 4.7, summarizes air emissions at the Burning Ground. Data on the onsite construction debris landfill and burning ground emissions indicate that they are being conducted in accordance with RCRA and Clean Air Act *guidance. One of the intents of RCRA waste management regulations is to minimize adverse impacts to plants and animals. Recognizing that waste cannot be simply ignored, the implementation of regulated forms of treatment and disposal is more advantageous than the practices prevalent throughout American industry prior to the 1970's.*

RC: 09.017
Doc: PC-025/94

Biotic Resources [section] does not analyze the number of playas within the ROI.

Response:

See responses to comments 09.003 and 09.014. Volume I, section 4.2 has been revised to indicate that the ROI for biotic resources was restricted to investigation of flora and fauna at the Pantex Plant Site and the nearby Pantex Lake, which is also owned by DOE. Also see response to comment 06.058.

RC: 09.018
Doc: SG-003/7

This comment is a duplicate of comment 09.011.

RC: 09.019
Doc: SG-003/27

Page 4-4, Biotic Resources: The text states that U.S. Fish and Wildlife Service and appropriate State agencies have been used in the process of determining whether Pantex Plant operations would impact any plant or animal. This is incorrectly stated. The Trustees understand that an ecological screen has not yet been completed for this site and an ecological risk assessment has not been performed. The text should be corrected to reflect what has actually been assessed at this site and which agencies were involved.

Response:

A Biological Assessment (BA) of the Pantex Plant was submitted to the U.S. Fish and Wildlife Service (FWS) by the Amarillo Area Office on May 9, 1996 in accordance with section 7 interagency consultation requirements of the Endangered Species Act (ESA). See response to comment 09.006 regarding the favorable FWS reply. The BA was prepared in accordance with ESA guidance and may not meet the requirements for a Natural Resources Damage Assessment required under Section 107 of the Comprehensive Environmental Response Compensation and Liability Act. However, Pantex officials have had meetings with attendance by EPA, TNRCC (representing the Texas Parks and Wildlife Office), and the Texas General Land Office. This additional information has been incorporated into volume I, section 4.2 (Biotic Resources subsection) and chapter 6 (Environmental Compliance Requirements for Implementing the Proposed Action and the Alternatives).

RC: 09.020
Doc: PC-028/8

The Biotic Resources (para 5.5.1.7) and cultural resources (para 5.5.1.8) will be in [a] higher risk category. The higher risk not only includes possible contamination, but even more probable, the damage caused by increase of related activities like facility preparation, transportation to and from, and even from the additional 150+ humans to be placed on or about the Manzano WSA full time. Select another site, not KAFB.

Response: *The analysis of both biotic (volume I, section 5.5.1.7) and cultural resources (volume I, section 5.5.1.8) leads to the conclusion that no impacts to these resources are to be expected by the relocation alternative. However, the decision to relocate or not would be made after consideration of environmental, cost, and other technical factors.*

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3.10 Cultural Resources

RC: 10.001
Doc: CO-008/27

Why were the agricultural based lifestyle and the community of Panhandle, as a cultural impact, not evaluated? Most people in the region are only one generation removed from the farm or their grandparents were farmers. Also, the supportive business and families are involved in this culture. The culture in general, and the resources associated with it, were not mentioned.

Response:

Volume I, section 4.10 addresses the prehistoric and historic resources within the boundaries of Pantex Plant. Twelve historic agricultural sites have been recorded within the plant's boundaries.

The community of Panhandle is located approximately 16 kilometers (10 miles) east of Pantex Plant, and is thus outside of the area addressed by section 4.10. A discussion of impacts to the agriculturally based lifestyle of this community is out of scope for this section. An ethnographic discussion of agricultural lifestyles and resources as a "culture" are likewise considered to be out of scope in this section of the EIS. Agricultural resources within the plant boundaries and the ROI are discussed in volume I, sections 4.4, Land Resources; 4.5, Geology and Soils; 4.6, Water Resources; and 4.11, Socioeconomic Resources.

RC: 10.002
Doc: HT13/37

... Is it your position that [this EIS] adequately analyzes archeological sites for historic preservation purposes [at the Manzano Weapons Storage Area]?

Response:

To elaborate on the response given at the public hearing, the comment is concerned with cultural resources at the Manzano Weapons Storage Area (WSA) on Kirtland Air Force Base (KAFB). The KAFB Environmental Management Division has coordinated historic preservation efforts, including all cultural resource surveys and findings within the Manzano WSA as well as the base. Twenty-seven archaeological sites have been located within the WSA by a 100% ground survey conducted by Argonne National Laboratories. As discussed in volume I, section 5.5.1.8, 22 of these sites have been recommended for inclusion or eligibility to the National Register of Historic Places.

RC: 10.003
Doc: PC-034/14

Comment (and background information):

In volume I, §4.10.1.2 "Native American Groups" (p. 4-150), it is stated that "An inventory of traditional Native American sites identifying features such as petroglyphs, ceremonial areas, or sacred sites has not been conducted nor have any such sites been identified at Pantex Plant (DOE 1995K:4-280)." This statement is incorrect! Numerous archaeological surveys have been conducted on both DOE-owned and DOE-leased land for the purpose of identifying and recording of all Native American sites including any petroglyphs, ceremonial, or sacred sites. That part of the sentence that states no such traditional sites have been identified is correct. It is worthy of note that the stated reference is incorrect both qualitatively and quantitatively! Page 4-280 of the given reference discusses Oak Ridge National Laboratory; however, when one turns to page 4-300 of that reference one finds: "Native American resources associated with these groups have not yet been identified at Pantex, but the remains of temporary campsites, hunting locations, ceremonial locations, or isolated burials are possible."

Question: How can these words be used as a reference for the statement in the Pantex SWEIS? And why doesn't DOE know that these surveys have been conducted?

Response: *The discussion of Traditional Cultural Properties (TCP's) is misleading as presented in the draft document and has been clarified. The identification of TCP's, as differentiated from archaeological or historical features, has been conducted through consultation with the 10 tribes with recognized potential ties to the area. There have been numerous cultural resource (archaeological and historical) surveys conducted at Pantex Plant that are discussed in volume I, section 4.10, and these surveys have no doubt identified features that could be TCP's. TCPs are identified through specific studies conducted to address properties or areas that are important in a community's historically rooted beliefs, customs, and practices. Studies of this type would typically entail a detailed ethnographic study involving consultation with Native American Groups with traditional or ancestral ties to the area which is now Pantex Plant, and possibly field inspections with these individuals prior to, or associated with, any survey project. This consultation is important as many TCP's may not be discernible as such to anyone but a knowledgeable member of the group that ascribes significance to them.*

The reference to page 4-280 is a typographical error. Page 4-280 was the location of the referenced section in the draft document. The correct page number is indeed 4-300 in the Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling (DOE 1995k). This has been corrected in the final version of the Pantex EIS.

The words used as a reference in the Pantex EIS are accurate, and represent the status of known resources belonging to historic Native American groups that occupied or utilized the Pantex region. There is a possibility that campsites, hunting areas, ceremonial sites and isolated burials may be discovered within the land that comprises the Pantex Plant. It is also possible that native plants with traditional medicinal or spiritual uses, landmarks important in religion, myth or visions, or areas of supernatural connotations that are kept secret until they are threatened, could be located within this area of land on the Texas panhandle. Cultural resource management involves much more than the survey and excavation work that DOE has conducted at the plant. It is an on-going management tool that traces and protects history and prehistory, as well as protecting the concerns of current Native American peoples.

RC: 10.004
Doc: HT17/33

I am a member of the Cheyenne-Arapaho Tribes of Oklahoma, which is a Federally recognized tribe. I did receive a letter dated September 15th, 1994 in regard to a summary notification of Native Americans. They mentioned several tribes on there, and in going through this letter I noticed that the Northern

	Cheyenne was not on here; neither was the Northern Arapaho Tribe. I would ask that they be included in this Environmental Impact Statement.
Response:	*The Northern Cheyenne and the Northern Arapaho Tribes have been included in chapter 9, the List of Agencies, Organizations, and Individuals to whom copies of the EIS are sent.*
RC: 10.005 **Doc: HT17/34**	There's a lot of concerns as far as being a member of the Plains Indians Tribes. ...We have a lot of historical and traditional cultural properties related to this area, all the way down from...the northern Dakotas down to the Palo Duro Canyon. So, we do have some sites that are significant to us,...and I am concerned about this. ...I would ask that you continue to address this on a government-to-government type basis and consult with the Federally-recognized tribes
Response:	*Cultural resources addressed in the Pantex Plant EIS only address known or suspected areas or features within the boundaries of the plant. These are discussed in volume I, section 4.10 of the document. Areas of traditional cultural properties (TCP's) have not been identified by past inventories or research within the plant boundaries; however, TCP's of importance to varying Native American Groups are located throughout the plains. DOE respects and protects the TCP's when they are identified, and will continue to consult on these issues with Native American tribes, governments, and groups.*
RC: 10.006 **Doc: HT17/35**	...there are other tribes out there that are not Federally recognized who you might consider consulting with as well.
Response:	*Consultations are made between the DOE and Federally recognized Native American Tribes, governments and groups, as well as Pan-Tribal groups such as the Owens Valley Board of Trustees.*
RC: 10.007 **Doc: HT17/36**	There's a lot of other concerns that I have, especially with the vegetation within the area. I also have some concerns with the potential adverse [effects from] inadvertent discoveries of artifacts or human remains that may be there.
Response:	*As discussed in volume I, section 4.10.2, any discovery of subsurface cultural features or artifacts identified during land disturbance activities will be appropriately mitigated after consultation with the State Historic Preservation Office (SHPO). Typically, in discovery situations, ground disturbing work is halted until a decision can be made between the consulting officials as to avoidance, collection, testing, or excavation. If human remains are located the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA) are followed; work is halted and the Pantex Cultural Resource Media Manager, the Texas SHPO, and concerned Native American Tribal groups and governments are immediately notified. Construction activities are not resumed until the remains are removed by a tribal member, archaeologist or coroner. It may also be decided to leave the remains in place, reroute the*

construction, and avoid further disturbance to the site. These decisions are made on a case-by-case basis.

There have been no vegetated areas or specific plants identified to-date within the boundaries of the Pantex Plant that have been identified as traditional cultural properties. Traditional use of specific plants for religious or medicinal purposes as well as harvesting areas may be identified as areas of future concern, but these have not been identified.

RC: 10.008
Doc: HT17/37

I am the designated NAGPRA representative for the Cheyenne Tribe. I don't know if any of you are familiar with the Native American Graves Protection and Repatriation Act of 1990. And that was one of my other concerns, that I noticed that it was cited inside this study, but it wasn't really in detail.

Response:

DOE is knowledgeable of the Native American Graves Protection and Repatriation Act (NAGPRA) and will abide by its direction if mortuary remains or related cultural items are located within Pantex Plant. The rights of lineal descendants and members of Indian Tribes to Native American human remains and funerary objects with which they are affiliated will be instituted when and if these remains are located. Consultation with the appropriate State, Federal and Tribal representatives will be instituted and if requested, reburial or a transfer of ownership of the items will be instituted. NAGPRA is mentioned in volume I, section 4.10, but is not discussed in detail as no human remains have been located on Pantex Plant Site.

RC: 10.009
Doc: HT17/38

And I did note...in this letter that there [were] scheduled visits to the tribes, and I would just like to ask if those visits have occurred, and if they have occurred, I would like to request copies of the comments that were received from those tribes.

Response:

The Pantex Plant Cultural Resource Manager visited the 8 Native American tribes listed in volume I, section 4.10.1.2 on June 22, 23, and 24, 1994. The tribes did not submit comments regarding these visits.

RC: 10.010
Doc: PC-027/6

Reference historic and prehistoric resources in the Summary (Page S-24) and in the volume I - Main Report page 5-59, item 5.5.1.8: "Twenty-seven historic and prehistoric archaeological sites have been found in the Manzano WSA. Of these sites, 8 have been recommended for inclusion in the National Register of Historic Places and 14 others are considered to be potentially eligible for inclusion." Noted that you said there would be no impact to cultural and paleontological resources, but they may be so locked up because of security requirements that nobody will be able to see them. I would think that inclusion in the National Register of Historic Places might involve the possibility of a visit or a look at the site. Will that be possible if strengent security requirements are in effect?

Response:

The Manzano WSA is a secured area. Sandia National Laboratories provides security to the facility and it is not available for public access without approval.

This policy would continue whether Manzano WSA is chosen for interim pit storage or not.

RC: 10.011
Doc: PC-028/5

Page 5-58, para 5.5.1.8–Comment: By placing the Pit storage area within Manzano WSA, the increased security will certainly reduce, even prohibit scientific and public access to the 27 historic sites. Consider the other alternative sites which do not present this type of problem.

Response:

At present, the Manzano WSA is a secured access area. Scientific and public access to the area must be obtained from the U.S. Air Force. If this area is chosen for pit storage, access to the 27 historic sites is not expected to change. The Secretary of Energy will consider the environmental impacts of each alternative along with mission requirements, technical factors, and public interest before issuing the Record of Decision.

RC: 10.012
Doc: PC-028/9

The Biotic Resources (5.5.1.7) and cultural resources (5.5.1.8) will be in higher risk category. The higher risk not only includes possible contamination, but even more probable, the damage caused by increase of related activities like facility preparation, transportation to and from, and even from the additional 150+ humans to be placed on or about the Manzano WSA full time.

Response:

The analysis of both biotic (volume I, section 5.5.1.7) and cultural resources (volume I, section 5.5.1.8) leads to the conclusion that no impacts to these resources are to be expected by the relocation alternative. However, the decision to relocate or not would be made after consideration of environmental, cost, and other technical factors.

RC: 10.013
Doc: PC-033/7

I request a copy of the transcripts or notes taken from meetings with any of the affected tribes mentioned in the Draft SWEIS. Gordon Yellowman commented at the recent hearing on June 25, 1996 and asked for a copy of the meeting notes. Nan Founds replied stating that they did not visit the individual tribes, but sent them a letter. She will send him a copy of the letter and comments received. I am requesting copies of this [letter] and the comments received.

Response:

Comment noted. Refer to response to 10.009.

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3.11 Socioeconomic Resources

RC: 11.001
Doc: HT03/1

Yes, there is one confusion factor, looking at all three PEIS's, and that is they use different multiplications for the number of direct jobs versus the impact in the community.

Response:

To elaborate on the response given at the public hearing, a number of comments relate to the economic multipliers used in the Pantex EIS, SSM PEIS, and S&D PEIS. (Refer to Comment 11.016 which has been repeated by various commentors.) A general explanation of the multipliers is provided below to avoid duplication of responses to all such comments. Further details are provided in response to specific comments later in this section.

All three documents referenced by the commentor use the U.S. Bureau of Economic Analysis' regional economic model known as Regional Input-Output Modeling System (RIMS II) as the basis for employment and income impact analysis. This model is used by government agencies, university researchers, and private economists to measure regional economic impacts. It is designed to be sensitive to differences in the economy from one region to another.

The differences in the employment multipliers presented in the three documents are not because of the models used but because of the differences in the input provided to the models by the authors of those documents. These inputs relate to a number of factors including the size of the region of influence, the type of activity involved in the projects being considered (assembly/disassembly versus construction of a light water reactor, for example), the number of direct employees needed, the average income per employee or total payroll, the money spent on local purchases of goods and services to support Pantex operations or construction and operation of new facilities, the money spent by the Pantex Plant workers in the local economy, and the average wage rate applied to indirect workers. Since all inputs to the model are converted into dollars, different wage rates applied to direct and indirect workers can alone generate different indirect employment multipliers. The activities involved in the three programs described in the three referenced documents are different and each requires significantly different inputs which may or may not be available within the region of influence (ROI). This also contributes significantly to different multiplier values in the three documents.

RC: 11.002
Doc: HT10/2

The question is, why is there no cumulative impact analysis in the socioeconomic impact analysis of past actions, like the cancellation in 1988 of the DOE program of a mine geologic repository for spent nuclear fuel and high-level radioactive waste in Deaf Smith County? That particular action was an action that [caused] a great economic disaster here in the [Texas] Panhandle region. And right now we are just barely coming out of..., or just towards the end of coming out of, that particular recovery from that particular action.

Response:

Cumulative impacts include the incremental impacts of the actions when added to other past, present, and reasonably foreseeable future actions.

Socioeconomic impacts of past actions, though not discussed individually by projects, are reflected in the baseline employment and population estimates which form the basis for evaluation of impacts from the proposed action and alternatives. Thus, any impacts from the cancellation of the repository program in Deaf Smith County on the Pantex ROI would already have been included in the description of the affected environment and the projections under the No Action Alternative. Cumulative economic impacts of concurrent DOE actions for which sufficient information was available have been discussed in volume I, section 4.11.5. As mentioned on page 4-7 of the Draft EIS, information on other Federal (non-DOE), state or local projects including private developments was sought through contacts with federal and state regulatory agencies, Amarillo Economic Development Corporation, Panhandle Municipal Water Authority, and the City of Amarillo. This effort yielded only one project (future closure of Helium Plant) that would contribute to the cumulative impacts in the Pantex Plant ROI. Cumulative impacts of this project have been included in volume I, section 4.11.5.4.

RC: 11.003
Doc: HT10/3

And then the more recent announcement of closure of the U.S. Department of Interior's Bureau of Mines Helium Operation. [This is] not addressed anywhere under cumulative impacts.

Response:

Volume I, section 4.11.5.4. has been expanded to note that the Helium Operations Plant, a facility that employs approximately 175 people, will be downsized (employing 30 to 40 workers). As a result of Congressional legislation, on October 9, 1996, the President signed the Helium Privatization Act of 1996 directing helium operations to discontinue production and sale of refined helium by no later than 18 months from the date of enactment (i.e., April 1998). The downsizing will occur over the next 18-months.

RC: 11.004
Doc: HT08/1

... It will hurt the economy of this city to have another payroll eliminated... Already gone are the Air Force base, the helicopter plant, the helium plant, and Pantex. What next? Cutting the payroll of this city further, I am against wholeheartedly.

Response:

The decisions to close federal facilities or operations are made by different federal agencies in the context of national policies. DOE has considered the cumulative economic impacts of these past actions in the baseline evaluation of the existing environment. DOE will further consider economic impacts in the decision-making process for projects for which it is responsible. See response to comment 11.002.

RC: 11.005
Doc: HT11/19

Well, one concern that I'd like to state is in your risk assessment, [which is based] on 1990 census figures.... Because Las Vegas itself has changed so much in the past six years, I think that...the 1990 census figures probably aren't...the ones to use.

Response:

Las Vegas has grown substantially since the 1990 census was taken. However, risk analysis requires population data by the smallest geographical units of the *city or the region of influence such as Census Tracts or Census Blocks. In fact, it is further broken down by sectors within a 80 kilometers (50-mile) radius circle from the project site in order to identify the potential number of people who may be at risk at different distances from the project site. Only the 1990 census information is available at that level of detail (census tract and block level) and is, therefore, utilized in risk assessment to provide a consistent basis for comparison of sites in different states.*

RC: 11.006
Doc: HT11/32

We also, depending upon the number of shipments and nature of the shipments,...are concerned here with perceptions of risk and possible consequences of that on the tourism industry. This is...the mainstay of Nevada economy, and if there were to be an incident or accidents on the interstate, especially near The Strip, this could have various severe consequences, economic consequences.

Response:.

Nuclear materials have been shipped to the Nevada Test Site (NTS) since the early 1950s. Radioactive waste has been shipped to the site since 1961. There is no historical evidence that perceptions associated with nuclear material or waste shipments to the NTS have affected the economy of Las Vegas or resulted in a deterioration of tourism in Las Vegas. In fact, the Las Vegas area has experienced remarkable growth over the past three decades. Tourism in southern Nevada has increased from 21 million visitors in 1990 to a forecast 31 million in 1996. Therefore, there is no reason to conclude that future shipments to NTS would adversely affect tourism industry or the State's economy.

Since its establishment in 1975, the DOE Transportation Safeguard Division has accumulated more than 119 million kilometers (74 million miles) over the road experience in transporting DOE owned cargo without any accidents that resulted in release of radioactive material. Section 6.3 of the Pantex Plant Safety Information Document provides a listing of accidents resulting in damage to safe secure tractor trailers (Pantex 1996a).

RC: 11.007
Doc: HT14/6

But I'm wondering just in the general proximity how many jobs, if any, will this create for the Tri-Cities.

Response:

To elaborate on the response given at the public hearing, as stated in volume I, section 5.4.1.9, approximately 150 additional personnel would be required for the interim storage of pits at the Hanford site. This number represents less than 1.0% increase in the total Hanford Site workforce. Most of the workers can be hired locally.

RC: 11.008
Doc: HT02-02/1

I have come to speak on health and safety issues, as well as the feasibility of having plutonium, other nuclear materials, and other types of hazardous materials and chemicals in our front yard,...over the area's major water supply, and in this very productive and vital agricultural area—[a] major food source—for the nation as well as the world just for Amarillo's "[powers] that be" to possibly create a few more jobs and wealth for themselves.

Response: *The Pantex EIS has been prepared to evaluate the environmental impacts (including health and safety) of continued operations of the Pantex Plant irrespective of whether they occur in the rural areas surrounding the plant site or in Amarillo. DOE's goal is to meet its mission requirements in a manner that protects the public, workers, and the environment; job creation may be an additional benefit but is not the primary objective of any of the proposed alternatives. See response to comment 14.018.*

RC: 11.009
Doc: HT01-08/2

Likewise, we believe that Pantex can be a site where good, high-paying jobs are created in a work environment that includes potentially dangerous materials. When measured in terms of payroll, Pantex is by far the area's largest employer. With 3,500 employees at the plant, a job multiplier of 3.87 shows that Pantex is responsible for a total of over 13,500 jobs in this region. This multiplier was established by Dr. Ray Perryman at Southern Methodist University. The multiplier reflects the fact that the money that Pantex brings into the local economy supports many retail, medical, educational, finance, insurance, and real estate jobs. All told, employment related to Pantex represents over 12% of all jobs in the Amarillo metropolitan area. I urge the DOE to correct the socio-economic impact portions of all three EIS documents to accurately reflect the impact of Pantex on our local economy.

Response: *DOE chose to use the U.S. Bureau of Economic Analysis's Regional Input-Output Modeling System (RIMS II) as the basis for employment and income impact analysis. This nationally recognized model is used by government agencies, university researchers, and private economists throughout the United States.*

Pantex is a major contributor to the employment in the region. However, as explained in response to comment 11.001, the employment multiplier is a derived value and would differ even when the same researcher is looking at different industrial activities. We believe that a multiplier of 1.65 indirect jobs for each direct Pantex job which translates to a total job multiplier of 2.65 is more realistic when considering the proposed and alternative actions being analyzed in the Pantex EIS. Dr. Perryman's analysis (see Amarillo Economic Development Corporation Release dated August 3, 1993 [AEDC 1993] and Perryman Consultants, "Analysis Shows Pantex Plant Adds a Billion in Revenues and Thousands of Jobs to Amarillo Economy," Press Release [Perryman 1993]) does not identify any specific job multiplier. In one place, he mentions that Pantex Plant employs 3,100 persons. Then he estimates that the total employment resulting from Pantex Plant operations is 11,688. This gives us a job multiplier of 3.77. (The commentor, using the rounded figure of 12,000 instead of 11,688, arrives at a multiplier of 3.87.) In the same article, however, Dr. Perryman states that Pantex Plant expansion by 2,400 jobs would result in 5,312 total additional jobs. This would imply a job multiplier of only 2.21, not 3.87. Should it be assumed that he is using two job multipliers because in the Pantex Plant expansion scenario, he is looking at different activities (industries) at the plant, which include peaceful uses for plutonium, operation of a linear accelerator, and long-term storage of plutonium and not the current operations *of assembly and disassembly of weapons. Your comments have been considered by the SSM PEIS and S&D PEIS authors and are addressed in their respective comment response documents.*

RC: 11.010
Doc: HT01-08/1

And there's not enough words to say how important Pantex is to our job situation in Amarillo. If you use a multiplier index in the total take on our economy, we're talking about [13,500] jobs out of the 3,500 job base that is at Pantex. Needless to say, from our standpoint, what's truly important to this area from an economic standpoint, we strongly urge the DOE to do everything they possibly can at the Pantex site.

Response:

The Department will consider economic impacts along with other environmental impacts, mission requirements, costs and technological considerations in the Record of Decision.

RC: 11.011
Doc: HT07/2

One of the reasons that employment increased at Pantex by about a thousand people was not so much for the increased work in dismantlement, but to invoke a safety culture at Pantex. A lot of these safety infrastructure programs are independent of the number of units you're doing. Whether you have one weapon or a thousand, you still need your conduct of operations, you still need your safety analysis, you still need your safety question determination, et cetera. And none of the numbers I've seen seem to take into account that you have a base line infrastructure that you can't go below without losing the safety culture. I'd like you to respond to that.

Response:

To elaborate on the response given at the public hearing with Pantex EIS specific information, the decrease in the number of jobs from 3,800 workers at the 2,000 weapon activity level to 3,000 workers at the 1,000 weapon activity level and 2,400 workers at 500 weapon activity level is less than it would be if reduction were in proportion to the reduction in dismantlement. This is mainly because the numbers reflect a baseline infrastructure and safety-related workforce which would remain at Pantex regardless of the volume of weapon disassembly activities. Safety at Pantex Plant is given highest consideration and will continue to be given the same consideration in the future.

RC: 11.012
Doc: HT07/3

My response to that, is that it was looked at...without looking at the plant as a total. ...The way the questions were asked, for the specific operations, we gave the numbers, but no one asked the questions about what it would take to maintain your overall safety infrastructure. I believe that's true.

Response:

See response to comment 11.011.

RC: 11.013
Doc: CO-008/65

Page 4-172. It is stated that the work force could reach 10,220. This is based on all Weapons and Disposition activities being done at Pantex. Please discuss in a manner that shows the time frame break down between construction, weapons and disposition work, and the possibility that everything will not be done at Pantex.

Response: *A workforce of 10,220 represents the cumulative (maximum) workforce assuming that current operations and waste management activities at Pantex Plant would continue when activities relating to the storage and disposition of weapons-usable fissile materials reach their full operational level. The referenced paragraph on page 4–172 of the Draft EIS also indicates that disposition activities cannot start earlier than 10 years from the date a decision is made selecting Pantex Plant as the site for disposition activities. Construction of a completely new reactor could take even longer. However, it should be noted that this discussion is relevant only in the event that Pantex is chosen as the site for long term storage and disposition of weapons-usable fissile materials. That issue is the subject of the S&D PEIS, not the Pantex EIS.*

RC: 11.014
Doc: CO-008/66

Page 4-172. Provide a work force break down by year and activity. If downsizing is required, and exceeds attrition, please provide a downsizing plan.

Response: *Although impacts of various levels of downsizing are evaluated in the Draft EIS, a realistic downsizing plan cannot be developed until a record of decision is issued by the Department identifying the level of activity and associated choice regarding new or upgraded facilities at the Pantex Plant. This decision will not be made before the Final EIS for the Pantex Plant is published. The Department will, however, keep the public informed of its actions on a regular basis and soon after a decision is made. Any decision that would result in downsizing would require a formal Workforce Reduction Plan and additional public participation opportunities in accordance with the National Defense Authorization Act of 1993 (Public Law 102-484).*

RC: 11.015
Doc: CO-008/67

Page 4-172. Knowing that all of the above activities are likely to be limited to 10 to 30 years, if there is an adverse impact from Pantex downsizing, is there money available to the Pantex ROI for long-term community assessment and planning?

Response: *The Record of Decision on the S&M PEIS will identify whether Pantex Plant would be downsized or not. If downsizing does occur, the affected communities can request the DOE to provide financial assistance for community assistance and planning. The DOE Office of Community and Worker Transition can be approached to obtain help for the facility and community transition in case of downsizing.*

RC: 11.016
Doc: CO-008/68

Page 4-172. The socioeconomic analysis of the three EIS's [is] not consistent. The SWEIS Summary (page S-17) assumes 1.65 indirect jobs in the region for every [job] at Pantex. The SSM PEIS (page S-32) assumes 1.16 and S&D PEIS (page 4-205) assumes 3.51. Please explain these differences. Why didn't the DOE use the analysis of the Amarillo Economic Development Commission (AEDC), which is based on local knowledge of the area? Their analysis gives a ratio of 2.87 to 1 (REF. Chamber Quarterly, 2nd Quarter, 1996, Amarillo Chamber of Commerce.)

Response: *Refer to the responses to comments 11.001 and 11.009 for general explanation of multipliers. The referenced article in Chamber Quarterly (ACC 1996) states that AEDC uses a multiplier of 3.9 for jobs at Pantex and goes on to state that the 1,600 jobs projected to be phased out at Pantex could ultimately result in a total loss of 4,600 jobs in all areas of Amarillo economy. If this statement is correct, the number of indirect jobs would be 3,000 (4,600 total jobs minus 1,600 direct jobs = 3,000 indirect jobs), or 1.88 times the direct jobs. The comparable number in the Pantex EIS is 1.65 indirect jobs for each direct job. Please refer to Final SSM PEIS and S&D PEIS for their responses to your comment.*

RC: 11.017
Doc: CO-008/69

Page 4-172. In the draft SWEIS Summary (page S-17, Table S-1), it is stated that at the 500 weapon activity level, Pantex "would support 2,400 direct jobs and 3,949 secondary jobs" and that "personal income additions to the economy would be reduced to $356 million annually." Please explain why this degree of economic loss would not only be an adverse but a Significant Adverse Impact to the community.

Response: *The statement in volume I, page S-17 is a summary of the description provided in volume I, section 4.11.2.1 (p. 4-167 of the Draft EIS), which indicates that a combined loss of 3,715 jobs (1400 direct+2,315 indirect jobs) would increase the unemployment rate in the region of influence from 4.1 percent to approximately 6.2 percent and could trigger out-migration. The reduction of personal income from $564 million at 2,000 weapon activity level to $356 million at 500 weapon activity level would mean a loss of $208 million or 37 percent of the personal income generated by the 2,000 weapon activity level. Compared to the total employment of 107,000 in Amarillo (Ref. Chamber Quarterly, 2nd Quarter, 1996, Amarillo Chamber of Commerce [ACC 1996]), this reduction would represent approximately 3.5 percent of the Amarillo area employment and 3.7 percent of its total personal income of $3.65 billion in 1994. These impacts would, no doubt, be adverse and may be considered significant by some members of the community. The text in the Final EIS has been revised to include this statement. The article in the Chamber Quarterly referenced above, suggests that the jobs added in the next 6 to 7 years would reduce the impact of this job loss.*

RC: 11.018
Doc: CO-008/70

Page 4-165. At the 500 weapon activity employment level, what would be the impact to the revenues for the governing bodies within the Pantex ROI, compared with the current revenues presented in table 4.11.1.6-1 (page 4-165)?

Response: *At the 500 weapons activity level, Pantex workforce would be reduced by 1,400 workers. Additionally, 2,351 indirect workers may lose their jobs in the Pantex region of influence. For analysis purposes, we have assumed that all direct workers and 50 percent of the indirect workers leave the Pantex region of influence as a result of this action. Further assuming, for simplicity in calculation, that all workers live in the City of Amarillo and based on the current per capita revenue of $457, the revenue loss in the City of Amarillo would be approximately $2.8 million about 3.6 percent of the total revenues of the City in*

1994. In reality, this number would be lower since some of these workers do not live in Amarillo and the per capita revenue generated in the counties of the region of influence is generally lower than in the City of Amarillo. Discussion in volume I, section 4.11.2.1 has been expanded to include potential impacts on population and tax revenues.

RC: 11.019
Doc: HT13/17

One of my biggest complaints about the document, which strangely enough some of us do actually read it, a lot of times, under the affected environment, you list everybody all the way from Rio Rancho to Belen and everybody to the west. There are people who live east of Manzano Base. It is the fastest growing area other than Rio Rancho, and this is something that needs to be brought up.

Response: *As shown in volume I, section 5.5, Figures 5.5.2.1-1 and 5.5.2.2-2, population living within a 80 kilometers (50-mile) radius from the Manzano Weapons Storage Area (WSA) has been considered in the analysis. People living east of Manzano WSA are, therefore, included in the analysis.*

RC: 11.020
Doc: PC-013/1

It will hurt the economy of this city to have another "pay roll" eliminated. The main 4 plans under plans to dispose of, and those already gone are - the Air Base.

Response: *See responses to comments 11.002 and 11.004.*

RC: 11.021
Doc: PC-012/1

Section 4.11.5 on page 4-170 in volume I, Main Report is titled "Cumulative Impacts" and is referring to Socioeconomic Resources. It states that "This section describes the cumulative impacts on Pantex Plant. Cumulative impacts include the impacts of continued operations at Pantex Plant combined with impacts associated with the activities described in the Waste Management Draft PEIS, the Stockpile Stewardship and Management Draft PEIS, or the Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS."

The Council on Environmental Quality Guidelines published in 40 CFR §1500-1508 define Cumulative impact in §1508.7 as follows:

"Cumulative impact is the impact on the environments (emphasis added) which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Question: Why is there no analysis of the incremental socioeconomic impact of this action, on the Pantex socioeconomic region of influence, when added to other past and present actions such as the cancellation, in 1988, of the DOE program of a mined geologic repository for spent nuclear fuel and high-level radioactive waste in Deaf Smith County, and the more recent announcement of closure of the U.S. Department of the Interior's Bureau of Mines Helium Operations?

Response: *See responses to comments 11.002 and 11.004.*

RC: 11.022
Doc: CO-002/1

In the draft SWEIS (p. S-17) it is stated that at the 500 weapon activity level Pantex "would support 2,400 direct jobs and 3,949 secondary [jobs]," and that "personal income additions to the economy would be reduced to $365 million annually."

Please explain why this degree of economic loss would have not only an adverse, but a significant adverse, impact on the community.

At the 500 weapon activity employment level, what would be the impact on revenues for the governing bodies within the Pantex region of influence compared to the current revenues present in table 4.11.1.6-1 (p. 4-165)?

Response: *See responses to comments 11.017 and 11.018.*

RC: 11.023
Doc: CO-002/2

In Section 4.11.5 "Cumulative Impacts," referring to socioeconomic resources (p. 4-170), it is stated, "This section describes the cumulative impacts on Pantex Plant. Cumulative impacts include the impacts of continued operations at Pantex Plant combined with impacts associated with the activities described in the Waste Management Draft PEIS, the Stockpile Stewardship and Management PEIS, or the Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS."

The Council on Environmental Quality Guidelines published in 40 CFR §1500-1508 define cumulative impact as follows (§1508.7). "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result [from] individually minor [but] collectively significant actions taking place over a period of time." (Emphasis added)

Why is there no socioeconomic analysis of the incremental impact of this action on the Pantex socioeconomic region of influence (ROI) when added to other past and present actions, such as the cancellation and shutdown in 1988 of the DOE's high-level nuclear waste repository in Deaf Smith County, and the more recent announcement of closure of the U.S. Department of the Interior's Bureau of Mines Helium Operations in Amarillo?

Response: *See responses to comments 11.002 and 11.004.*

RC: 11.024
Doc: CO-002/3

The socioeconomic analyses of the three EISs are not consistent. The SWEIS (p. S-17) assumes 1.65 indirect [jobs] in the region for every job at Pantex. The SSM PEIS (p. S-32) assumes 1.16, and the S&D PEIS (p. 4-205) [assumes] 3.51.

Response: *See response to comment 11.001.*

RC: 11.025
Doc: CO-002/4

The Amarillo Economic Development Commission (AEDC) analysis, based on local knowledge of the area and a regional impact study performed by Dr. Ray

Perryman of Southern Methodist University, gives a [ratio] of 2.77 additional jobs in the region to every 1 Pantex job (for a total job multiplier of 3.77).

Response: *See responses to comments 11.001 and 11.009.*

RC: 11.026
Doc: CO-009/5

In fact, the impact of Pantex employment in the region of influence is highly significant to the region. Measured in terms of total payroll, Pantex is by far the area's largest employer. The reasonable job multiplier developed by Dr. Ray Perryman at Southern Methodist University, a multiplier of 3.87, applied to the some 3,500 employees at Pantex, suggests the site is responsible for a total of over 13,500 jobs. Employment related to Pantex represents over 12% of the jobs in the Amarillo metropolitan area.

Incidentally, the three subject EISs inconsistently analyze the indirect jobs created in the region by Pantex employment: The site EIS assumes 1.65 indirect jobs for each job at Pantex; the stewardship and management EIS assumes 1.16; the storage and disposition EIS, 3.51 (by far, the most consistent with Dr. Perryman's, which is the same, regional-experience-based multiplier employed by the Amarillo Economic Development Commission).

Certainly, we consider a potential 10% to 12% reduction in metro-area employment a major loss, and by no means a "negligible" concern. We strongly urge the Department to correct the socio-economic impact portions of all three EIS documents to accurately reflect the impact of Pantex employment in its region of influence.

Response: *See responses to comments 11.001 and 11.009.*

RC: 11.027
Doc: PC-034/8

Table 4.11.1.6-1 presents revenues for the governing bodies within the Pantex ROI (p. 4-165). If Pantex is reduced to the 500 weapons activity level, what would be the impact to these revenues?

Response: *See response to comment 11.018.*

RC: 11.028
Doc: HT17/1

I think the DOE has done a pretty good job of describing our economy; however, I think on the impact section there are some weaknesses. It's more of a descriptive document about our economy than it is a projection of what the impacts of Pantex might be on the economy. I know you've used a number of figures for your job multiplier, in terms of how many jobs in the economy exist as a result of the operations at Pantex. Is that a regionally sensitive multiplier that you've come up with, or is that something that's just standard across the board for the nation?

Response: *The socioeconomic impacts associated with the alternatives at the Pantex Plant extend beyond the city of Amarillo and include all the jurisdictions within the four-county region of influence. The database used for the socioeconomic study was developed using information from the Department of Commerce and Labor, as well as financial reports provided by cities and counties. The impacts were measured using the latest version of Regional Input-Output Modeling System II*

(RIMS II), a model developed by the U.S. Bureau of Economic Analysis. The model is used by Government agencies, university researchers, and private economists to measure economic impacts and is available for every economic region in the nation. It is designed to be sensitive to differences in the economy from one region to another.

RC: 11.029
Doc: HT17/2

I think there is some weakness [in] looking at the effects on certain sectors of the economy. In particular, I would note it [the EIS] doesn't talk a lot about [the effects on] retail sales and employment in the retail sector, which has been a tremendous growth portion of our economy over the last five years.

Response:

The socioeconomic impacts associated with the alternatives at the Pantex Plant are described in terms of total earnings (salaries and wages to employees) and total personal income. It is true that impacts on individual sectors of the economy are not analyzed. However, the text in volume I, section 4.11.2.1, states that most of the secondary jobs in the local economy are in the retail trade and service sectors.

RC: 11.030
Doc: HT17/3

It [the EIS] doesn't look extensively at wholesalers and industrial suppliers, many of whom supply [products] to Pantex, but also associated with industry in general. We wouldn't...have the diversity of industrial supply companies in Amarillo without Pantex, and I think that should be taken into account.

Response:

See response to comment 11.029.

RC: 11.031
Doc: HT17/4

...perhaps the most important [aspect] would be the impact, if there were significant job losses. And I know this EIS doesn't contemplate it, but if there were significant job losses beyond what's mentioned, even in terms of looking at the [1,000 weapons] per year, let alone the [500 weapons], the real estate sector would suffer considerably.

Response:

The job losses resulting from reduced weapon activity level are discussed in volume I, section 4.11.2.1 and the job losses resulting from the closure of the plant are summarized in volume I, section 4.11.5.2. The loss of approximately 3,700 direct and indirect jobs would certainly impact the real estate sector, but it should be noted that not all unemployed workers, particularly the indirect workers, are likely to leave the Pantex region of influence immediately or even over a longer period. The text in volume I, section 4.11.2.1 has been expanded to include these effects.

RC: 11.032
Doc: HT17/5

... I think we have some pretty good historical data in Amarillo on what happens when there's large outmigrations in number of jobs and in population. You can look back to what happened when the air base left town or look back in the late eighties, what happened to our economy.

Response:

Comment noted. The text in volume I, sections 4.11.1.1 and 4.11.1.5 has been revised to incorporate population and economic changes occurring prior to 1990.

RC: 11.033
Doc: HT17/6

I'd also ask that maybe additional analysis could be done on the tax revenue portions.

Response: *See response to comment 11.018. The text in volume I, section 4.11.2.1 has been revised to add a discussion of tax revenues.*

RC: 11.034
Doc: HT17/7

Again, going back to the problems that happen when you talk about severe job losses in the manufacturing sector of the economy. In terms of real estate, it would have a dramatic effect on all the cities in the region and their ability to raise revenue through property tax. ...There is discussion of the city's revenue capacity in the document, but I think it could be strengthened. Counties are also very dependent in Texas on property tax. In fact, Texas counties are nearly completely dependent on property tax revenues. So, they suffer severely when there are declines in property tax values. Finally, school districts, which aren't mentioned at all in the document,...are also very sensitive to property tax issues. Changes in the property value can have interesting effects in Texas because of our school equity financing law. I'll note that the Canyon School District, which is in the Region of Influence, is already looking at a million dollar deficit because of certain property tax issues.

Response: *See response to comment 11.018. The text in volume I, section 4.11.2.1 has been revised to add a discussion of tax revenues.*

RC: 11.035
Doc: HT17/8

The City of Amarillo...in 1989, passed a half cent sales tax to reduce the property tax. So, in essence, they shifted their taxation burden from property taxes, to some degree, to retail sales. If retail sales do not grow at least at the inflation rate, that translates into an actual, in essence, reduction in the funds available to operate the city.

Response: *Comment noted. Retail sales would be reduced if the weapon levels are reduced to 1,000 or 500 per year. The reduction in worker earnings and personal income are discussed in volume I, section 4.11.2.1.*

RC: 11.036
Doc: HT17/9

In looking at the government debt section of the document, the majority of the debt was listed as the City of Amarillo. I think there's 55 million dollars of debt. That is primarily revenue bond debt...that is financed through utility fees. It's not dependent on general revenue taxation at all.

Response: *Comment noted. Socioeconomic analysis in volume I, section 4.11.2.1, has been revised to provide a better discussion of population change and tax revenue.*

RC: 11.037
Doc: HT17/10

...I think there needs to be some analysis on what effect this might have on water consumption, on water revenues in the city, because that's what backs those revenue bonds that...secure the debt that you've mentioned in there.

Response: *Additional information on impacts to overall tax revenues has been provided in volume I, section 4.11.2.1. Impacts on individual sources of revenues are not* *provided because they depend on annual budgetary processes and are too speculative to be included in this EIS.*

RC: 11.038
Doc: HT17/11

Finally,...maybe most importantly is population outmigration. Cities tend to be in a growth mode, they tend to plan on future growth. As happened in Amarillo in the sixties and again in the late eighties, when you have outmigration, it dramatically affects all sectors of the economy, particularly retail and otherwise.

Response:

Volume I, section 4.11.2.1, provides socioeconomic impacts which could occur as a result of population inmigration. It should, however, be noted that reduced workforce at Pantex Plant or even the closure of the plant would not result in instant outmigration of population. Even after the closure of the plant, workers would continue to be employed at the site for decontamination and decommissioning of plant facilities over a number of years.

RC: 11.039
Doc: HT17/13

The population figures that you just showed on your slides, I found...in Volume I, on page 4-155. There's some conflicting population estimate numbers for the Region of Influence given in the section dealing with accident risk estimates and fatal cancer estimates. The numbers that are given there are 267,107 [for] population in the Region of Influence. And I'm wondering what the difference is in those estimates.

Response:

In the NEPA process regions of influence (ROI) are defined in relation to the potential for an environmental aspect to be affected. For health risk analysis, whereby contaminants can be dispersed over large geographical areas by weather phenomena or surface features such as rivers, streams, etc., traditionally such potential impacts are assessed within an 80 kilometer (50 mile) radius of the facility of interest. On the other hand, studies have shown that people tend to spend money in the communities where they live. Thus the socioeconomic ROI, for NEPA analysis is traditionally analyzed by defining the political (and census) boundaries within which at least 90 percent of a sites workers live. For the Pantex Plant, 96 percent of workers live in Carson, Potter, Randall, and Armstrong counties. Thus these four counties comprise the socioeconomic ROI for Pantex Plant.

Since the 80 kilometer circle for the human health (accident) analysis includes 14 counties, it has a larger population than the 4-county socioeconomic ROI.

RC: 11.040
Doc: HT17/14

I neglected to mention one aspect that I think should be taken into account on all the EIS documents for all sites, and that's the effect on nonprofit agencies that rely on contributions of the employees at the plant. You would have a decline in the revenue to those nonprofit agencies; at the same time, you'd have economic hardships, creating a larger need for those services.

Response:

Discussion in volume I, section 4.11.2.1 has been expanded to include the potential effect on non-profit agencies due to downsizing.

RC: 11.041 **Doc: HT17/16**	I think that we felt,...especially looking at your view graph here, that you have brought it down to within just a four-county area for the Region of Influence. And yet for all the other study that was done throughout the document, it is a much wider [area], as was noted by Joe Martillotti.
Response:	*See response to comment 11.039.*

RC: 11.042 **Doc: HT17/17**	...the magnitude of the impact of agriculture was really not addressed and the importance that agriculture has played in this area and the stability of the area. And when the air base was phased out, it was agriculture that brought this part of the State of Texas, or that kept it alive and kept it going. ...One of every four dollars of cash receipts from the State of Texas in total revenue comes from crops and livestock that are produced in this part of the State. Right here in...the High Plains Trade Area, if these counties were detached from the rest of the State of Texas, this [area] would rank number one [nationally] in the fed cattle...production. These are very important items for this area, because you're right in the middle of a prime agricultural area. The cereal crops that are grown here are shipped all over the world. For any product that we raise here, if there is the slightest hint of any contamination, that could devastate this total area. I don't know how many of the other facilities are situated in an area that is a bread basket as much as this area is. I don't think that that was brought out in this document. One of four people is employed in [an] ag-related job in this area. And for anything to happen in agriculture would devastate the area.
Response:	*The Department of Energy recognizes the importance of both agriculture and Pantex Plant jobs in the Panhandle economy. The Department has programs of environmental stewardship to protect the environment in general and neighboring farms, ranches, and communities in particular. The analyses in this EIS demonstrate that the Pantex Plant and agriculture can not only coexist, but mutually and beneficially contribute to the economic and social fabric of the region.* *The contribution of agriculture to the regional economy of the Panhandle has been expanded in volume I, sections 4.4 and 4.11.*

RC: 11.043 **Doc: HT17/18**	... I think that it's extremely important to realize that even for the State of Texas, the importance agriculture plays has a tremendous effect upon the revenue that the State of Texas receives. So that even though in this document, which is a nuclear document, it may seem a little strange to address agriculture, I think that a complete risk analysis needs to be done with regard to just exactly what could happen with regard to the future for this area. I know that in 1991, when we first began looking at this issue, that the total impact of agriculture in this area was about three billion dollars, and now that has increased to between five and six billion dollars, and with an economic multiplier it's [in] excess of 12 billion dollars. So, you're looking at a tremendous figure there that could stand a chance of being hurt in some way. So, we'd like to see that addressed.
Response:	*See response to comment 11.042.*

RC: 11.044
Doc: HT17/55

In our study of this document, we find that it fails to address the magnitude of agriculture in the Pantex ROI. In this, the heart of production agriculture, it is unthinkable for agriculture, the viable, stable, and essential industry of the Texas Panhandle, not to be appraised. When considering continued and new [missions] at Pantex, work with radioactive, toxic, and hazardous materials, omitting a detailed analysis of the agricultural economy, the basis for economic stability in this area, is a significant impropriety. The dollar value of the agricultural industry to the Panhandle economy is in excess of six billion dollars, creating a local economic activity in excess of 12 billion per year. The State of Texas cannot afford a loss in State revenues from High Plains agriculture.

Response: *See response to comment 11.042.*

RC: 11.045
Doc: PC-017/1

What kinds of studies (if any) have been conducted to learn the effects of the proposed actions -- storage of large amounts of plutonium, chemicals, nuclear waste, uranium and other toxic substance and/or the [processing]/reprocessing of those substances on agriculture production, sales, uses, etc? What were the results of such studies if any have been made? Agriculture is mentioned very briefly in the EIS. Agriculture is the major industry in the Texas Panhandle and the only industry near the Pantex Plant.

Response: *Risk assessments conducted in the Pantex EIS as well as in the SSM PEIS and S&D PEIS have shown that Pantex Plant activities do not adversely impact agricultural operations in the region. This is clearly indicated by the growth of the agricultural economy in the ROI over the past several decades since Pantex Plant has been in operation. Pantex Plant routinely conducts environmental monitoring and the results are summarized in its annual site environmental reports (see references to these reports in the Pantex Plant Environmental Information Document, [Pantex 1996]). One special study dealing with radiological effects on beef cattle was conducted in 1982. It was published as a Supplemental Documentation for an Environmental Impact Statement Regarding Pantex Plant, Agricultural Food Chain Radiological Assessment (LANL 1982). Refer to volume I, section 4.9.1.1 of the Pantex EIS and response to comment 09.001 for additional details. Additional agricultural documentation has been added to volume I, sections 4.4 Land Resources, 4.5 Geology and Soils, 4.6 Water Resources, 4.9 Biotic Resources, and 4.11 Socioeconomic Resources.*

RC: 11.046
Doc: PC-017/3

What studies have been made on the long-term effects of those activities being proposed or possibly being proposed on our agricultural products? When were such studies made? How were they done? What results were found? Where were they done? Were neighboring farmers and ranchers consulted? Who? Major plans for the future of Pantex cannot be made until such studies are made and found to be positive.

Response: *See responses to comments 11.045 and 09.001.*

RC: 11.047
Doc: PC-025/54

Page 4-155. Given the fact that this is 1996 and the section uses 1990 data, has a significant change occurred in population since 1990 and the socioeconomic parameters to warrant estimating the affected environment closer to 1996 time frame? How many visitors to Amarillo are there each year? Is that important? If I-40 closes due to [a] Pantex accident, what are the impacts to East/West Interstates?

Response:

We agree with your comment that Amarillo has grown substantially since the 1990 census was taken. Population change from 1990 to 1995 and estimates of population for the year 2005 are presented in volume I, section 4.11.1.1 of the EIS. Impacts of downsizing have been measured against the more recent population estimates available for 1995 and have been included in the expanded text of volume I, section 4.11.2.1. We do not have data on number of visitors per year, but the money they spend is in the economic statistics. Probability of accidents on interstates used for carrying nuclear materials and their impacts have been presented in volume I, section 4.16, Intersite Transportation of Nuclear and Hazardous Materials.

RC: 11.048
Doc: PC-008/1

The socioeconomic analyses of the three EIS's are not consistent. The SWEIS (p. S-17) assumes 1.65 indirect jobs in the region for every job at Pantex. The SSM PEIS (p. S-32) assumes 1.16 and the S&D PEIS (p. 4-205) assumes 3.51. Please explain these differences. Why didn't the DOE use the analysis of the Amarillo Economic Development Commission (AEDC), which is based on local knowledge of the area? Their analysis gives a ratio of 2.87 to 1 (REF. Chamber Quarterly, 2nd Quarter, 1996, Amarillo Chamber of Commerce).

Response:

See response to comment 11.016.

RC: 11.049
Doc: SG-010/6

Research has demonstrated that nuclear-related activities such as radioactive material transportation have the potential to result in significant socioeconomic impacts. These impacts originate in intense negative perceptions and avoidance behaviors by the public, and public and media interests in "things nuclear" makes it almost certain that these negative perceptions will adversely affect a community's quality of life and subsequently its commercial, residential, and business investment opportunities. Thus, we contend that DOE should do everything possible to limit the movement of these dangerous materials.

Response:

DOE is very sensitive to public perceptions of nuclear-related activities such as radioactive material transportation and has established strict guidelines for transportation of such materials.

See response to comment 16.045 for the safety record of nuclear materials shipments over the past 20 years.

RC: 11.050
Doc: CO-005/1

We are greatly troubled by the fact that agriculture was totally discounted as the major economic stability of the entire area and the second-largest industry in the State. Providing a job for one in every five Texans and generating more than $40 billion annually for the State of Texas, agriculture cannot be slighted in this document. Beyond the economic consideration is something we must never forget—AGRICULTURE PRODUCES THE ESSENTIALS OF LIFE. As long as people need food, housing and clothes, they will need and depend on agribusiness. This factor was ignored in this environmental document, thus creating a document that is flawed in its most basic conjecture.

This High Plains Trade Area, which encompasses the northernmost 26 counties in Texas produces close to $6 billion annually in cereal crops and livestock, of which $3.25 billion annually is in value-added industry, and creates local economic activity in excess of $12.5 billion.

This region produces 96.8 percent of the State's sugar beets, 85 percent of its fed beef, 48.4 percent of its corn and 47.5 percent of its wheat. Over 100,000 jobs are generated by High Plains agriculture.

Response: *See response to comment 11.042.*

RC: 11.051
Doc: PC-033/5

The agricultural industry and adverse impacts on this industry, as far as I could tell, have been included in only four paragraphs in the Draft SWEIS. In this High Plains Trade Area agriculture plays a major role in the economic stability and I feel should warrant more in depth study as to the adverse impacts on such a valuable industry than are dedicated in this Draft SWEIS.

Response: *The contribution of agriculture to the regional economy of the Panhandle has been expanded in volume I, sections 4.4 and 4.11.*

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3.12 Intrasite Transportation

RC: 12.001
Doc: HT13/19

In the document on [pages] 5-60 and 5-61, you talk about intrasite transportation within the bounds of Kirtland Air Force Base. There is no discussion here, and again, no reference documents, that describe any transportation-related accidents within the bounds of the base.

I am interested in information [on] varying kinds of accidents ranging from fender-benders to other kinds of accidents that would have happened within the bounds of the base [and] over whatever period of time you have that information.

Response:

Accident statistics are maintained by the U.S. Air Force. For 1995, there were a total of 271 vehicle accidents within Kirtland Air Force Base (KAFB); 241 were minor and 30 were major. A major accident involves a loss of life or damage in excess of $10,000. For 1994, there were a total of 283 vehicle accidents within KAFB; 233 were minor and 50 were major.

The potential of vehicle accidents involving pit shipments was considered in the EIS analysis. It was concluded that it is not reasonably foreseeable that an accident on KAFB would occur with the severity necessary to lead to a release of plutonium from an AT–400A container within a Safe Secure Tractor Trailer (SST). As discussed in volume I, section 5.5.1, the controlled transportation route on KAFB does not contain threats that may create the severe environment required to lead to a dispersal of plutonium. In addition, base personnel traffic would be controlled as SST convoys pass through the base roads. Thus, other vehicles do not pose a threat to the SSTs while on KAFB.

RC: 12.002
Doc: HT13/20

That wasn't my question. My question was what documentation exists of transportation accidents within the bounds of the base?

DOE has got documents. If the Air Force has documents, that is fine. I want to know what exists because there is nothing referenced in this document, in the sitewide.

Response: *See response to comment 12.001.*

RC: 12.003
Doc: HT13/21

I will be glad to get to the accident scenario in a little bit, but my question hasn't been answered. Just to sort of add to it, there is some interesting numerical information in chapter 4 about actual numbers of transfers internally within Pantex. There is not that same kind of information in this document about Manzano, and that is the kind of information I am looking for. ...So...my specific question...is as you were looking at intrasite transportation issues, did you receive, did you have access to, did you look at actual transportation analysis of accidents, transportation accidents, not necessarily dispersal accidents, just accidents within the bounds of Kirtland Air Force Base?

Response: *See response to comment 12.001.*

RC: 12.004
Doc: HT13/77

Are you all, in this document, proposing that the pits currently [in] AL-R8 containers, be transferred into AT-400 containers in this interim timeframe?

What is that timeframe? Over what period of time would that transfer be done?

Response: *DOE is planning on repackaging pits into AT–400A during the period analyzed by this EIS. Pit repackaging is currently scheduled to begin in late 1996 or early 1997. Repackaging of the pit inventory at Pantex Plant is expected to take longer than 5 years.*

RC: 12.005
Doc: HT12/15

What is the intent of the hole, the square [in the Stage Right pallets]?

Response: *Discussion of the Stage Right pallets is included in volume II, appendix F.*

RC: 12.006
Doc: HT12/17

[In] the newer method of staging, [is there a] forklift [driver] on the forklift?

Response: *To elaborate on the response given at the public hearing, DOE has introduced an automated guided vehicle to replace the stage right shielded forklift that has been used for operations within pit storage magazines. The use of the automated guided vehicle eliminates the need for personnel inside the pit storage magazines for inventories and inspections.*

RC: 12.007
Doc: HT12/18

You said when I load these things I'm going to put them in a Type A container. Type B container, okay, fine. Now, you never said I'm going to take them out of that Type B container. So I'm assuming they're stored in a Type B container which is suitable for drop [of] 30 feet or puncture and so forth. How in the world is a forklift going to ram a hole through it?

Response: *To elaborate on the response given at the public hearing, certification testing requirements for Type B packages are described in volume II, appendix F, section F.2.3. After consideration of the range of operational accidents that could occur, a bounding forklift accident scenario was developed. This accident could occur when a 20,000-pound forklift traveling at 5 miles per hour strikes a horizontally positioned container that is fixed. The impact would occur between the boom of the forklift and the container.*

RC: 12.008
Doc: HT12/19

Okay, how many forklift operations [have] occurred?

Response: *There is no record of the number of past forklift operations, but there have probably been at least 10,000, none of which resulted in a puncture of a pit container.*

RC: 12.009
Doc: HT12/27

Public Speaker: That's, you know, the structures are ventilated, the atmosphere –

Unidentified Speaker: And that's -- they are not in containment.

Public Speaker: And, in fact, they're [unintelligible] out in here that the storage container, you know, is not sealed so it's not a containment barrier either.

Unidentified Speaker: Wait a minute. The storage container is not sealed?

Public Speaker: ALR8s being unsealed the ALR8 container does not --

Unidentified Speaker: They're sealed containers. And the other point is that regardless of which option we're going to the AT400-A, which have the pit which is clad, the inner vessel which is welded, and then you have the outer canister. So actually that's layers of containment there and that's what we're going to in terms of the AT400-A.

Response: *To elaborate on the response given at the public hearing, all pits are hermetically sealed within a metal clad. The AL–R8 container is sealed but does not have an inert atmosphere surrounding the pit. The AT–400A will provide an inert atmosphere as a defense-in-depth measure in addition to the pit clad. Further information on pit container design is provided in volume II, appendix F.*

RC: 12.010
Doc: PC-034/1/2

In the Summary, Table S-1, under intrasite transportation, presents person-rem information (page S-18). The table is supported by Section 4.12 in the main text. An underlying baseline person-rem appears to be incorporated into the estimates for the Proposed Action alternative. Neither the main text nor the table clearly states the assumptions used. The person-rem shown for the Pit Storage Relocation alternative adds the estimated person-rem for pit storage relocation and the person-rem from the 2,000, 1,000, and 500 weapons levels under the Proposed Action alternative.

Thus, while implementing the Pit Storage Relocation alternative, Plant workers are assumed to receive the person-rem associated with the Proposed Action alternative. The radiation exposures for individual workers for the alternatives are within regulatory guidelines and do not have any public health significance.

Response: *The dose estimate presented includes not only the expected doses from weapons operations but also the expected doses from the interzone transfers of 20,000 pits as part of the pit repackaging project. The No Action Alternative dose numbers presented include not only the expected doses from weapons operations but also the expected doses from interzone transfers of 12,000 pits as part of the pit repackaging project.*

The environmental impacts of interim pit storage at Pantex have been discussed and analyzed in the Pantex EIS. The Department of Energy, through its contractor Mason & Hanger, is fully committed to the As Low As Reasonably Achievable (ALARA) program at Pantex Plant to help limit the number of personnel occupational exposures and public/environmental exposures to radioactive material. The majority of Pantex Plant workers receive no radiation exposures (zero dose) during normal operations.

Response: *The environmental impacts of intersite transportation of plutonium pits including each of the four alternative sites have been discussed and analyzed in the Pantex EIS. DOE considered the Relocation Alternative as reasonable. However, DOE has determined continuing interim plutonium pit storage at Pantex Plant as the preferred alternative.*

Costs are not analyzed as part of the environmental impacts.

RC: 12.011
Doc: PC-034/3

In Table S-1 for the Proposed Action alternative, 50 workers receive 61 person-rem for 2,000 weapons. Next, 50 workers receive 48 person-rem for 1,000 weapons. Finally, 50 workers receive 41 person-rem for 500 weapons. How does one scale these numbers? The same type of calculations are made for the No Action alternative. Again, the numbers for person-rem do not follow the amount of work. Why don't the workers receive only one half the amount of person rem for a one half decrease in the work? Is there a certain amount of radiation that they receive no matter what?

Response: *See response to comment 12.010.*

RC: 12.012
Doc: PC-034/4

In the Pit Storage Relocation Alternative, the amount of person-rem from the Proposed Action alternative appears to be added to what happens for pit storage relocation. How can one add the person-rem for these two alternatives? Is the same person-rem used two different times?

Response: *The Proposed Action includes continued weapons operations and pit transfers for pit repackaging. For the Pit Storage Relocation Alternative, both of these activities will be performed in addition to the activities associated with offsite pit shipments.*

RC: 12.013
Doc: HT15/46

It's not clear to me that the document reflects worker exposures of workers who have been dealing with pit storage in Zone 4 West. So I'd like to have some clarification about what is and isn't included in terms of the numbers that you're giving in the documents.

Response: *The Transportation and Staging Department is responsible for pit storage activities as well as interzone transfers of nuclear material. Historical dosimetry data and a description of responsibilities for this department are provided in volume I, section 4.12.1, of this document. This historical dosimetry data were correlated with historical material transfers to estimate impacts from future operations.*

RC: 12.014
Doc: HT15/47

So what's included in as transportation staging includes the workers in Zone 4 as well as the Zone 12 workers involved in those two sites? I'm just trying to clarify.

Yes, both Zone 4 and Zone 12 workers are included. The commentor is asking for clarification of the responsibilities and impacts for the department responsible for pit storage and handling activities. The Transportation and

Staging Department is responsible for pit storage activities in both Zones 4 and 12 as well as interzone transfers of nuclear material. Historical dosimetry data and a description of responsibilities for this department are provided in volume I, section 4.12.1, of this document.

RC: 12.015
Doc: HT15/48

[Are] the calculations...for those [Transportation and Staging Department] workers...the 1993 to 1994 similar reading? When [is] the 1995 similar reading information going to be available and...included?

Response:

The Transportation and Staging Department had a cumulative dose of 3.642 person-rem for 1995. This information is provided in the Final EIS.

RC: 12.016
Doc: HT16/10

It just occurred to me just as I was listening to you talk about whether or not there would be less exposure if the pits were left onsite rather than transporting them and I wondered if the repackaging were not part of the long-term storage...[would then] be left onsite. And...if repackaging is a part of the action,...would [that] be part of the analysis also? Because it would provide the same worker exposure as taking it out of the bunkers and moving it to a new location.

Response:

Onsite movements of pits differ significantly from offsite pit shipments. Because of the limited speeds for onsite transfers, the restraint procedure required for pit containers is less complex and less time consuming than the restraint procedure for offsite shipments. Because of the additional complexity of the restraint procedure, dose estimates for offsite transfers are greater than the estimates for onsite transfers.

RC: 12.017
Doc: HT16/13

If Pantex is chosen for long-term storage, [would] workers...actually be exposed to the same activity bringing them out of the bunkers as they would if they were taken out and moved to another location?

Response:

It is a correct statement that there will be continued onsite movement of pits. A discussion of the pit transfers and the subsequent impacts occurring during the period analyzed in this document is provided in volume I, section 4.12. Onsite movements of pits differ significantly from offsite pit shipments. Because of the limited speeds for onsite transfers, the restraint procedure required for pit containers is less complex and less time consuming than the restraint procedure for offsite shipments. Because of the additional complexity of the restraint procedure, dose estimates for offsite transfers are greater than the estimates for onsite transfers.

RC: 12.018
Doc: HT16/14

My question has to do with Figure F-6.3.1 on Page F-19, appendix F. There is listed a variety of collisions that might occur during transportation which form the basis for the risk and the consequence analyses in that [appendix] and I note that aircraft collisions with the transport train have not been considered, or at least they're not listed. The stage right trailer, the whatever trailer you would like to consider. I guess there's something hauling a trailer, so I think of it as a train. If we're really looking at 30,000 movements a year, which was the number referred to earlier in the discussion, the total exposure of all of those targets averaged over a year may match the total exposure of a single storage facility, in terms of hours of vulnerability. So it relates to an observation that I've had that, in analyzing the aircraft crash probability, there's been no consideration of the fact that the aircraft is only in a position to impact the target for a short duration, a very short proportion of its entire flight. Here we've got a slowly moving target that's only vulnerable for a short period of time and we've not worried about it. When you're moving the missile instead of moving the target, we worry about the sum total of all these passes. When we're moving the target more slowly, we say, well, it's in the open for such a short period of time that it's negligible.

Response: *To elaborate on the response given at the public hearing, aircraft impacts into a moving vehicle containing weapons or weapons components were considered in the analysis. The potential for this accident is discussed in volume I, section 4.12.2. Assuming a trailer were continually parked within Zone 4, an aircraft impact frequency of less than 1 x 10^{-7} per year was calculated. The risk from this accident using a frequency of 1 x10^{-7} per year is presented in volume I, section 4.12.2.*

RC: 12.019
Doc: HT16/42

In the document, it commented that 18 magazines are currently being used for pit storage. And then there was a chart that indicated pit storage magazines, 22 of them was all. And, yet...as of August 1995, [there were] 7,950 pits at the plant. And it just doesn't add up. We need to know where else the pits are at the plant. You've got too many pits for too few magazines.

Response: *As of July 1996 there were just over 9,000 pits stored at Pantex. There are 22 Zone 4 magazines in Stage Right configuration. That is, magazines in which pits are palletized horizontally, in groups of 4 or 6, AL–R8 containers (one pit per container). The Stage Right configuration utilizes the automated guided vehicle forklift. Of the 22 Stage Right magazines, 18 Modified Richmond magazines and 4 Steel Arch Construction magazines currently contain pits. Each of the 18 Modified Richmonds has 424 pits in it (212 per side), whereas, the 4 Steel Arch Construction magazines contain 252 pits each. In Zone 12, building 12–44, Cell 8 can hold up to 288 pits, and the 12–26 Pit Vault (PV) holds approximately 150 pits. The following table summarizes the these quantities:*

FACILITY	STORED PIT QUANTITIES
18 MR Magazines	18 x 424=7632
4 SAC Magazines	4 x 252=1008
12-44 Cell 8	288
12-26 Pit Vault	150
TOTAL	9078

It should be noted that the two Zone 12 facilities, 12–44 Cell 8 and 12-26 PV, are not currently completely full. Thus, the total number of stored pits is something less than 9,078 (as of July 1996). Since the total changes day to day, exact figures were not available as this response was written, but these numbers indicate approximately 9,000 total pits currently stored at Pantex.

RC: 12.020
Doc: HT16/43

I also would like you all to clarify—there's a place where you say pits accumulated on site. I would like to know if there's a certain point at which a pit is designated as being in storage and if there is kind of an interim staging step where you can have some 'X' number of pits.... If you don't mind, I would like to have clarity about how all pits are categorized, they fall into what categories, et cetera.

Response:

To elaborate on the response given at the public hearing, there is no specific interim staging step for pits designated for storage. When pits are removed from dismantled weapons they are placed in AL–R8 containers (at this point they are counted as "stored" pits with respect to the 12,000 pit limit) and either palletized into Stage Right pallets in the dismantlement facility or temporarily staged in the 12-26 Pit Vault until a quantity exists to fill a pallet. Stage Right pallets hold 4 or 6 pit containers per pallet, depending on the pallet size. Full pallets are then transported from Zone 12 to Zone 4 and placed in one of the storage magazines.

With respect to pit categorization, pits at Pantex can be divided into four primary categories as follows:

- *Surplus—Interim storage pits, not intended for future defense programs use..*
- *Strategic Reserve —Reserved for potential use in future defense programs.*

- *Enduring Stockpile—Current stockpile weapons spares or maintenance units.*
- *Evaluation—Small quantities of pits designated for quality assurance tests.*

With the exception of enduring stockpile pits (limited classified quantities), all of the aforementioned pits are considered as "in storage" and counted with respect to the authorized limit of 12,000 pits currently allowed to be stored onsite at Pantex. See the response to comment 12.019 for details on current pit quantities stored at Pantex.

RC: 12.021
Doc: HT16/44

Something that also doesn't seem to be in the document is the air-conditioning that's being installed in some of the pit storage you use. Things like that, that have to do with current operation and status of the plant, we'd like to understand better.

Response:

The comment is correct. Two Modified Richmond magazines in Zone 4 have air conditioners. Some pits have a maximum storage temperature which has been established by the design laboratory (Los Alamos or Lawrence Livermore National Laboratory). The air conditioning is provided to maintain appropriate temperatures during the summer months for these pits. Additional Zone 4 magazines may have air conditioning installed in the future. This information has been added to volume I, section 4.3.

RC: 12.022
Doc: PC-025/55

Page 4-174: According to Table 4.12.1.1-1, Pantex is stockpiling nuclear explosives or pit components in Zone 12. Please comment since interzone transfers don't balance.

Response:

The commentor is incorrect. DOE is not stockpiling nuclear explosives or pit components in Zone 12. The data in the referenced table refer to transfers occurring during 1994. The data do not include components that were brought to Zone 12 late in 1994 and returned to Zone 4 early in 1995.

RC: 12.023
Doc: PC-025/56

Page 4-174: In the magic numbers of 12,000 and 20,000, what is the maximum number of pit components that would not be included in the storage limits but would be managed in Zone 12 but not considered in storage under the definition of storage? Is this discrepancy accounted for in the analysis? Will these pits be in AT-400 containers? If a shortage of AT-400 containers exists would there be greater risk in Zone 12 management?

Response:

See response to comments 12.019 and 12.020. This small discrepancy is accounted for in the EIS risk analyses, since all calculations used the maximum facility limit quantities for evaluation purposes. It is planned that all pits will eventually be stored in AT–400 containers. The order or priority of which pits will be repackaged first is not yet established. However, the risk assessments presented in the EIS were for AL–R8 containers and constitutes a bounding analysis with respect to risk. Thus, any number of pits which get repackaged into

AT–400 containers would reduce the overall risk from pit storage regardless of whether they are in Zone 4 or Zone 12.

RC: 12.024
Doc: PC-025/57

Page 4-174. Has the analysis accounted for the aging of pits and aging of containers? If Pantex has pits from the fifties, forty years of material fatigue from the radiation, thermal, handling, and other adverse environmental conditions must be enormous. Has DOE accounted for this?

Response:

Pits have been under careful scrutiny for many years through various DOE programs, particularly the weapons Quality Assurance Testing Program, which includes the Pit Surveillance Program and an accelerated aging program to ensure that aging-related defects do not develop in pits. The same pits have already spent several decades under surveillance of DOE, the national laboratories, and the military in the field. Routine stockpile surveillance has been performed on the pits for 20 to 30 years in more hostile environments than Zone 4. All data indicate that pits and containers will not degrade over the interim storage period. The AT–400A container is designed for a 50-year life. A pit and pit container surveillance program will continue for the AT–400A container. This surveillance program will minimize the likelihood of undetected failures in the pits and/or containers.

RC: 12.025
Doc: PC-025/58

In the Zone 4 West Activities section, on page 4-181. DOE estimates 20-22 containers would be removed for surveillance activities. Should a problem become evident, what is the maximum number of surveys possible? What are the impacts? Was this considered?

Response:

Pits have been under careful scrutiny for many years through various DOE programs, particularly the weapons Quality Assurance Testing Program, that includes the Pit Surveillance Program and an accelerated aging program, to ensure that aging-related defects do not develop in pits. The same pits have already spent several decades under the surveillance of the DOE, the national laboratories, and the military in the field. A routine stockpile surveillance has been performed on the pits for 20 to 30 years in more hostile environments than Zone 4. All data indicates that pits and containers will not degrade over the interim storage period. The AT–400A container is designed for a 50-year life. A pit and pit container surveillance program will continue for the AT–400A container. This surveillance program will minimize the likelihood of undetected failures in the pits and/or containers. Should a problem be detected additional surveillance would possibly need to be conducted, but it is not possible to determine the number that would need to be examined without knowing what type pit was affected and what the nature of the problem might be.

RC: 12.026
Doc: PC-025/59

Page 4-182. What is a small number? Several magazines?

Response:

In this case, a small number refers to one Zone 4 magazine. The impacts from this facility have been evaluated in the EIS.

RC: 12.027
Doc: PC-025/60

General comment in section 4.12: The tritium accident caused quantifiable radiological impacts to plant personnel, facilities, environment, and public. For comparison purposes, please compare tritium accident with intrasite transportation impacts. What is the maximum impact to plant personnel, facilities, environment, and public from tritium storage at Pantex? Has the explosive damage potential of stored tritium been evaluated?

Response:

Intrasite transportation impacts are described in volume I, section 4.12. Impacts to the workers related to the past tritium accident are discussed in volume I, section 4.14. All potential accidents involving tritium were explored. Volume I, section 4.14, discusses the risk dominant accidents involving tritium.

RC: 12.028
Doc: PC-025/61

... Section 4.12.2. Since Table 4.12.1.1-1 does not balance, where are the impacts to storage activities in Zone 12 from pits, CSAs, and tritium?

Response:

These components are located on an interim basis within Zone 12. Pits and Canned Subassemblies are stored on an interim basis prior to transfer to Zone 4. Canned Subassemblies are also stored prior to transfer to the Y-12 Plant at Oak Ridge. Tritium reservoirs are stored in the Tritium Vault within Zone 12. Radiological impacts related to these activities are included both in the worker dose estimates and the accident risk evaluation provided in volume I, section 4.14.2.

RC: 12.029
Doc: PC-025/62

General question. What are the continuing impacts to transportation workers resulting from past tritium accident?

Response:

Exposures to plant personnel from the small amounts of tritium offgassing from the past tritium accident in Cell 1 are discussed in volume I, section 4.14, of this document. The total amount of tritium emissions are at the limit of detection. As a result, it is not possible to calculate doses and consequences to the non-involved workers and the public with high confidence levels. To the extent practicable, the dose to the public has been estimated to be less than 1.33×10^{-4} person-rem per year, resulting in a risk of 6.65×10^{-8} excess LCFs. Practically speaking, the maximum dose to an individual non-involved worker or member of the public would be effectively zero.

RC: 12.030
Doc: SG-003/3

Table S-1 in the Summary, under intrasite transportation, presents person-rem information (Summary page-18). The table is supported by Section 4.12 in the main text. An underlying baseline person-rem appears to be incorporated into the estimates for the Proposed Action alternative. Neither the main text nor the table clearly state the assumptions used. The person-rem shown for the Pit Storage Relocation alternative adds the estimated person-rem for pit storage relocation and the person-rem from the 2,000, 1,000, and 500 weapons levels under the Proposed Action alternative. Thus, while implementing the Pit Storage Relocation alternative, plant workers are assumed to receive the person-rem associated with the Proposed Action alternative. The radiation exposures for individual workers for the alternatives are within regulatory guidelines and do not have any public health significance....

Response: *The exposures associated with intrasite transportation under the Proposed Action are the results of weapons transfers, pit transfers after weapon disassembly, and pit transfers from the repackaging of 20,000 pits. The exposures associated with the Relocation of Pits Alternative are the results of the same activities as the Proposed Action plus the loading of either 8,000 or 20,000 pits for offsite shipment. The No Action Alternative dose numbers presented include not only the expected doses from weapons operations but also the expected doses from the interzone transfers of 12,000 pits as part of the pit repackaging project.*

RC: 12.031
Doc: SG-003/4

In Table S-1 for the Proposed Action alternative, 50 workers receive 61 person-rem for 2,000 weapons. Next, 50 workers receive 48 person-rem for 1,000 weapons. Finally, 50 workers receive 41 person-rem for 500 weapons. How does one scale these numbers? The same type of calculations are made for the No Action alternative. Again, the numbers for person-rem do not follow the amount of work.

In the Pit Storage Relocation alternative, the amount of person-rem from the Proposed Action alternative appears to be added to what happens for pit storage relocation. How can one add the person-rem for these two alternatives? Is the same person-rem used two different times?

Response: *The exposures to the workers associated with intrasite transportation are the result of several activities (see response to comment 12.030). Only a couple of those activities will vary with, and therefore scale to, the different weapons levels. The transfer of weapons for disassembly and the transfer of pits after disassembly will vary according to weapons levels. The transfer of pits for repacking will not vary according to weapons level.*

Since activities associated with pit relocation (e.g., intersite transfers, SST loading) and the Proposed Action (e.g., continued weapon storage and transfer operations) will be performed, the doses associated with these activities are added.

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3.13 Waste Management

RC: 13.001
Doc: HT11/22

... Are [there] currently any waste by-products involved that result from the disassembling process?

Response:

For an elaboration on the response given at the public hearing, see the discussion in section 1.3.9 of this volume.

RC: 13.002
Doc: HT11/23

Any nuclear waste by-products or radioactive waste? And is that waste studied in this EIS?

Response:

For an elaboration on the response given at the public hearing, see the discussion in section 1.3.9 of this volume.

RC: 13.003
Doc: HT11/24

So are most of the by-products stored onsite at Pantex?

Response:

To elaborate on the response given at the public hearing, currently, low-level waste (LLW) is stored onsite prior to shipment and final disposal at the Nevada Test Site. All low-level mixed waste (LLMW) is stored in accordance with the Agreed Order & Site Treatment Plan-Compliance Plan, 30 TAC 335, the RCRA Part B Permit and 40 CFR 260-280. In 1994, Pantex Plant disposed of 32.6 cubic meters (42.4 cubic yards) of LLMW through an offsite commercial landfill located in Utah. In 1996, a second shipment of LLMW was disposed at the same facility totalling 70 cubic meters (91 cubic yards). In September 1996, a third shipment was disposed at the same facility. Volume I, section 4.13, Waste Management, presents the above information, including the updated information regarding the 1996 LLMW disposal shipment. Eventually all stored LLMW would be disposed offsite. See the discussion in section 1.3.9 of this volume.

RC: 13.004
Doc: HT02-09/2

What will the DOE and "We" do with all the waste that will be generated for at least the next 20 years? There are no licensed facilities to accept the wastes that are piled up on facilities throughout the DOE Complex at this time—why generate more than needs to be generated.

Response:

DOE is considering programmatic waste management strategies for the next 20 years under the WM PEIS. The WM PEIS considers economic and environmental impacts including local, regional, and decentralized management strategies.

Pantex Plant, through a combination of successful pollution prevention and waste avoidance techniques (see volume II, appendix G), and offsite disposal of approximately 103 cubic meters (133 cubic yards) of LLMW, has reduced the "piled up" inventory equivalent to the volumes generated during 1992–1995. Further reduction is expected in fiscal year 1997.

RC: 13.005
Doc: HT02-04/3

Pantex, the Superfund site, is currently operating under no [discharge] permit with the State of Texas.

Response: *See discussion in section 1.3.9 of this volume regarding past practices.*

RC: 13.006
Doc: HT13/84

Reference page 6-4 in the draft where it talks about permitting, specifically permitting at Manzano if pit storage was done—...I have several questions related to that. Has...the Department of Energy had discussions with the New Mexico Environment Department about what kind, if any, of permit modifications would be needed if the pit storage was done at the Manzano site?

... Does the Department have a position about whether pit storage would be subject to a RCRA permit at Manzano or any other site?

(Ms. Founds: Since this is not waste or surplus material, it would not be part of a RCRA permit.)

Reference page 6-4,...in the discussion...about permit requirements and the fact that Kirtland has an existing permit. It says that new permits or permit modifications could be required. Would you explain that statement in relation to the statement that you just made, Nan?

So will the final EIS have a clear statement about what RCRA permitting requirements the Department feels will be necessary at Manzano or any other site from a RCRA standpoint?

Just as a follow-up to complete the loop, and I have primarily been talking about the Manzano site, but the question really relates to that I was surprised that the draft singles out Kirtland for that on this page. The Pantex site, of course, also has a permit, so the question is, is the similar waste stream modification, to use your term, or waste stream results, would that be included at any site that had a RCRA permit?

To make sure I understand, you are saying that the existing Pantex Part B permit covers storage of 20,000 pits at Pantex?

RCRA waste might result from those kinds of operations, but that is not saying those are RCRA-type waste.

Response: *There are several reasons the New Mexico Environment Department may require RCRA permit modifications for both DOE and the Air Force. Since the Manzano Weapons Storage Area (WSA) has several Air Force Solid Waste Management Units as defined under RCRA, the responsibility for investigation, cleanup, and closure of the SWMUs would likely continue under Air Force's RCRA permit. However a language modification might be required that any new SWMU resulting from a DOE activity would be DOE's responsibility. The Manzano WSA is not currently DOE property (see 40 CFR 270 criteria), language addressing the Manzano WSA would likely be added to the DOE RCRA Part B permit and the Air Force RCRA Part B permit. New Mexico Environment Department is likely to consider these changes as Class 1 modifications covered* *under 40 CFR 270 to assure integration of the Kirtland Air Force Base and DOE permits. In addition, see discussion in section 1.3.9 of this volume regarding permit requirements.*

Clarifying language has been added to volume I, section 6.5.

RC: 13.007
Doc: HT13/85

To follow up on that helpful comment, is there a document that exists that describes that analysis that you just gave?

My comment would be that prior to the time of the final, I would hope there would be some written-down analysis that would be either included in the EIS or referenced in a supporting document reference that provides this explanation that has just been made, because I don't see it in page 6-4 in the way I read it, and certainly, there is no document...or documents referenced on that page that provides that information.

Response: *See discussion in section 1.3.9 of this volume regarding permit issues. Clarifying language has been added to volume I, section 6.5, with a source.*

RC: 13.008
Doc: HT12/36

Public Speaker: I have a comment. It's a crosscutting issue, it should be brought up in each one. I'm past chair of the CSRA Planners Group.... The State of South Carolina is concerned with any new project coming into the area if Yucca Mountain doesn't [come] about. And that really has to be addressed strongly. And I've heard it from folks in the governor's office and folks in the area around here that before we can have any of these, that issue should be solved at the policy level, like somebody [mentioned]...

Unidentified Speaker: Of State's concern of moving additional operations here with South Carolina?

Public Speaker: Without their feeling that they will be a dumping ground.

Unidentified Speaker: Okay.

Public Speaker: And that Yucca Mountain should be the dumping ground or whatever, but...the issue is, let's not have it stop here. ...Each one of these projects should be looking at the waste issue and even DWPF is not supposed to have its glass containers stay here. So that's something that has to be stressed somewhere as a crosscutting issue. I know it's not unfamiliar with [you].

Response: *See discussion in section 1.3.9 of this volume regarding hazardous materials.*

RC: 13.009
Doc: CO-003/1

The acceptance of plutonium at Hanford should not delay, defer, or negatively impact Hanford cleanup.

Response: *See discussion in section 1.3.9 of this volume regarding hazardous materials.*

RC: 13.010
Doc: PC-019/1

Enclosed is another problem associated with the plant pointed out by Amarillo Globe News. (Globe News, Article, "City Won't Search For Contaminated Glove," May 24, 1996.)

Response: *The specific issue referred to in the article is considered an isolated incident. Pantex Plant has resolved the issue with the City of Amarillo and the State of Texas.*

RC: 13.011
Doc: HT16/32

...the hazardous waste permit 51289 [that] is issued by the TNRCC and mentioned on Page 4-189, the comment...should be amended because the brand new permit became effective February 16th, 1996. ...Section 4.13.1.3 on Page 4-79, some of the units identified in the third paragraph have now been closed and you'll probably want this reflected in the EIS. On Page 4-147 and 148, these paragraphs should be reviewed by the low-level mixed waste team for updates on the current waste inventories, waste plans, and waste activities. Also, discussion of MTU's may need to be revised on these pages. ...we've issued the agreed order, site conception. It's an agreed order issued October 2nd, 1995 concerning mixed waste. I'm not sure that's fully reflected in the EIS.

Response: *Clarifying language has been added throughout the EIS regarding approval of the Class 3 modification dated 2/16/96 and the relationship with the Agreed Order. The offsite disposal of low-level mixed waste has been updated. Another change included deletion of volume I, table 4.13.2.2–1, with the salient information being incorporated in the text.*

RC: 13.012
Doc: HT16/34

...on Page 4-197, first column, first full paragraph, when you describe: In Zone 4, two magazines, eight permitted conex boxes and 25 conex boxes are used for storage of low-level waste. I think I understand that better now. It was very confusing to me when I read it. So eight of the conex boxes are permitted and the other 25 are just the surge capacity that's been added without any permitting process?

Response: *As a result of the recent Class 3 modification dated 2/16/96, clarifying language has been added throughout the EIS, including section 1.3.9 of this volume.*

RC: 13.013
Doc: HT16/35

There's a sentence in the middle of that paragraph that says: Stormwater discharge associated with industrial activities is discharged to the playas on site. I don't know what that means. Can you help me there? I didn't know that stormwater discharge was used in industrial activities.

Response: *The phrase "Stormwater discharge associated with industrial activities" is regulatory language contained in the National Pollutant Discharge Elimination System (NPDES) permit. The sentence was simplified to read "Stormwater drains to the playas onsite."*

RC: 13.014
Doc: HT16/36

...on Page 4-204 where you do your cumulative thing with the PEISs again for the disposition alternative. You list the types of wastes that will be involved in that alternative. And even though a reactor, a nuclear reactor, is kind of the bounding case there, there's no high-level waste mentioned in category of waste that will be generated under that option. I think maybe you may need to add high-level waste or spent fuel storage or something that's going to be impacted under that.

Response: *Commentor is correct. The clarification has been added to volume I, section 4.13.5.*

RC: 13.015
Doc: HT16/37

...since the contested case hearing negotiations got mentioned, in the settlement agreement there was a much appreciated and significant commitment on the part of the DOE to at least examine one alternative to the burning grounds, an alternative method of incineration of those wastes. It's not mentioned in this document. It should be.

Response: *Additional language examining the continued study of an alternative disposal method has been added to volume I, sections 1.2.2 and 4.13.1, and volume II, appendix G of the EIS.*

RC: 13.016
Doc: HT16/38

It says new facility construction and upgrades are not expected to impact waste operations. One of the things that I have a concern about in this document is the pit conversion and reuse facility, one of the two new facilities that are covered by this document, which we don't seem to learn a great deal of detail about, in terms of what it generates in waste streams, et cetera. And, when you went through this viewgraph, I seem to infer from what you said that this statement was based, in part, on new facilities, I assume waste handling facilities, that had been built on site. And so I'm asking you, is my concern a basis of definition of what impact is or what? I mean, how [do] we bring these kind of broad blanket assumptions back into a document where you're talking about dust particles when you do construction and then you assert that there's no impact. ...I mean, how do we relate this broad assertion to the fact that we have new plutonium handling functions that are going to come onto the plant in this document in this new facility and we have new kinds of hazardous waste operations that are coming on the plant with the other new facility? How can we say that that has no impact?...if you're talking about negative impact as opposed to impact, it's not accurate to say that it has no impact. Maybe your assessment is that none of it is a negative impact. Is that an accurate interpretation?

Response: *To elaborate on the response given at the public hearing, the impacts of new facility construction and upgrades on waste management are discussed and analyzed in volume I, section 4.13.2, and volume II, appendix H, including the Pit Reuse Facility. The six projects presented in the EIS are the Hazardous Waste Treatment and Processing Facility, Pit Reuse Facility, Gas Analysis Laboratory, Material Compatibility Assurance Facility, Nondestructive Evaluation Facility, and Metrology and Health Physics Calibration and Acceptance Facility.*

As described in volume II, appendix H, the Pit Reuse Facility operations are limited to casing enhancements, cleaning, weighing, radiographing, leak checking, inspection, and backfilling. These activities are not considered plutonium processing or reprocessing. Plutonium processing and reprocessing *are not within the scope of the Pantex Plant EIS (see the Stockpile Stewardship Management PEIS).*

RC: 13.017
Doc: HT16/41

On the *Federal Facility Compliance Act*, this was being drafted when this draft document was made. And the document says that the impact of this is...unknown at this time. I want to know if there's been an update on this or will...there be more information forthcoming?

Response:

As discussed in section 4.13, Waste Management, the Federal Facility Compliance Act Final Site Treatment Plan was approved by TNRCC in September 1995, and an Agreed Order was issued October 2, 1995. In addition, the tri-party Federal Facility Agreement (FFA) continues to be negotiated (as of September 1996) regarding restoration activities. As discussed, impacts of an FFA remain unknown. Updated information has been incorporated in volume I, section 4.13.

RC: 13.018
Doc: HT17/68

...it's been pointed out several times that this document intentionally didn't try to deal with the permits that have been issued between the time that the document was being written. The concern that I have, however, is...that it be explicitly stated, not just in a chart showing the duration of the permits, but explicitly stated that the permits that we're talking about here, the existing permits that you will be talking about, will all...need to be renewed, revised [again] during the ten-year time frame of this document.

Response:

DOE understands that the permits routinely undergo revision or renewal during the EIS timeframe. Volume I, section 4.13.1, presents the Pantex Plant permits, including effective date and expiration dates. Should renewed or modified permits result in NEPA related compliance issues, DOE will address those issues at that time. As indicated in volume I, section 4.13, Pantex Plant successfully renews and modifies existing permits, as necessary.

In addition, see general discussion in section 1.3.9 of this volume regarding permits.

RC: 13.019
Doc: SG-012/1

Some of the actions appear to (potentially) be in conflict with NMED laws and regulations.Vol. I, page 6-4, 6.5 Pit Storage Sites, under the paragraph referring to Kirtland Air Force Base. The U.S. Department of Energy (DOE) must be in compliance with the Federal Facility Compliance (FFC) Order issued by New Mexico under the provisions of the *Federal Facility Compliance Act*. The FFC Order has jurisdiction over generation and storage of mixed waste and site treatment plans for its disposition (p. 5-60, 5.5.10 Waste Management, "The pit storage operations would generate less than 1 cubic meter (1.3 cubic yards) of mixed, low-level, and hazardous wastes.")

Response:

Clarifying language has been added to volume I, section 5.5 and chapter 6.

RC: 13.020
Doc: SG-012/2

Mention of the New Mexico unilateral FFC Order is not included in table 6.5-4.

Response:	*The New Mexico unilateral Federal Facility Compliance Order was added to the table.*
RC: 13.021 **Doc: FG-003/2**	EPA suggest that Appendix G should reference the requirements of Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities (March 8, 1994), particularly for the six new construction projects at Pantex listed in table 3.1.1.1-1 (gas analysis laboratory, materials compatibility assurance facility, etc.). Section 306 of Executive Order 12902 contains specific requirements regarding the construction of new facilities owned by the United States. Additionally, the Final EIS would be strengthened if it could discuss whether this Executive Order has any implication on the proposed interim storage of plutonium pits in Nevada, South Carolina, New Mexico, and Washington State in terms of energy and water conservation.
Response:	*Additional information has been added to volume II, appendixes G and H regarding Executive Order 12902. For the purpose of bounding the NEPA analysis, current levels of energy and water consumption were used to compare alternative site impacts. The actual design of the proposed facilities includes an energy conservation analysis with life cycle costing.*
RC: 13.022 **Doc: PC-025/4**	On Page 1-16 in column two in the first paragraph. What is the definition of abnormal? Is the chance of a similar accident greater than 1 in a million? If not, I would argue with DOE risk numbers that the incident is not abnormal. For consistency use risk assessment language for "abnormal." "Abnormal" means nothing. Use unlikely, extremely unlikely, etc. If this incident occurred, what calculations prove the event is abnormal? What number of similar operations were completed before the event occurred? How do you justify orders of magnitude difference between theoretical and actual experience, if one exists? Why does the WM PEIS identify Pantex as a TRU waste generator (see appendix) if Pantex is "Abnormal?"
Response:	*The statement "Pantex currently is custodian of significant volumes of LLMW, LLW, and TRUW," found on page 12-1 of volume II of the Draft Waste Management PEIS is incorrect. Pantex Plant currently manages three drums of TRU waste as discussed in volume I, section 4.13.1.* *The phrase "generated from an abnormal weapons dismantlement incident" has been deleted.*
RC: 13.023 **Doc: PC-025/63**	See section 4.13. Why only to 1994 for data? DOE reports annually, correct? Status of permit modification? What impacts are expected? What is status of EPA CERCLA negotiations?
Response:	*Updated information has been incorporated in volume I, section 4.13. This includes adding 1995 data to Table 4.13.1.2–1. The 1996 shipment and disposal of low-level mixed waste to Utah has been incorporated. Impacts were reevaluated based on the updated information and presented in volume I, section 4.13.2. The permit modification was approved on February 16, 1996. The EPA*

Comprehensive Environmental Response, Compensation, and Liability Act negotiations are continuing.

RC: 13.024
Doc: PC-025/64

Table 4.13.1.2-2. Why no margin for ER wastes? ER wastes are the most unpredictable!

Response:

A 10 percent margin has been added to environmental restoration waste volumes.

RC: 13.025
Doc: PC-025/65

Table 4.13.1.1-2. In SSM and S&D, the number of burning ground facilities is expected to be reduced to one. Are the 9 trays and 3 pans expected to be closed in the near future like the cages and pits?

Response:

The Stockpile Stewardship Manangement PEIS and Storage and Disposition PEIS look at environmental impacts through 2055. On February 16, 1996, TNRCC approved a Class 3 modification which identifies DOE's operational needs for 9 trays, 3 pans, and 3 flash pads. The permit also identifies the need for these facilities through 2100, the expected year of final closure. The former flashing pits and cages are no longer operational and are undergoing RCRA closure per the permit. The RCRA closures are expected to be completed by fiscal year 1997.

RC: 13.026
Doc: PC-025/68

In sections mixed waste and hazardous waste on page 4-193. Where is all the explosive burning waste noted in section 4.7 and table 4.13.1.1-2?

Response:

For the purpose of NEPA analysis, waste categories (e.g. LLMW, HW, etc.) were used to assess waste management impacts. The commentor is referred to the Pantex Environmental Information Document for detailed waste stream information.

RC: 13.027
Doc: PC-025/69

Page 4-199. How accurate is the 1.45 factor? Why doesn't table 4.13.2.2-1 contain a margin?

Response:

The 1.45 factor represents the best available information. Table 4.13.2.2–1 of volume I has been deleted as noted in response to comment 13.011.

RC: 13.028
Doc: PC-025/70

Page 4-202. 14,000 LLW shipments over 20 years? That's 700 a year, almost 3 shipments a week not including weekends. Is DOE hiding waste at Pantex, the numbers presented in tables 4.13.1.2-1 through -3 don't show this to be true? DOE is considering a landfill for at most 2,500 cubic meters over 10 years. That's stupid! Why don't you landfill the NHW around 13,000 cubic meters over 10 years, 18,000 shipments of HW over 20 years? That's 900 a year, almost one shipment every day not including weekends. Is DOE hiding explosive wastes? DOE should think about a hazardous waste landfill for the 2,000 cubic meters over 10 years.

Response:

Volume I, section 4.13.5.1 has been completely rewritten. The WM PEIS information has been updated to reflect reduced waste volume projections.

RC: 13.029
Doc: PC-027/4

Reference page 6-17, volume I Main Report, Column Potential Applicability/ Permits: The word "permit" was omitted from this page on New Mexico while it appeared in the South Carolina page 6-14 and the Texas page 6-12. I know that water permits are required for businesses and individuals and would assume that a government entity should also comply with the permit requirements, especially since this State has severe water problems. The word "permit" should be added for those New Mexico areas where a permit is required. I realize that laws differ from state to state, but there are some areas where permits are required here.

Response:

The table has been corrected to include the word "permit".

RC: 13.030
Doc: SG-003/38

Regulatory Oversight - The TNRCC would be more willing to embrace Pantex's mission within the State of Texas if DOE would promote independent regulatory oversight for radioactive source, special nuclear, or by-product material. We applaud DOE's willingness to share its information concerning radioactive contaminants; however, it is our opinion the public would be better served and potential waste management errors minimized if the oversight authority was shared with the TNRCC.

Response:

For DOE to continue to fulfill its responsibilities as mandated by statute, Presidential direction, and Congressional authorization and appropriation, the generation of solid waste including "nuclear waste" is an unavoidable result. Recently, in response to numerous public requests for independent regulatory oversight of radioactive source, special material and by-product material, the Secretary has created a Working Group on External Regulation. This Working Group is presently reviewing various alternatives for external oversight of activities at DOE's nuclear facilities and will submit a report sometime in 1996.

RC: 13.031
Doc: PC-030/2

DOE should move with all possible speed to cease using the Burning [Ground] for waste management at Pantex.

Response:

The Pantex Plant continues to implement a Pollution Prevention/Waste Minimization Program to reduce environmental impacts through waste avoidance and waste minimization. Appendix G of volume II contains detailed information of the PP/WM Program. As discussed in volume II, section G.3.2, Pantex Plant, in 1994, as a result of a new procedural control reduced HE-contaminated hazardous waste by 99%. As discussed in volume II, section G.3.8, in March 1994, a formal literature search was conducted to investigate treatment/processing methods for HE other than open burning-open detonation. The Best Available Control Technology (BACT) analysis concluded that controlled open thermal treatment with existing administrative controls constituted BACT. The alternatives were determined to be either technically infeasible or economically infeasible.

However, as part of the Pantex Plant continuing effort to reduce pollution and minimize waste, DOE continues to study potential alternatives to open burning of energetic materials at the Pantex Burning Ground (e.g., commercial resale, *base hydrolysis treatability study). This additional information has been incorporated in volume I, section 4.13, and volume II, appendix G.*

RC: 13.032
Doc: PC-033/1

Page S-6, col. 1, par. 1: It states that "Pantex also generates and manages recyclable materials." What are these [materials] and where are they recycled to? Do these include the various barrels of miscellaneous bolts and nuts that are sold at auction or to salvage what the general public can purchase? These barrels have been known to contain various parts that are far from nuts and bolts and are apparently parts of disassembled weapons and other confidential tags and various seals included in these barrels of supposedly recycled materials that I have been told by plant employees are confidential makeup and design. How did these materials make it into a barrel of miscellaneous bolts and nuts at a salvage yard and what are the procedures for recycling these bolts and nuts? Can any individual purchase these, and if so what is to keep them from copying the design and makeup of these parts?

Response:

Volume II, appendix G, addresses the current status of Pantex Plant's Pollution Prevention and Waste Minimization program. Scrap metal or "nuts and bolts" can be recycled and are recycled through various outlets depending on the value of the metal. In some cases due to liability concerns scrap metal is only sold to operators of smelters to ensure the "nut and bolt" is melted down.

The materials contained in weapon components in whole or in part are routinely recycled. In cases were the weapon components are classified (i.e., contain information subject to Atomic Energy Act regulation) or have the potential for military-proliferation value, Pantex Plant is required by law to demilitarize and sanitize (D&S) weapon components. Examples of D&S processes are presented in volume I, section 1.2.2, Disassembly of Nuclear Weapons. After the D&S process, the resulting materials can be recycled. The Pantex Plant uses written procedures for identifying weapon components requiring D&S, D&S processes, and releasing of D&S materials. Volume II, table G.3.7–1, in appendix G of the EIS, shows that 41 metric tons of "weapons metals" have been recycled with a salvage value of 2.1 million dollars.

3.14 Human Health

RC: 14.001
Doc: PC-018/1

There are over 1 million people living in this area. All of the above would be in danger of contamination if an accident did occur at Pantex.

Response:

The Pantex region of influence (ROI) for potential accidents includes an 80-kilometer (50-mile) radius surrounding the plant. An ROI with a diameter of 80 kilometers is the usual ROI for accident analyses in NEPA documents and Safety Analysis Reports. The population in the Pantex ROI is estimated at 267,107 persons. A representative range of accidents including accidents that could result in the release of nuclear materials to this population has been evaluated in this EIS. The impacts from potential accidents at Pantex Plant to people in the area including the risk from contamination are discussed in volume I, section 4.14.

RC: 14.002
Doc: PC-009/1

My question relates to DOE/EIS-0225D, Page 5-12, second column, second paragraph, line 6. The document states starting at line 5: "With an additional 0.11 LCF from pit handling, the total risk of *latent cancers among workers at the P-Tunnel would increase by 1.8 percent."

All references to latent cancers in that section titled "Impacts of Storing 20,000 Pits", refer to LCFs, latent cancer fatalities, except line 6 as indicated above by a "*". Does the increase of 1.8 percent refer to "latent cancers" as it states, or to "latent cancer fatalities" as the rest of the section would seem to imply.

Response:

The commentor is correct. The increase refers to latent cancer fatalities, not latent cancers. The text has been revised.

RC: 14.003
Doc: HT11/1

... How many years is this [plutonium] considered to be actually hazardous waste?

Response:

To elaborate on the response given at the public hearing, plutonium in pit form is not considered a hazardous waste. Weapons-grade plutonium is made up largely of plutonium-239, which has a half-life of approximately 24,000 years. After 24,000 years, one half of the plutonium will still be present. The standard calculation is that 10 half-lives or 240,000 years are required before all of the plutonium is decayed. Whether the plutonium is hazardous depends on its location relative to human receptors.

RC: 14.004
Doc: HT11/2

... If the half life is 24,000 years, wouldn't the actual hazard be much longer than that?

Response:

See response to comment 14.003.

RC: 14.005
Doc: HT11/3

What was the consideration of the maximally exposed individual?...[From] 6.6 rem, which I assume is the forklift driver or whoever punctures this thing,...we go all the way down...to the public exposure.... Public exposure would not be safe 100 milligrams per year, and I was wondering how we went from one number to the other just like that?

Response: *To elaborate on the response given at the public hearing, the involved worker (forklift driver) is estimated to receive 6.6 rem of dose commitment when a pit is punctured. This dose commitment is over a 50-year period due to the inhalation of plutonium oxide dust released during the forklift accident. The amount of plutonium oxide released is about 0.6 milligrams. This release is then transported and dispersed by the wind. An individual at the site boundary would also inhale some of the plutonium dust if located directly downwind from the release. The dose commitment that the maximally exposed offsite individual receives is much less due to dispersion and deposition of the plutonium dust during its movement from the release point to the site boundary.*

RC: 14.006
Doc: HT11/4

And that [maximally exposed individual] person is really the person hanging around for 24 hours a day?

Response: *To elaborate on the response given at the public hearing, the maximally exposed individual is a hypothetical person who is assumed to be at the site boundary for 24 hours a day.*

RC: 14.007
Doc: HT02-02/2

It may be safer than other sites, but we can prove that accidents—at least I hope the incidents that have affected us personally were accidents—have happened that [have] endangered our property as well as our personal safety and others in the neighborhood of Pantex Plant.

There have been numerous major fires on the site, three of four within the past two years. We took cold drinks and ice to the firemen on various occasions. We have had cast steel shrapnel chunked at us. We have picked up some 300 to 400 pounds of a naval breech block, one piece weighing 59 pounds. Some of this shrapnel was found some one and one-half to two miles from where it was exploded. We have had tractor tires ruined from it.

Through the years, we have had windows broken, pictures knocked off walls, et cetera. On October 4, 1995, a very large charge of explosive was set off to signal the start of an emergency management drill. This drill "test" broke our house, cracked the slab, rafters, walls, brick, shower, plumbing causing flooding of the basement, and other damages resulting in some $30,000 in repairs and replacement of carpets and other floor coverings, rebuilding the shower, cracks, et cetera. We also must have the house leveled.

Too many questions are yet unanswered by the studies that have been conducted. Granted, it would be impossible to anticipate all potential problems that may arise, but there does seem to be a lack of scientific research used for the study. It would appear that a conclusion has been drawn and figures to support that conclusion were used without any real scientific information.

Response: *Incidents or accidents occur at all active industrial plants and Pantex Plant is no exception. However, there have been no accidents at Pantex Plant which* *have endangered personal safety of the public in the plant vicinity. DOE is committed to the safe operation of Pantex Plant, as well as the protection of the public, the environment, and the facility employees.*

Grass fires were considered as part of the EIS risk assessment. The specific examples mentioned in the comment were fires which were contained onsite and posed no threat to Pantex operations or offsite property.

With respect to the Naval breech block event, that was a one-time experiment (almost 30 years ago) which is now precluded from reoccurrence by administrative limits and procedures.

The analysis conducted for the EIS was done according to CEQ and DOE guidance in using the best information available and nationally accepted methods and models.

RC: 14.008
Doc: HT05/11

Could you speak more toward the latent cancer fatality issue... and discuss what is the most likely outcome?

If that's the actual expected...outcome, why isn't that put into your statement as the most important?

In other parts of the document, you indicate that the most likely outcome is zero cancers.

Well, I'm saying is you explain this in two different ways in your document. In this shorter version that you've put here in the narrative summary, you appear to attach some greater certitude to potential cancer risks than you do in the other sections, especially in the appendix, where you indicate that the most likely outcome is zero cancers.

And I'm saying, for purposes of explaining this to the community, the more appropriate explanation would be to indicate that the most likely outcome is zero cancers.

Response:

This discussion regards the interpretation of calculated risks from radiological exposures, for example, 0.13 cancer fatalities from an exposure of 330 person-rem. Further clarification of the interpretation of the calculated risks has been provided in the form of a discussion in section 1.3.10 of this volume.

RC: 14.009
Doc: HT05/12

Under the statement he was referring to, it said shipment of pits to an alternative site would increase radioactive exposure of the Pantex Plant by 113. Why would it increase if the pits are shipped to an alternative site?

Response:

The offsite shipment of pits from Pantex Plant would require the removal of the pits from the Zone 4 magazines and the loading and the restraining of pits within a Safe Secure Tractor Trailer vehicle. The performance of these activities will increase the worker exposure total.

RC: 14.010 **Doc: HT05/13**	What is the underlying base assumption of man-rem or person-rem exposure that you have ascribed to ongoing site work at the 500, 1,000, and 2,000 levels such that you would be able to extrapolate from these numbers exactly what is the base amount that you say they're going to get, irrespective of the number of weapons that they're working? ... I've tried to deconvolute your calculations and I can't do it. As the person who supplied that data from the Pantex Plant, I'm not able to follow your calculations, nor do I see them stated anywhere in the documents. I cannot extrapolate where there's a base of what they used to build up on some of these numbers when they compared from site to site. There are some assumptions that were made that are not stated when they made the calculation on what might happen, especially when you start looking at making movements to alternative sites. ... I want some additional information [in the EIS] on the assumptions that were made in reaching these calculations, such that someone reviewing it, not having the opportunity to speak to [authors of the document], could also see if their pencil-whipping of the data would be the same as his.
Response:	*This discussion regards the dose estimates for the Transportation and Staging Department provided in volume I, section 4.12, Intrasite Transportation. The commentor requests clarification on why the estimates for worker exposures do not scale to zero for a weapons activity level of zero. The reason that this is not the case is because the dose estimates also include impacts related to interzone pit shipments required for the pit repackaging project. Thus, even at a hypothetical zero weapons activity level, there will still be worker exposures from pit transfers. Further clarification of this issue is provided as a discussion in section 1.3.8 as well as in volume I, section 4.12.*
RC: 14.011 **Doc: CO-008/38**	Page 4-205, Paragraph 4 Exposure from inhalation is the only pathway assessed in Pantex SWEIS. Please discuss exposure through other pathways such as water, soil, and vegetation.
Response:	*Additional alternative pathway discussions have been added to volume I, section 4.14.*
RC: 14.012 **Doc: CO-008/39**	Page 4-208, Paragraph 2. Internal exposures, received when radioactive materials are deposited through inhalation, ingestion, absorption, are considered minor contributors to worker doses, therefore are not considered in this document. Please define "minor."
Response:	*Historical evidence of external and internal exposures at Pantex is presented in the Pantex Plant Safety Information Document (Pantex 1996a). These exposures show that the internal exposure received by workers is typically a factor of 100 to 1000 less than the external exposure received by workers. The two to three*

orders of magnitude difference between these exposures is why it is considered to be a minor contributor to worker exposures.

RC: 14.013
Doc: CO-008/40

Page 4-207, Paragraph 2. Please list improvements/changes in work practices and scope that have been implemented to significantly reduce worker external exposure?

Response:

The As Low As Reasonably Achievable (ALARA) program implemented at Pantex Plant minimizes radiation exposure during performance of all radiological operations. Plant management and the Radiation Safety Department are constantly seeking ways to reduce exposures. As recently as January 1, 1996, exposure limits were reduced from 1 rem/yr to 900 mrem/yr for manufacturing personnel and 500 mrem/yr for the general plant population.

RC: 14.014
Doc: CO-008/41

Page 4-207, Paragraph 2. Please discuss the cumulative effects from radiological exposure, hazardous chemical, toxic releases and emissions on individual workers and the public population.

Response:

There is insufficient scientific evidence to quantify synergistic effects between radiation and chemical exposures, if any. Effects of these exposures are modeled individually using accepted scientific standards and models. The calculated effects from these exposures are shown individually to be extremely low.

Additionally, a useful measure of potential human health effects resulting from exposure to a combination of non-carcinogenic chemicals is the hazard index. Volume I, section 4.14.1.2, describes the basis and the evaluation of the hazard index for Pantex Plant. The hazard index calculation indicates that no adverse health effects are expected.

RC: 14.015
Doc: CO-008/42

Page 4-208, Paragraph 6. "Effects Screening Levels (ESLs) may be unrealistic, to state that none of the chemical concentrations exceed ESLs, therefore they are not expected to have adverse health effects to members of the public." What is the basis for this statement, when synergistic effects have not been evaluated?

Response:

See response to comment 14.014.

RC: 14.016
Doc: CO-008/43

Page 4-209, Table 4.14.1.2-1. Why are there no standards for 5 pollutants resulting from Plant sources in Table 4.14.1.2-1?

Response:

At the time the Draft EIS was produced, TNRCC had not established standards for the fixed pollutants. Since the publication of the Draft EIS, the TNRCC has published standards for Trichloroethylene and for Ketones. Volume I, Table 4.14.1.2-1 has been updated to reflect the new standards.

RC: 14.017
Doc: CO-008/44

Page 4-210, Table 4.14.1.2-1. The table lists significantly higher ESLs for several contaminants, i.e., MIK, and MEK. Please correct the inconsistencies from the table on page 4-209.

Response: *Page 4-210 was a continuation of table 4.14.1.2-1 in the Draft EIS, which began on page 4-209. The ESLs presented in volume I, section 4.14 are specific to each pollutant and are consistent with those presented in Table 4.7.1.3-4.*

RC: 14.018
Doc: CO-008/45

Page 4-210, Table 4.14.1.2-1. Please address latent cancer probability resulting from releases and/or daily operations emissions. Describe cancers not linked to radiological exposures.

Response: *The radiological emissions from normal operations are described in volume I, sections 4.14 and 4.7. Modeling has shown that the doses to the public from these releases is small (6×10^{-5} mrem/yr for a maximum offsite individual from Pantex Plant sources compared to 334 mrem/yr from natural background radiation). This dose is considered a negligible individual dose by the National Council on Radiation Protection and Measurements. The yearly cancer risk from this exposure is estimated at 3×10^{-11}. When compared with the baseline cancer risk in the vicinity of the Pantex Plant (1.7×10^{-3} per year), an individual has a much greater likelihood of incurring a cancer from sources other than Pantex Plant related emissions (e.g., from genetic predisposition, chemical exposure, diet, stress, and other sources of pollution). Cancer mortality statistics for the State of Texas are available in the Pantex EIS public information center.*

The risk of cancer from chemical exposures to a hypothetical offsite individual is discussed in volume I, section 4.14. A hypothetical individual living at the plant boundary would have an increase in lifetime fatal cancer probability of 1.2×10^{-5} from exposures to carcinogenic chemicals released from Pantex Plant.

RC: 14.019
Doc: CO-008/46

Page 4-215, Paragraph 2. The June 1994 study by the Texas Cancer Registry, TDH, focused only on cancers of the breast, prostate, brain, thyroid, and leukemia. Other radiation-associated cancers, such as bone and lung were not included. Why? What about other types of cancers? Please include or justify other types not included.

Response: *The referenced health study was performed solely by the State of Texas. However, discussion with Mr. Barry Wilson of the Texas Department of Health, Cancer Registry Division indicated that the "Study of Cancer in Selected Counties Near the Pantex Nuclear Weapons Plant" (TDH 1994) report was performed "because of a request from environmental groups and media attention." The cancers studied were specifically requested by these groups.*

RC: 14.020
Doc: CO-008/47

Page 4-215, Paragraphs 3 and 5. The epidemiologic study (Acquavella 1985) and the follow-up study conducted by NIOSH only looks at mortality ratios. Is there an on-going health surveillance, either mortality or incidence, for ex-workers of Pantex?

Response: *See discussion in section 1.3.10 of this volume regarding a planned follow-up study.*

RC: 14.021
Doc: CO-008/48

Page 4-215, Paragraphs 3 and 5. Cancer is the only health issue addressed. What about all other health problems associated with nuclear and HE materials processes? Please explain.

Response:

The risk of latent cancers is consistently the major endpoint for mortality associated with nuclear and high explosive (HE) materials processes. The reasons for this focus include:

- *Chemical hazards and impacts are analyzed in volume I, section 4.14 and are found to be small.*
- *Mortality from diseases other than cancer has not been consistently or significantly increased by radiation in human populations (BEIR V) (NAP 1990).*
- *Occupational dose limits (both for chemicals and radionuclides) are set such that deterministic effects (effects other than cancers) will not occur among adults if the dose limits are not exceeded (ICRP 1983).*
- *Genetic damage to worker progeny is not expected at exposure levels experienced at Pantex Plant (ICRP 1991).*
- *The maximum exposures to offsite individuals from potential accidents are not severe enough to cause deterministic effects (ICRP 1983).*

RC: 14.022
Doc: CO-008/49

Page 4-216, Paragraph 2. The yearly incidence rates (refer to work place injuries) measuring Pantex safety programs compares Pantex to national industries. Is this a likely scenario? Why?

Response:

The frequency of workplace injuries provides clear indication of the severity of hazards encountered by the workforce at Pantex Plant as well as the viability of Pantex Plant workplace safety programs. The frequency of work place injuries at Pantex Plant compared to other industries provides a relative comparison both between the severity of hazards encountered at these different workplaces and the viability of workplace safety programs.

RC: 14.023
Doc: CO-008/50

Page 4-217, Paragraph 2. This paragraph states that a fire limited to the interior of a facility would only cause internal releases in the room of the fire. Where would those internal releases eventually go? Wouldn't they have to go external? Please explain.

Response:

As stated in volume I, section 4.14.1 high efficiency particulate air filters installed on ventilation system exhaust ducts will limit the amount of particulate radionuclides released to the environment.

RC: 14.024
Doc: CO-008/51

Page 4-218, Paragraphs 1 and 3. When and how will OSHA regulation of worker health and safety be implemented? What will the reporting mechanisms be?

Response: *The DOE and Occupational Safety and Health Administration (OSHA) have agreed to a temporary pilot project to facilitate the shift of worker protection to OSHA. Under a temporary pilot project agreed to by the two agencies, OSHA will regulate and oversee worker health and safety at the Argonne National Laboratory in DuPage, Illinois. During the pilot, OSHA will evaluate the current safety and health program at Argonne and respond to employee complaints.*

Information obtained during the Argonne pilot project is expected to help the two agencies determine the resource needs of OSHA if it is to ultimately assume responsibility for worker safety and health at DOE facilities. While OSHA regulates and enforces worker health and safety at industrial and some government workplaces, current law exempts most DOE facilities from external regulation and enforcement. DOE internal regulations do, however, require all facilities to meet current OSHA standards.

RC: 14.025
Doc: CO-008/52

Page 4-218, Paragraphs 1 and 3. "DOE contractor operations at Pantex expose workers to hazardous constituents." Are workers fully aware of these exposures and of the combined effects to human health? Discuss in detail how workers are prepared for these exposures, consequences, and effects.

Response: *All hazardous materials at Pantex Plant are required to have a Materials Safety Data Sheet (MSDS) that describes the hazards of the material and the proper packaging, handling, and disposal of this material. All Pantex Plant employees are required to attend a hazards communication training course which trains them to read and interpret hazardous material labels and how to use an MSDS. Workers involved with specific activities such as hazardous chemicals, high explosives, and radioactive materials receive additional job-specific training.*

RC: 14.026
Doc: CO-008/53

Page 4-218, Paragraphs 1 and 3. Daily routine emissions are not reported to the public. Shouldn't workers and the public be made aware of these routine emissions for human health reasons and environmental consequences?

Response: *Daily routine emissions are reported in volume I, section 4.14.2 for radiological emissions and volume I; section 4.7.1 for hazardous chemical emissions. Responses to comments 14.025 and 14.027 describe hazard communication with workers. Documents such as this EIS and site environmental reports provide hazard communication with the public.*

RC: 14.027
Doc: CO-008/54

Page 4-219, 4.14.2.1. "The continuation of weapons-related operations at Pantex would result in the continuation of radiological exposure to plant workers." Have these workers been made aware of these health hazards? Do their families know the consequences of these health effects to themselves, also?

Response: *Radiological workers are required by federal law (10 CFR 835) to receive radiological worker training. Radiological workers are required under article 835.902 to be trained to ensure familiarization with the hazards they will encounter in the workplace. Uninvolved family members will not be exposed to radiation as a result of another family member's employment at Pantex Plant. DOE is required to provide periodic reports to personnel of their individual dosimetry readings. This keeps workers informed of the level of exposure they have received and allows plant management to move personnel (e.g., expectant mothers) away from any operations that could be potentially harmful.*

RC: 14.028
Doc: CO-008/55

Page 4-220, Table 4.14.2.1-1. The cumulative radiological doses and expected latent cancers to the public from normal operations have not been assessed. Why are these exposures not evaluated?

Response: *The radiological emissions from normal operations are described in volume I, section 4.14 of this document. Modeling has shown that the doses to the public from these releases is small (6×10^{-5} mrem/yr for a maximum offsite individual). This dose is considered a negligible individual dose by the National Council on Radiation Protection and measurements. The yearly cancer risk from this exposure is estimated at 3×10^{-11}. When compared with the baseline cancer risk in the vicinity of the Pantex Plant (1.7×10^{-3} per year), an individual has a much greater likelihood of incurring a cancer from sources other than Pantex Plant related emissions (e.g., from genetic predisposition, chemical exposure, diet, stress, and other sources of pollution).*

RC: 14.029
Doc: CO-008/56

Page 4-220, Table 4.14.2.1-1. The combined toxic chemical, radiological releases and emissions are not evaluated for workers or off-site populations. Why? Give exposure rates for both groups.

Response: *See response to comment 14.026 and discussion in section 1.3.10 regarding chemical and radiological synergism.*

RC: 14.030
Doc: CO-008/57

Page 4-221, Paragraph 4. Not all accident scenarios are evaluated. Only a subset that contribute a large fraction of the total risk from Pantex operations are analyzed. Please give reasons why all potential scenarios are not evaluated.

Response: *All potential accident scenarios were not analyzed in detail because their contribution to risk was determined to be small. It is standard practice in risk assessment to identify and discuss those risks with the greatest potential to effect human health.*

RC: 14.031
Doc: CO-008/58

Page 4-222, Paragraph 3. "For the risk significant scenarios for Pantex, the frequency and consequence assessments are performed on a site-wide rather than a facility-specific basis." What would the outcome be if assessment were facility-specific?

Response: *The risk for an individual facility would be lower because the site-wide risk is the summation of the risks of all facilities. It was the intent of the risk assessment* *to identify the total risk that the Pantex Plant poses to the surrounding communities.*

RC: 14.032
Doc: CO-008/59

Pages 4-223 and 4-224, Figure 4.14.2.1-1. On the evaluation of risk, does DOE look at all types of cancers or only those noted in the workers study of 1985? If so, why?

Response: *This assessment looked at all cancers that cause fatalities. Nonfatal cancers were not assessed. See discussion in section 1.3.10 of this volume.*

RC: 14.033
Doc: CO-008/60

Pages 4-223 and 4-224, Figure 4.14.2.1-1. What chemical and radiologic exposures are "non-involved workers" subject to? What steps are being taken to prepare these workers for unexpected health effects?

Response: *Daily routine emissions are reported in volume I, section 4.14.2 for radiological emissions and volume I, section 4.7.1.3 for hazardous chemical emissions. Radiological exposures to "non-involved" workers are discussed in volume I, section 4.14.2; chemical exposures to "non-involved" workers are discussed in volume I, section 4.14.1.2. Radiological doses during normal operations associated with future Pantex Plant activities would be well below regulatory standards established by the Nuclear Regulatory Commission and EPA and, as such, no non-stochastic health effects are expected. Hazardous chemical exposures during normal operations will be maintained below regulatory standards developed to prevent non-stochastic health effects.*

RC: 14.034
Doc: CO-008/61

Pages 4-223 and 4-224, Figure 4.14.2.1-1. The document only analyzes accidents. Please include routine emissions from normal operations.

Response: *See response to comment 14.026.*

RC: 14.035
Doc: CO-008/63

Page 4-237 - 239. The combined cumulative impacts resulting from adding the bounding alternative in the other three documents to the Pantex EIS do not fully address all health effects. Give the complete combined cumulative health impacts of all four documents. [This comment applies to all analyses.]

Response: *Combining the bounding alternatives would be useful only if the bounding alternative is chosen from all four documents. However, since it is likely that one or more of these documents would choose alternatives other than the bounding alternative, this format allows the readers and decision-makers the opportunity to combine these impacts appropriately.*

RC: 14.036
Doc: CO-008/64

Page 4-239, Paragraph 6. Please provide a schedule for additional evaluations mentioned in this paragraph.

Response: *Pantex Plant operations are continually evaluated by numerous internal and external regulators both DOE and other federal agencies such as the Defense Nuclear Facilities Safety Board. Results from these evaluations are tracked in an issues management system which ensures the findings are incorporated in the* *work practices of Pantex Plant. Additionally safety analysis reports are reviewed on an annual basis.*

RC: 14.037
Doc: HT13/39

Could you talk some about the scope of what the high explosive research program is and what the fatality rate has been over the last decade for workers who are messing around with high explosives?

Response:

Pantex Plant performs high explosive (HE) synthesis, formulation, machining, extrusion, testing, process development, and analytical operations in performing its HE research and development and production missions. The Pantex EIS Proposed Action includes the continued research and production of HE and weapons components.

On March 30, 1977, two high-order detonations of different types of HE occurred at Pantex Plant. The explosions occurred in Zone 11, Building 11-14A, Bay 8. This resulted in two immediate fatalities and ultimate fatal injuries to a third employee. At the time of the accident, Zone 11 was the plant's high explosive development area. High explosives activities in this area included remotely operated pressing, contact machining (meaning the operator was very near the work being done and was not protected in the event of an explosion), and certain support functions for high explosive operations. Contact machining with personnel present is no longer permitted at Pantex Plant.

RC: 14.038
Doc: HT13/40

So is the Pantex Plant going to be planning to experiment with new types of high explosives as we look ahead in the coming years that the site-wide is supposed to cover?

Response:

See response to comment 14.037.

RC: 14.039
Doc: HT13/43

Secondly, related to that, there's been some discussion about a fatality related to the Lawrence Livermore incident. Nan, I [thought] you said the fatality occurred at Pantex. That is not necessarily what I thought I heard Dave say, so I wish that somebody would clarify that with as much information as you fully have so that it is clear to everybody.

Response:

See response to comment 14.037.

RC: 14.040
Doc: HT13/44

I would like to clarify for everyone there were three people killed at Pantex in 1977. If I remember correctly, two of them inside the building and one of them outside the building [were] killed, so what I would like to ask is how will a document like this handle a facility at Pantex that is known to be deficient?

There is a high explosives machining facility at Pantex that has public access and public parking too close to the building, and it does not meet the plant's current standards, so how is something like that addressed in a document like this?

Response:

The facility referenced does not have public access and does not have public parking. Recently plant personnel determined that a small portion of the nearest *parking lot is slightly closer than current regulations allow. Those safety regulations establish "buffer zones" that are intended to keep noninvolved workers and the public far enough away from a high explosives facility that they would be expected to survive an accident. In the case cited, the only vehicles that are allowed to park in that area are Government vehicles driven by personnel with official business in the facility. This did not cause the facility itself to be deficient. Rather, it meant that the plant needed to take corrective action to satisfy regulatory requirements. Following the discovery, the plant personnel filed an "Occurrence Report". In accordance with the DOE policy on openness, this report was discussed at the next meeting of the Pantex Plant Citizens Advisory Board. Subsequently, the plant resolved the issue by removing that portion of the parking lot that was within the buffer zone.*

Scenario #2 analyzes accidents involving accidental HE detonation. Because of facility design and buffer zones associated with HE facilities, impacts to non-involved workers are not expected.

RC: 14.041
Doc: HT13/45

... You have a facility at Pantex that is a high explosives facility that the public can get too close to the building, and this is something that was brought before the Pantex Citizen Advisory Board a couple of months ago.

... There is a parking lot too close to the building so that people who are outside the building could be injured by an accidental explosion; that is other workers at the plant that may not be working in the facility, but they can be near that facility because the buffer zone is not appropriate.

How does a document like this handle a deficient facility?...

Response: *See response to comments 14.040 and 14.043.*

RC: 14.042
Doc: HT13/46

In theory, I want to understand how a site-wide EIS addresses a facility that is not [adequate]. Do you just do this generally? Also, when you find something specific, do you discuss it in this document in general, or do you turn it into a generalized accident scenario rather than addressing specifics?

Response: *See response to comments 14.040 and 14.043.*

RC: 14.043
Doc: HT13/47

Let me express a concern that I think is related to this, and that is why -- let's keep on this point, because I don't think Nan is quite understanding the point, which is on the high explosives facility and the parking and also related to the gaps in the doors of the Zone 12 assembly/disassembly bays, there was analysis done related to this document.

However, I believe, and I would be delighted if anybody here can point me to it, I believe that neither of those specifics, the lack of buffer zone around high explosives and the specifics of the gaps and the mitigation efforts that have been taken, neither of those things, in fact, are included in this document.

[Ms. Bergman: The doors are.]

	The discussion of the doors and gaps that were found and what was done is in this document? Where?
Response:	*During preparation of the Draft EIS, Pantex Plant personnel discovered that particular assembly/disassembly cells had larger gaps between the edges of personnel and/or equipment doors and their frames than had been analyzed in prior studies. The cumulative gaps around the personnel and equipment doors of individual cells varied, but the worst case resulted in a total gap area greater than the 42 square inches that had been analyzed in previous Safety Analysis Reports. Since the gap area affects the amount of radioactive material that can be forced out of a cell by the air pressure of an explosive accident, plant personnel immediately reported the variance and initiated an Unreviewed Safety Question. To resolve the issue, the plant immediately implemented measures to reduce the amount of high explosives and plutonium allowed in the cell and then modified the doors to close the total gap area of each cell to less than 42 square inches. Additional modifications have been designed to further close the gap area of each cell to less than 5 square inches. These modifications have been approved and funded for implementation in Fiscal Year 1997. This Final EIS includes health risk analyses of cell accidents that portray the present design basis gap area (42 square inches) and the future gap area (5 square inches). See response to comment 14.040 for discussion of the buffer zone around the high explosives facility.*
RC: 14.044 **Doc: HT13/48**	Where in this document does it specifically say that you have, in an existing high explosive facility, a parking lot that is closer to the building than what current DOE requirements are, and secondly, where in this document does it say that there were gaps around doors in virtually all of the major assembly/ disassembly bays at Pantex that were there for up to 13 years? Where are those two statements in this document?
Response:	*The buffer zone is not discussed. The problem identified has been corrected and does not change the impacts in the EIS. The door gaps are discussed as part of volume I, section 4.14, Scenario 1. See responses to comments 14.040 and 14.043.*
RC: 14.045 **Doc: HT13/49**	What computer model did you use to assess the risk associated with transporting the pits from Pantex to Manzano?...
Response:	*The ADROIT code was used to assess the risk associated with transporting the pits from Pantex Plant to Manzano; specifically, it is used to model transportation carried out in Safe Secure Tractor Trailers (SSTs).*
RC: 14.046 **Doc: HT13/53**	Perhaps I have missed it in Volumes 1 or 2 for the discussion of the tritium risk [for] current and proposed activities in Pantex. I understand during disassembly, they have to take the tritium bottles off of the weapons, and sometimes there may be trouble with the valves being open that should be closed.

I didn't see any discussion in here of the number of times that a base had to be shut down because of tritium release setting off the monitors, and I didn't see any analysis of what the health risk was from the tritium exposures that happened during dismantlement in the current report.

I didn't see any more generalized analysis of an accident that [allows] tritium to go into a water form and escape from the building. Did I miss it somewhere, or is it not in here?

I didn't say "go off consistently," but I have heard there's been a number of incidents [where] tritium has escaped from a weapon that was under dismantlement.

I didn't see any accounting of the numbers of tritium releases that have happened inside.

How many times has there been tritium released during dismantlement to this point in time?

In your bounding scenario that you have got, you are ballparking how many times that will happen as we move ahead into the future?

Do you expect there to be a subsequent tritium accident where there is tritium released?

Is it the usual 1×10^{-4} when you have already had an accident that was 1×1?

What I am suggesting in my comment is really the failure to report accurately on the accidents that have already occurred at Pantex.

The failure to really have a full discussion of the accidents that have already occurred makes the public reader of these documents be somewhat skeptical about the extremely low estimates about accidents happening and extremely low estimates of health effects from the accidents that come about.

A more full discussion of the accidents that have already occurred, I think, would have contributed to a much greater sense of public credibility and that which I think you will be encountering through the rest of this process.

Response: *Tritium is a potential health hazard for personnel engaged in weapon assembly or disassembly procedures. During these procedures, the hazard of bodily tritium uptake by plant workers potentially exists due to potential contamination of weapon components by trace leakage of tritium gas from storage reservoirs in certain weapons. Valves on tritium reservoirs are closed during dismantlement. Workers involved in these operations are monitored for tritium uptake. The tritium bioassay program is in place to track tritium uptake by weapons workers. The bioassay program is also used to track the extent of any tritium releases. In 1993, the total tritium population dose was 0.183 person-rem with a maximum individual dose of 14 mrem. In 1994, the total tritium population dose was 0.115 person-rem with a maximum individual dose of 11 mrem.*

Facilities where tritium operations are conducted are equipped with Radiation Alarm Monitoring Systems (RAMS) that provide prompt warning to plant personnel so that they can effect emergency procedures and minimize possible radiation exposures from the release of radioactive material. At times, a RAMS alarms because of system equipment failures not related to tritium releases; nevertheless, plant procedures dictate a facility evacuation anytime a RAMS is activated. Occurrence reports for inadvertent tritium alarm actuations are available in the public reading rooms in Amarillo and Panhandle. These alarm actuations do not involve tritium releases.

There is also a hazard from potential accidents involving tritium. Volume I, section 4.14, describes two risk significant accidents involving tritium: Scenario 5, Tritium Reservoir Failure from Internal Event, and Scenario 7, Multiple Tritium Reservoir Failure from External Event/Natural Phenomena. Scenario 5 involves the release of tritium as a gas and Scenario 7 involves the release of tritium as water vapor. Scenario 5 has occurred once in the past (reservoir discharge within Cell 1 in 1989); this event, with other past accidents, are described in detail in section 6.4 of the Pantex Plant Safety Information Document (Pantex 1996a). The impacts of this accident are described in section 4.7, Air Quality. The frequency of tritium releases at Pantex Plant is defined as "anticipated" and is estimated based on historical experience at approximately 2×10^{-2} releases per year at a 2,000 operational level. Mathematically, this frequency indicates a tritium release related to Scenario 5 every 100,000 operations. Even though this event is defined as anticipated does not guarantee its occurrence in the future. With adherence to procedures and proper training, Pantex Plant personnel work to minimize the likelihood of the reoccurrence of the Cell 1 tritium accident.

RC: 14.047
Doc: HT13/55

In your accident analysis, you have a puncture, so that is a puncture of one pit container, right?

Did you ever consider the possibility that there could be more than one?

Response:

Volume I, section 4.14.2.1, Scenario 6 examines the risk from plutonium release due to a forklift impact during pit handling. The physical configuration of pit containers precludes the possibility of puncture of more than one by a single forklift. The frequency of the event, however, accounts for all operations and thus considers all forklift activities.

RC: 14.048
Doc: HT13/56

What is the fire tolerance?

Response:

See discussion on Intrasite Transportation in section 1.3.8 of this volume regarding pit pyrophoricity.

RC: 14.049
Doc: HT13/58

We don't have any records about how these pits are going to hold up in the coming decade, so we need to invest multiple billions of dollars in doing research to see if problems could develop in these pits sometime in the next 10, 20, 30, 50 years. There is a lot of discussion about multiple billions of dollars going into trying to answer those questions.

Response: *See discussion on Intrasite Transportation in section 1.3.8 of this volume regarding the DOE pit surveillance program.*

RC: 14.050
Doc: HT13/59

Currently, how many of those pits in storage are actually under surveillance or actually looked at visually each year of the 12,000 whatever it is pits in storage in Pantex? How many of them are actually taken out and looked at each year? Could you give us a ballpark idea?

Response: *Historically, pits have had few problems. With 20,000 pits in storage, approximately 20 pits per year will be inspected. These pits will be from different weapons programs. Approximately 22 AT–400A containers will be tested yearly. Based on historically low problems with pits, DOE believes this surveillance program will minimize the likelihood of undetected failures.*

RC: 14.051
Doc: HT13/60

What is the length of time that the current containers have been studied to see how effective their seal has been?

So what is the track record?

The reason why I ask is the similarity between the stockpile stewardship concern about what is going to happen to plutonium in the aging pit inside a very carefully sealed weapon where there's been decades of study of humidity, moisture, air pressure, materials compatibility...

With all this study, they are still investing multiple billions of dollars, because if you get a leak inside your pit, inside your container, inside your weapon, if there is even a pinprick air hole, you can get moisture introduced inside a weapon, and the moisture can cause all sorts of problems, and oxygen, as we know, with these materials can cause all sorts of problems, but somehow, those same sorts of problems could happen with the pit in storage, could it not, if the seal on the containers is broken?

I may be wrong about this, but apart from the risk of a criticality accident, a nuclear explosion, aren't there also risks from the plutonium meld getting oxidized, and isn't the oxidized metal more mobile than the metal itself in the shape and the form of the pit? Isn't there a flammability risk for the plutonium metal as well? I [thought] I understood there were those two potential risks.

Response: *See discussion on Intrasite Transportation in section 1.3.8 of this volume regarding pit pyrophoricity.*

RC: 14.052
Doc: HT13/61

Are you saying there is no flammability risk for the pits that are in storage in the current containers?... So are you saying it is pyrophoric, meaning that it ignites on contact with air?

Response: *Plutonium in pit form is not pyrophoric. See discussion on Intrasite Transportation in section 1.3.8 of this volume.*

RC: 14.053 **Doc: HT13/62**	So if your container developed, for example, a pinprick. If the seal on the pit developed a pinprick hole or rusting crack, then the plutonium metal became oxidized from the contact with the oxygen which it wasn't supposed to have, and you had some plutonium in an oxide form inside the plutonium metal pit, and if it was exposed to air, are you saying there is no flammability risk and no dispersal risk?
Response:	*All pits are hermetically sealed within a metal clad. DOE has considered the potential for pit leakage during storage and has designed both a container and a surveillance program to minimize the likelihood of oxygen introduction into a pit. The AT-400A will provide a container within a container, the inner container having an inert atmosphere as defense-in-depth measures in addition to the pit clad. Scenario 6 examines the risk from plutonium release due to a forklift impact during pit handling. The amount of material released in this event bounds any material released from a pinprick hole. Because the plutonium pit is made of plutonium metal, most of the plutonium remains in the storage container during a forklift accident. Less than 0.6 milligrams of plutonium oxide dust would be released from the storage container.* *The possibility of intentional damage to pits within Zone 4 is minimized by an active personnel assurance program and a high level of security. DOE believes the policy, procedures, and security in place at Pantex Plant preclude the occurrence of the scenarios described by the commentor.*
RC: 14.054 **Doc: HT13/63**	If you drilled a hole, for example, through your container, then you drilled a hole through a pit, and you left it sitting out in the sun for a couple of decades, there wouldn't be any problems whatsoever with any health or safety or environmental problems with the these stored pits? Is this what you are saying?
Response:	*DOE believes the policy, procedures, and security in place at Pantex Plant preclude the occurrence of the scenario described by the commentor.*
RC: 14.055 **Doc: HT13/64**	What is the difference between a drilled hole and a pinprick hole in terms of introduction of oxygen into a part of the nuclear weapon pit that wasn't designed to have contact with oxygen?...
Response:	*All pits are hermetically sealed within a metal clad. DOE has considered this scenario and has designed both a container and a surveillance program to minimize the likelihood of oxygen introduction into a pit. The AT-400A will provide a container within a container, the inner container having an inert atmosphere as defense-in-depth measures in addition to the pit clad.*
RC: 14.056 **Doc: HT13/65**	Isn't it true that the container in which the pit is placed is multilayered, there is metal, [there] is styrofoam, and there is stainless steel? We are not talking about going through the external wall of the pit container, and then you have got the pit right there.

Response: *Design features of both AL–R8 and AT–400A are provided in volume II, appendix F.*

RC: 14.057
Doc: HT13/66

What if you puncture a pit, what happens then? How much of the pit would disperse? How would it actually get dispersed from a puncture? Would these be metal particles or oxidized?

Response: *Because the plutonium pit is made of plutonium metal, most of the plutonium remains in the storage container during a forklift accident. Less than 0.6 milligrams of plutonium oxide dust would be released from the storage container. The only pathway for release of this plutonium dust is through the opening caused by the forklift.*

RC: 14.058
Doc: HT13/67

Over what length of time would that oxidation process and dispersal process happen if you have had a puncture through a pit?

... How would the dispersal occur? Would the process of oxidation actually suspend some of these particles into air spontaneously without it having to receive further kinetic energy?

Response: *See discussion on Intrasite Transportation in section 1.3.8 of this volume regarding pit pyrophoricity.*

RC: 14.059
Doc: HT13/68

So if you, somebody, opened up 100 pits and poked holes in all of them. This kind of scenario like an internal sabotage scenario, somebody was really mad at the DOE for getting laid off from their job after serving their nation for 25 years in a job where they get picked on by the public all the time, and they went in and they opened 50 of these containers and poked holes in pits and walked out, what would the general scope of plutonium dispersal impacts be? Did I miss it somehow?

[What if this happened when] wind is blowing 50 miles per an hour?

But you have all the security around Pantex and the Kirtland base, and you don't consider that.

Response: *DOE believes that the high level of security and personnel assurance program at Pantex Plant will preclude the occurrence of the internal sabotage scenario described by the commentor.*

RC: 14.060
Doc: HT13/72

Page 5-61 of the draft statement says that each of the bunkers at Manzano has the capacity to store up to 800 pit containers in a Stage Right configuration in you slide show. Has there been a Safety Analysis Report done on storing...up to 800 pits in those bunkers?

Response: *Safety analyses have been done for similar structures at Pantex Plant. These facilities have capacities of hundreds to thousands of pits. The Manzano bunkers being considered for use provide similar or better capabilities for storage than those previously analyzed at Pantex Plant. In any case, before*

	DOE elected to move pits to Manzano, a full site-specific safety analysis report (SAR) would be developed for the proposed Manzano facilities.
RC: 14.061 **Doc: HT13/73**	Has the safety analysis report for storing pits in zone 4 at Pantex been updated since...the 1993 safety analysis report that was done at the time of the EA for interim pit storage at Pantex?
Response:	*The Zone 4 safety analysis is being updated but is not complete.*
RC: 14.062 **Doc: HT13/75**	Back to the AL–R8 which is currently being used at Pantex, that has an oxygen atmosphere, and it is not a neutral atmosphere, it is not a sealed container, am I right? You haven't put a special neutral helium in there, and you are not preventing oxygen from getting in there. It is just air, right? ... So what I would like to know is how this document accounts for not just as accident like if a forklift threw something, but a pit that has a minor flaw that you all had checked for but overlooked so that over time, years of storage, you once again have this, perhaps, pinprick sort of thing going on in a container where oxygen is present, so you have your plutonium to oxidize over time and perhaps surprise some worker when they open that canister at some later date. How does this document evaluate that kind of scenario?
Response:	*The AL-R8 pit container does not have a sealed inner container with an inert atmosphere. Additional details for the AL–R8 container can be found in volume II, appendix F. The pit itself is hermetically sealed so oxygen does not have a route to the plutonium. Pits have been monitored over time and from a storage perspective no problems have occurred. DOE has considered this scenario and has designed both a container and a surveillance program to minimize the likelihood of oxygen introduction into a pit.*
RC: 14.063 **Doc: HT13/76**	Do you stand by your earlier comment that about ten pits per year are all that are examined out of the almost 8,000? That is the number that I think are destructively tested.
Response:	*Historically, pits have had few problems. With 20,000 pits in storage, approximately 20 pits per year will be inspected. These pits will be from different weapons programs. Approximately 22 AT–400A containers will be tested yearly. Based on historically low problems with pits, DOE believes this surveillance program will minimize the likelihood of undetected failures.*
RC: 14.064 **Doc: HT13/78**	Where are the impacts, including radiation exposures, from that transfer to be discussed in the Pantex Draft EIS?

Just to clarify that you are getting information to use in the final, so there will be —this further information you are talking about will be available before the final? I am trying to figure out essentially where it fits in.

Let me say what I understood you to say so you can correct me if I misheard. You are saying that any worker exposures, radiation exposures to workers, for this transfer from the AL–R[8] to the AT–400 is covered in the overall worker exposure analysis of operations in this document?

Is the operation — is that operation, in terms of where it happens at Pantex, in terms of what facilities, et cetera, is that discussed in the document, and if so, where?

Is there a safety analysis report or other document that describes this transfer process?

I am asking you now to tell me which specific document that you are talking about.

Again, just so we are speaking the same language, those three documents that I heard you talk about are what I call the three background documents.

I don't recall, and if there are people here that know these documents better than I, that is why I am asking, I don't recall in any of those three background information documents that this transfer procedure is, in fact, described. If it is, I would like somebody who knows that to tell me, because I missed it, and I'd like to read it.

Response: *At the time the Draft EIS was written, doses from the pit repackaging operations were estimated to be within the current cumulative doses for production workers. Since, the Draft EIS was published the design of the pit repackaging facility has been changed and is under development. Because of these changes, there is likely to be additional cumulative exposure to workers at Pantex Plant. Additional exposures due to the pit repackaging operation are described in volume I, section 4.14.*

RC: 14.065
Doc: HT13/86

I want to go back to an issue that was brought up earlier about the accidents at Pantex and about supposedly deficient facilities at Pantex. I think it should be noted that [the high explosives] accident occurred nearly 20 years ago....

The practices have changed since that time. The facilities at Pantex for high explosives are extremely modern. They are the only facilities in the DOE complex that can perform this mission today without any modification. The parking lot problem is being addressed by management at the plant. It was brought up to the P[P]CAB in order to let them know that they are addressing that.

The door gap issue has been widely discussed in P[P]CAB meetings and in the community in Amarillo. I think that's been mischaracterized in the meeting tonight. I think that is being addressed by management at the plant.

I guess my comment would be both those issues have been raised in recent months concurrently with the production of this EIS, but near the end of the process at the time the draft was issued, I think it is unrealistic to expect very contemporary events that occurred near the end of the process to be addressed in this when they are really day-to-day management things that are being handled by plant management, and they are being done in concert with the P[P]CAB.

I will further comment that Pantex has an outstanding safety program. Pantex is used as a resource by employers in the Amarillo region for training information, for how to institute a safety program, and there is an extreme confidence in the safety and reliability of not only the weapons but the employers who handle those weapons at the plant.

Response:

See responses to comments 14.040 and 14.043. The two cases cited were the parking lot of the high explosives facility and the gap areas around the doors of assembly/disassembly cells. It is correctly noted that the problems were discovered by plant personnel, immediately reported to plant management, and promptly solved by plant action without accident or injury. These are success stories of how the safety program is designed to preclude accident and injury. The discussion of the door gaps is located in volume I, section 4.14, Scenario 1.

The Pantex Plant Cells are currently being operated within the safety basis defined in a Justification for Continued Operation (JCO). This JCO establishes administrative controls to minimize the consequences of a potential accident until the end objective of reducing the door gap area to 5 square inches is reached.

RC: 14.066
Doc: HT13/89

I have a request that is kind of similar to and follows along with actually both of the last two comments which related to this document, and that is that not only the history of safety practices at Pantex, but the history of safety practices at each of the alternative sites...included, because while it is not necessarily always specifically factored into your risk analysis that you do in these documents, from a public standpoint, the public is interested in evaluating the safety performance of facilities in terms of handling hazardous and radioactive materials.

There are lots of differing perceptions on the part of the public as to which facilities are safe and which facilities are dirty. The most helpful and objective way of having some analysis of that is actually having some comparative analysis of the historic practices at those various facilities so that it can be identified whether certain facilities may have a "better" or "worse" safety record.

It is not up to me or anybody else to say, "We suppose this," or, "We suppose that." There is some actual data that is released in unclassified form so that it could be available to the public, and so I would request that kind of information be done on all of the sites and included either in the document or a reference document that cites that.

Response: *The type of historic comparisons suggested cannot be realistically and meaningfully presented. The Department and its plant operators have extensive programs to identify and analyze potential accidents in order to develop techniques that both minimize the possibility of occurrence and mitigate the consequences should an accident occur. In like manner, when an accident does occur, root cause analyses are performed and changes are made to prevent recurrence. Because of these ongoing programs of safety analyses, facilities and procedures are continually improved. This means that the set of procedures and facility conditions present at any given time are likely very different from other times in history. Thus, a historical review of past accidents as an estimate of current safety is inherently flawed. This can be illustrated by the case of the explosive accident that occurred in 1977. This is the only explosive accident in the history of the plant that resulted in fatalities. The procedure that resulted in the accident was an operation in which a worker used a lathe to shape an experimental high explosive. The operator was killed in the resultant explosion, as were two other nearby personnel. Following that accident, the procedure and equipment were both redesigned to eliminate the cause of the accident. The procedure is now performed by a computer controlled robot to regulate pressure and under water to control the temperature of the process. The operator is no longer in the room when the process occurs. Thus, one cannot evaluate the safety of the current facility and its operations by the circumstances that were present in the past. Instead, safety analyses are performed by detailed examination of each step of the process—the physical and chemical characteristics of the materials and equipment used and the actions performed by humans and machines during the process. For each step of the operation, every event that could initiate an accident is systematically identified and the results of that occurrence are characterized. Motion and time studies, measurements, and historical data are used to assist in estimating how frequently an abnormal event (e.g., dropping a wrench) is likely to occur and what could occur as a result of that event. From this analysis, a calculation can be made to estimate the frequency of an accident. Then calculations are made to quantify the results of such an accident. This process results in the most scientifically defensible prediction of the risk of an accident under the actual circumstances present at the time.*

RC: 14.067
Doc: HT13/18

Also, I wish the documents in the future would at least admit that we exist. Kirtland, in 1989, when they started the fire by accident, which was an accident, said that South 14 could be the fire break. ...At that time, there were 500 homes. Now, there are probably 750 to 1,000 families who live directly east of this facility. We would like some recognition of our concerns as well as the Four Hills residents.

Response: *Range fires do occur during dry seasons in New Mexico. However, the nature of the alternative to relocate interim storage of pits to the Manzano Weapons Storage Area at Kirtland Air Force Base would result in no fire hazard. The relocated pits would be sealed in stainless steel, welded shut, Type B containers (e.g., the AT-400A) and placed in a magazine tunneled into the granite of*

Manzano Mountain. The entrance to the tunnel and the interior storage magazine would be protected by heavy steel doors. There would be no high explosives or any other combustible material present inside the storage facility. Consequently, there is nothing in the storage facility which could be a fuel to either start or sustain a fire. Likewise, the pit would be shielded from any externally initiated range fire by the steel doors, the granite of the mountain, and its own protective stainless steel container. It would not be possible to either expose or burn the pit in any credible fire scenario. Thus, while a range fire might occur in the Kirtland area, the pits in the storage facility would not be affected or contribute in any way to the consequences of such a fire.

RC: 14.068
Doc: HT13/30

We have created some problems, quote, inadvertent problems, that we dare not create. The dangers associated with these plutonium pits in or out of warheads are going to last for a long time, and it is unfortunate that we didn't have a broader public discussion about all of these issues before a decision was made to even create the 20,000 plus warheads and what these unintended consequences would be.

I certainly hope as we talk about interim storage of pits, which frankly, for better or worse, is going to be a lot longer than ten years, and this document should more clearly state that kind of along the lines, Nan, that you, in fact, said in answer to Janna's question, but I don't really see that kind of comment reflected in here, so that is the kind of change that needs to be made in this document.

Response:

It is DOE's policy to evaluate site-wide NEPA documents at least every 5 years to determine whether the existing EIS remains adequate and whether to prepare a new site-wide EIS or supplement the existing EIS (10 CFR 1021.330).

RC: 14.069
Doc: HT12/6

Yes. According to your summary report there was a calculation of potential risks of -- the citizens of Savannah are within the range of the site for getting cancer over a estimated of 50 years. Was there -- did you-all calculate the -- not only the potential release of radiation coming from the Savannah River Site, but did you-all calculate the other plants that's releasing other types of chemicals and other types of radiation or other forms of radiation in combined with that which is coming from the Savannah River Site?

Because if you haven't and you only estimated the potential risk of cancer coming from the Savannah River Site, then there may be a greater risk of low-income people getting the repercussion [effects] of what we economically are trying to benefit from the Savannah River Site.

Response:

The scope of the Pantex EIS includes evaluating the impacts of storing either 8,000 or 20,000 pits at the P-Reactor at the Savannah River Site (SRS). The EIS concluded that no adverse health effects would be expected among the general public, including minority and low-income populations, as a result of normal storage operations. Evaluating the impacts from other operations in the vicinity of SRS is beyond the scope of this EIS.

RC: 14.070
Doc: HT12/7

... Well, in my opinion, that is not fair to the citizens of Savannah because now you're only projecting what Savannah River Site. This is supposed to be a total...assessment of what's going to -- a health assessment, what's going to take place.

So not only should it be calculated, the radiation that's going to be released from the Savannah River Site,...the total impact because say, for instance, we may have a better chance if the Savannah River Site was closed down, you know, instead of adding what radiation or what contamination would be released from the Savannah River Site, we may have a better chance of having a longer life span if we would close the plant down. So if there was a total calculation along with all the other plants along with Savannah River Site, then I think there would need to be more input in the study as far as health...is concerned....

Response: *See response to comment 14.069.*

RC: 14.071
Doc: HT12/8

My concern is birth defects toward our children.... I've read in the past how different radiations...affect births, pregnancies of mothers, and I would like to know the same situation in this area.

Response: *Radiological impacts to the public (including children) from Pantex operations are discussed in volume I, section 4.14. Modeling has shown that potential doses to adults and children alike will be extremely small and as defined by the National Council on Radiation Protection and Measurements, they are negligible.*

RC: 14.072
Doc: HT12/16

I assume that's gamma. The worker at what distance for that 6 rem?

Response: *The 6-rem worker dose from a forklift puncture is primarily alpha radiation due to the inhalation of plutonium dust. This 6-rem exposure is a 50-year dose.*

RC: 14.073
Doc: HT12/21

You have done SARs on those facilities?

Response: *The Zone 4 magazines have an approved Safety Analysis Report. The SAR is currently being updated to the latest DOE Standard.*

RC: 14.074
Doc: HT12/22

[Are you] familiar with plutonium vulnerability assessment done in November of '94? It says that operations of storage activities are continuing with a -- on the basis of a BIO instead of approved safety analysis reports.

Response: *The DOE Plutonium ES&H Vulnerability Assessment (DOE 1994cc) was performed to characterize ES&H vulnerabilities. An ES&H vulnerability is defined as a condition or weakness that may lead to unnecessary or increased radiation exposure of the workers, release of radioactive materials to the environment, or radiation exposure to the public. The study of Pantex Plant, completed in July 1994, identified four potential vulnerabilities: (1) explosion* *in an assembly cell dispersing plutonium outside of the cell/facility; (2) operational accident, human error, or equipment failure causing failure of the pit cladding or pit tube; (3) lack of experience concerning design and lack of knowledge of interim storage and aging of pits and RTGs; and (4) collapse of roof over Bay 27, Building 12-26 due to natural phenomena. The report stated that all handling of disassembled nuclear explosive components and sources containing plutonium at Pantex Plant are performed by trained and qualified individuals in accordance with operating procedures. Likewise, the report concluded that facilities containing the disassembled nuclear explosive components and sources are designed to withstand adverse conditions with minimal damage or release of plutonium. While the responses to these vulnerabilities are being addressed in other documents, this EIS discusses the relevant issues through accident scenarios. The risk from vulnerability 1 is addressed in volume I, section 4.14, accident Scenario 1. The risk from vulnerabilities 2 and 3 are addressed in volume I, section 4.14, accident Scenario 6. The final vulnerability is included as part of volume I, section 4.14, Scenario 3. It should be noted that the particular facility cited as vulnerable to natural phenomena (Bay 27, Building 12-26) is scheduled to be phased out this fiscal year. The operations performed in that building will be relocated to Building 12-104A after completion of an Operational Readiness Review. In view of the nature of the vulnerabilities identified, the actions taken by the plant, and the risk analyses of those vulnerabilities in Pantex Plant Safety Analysis Reports and in this EIS, there is sufficient information on potential environmental impacts (including human health impacts) for the Secretary to proceed with a Record of Decision on storage of 20,000 pits.*

RC: 14.075
Doc: HT12/25

I think that also the other vulnerability noted for Pantex was that...Pantex is the only site, the only major plutonium site, that is identified as having a single barrier for plutonium....

Response:

All pits are hermetically sealed within a metal clad. The AL-R8 container is sealed but does not have an inert atmosphere surrounding the pit. The AT-400A will provide a container within a container, the inner container having an inert atmosphere as defense-in-depth measures in addition to the pit clad. Further information on pit container design is provided in volume II, appendix F.

RC: 14.076
Doc: HT12/29

... On page 5-33, you're talking about the worker at Savannah River health consequence and what you show...[as 4×10^{-3} to] the maximum exposed individuals. But you say the probability of a cancer from all causes to the general public is estimated to be twenty percent which implies that six of the thirty workers are going to develop cancer. Now, that doesn't sound like an insignificant consequence to me. That sounds like a significant consequence.

That's from natural causes. Let me comment that the paragraph is unclear. That's what I'm saying, okay. The paragraph is unclear. I know what it means -- what it should mean.

Response: *The text refers to the number of cancer deaths from all causes in the United States. Twenty percent of all deaths in the United States are attributable to cancer from all causes. The text has been changed to clarify the statement.*

RC: 14.077
Doc: HT12/33

Work chart is totally confusing to me. And how a dose rate of one rem per year at one meter at the surface of the trailer, why does that affect the human dose based on geography?

Response: *The dose identified refers to the expected dose rate outside of a Safe Secure Tractor Trailer carrying pits. It is used to estimate population doses along pit shipment routes.*

RC: 14.078
Doc: HT12/34

... What's the natural radiation dose?

Response: *Background radiation doses for the Savannah River Site are provided in volume I, section 5.3.2.*

RC: 14.079
Doc: HT12/35

Now, I submit Pantex has a much higher background radiation than Savannah River. Now, you do not say we ought to move it to Savannah River in order to...decrease the number of people at Pantex, did you? Get the people out of that god-awful place.

Response: *The average dose from natural background radiation to an individual in the vicinity of Pantex Plant is 334 mrem/yr. The average dose from natural background radiation to an individual in the vicinity of the Savannah River Site is 312 mrem/yr.*

RC: 14.080
Doc: CO-003/3

Any permit or plan approval for new Hanford programs/activities must be fully integrated and must comply with all State of Washington public health and safety rules and regulations.

Response: *Transition planning is described in volume I, section 5.1. Existing laws, regulations, formal agreements, and DOE orders will form the basis for transition planning and execution.*

RC: 14.081
Doc: PC-011/2

None of the draft PEIS's have adequately addressed what would happen to this area's farm and ranch economy if a significant accident releasing substantial quantities of radionuclides were to occur regardless of how well it were to be cleaned up. I think the public's perception of the contamination would be such that it would make our products unmerchantable not just for the immediately affected area, but for the entire Panhandle's products.

Response: *Perceived risks are not easily quantified. The socioeconomic impacts of such perceived risks are even more difficult to evaluate. However, a statement characterizing this potential has been added to the appropriate sections of the Final EIS.*

RC: 14.082
Doc: PC-006/2

Storage of pits at Pantex should not be [increased] until the findings of the [Plutonium] Vulnerability Assessment are resolved.

Response:

See response to comment 14.074.

RC: 14.083
Doc: PC-034/5

In Section 4.14.2.1 (page 4-219) and in Figure 4.14.2.1-1 (page 2-224), a quite classic error is made in explaining potential latent cancer fatalities. The error is to use risk estimates for exposures to large populations and to assume that applying that risk estimate to a specific group of workers allows for definitive conclusions about that group. In this example, the figure provides the correct explanation. The text is misleading and might cause confusion in the community by indicating that the 330 plant workers would suffer a certain number of cancers.

Response:

Further clarification of the interpretation of the calculated risks has been provided in section 1.3.10 of this volume.

RC: 14.084
Doc: PC-034/6

Health effects are important to understand. The section on continued operations talks about health effects for workers. A statement is made that workers would experience additional cancers.

In the figure, a different explanation is used. The statement in the figure is that an average number of cancers could occur if many groups of workers were exposed. The final statement was that the most likely outcome is zero cancers.

What is the average community member to think?

What is the correct explanation?

Response:

Further clarification of the interpretation of the calculated risks is provided in section 1.3.10 of this volume.

RC: 14.085
Doc: PC-034/7

The Department of Energy's Office of Emergency Management (NN 60) and the Office of Emergency Response (DP 23) fund the DOE's Atmospheric Release Advisory Capability (ARAC), which is housed at the Lawrence Livermore National Laboratory. ARAC's computer models, which have world-wide acceptance, have been called into service in many real-time responses to both real and potential accidental releases of radioactive material. The Three-Mile Island nuclear power plant (NPP) accident in 1978, the 1986 Chernobyl NPP disaster in the former Soviet Union, and the U.S. Air Force Titan II missile accident in Damascus, Arkansas are just a few examples. In addition, the ARAC models have been utilized in every nuclear weapons accident exercise (NUWAX), since NUWAX 79. Pantex Plant is an "ARAC Site" and is linked to the ARAC center in Livermore via a computer-to-computer connection. ARAC operators are familiar with Pantex operations and can respond in a matter of a few minutes with a computer model graphic output showing the trajectory of the plume of contamination in the event of an accident. When, an if, a real accident occurred at Pantex it would be the ARAC models and the ARAC capability that DOE would call upon to respond in real time.

... Since ARAC is funded by NN 60 and DP 23 and ready to respond to a radiological accident at Pantex, why did DOE choose to use a model like ERAD to assess consequences for this EIS?

Response: *The Atmospheric Release Advisory Capability (ARAC) is a U.S. government emergency assessment program designed to provide timely and credible assessment advisories to emergency managers for nuclear, chemical and biological hazardous releases to the atmosphere. ARAC uses a series of codes and models integrated into a coherent software system for automated communications, processing and management of both data and calculated assessment products. It uses real time meteorological data to identify populations at risk and enable mobilization for quick response. ARAC is not currently used for risk assessment purposes in a non-emergency situation to predict dose consequences.*

The ERAD code was also funded by DOE to specifically address the radiological impacts associated with an explosive dispersal. ARAC uses a portion of the ERAD code for buoyant heated explosion cloud rise formulation. The ERAD code does have the capability to use climatological data in iterative computations to predict dose consequences required in NEPA documents.

RC: 14.086
Doc: PC-034/9

... In Table 4.14.1.4-1, safety statistics for Pantex are compared to general industry, manufacturing industry and chemical industry (page 4-217).

... Since the largest industry in the Panhandle is agriculture, should not the agricultural statistics be included here?

Response: *The purpose of Table 4.14.1.4–1, in volume I, section 4.14.4, is to compare the safety statistics for Pantex Plant with industries that are similar to the operations performed at Pantex Plant. This is the reason the statistics are compared to general industry, manufacturing industry, and chemical industry rather than agricultural industry.*

RC: 14.087
Doc: PC-034/10

... Appendix D, Human Health, does very little to explain how the impact to human health are derived or calculated. This appendix is more of an explanation of the risk assessment methodology than human health.

Response: *Volume II, appendix D as well as volume I, section 4.14, Figure 4.14.2.1-1 provide detailed descriptions of the methodology followed to estimate human health impacts. Appendix D and section 4.14 discuss the estimated human health impacts associated with continued Pantex Plant operations. Both radiological and chemical impacts are described as well as other worker safety issues.*

The risk assessment methodology presented in volume II, appendix D was utilized to identify the risk dominant impacts in terms of excess cancer fatalities from continued Pantex Plant operations. The human health appendix provides *references to reports such as the BIER-V report which provides further details on the human health effects of ionizing radiation (NAP 1990).*

RC: 14.088
Doc: PC-024/4

Page S-9, right column, top of third paragraph. I suggest that the release of chlorine gas, as the dominant accident scenario, may not be accurate. If the Pantex plant was targeted in a terrorist attack, that could prove to be much worse. Another point, is that the chlorine accident may have been considered for a 10-year period, but the plutonium-239 will remain a hazard for over a quarter million years.

Response:

The paragraph addressed begins with the sentence, "The dominant accident scenario in terms of release of hazardous chemicals to the public involves a release of 408 kilograms (900 pounds) of chlorine gas from the water treatment facility." The contention here is that for accidents involving hazardous chemicals (as opposed to radionuclides or high explosives), chlorine is the risk dominant hazard. Acts of terrorism are outside of the scope of the EIS, and are considered very unlikely due to the high level of security evident at Pantex Plant.

Other risk contributors are also assessed in the EIS, so the conclusion about chlorine does not preclude risk contributions from radioactive materials and high explosives. These risk contributors are summarized in volume I, Summary.

The concern that the chlorine accident may have been considered for a 10-year period is unnecessary. The frequency calculations used in the risk assessment are independent of how long a substance remains a hazard, and it is DOE's policy to evaluate site-wide NEPA documents at least every five years to determine whether the existing EIS remains adequate and whether to prepare a new site-wide EIS or supplement the existing EIS (10 CFR 1021.330) cited in volume I.

RC: 14.089
Doc: PC-024/13

Page 5-11, Table 5.2.2.1–1, Major Sources of Radiation Exposure in the Vicinity of the Nevada Test Site. This table should be removed because it contains unnecessary information and is highly misleading in other respects. The term "Vicinity" can, and is likely to, refer to areas [that] are dozens of miles from the test site, and upwind of the test areas that are at the far side of the vast test site.

Under the heading "Other Sources," is "NTS - environmental radioactivity," which is shown to be at least 1,000 times less than any other source including global "weapons test fallout" [in] which NTS was one of the primary sources.

This EIS was supposed to conform with all the requirements set forth in the "Agencies shall insure the professional integrity, including scientific integrity of the discussions and analysis in environmental impact statements" (40 CFR1502.24).

Response:

Volume I, section 5.2, Table 5.2.2.1–1 presents the radiation environment that individuals in the areas surrounding Nevada Test Site (NTS) receive on average. The term "Vicinity" refers to the areas surrounding NTS and the members of the *public within these areas. These areas include both upwind and downwind areas from the test site.*

Nuclear tests in the atmosphere at NTS have been confined to weapons having yields below 100 kilotons. All other atmospheric nuclear testing by the U.S. were made at the Eniwetok Proving Grounds in the Pacific Ocean. The predominate source of global weapons test fallout is from atmospheric testing of megaton-range detonations by the U.S. and the U.S.S.R. during the early 60's. A relative comparison between the NTS environmental radioactivity and the weapons test fallout was not made since both are less than 1 mrem and do not contribute significantly to the radiation environment in the vicinity of NTS.

RC: 14.090
Doc: PC-024/15

Page 5-17, left column, first line. Though such an incident may result "...in no significant short-term radionuclide releases to the exterior environment," the next quarter million years might tell a different tale. The mitigation analysis of such an event should not be left to whatever kind of society follows us.

Response: *Should P-Tunnel become the preferred alternative for interim pit storage, DOE would consider performing mitigation analysis for a tunnel collapse.*

RC: 14.091
Doc: HT15/25

Under the description of the risk about plutonium on Page D-5, both [involved] workers...and the public are vulnerable to plutonium inhalation if an accident occurs that disperses it as respirable particles; for example, a fire or explosion. ...On Page D-23, there in the first column, first paragraph, it says the long-term exposure pathways and the liquid exposure pathways were not considered.

So we want to be sure, not only that you can take into accurate account types of flight and that type of thing. We want to make sure also that the consequences of [a plutonium] release on a population on-site or off-site are accurately taken into account. ...Long-term exposure [to plutonium has] to be a consideration with soil, farming, and water. ...I have certainly not done full justice to this document, but I raise these issues.

Response: *Details on alternative pathways have been provided in volume I, section 4.14.*

RC: 14.092
Doc: HT15/34

For transportation of material, the listing of the accident scenario included environmental impacts for transportation [accidents]. In the evaluation of those accidents, it wasn't included in this event tree analysis.

Response: *The human health impacts from transportation accidents are described in volume I, section 4.16.*

RC: 14.093
Doc: HT15/36

... It's really talking about the risk for inhalation of hazardous substances, as I understand the document. The risks for ingestion haven't been included in there.

The inhalation cancer risk is above the normal, except for 1.45×10^{-7}.

esponse: *The risks from ingestion of hazardous substances have not been included because the human health risk is dominated from exposures through inhalation.*

RC: 14.094
Doc: HT15/37

... What was the assigned risk bin for accidents involving Ogallala aquifer?

Response:

No accidents were identified during the preparation of the Pantex Plant EIS as capable of contaminating the Ogallala aquifer. Risk bins were for human exposures. The pathway for human exposure form the Ogallala aquifer is not a significant contributor. Additionally, several studies indicate that plutonium disposed from accidents will not reach the aquifer.

RC: 14.095
Doc: HT15/38

... We had trouble, particularly when the Ogallala [aquifer] was involved,...multiplying the risks times the frequency that would happen. ...In other words, if you're considering 10 to the minus 7 or 8 or 9, that multiplied by the likelihood of the accident occurring...reduces the significance. The problem with reducing the Ogallala [aquifer] is [that] it would be such a catastrophic event, that we'd rather not allude to the risk by the possibility of the accident occurring.

Response:

See response to comment 14.094.

RC: 14.096
Doc: HT15/39

... I understand this EIS really evaluates the future activities at Pantex and several standard alternatives. So I think that approach is valid. But it seems that if the hazardous instances were discounted...because...the constituents' concern were limited, based on that, [we're] not seeing above this particular level. Their evaluation was not carried forward.

My understanding is that the risk was posed only for inhalation pathways, [not] that that would be only added together.

Response:

The commentor's understanding of the EIS appears to be correct. However, it is unclear as to whether or not the commentor has a concern with the EIS. Further detail on alternative pathways has been added to volume I, section 4.14.

RC: 14.097
Doc: HT15/40

Model for chlorine?

Response:

The chlorine release scenarios were modeled using the Emergency Prediction Information (EPI) code.

RC: 14.098
Doc: HT15/41

Did you base the probability of the accidents occurring on the data of accidents that have occurred in the past?

Would your analysis predict that there has been as many as one fatality in the plant due to a radiological release?

What would you say the probability is, based on the data that you have, that there would be a death from the radiological release at the plant by someone working in the plant?

Based on past experience with the plants, you do not project...any fatalities from a radiological accident?

Did you estimate any probability of this occurrence base upon previous experience?

But the radiological risks were regarded as negligible; is that correct?

... if you calculated them, what was the probability that someone would incur a fatality on account of a radiologic incident, one in 10,000, one in a million?

... what did you calculate the probability to be that any worker at the factory would die as a result of a radiological release?

Response: *The accident analysis evaluated historical data in addition to Pantex Safety Analysis Reports and other published safety documents. This is represented by the fact that scenarios involving accidental high explosives detonation and tritium reserve failures caused by an internal event are evaluated as being "anticipated." This means that they are expected to occur at least once within a human lifetime.*

There have been no fatalities at Pantex Plant due to radiological releases. Also, no radiation-caused fatalities are predicted. Volume I, section 4.14, Table 4.14.4.1–1 lists the predicted number of excess latent cancer fatalities from Pantex Plant operations.

RC: 14.099
Doc: HT15/42

Have you ever heard of a case of Mr. Glen McGough? The data indicates that there actually has been a death due to a radiological accident at the plant. The exact cause of his leukemia was never exactly identified. And the court case was sealed in 1983 so that there never has been an attempt to find out if his particular death was due to a radiological release.

We've also got recent cases involving a man named John Bell who claims that his illnesses are due to a radiological release. And he also anticipates his demise soon. There may be some other cases. I have heard of a few.

In other words, without taking the actual records on people who have worked at the plant and doing anything, the probability that their deaths were in some way related to accidents that occurred in the plant, we have no reliable way of projecting how many deaths may occur in the future.

Response: *DOE has an ongoing worker health surveillance program. To date, there have been no verifiable indications of adverse health effects from employment at Pantex Plant.*

RC: 14.100
Doc: HT15/43

... Based upon the actual history of the plant, could you have calculated fatalities in the future? And if the calculations that you make indicate extremely low probability of deaths in the future from radiological release, how reliable are your calculations since what we do have, what we actually know,...indicates a vastly greater risk than [what] even you calculated.

Response: *See response to comment 14.098.*

RC: 14.101
Doc: HT15/44

... It bears some examination as to whether or not these particular cases are attributable to the fact that some of them were working at Pantex.

However, the point is that you've made a risk calculation. And in order to determine whether or not it's accurate, we need to identify cases which may be contributable. It's not so much that I fear what is current activity at Pantex. It's what I anticipate may be coming in the future if the plutonium processing occurs. And, in that case, we need to be exceedingly careful about the possibility of radiological production.

If we calculate now what may happen in the future and our calculations are inaccurate, we will probably be inclined to take a much greater risk in the future operations in the plant than we ought. I think you should give that consideration.

Response: *See discussion in section 1.3.10 of this volume regarding health effects.*

RC: 14.102
Doc: HT15/45

I think it's worth noting that in one obvious example of an industrial accident which occurred at Pantex in 1979 that resulted in fatalities, neither the plant operator nor the Federal government was willing to take financial responsibility for the consequences of the accident.

Response: *DOE provides compensation and restitution where appropriate, in accordance with the governing law and/or Presidential direction.*

RC: 14.103
Doc: HT15/49

I just need some help understanding about the consequence categories. When I looked at that, it struck me that this was an acute exposure, a one-time exposure type; is that correct, or am I misunderstanding?

Response: *Exposures from accidental releases of radioactive material are determined from the concentrations and types of material released. During the period following an accident, exposures are from direct radiation from the passing plume and from radioactive material deposited on the ground, inhalation from the plume, deposition on skin, and inhalation of resuspended ground contamination. The inhalation of resuspended contamination is calculated for the lifetime of the exposed individual. Once radioactive material enters the body, it remains there for various periods of time depending on decay and biological elimination rates. Tritium emits a weak beta particle and is biologically eliminated from the body over several weeks. Plutonium emits relatively high-energy alpha particles and is retained in the body for periods of several months to many years. This was accounted for in the EIS by calculating a committed effective dose equivalent, which is a 50-year committed dose, not an acute exposure. Obviously, when an explosion occurs, its impact apart from any associated radioactive release is limited to the timeframe of the explosion.*

RC: 14.104
Doc: HT15/50

... I just wanted to understand what we're talking about when we talk about consequences. The consequences are greatly varied depending on the material we're talking about, just as you referred to. So sometimes you say the acute exposure is probably from an explosion. But, just as we talked about previously with aircraft and the probability of a...plutonium release getting into the soil, there are materials that are toxic. ...So I'm wondering, how do they take all those factors into account?

Response: *See response to comment 14.103. Additional details on long-term pathway issues has been added to volume I, section 4.14.1.*

RC: 14.105
Doc: HT15/51

... The [exposures] through the operation of Pantex are in addition to, not other than, so as not to avoid one choice or the other. These are additions to exposure.

Response: *The exposures from Pantex Plant operations are in addition to those received from background sources. These exposures are discussed in volume I, section 4.14.*

RC: 14.106
Doc: HT15/52

... Latent cancer fatality [risk factors] are all Greek to me. Would you talk to me about that?

I'm not sure that I know what CEDE is and what it means?

Response: *Based on recommended risk factors of 0.0005 deaths per rem in the general public and 0.0004 deaths per rem for workers, a latent cancer fatality risk can be calculated based on the amount of radiological exposure. Committed Effective Dose Equivalent (CEDE) refers to radiation doses received from radionuclides deposited in organs and tissues. Once deposited in organs and tissues, radionuclides provide a continual source of irradiation. To take account of this continuing irradiation of organs and tissues that occurs after the intake of radionuclides, the CEDE is defined. The CEDE is the time integral of the equivalent dose-rate in a specific tissue following intake of a radionuclide into the body. The CEDE is usually calculated for a 50-year period.*

RC: 14.107
Doc: HT16/1

Along with that inhalation and the statement that was made in the document that DOE only addressed inhalation exposure, inhalation is the only pathway accounted for in the assessment of chemical and radiological airborne hazards from normal operations (page 4-205). Now, does this mean that there are exposure pathways of non-airborne hazards, for example, through groundwater contamination? And are these included in the analysis and where do we find them?

Response: *Detail on alternative pathways has been added to volume I, section 4.14.1.*

RC: 14.108
Doc: HT16/2

Are there other pathways and accidents that are non-normal operations? Are these included in the accident analysis?

Response: *Detail on alternative pathways has been added to volume I, section 4.14.1.*

RC: 14.109
Doc: HT16/3

The Acqua[v]ella Study I believe was referred to, the study on the workers at Pantex. Am I correct that this study compares workers to the community at large?...

Response:

The Acquavella study (Acquavella 1985) compared total and cause-specific mortality for Pantex Plant workers employed between 1951 and 1978 with expected mortalities based on U.S. death rates.

RC: 14.110
Doc: HT16/4

In the accident scenarios and analysis, it seems as though everything has to work 100 percent correctly all the time. ...Is there any built-in analysis for if something does not actually fall into place like it is supposed to?

Response:

Volume I, section 4.14.1.4 describes the mitigation features in place at Pantex Plant to prevent or minimize potential releases. These include multiple protective barriers and systems, reinforced buildings, and redundant safety features. Accident analysis begins with the premise that there has been an event in which some form of failure of the protective barriers or systems has taken place. Consequences are then calculated based on the type and degree of failure.

RC: 14.111
Doc: HT16/5

... Do you consider that there are different initiating events at different times that would cause a different sequence? And is there data that supports this claim?

Response:

For each facility and operation at Pantex Plant, DOE has developed or is in the process of developing a safety analysis report. In addition, other facility-specific safety analyses have been performed and documented. These documents were utilized to identify potential accidents at Pantex Plant. The frequency of internal (e.g., equipment failures or human errors), external (e.g., aircraft crashes), and natural phenomena (e.g., tornadoes and earthquakes) initiating events were evaluated for different facilities and operations. To bound the possible consequences, the amount of hazardous material available for release was taken to be the maximum allowed by facility limits, rather than what might be actually present.

RC: 14.112
Doc: HT16/6

... What is the Panhandle's background, as far as radiological exposure? What's the norm for the region?

From background sources 334 is the total natural [background radiation dose]?

So the 330 that you have here, is that in addition to the 334?

Response:

The natural background radiation in the vicinity of Pantex Plant results in an average dose to an individual of 334 mrem/yr. The 330 rem referred to here is the dose for all workers for ten years. Each worker is getting about 111 mrem/yr (0.111 rem/yr) in addition to the dose from background sources.

RC: 14.113 **)oc: HT16/8**	This document and, frankly, the other PEISs, don't have historic data on worker exposures at MOX fuel facilities that they're basing their projected impacts on. They don't use that kind of data. So when you come to the public and make statements like we're going to be within regulatory limits,...that doesn't have anything to do with you probabilities and your risks, because the probabilities and risks are not necessarily always related to the regulatory limits. ... I think one of the things that I would suggest is that you make clearer in the text of the document, particularly on the health issues, specifically how you're basing your analysis on historic data and where you really don't have much historic data or very limited historic data that you are, therefore, extrapolating to a 50-year CEDE or to a 10-year operational lifetime.
Response:	*DOE has made this revision in the final EIS to ensure that the basis for the dose numbers is apparent.*
RC: 14.114 **Doc: HT17/28**	My surveys of radiation and health around several different Texas nuclear facilities have impressed me with the failure of government and industry tc study the health effects of such facilities in any meaningful way. I'm happy to hear that there is another investigation of the Pantex area underwa this summer by the Texas Department of Health in conjunction with ATSTI but I believe that we need much more thorough going studies, including doo to-door surveys and follow-ups for former Pantex workers and residents c these counties.
Response:	*See discussion in section 1.3.10 of this volume regarding health effects, including the planned follow-up study by the National Institute for Occupational Safety and Health (NIOSH).*
RC: 14.115 **Doc: HT17/29**	I found it very instructive to do a simple analysis looking at all cancer mortality before the tritium accident in 1989, in which 40,000 curies were released, compared to the years after, for which I had data at the time [and] I did the analysis. And there was approximately a doubling of the cancer death rates in Carson County after the accident compared to the four years before.
Response:	*The estimated impacts of the past tritium accident are described in volume I, section 4.14 in relation to Scenario 5. The public impact from this accident is estimated at 8.0×10^{-2} person-rem. The hypothetical maximally exposed offsite individual exposure is estimated as 1.1×10^{-2} rem. This exposure would result in an increase in individual lifetime cancer probability of 5.5×10^{-6} compared with a lifetime fatal cancer probability from all other causes of approximately 20 percent for an average individual.*
.C: 14.116 **Doc: HT17/30**	A 1979 study by...a group of University of Heidelberg scientists re-examined the U.S. experiments on which allowable emissions for nuclear facilities were

based, and discovered,...in looking at the protocols of these experiments, that they were doctored from the beginning.

Soil was cooked so there were no microbes present, so the uptake of plants' radionuclides was minimized. And...the radiation was induced just before the plants were harvested, instead of into the soil from the time the plant was a seed, just as an example of the way in which science was acting to obscure the reality of radiation exposure to humans.

The German scientists concluded that the allowable emissions were too high by a factor of 100. So, I keep that in mind in thinking about the expansion of operations at Pantex.

Response: *Discussion of DOE Occupational Radiation Protection standard development can be found in 10 CFR Part 835.*

The goals of current DOE radiation protection standards are based on two basic types of radiation induced health effects: stochastic and nonstochastic. Radiation-induced health effects that do not have threshold doses are referred to as "stochastic effects." Examples include cancer and hereditary effects. The objective of the radiation protection standards is to limit the probability of stochastic effects to acceptable levels. Nonstochastic effects can only be manifested if a threshold dose is exceeded; therefore, the objective of the radiation protection standards is to maintain personnel exposure below the threshold doses in order to prevent these effects.

DOE currently accepts the assumption that there is no threshold for stochastic effects. DOE also currently accepts the linear threshold model for stochastic effects. The linear threshold model assumes that any radiation dose increases a person's risk of cancer.

RC: 14.117
Doc: HT17/31

... I noticed a study of the area around Rocky Flats by Dr. Carl Johnson of the Jefferson County Health Department, who correlated plutonium levels in the soil with cancer increases around Rocky Flats. It was a very close correlation, which was corroborated later by the DOE's own studies.

The second article I found worrisome was the contention of the University of Colorado scientist who believes that there is no way you can completely capture fine plutonium particles and prevent them from escaping into the air around plutonium processing facilities.

Given that Panhandle agriculture, the Ogallala aquifer, and the health of many area residents who I'm coming to consider close friends [are] at risk in the event of contamination by plutonium, among other radionuclides that are released in plutonium processing, I would stress that the excess cancers that Dr. Johnson found, which were leukemia, lymph, lung, thyroid, testes, and breast cancers, which paralleled the cancers found in the survivors of the Japanese atom bombs, are of concern.

And would request that no expansion of Pantex operations be considered until thorough health studies, including door-to-door surveys and follow-ups, be conducted to examine the damage that I believe may have already been done to this area by previous emissions.

Response: *See discussion in section 1.3.10 of this volume regarding the planned follow-up study by NIOSH.*

RC: 14.118
Doc: HT17/32

... The track record at Pantex does not give us great confidence that an expansion of an extremely dangerous operation could be handled with any more safety than we've experienced in the past.

Response: *DOE is committed to the safe operation of Pantex Plant, as well as the protection of the public, the environment, and the facility employees. The safety and health environment and impacts at the Pantex Plant are discussed in volume I, section 4.14. In addition, further information on Pantex Plant safety and environmental programs can be found in the Pantex Plant Safety Information Document and Environmental Information Document (Pantex 1996a, Pantex 1996).*

The As Low As Reasonably Achievable (ALARA) program implemented at Pantex Plant minimizes radiation exposure during performance of all radiological operations.

RC: 14.119
Doc: HT17/44

... We were discussing earlier the effect, possibly the health effects on farmers that do farm on the plant site itself, [whether] that has been addressed in this document or not. We would like for it to be.

I know that my husband has done some farming on the plant site. Just the other day he was combining some wheat on the plant site. That stirs up the dust, it disturbs the soil.

Response: *Soil and vegetation sampling of these areas show no levels of pollutants that would be a hazard to farmers.*

RC: 14.120
Doc: HT17/49

There has been considerable concern over the status of how the plant establishes its safety envelope, certain things like safety analysis reports that are being redone at Pantex. What is the status of updating the safety analysis reports so that you establish the safety of work for this plant?

Response: *Safety analysis reports (SARs) for Pantex Plant are being rewritten to DOE Order 5480.23. In accordance with that order, Pantex Plant has submitted a Basis for Interim Operations (BIO). The BIO includes the status of all SARs, a schedule for completion of the remaining SARs, and a summary/status of all Unreviewed Safety Questions. This report also defines the safety envelope, including compliance status. The DOE-approved BIO establishes the authorized safety basis for Pantex Plant. The latest BIO for Pantex Plant is available in the EIS reading rooms in Albuquerque and Amarillo.*

RC: 14.121
Doc: HT17/50

... I think there needs to be a description of unreviewed safety questions, or unresolved.

I don't think it would hurt at all to have a chart listing what they've been in the past year or two, what are [still] pending, where we are on that.

Response: *The Pantex Plant Programmatic Information Document (Pantex 1996b) presents a listing.*

RC: 14.122
Doc: HT17/51

What facilities are in compliance, and which ones aren't, with...DOE orders? And if there's been great change in recent history,...describe that change, that the orders were changed,...that [that] caused problems. Give it the context you want, but please give us more of the story to work with.

Response: *The Pantex Plant Programmatic Information Document (Pantex 1996b) presents a listing.*

RC: 14.123
Doc: HT17/57

The approach to human health in the draft EIS is flawed. It uses only optimistic scenarios of exposure, statistical methods that obscure potential risks and problems. Evidence used is one-sided, a very theoretical presentation which suggests more exactness in scientific knowledge than is supportable and seems designed to lend credibility where it is not necessarily due. Moreover, the theoretical approach is difficult to [wade] through. It obscures and hides assumptions and it is meaningless to public concerns, because it is removed from everyday life experience.

Response: *The risk assessment and scenario for the EIS examined a wide range of scenarios which included failures in safety systems and emergency responses. For example, scenarios involving fires typically include failures in the fire protection system and emergency fire response crews in their event sequences. Most of the scenarios that are not initiated by external events are initiated by human errors such as dropping, improper forklift handling, or failure to follow a procedure.*

Concepts of relative risk, frequency, and consequence may be both difficult to understand and removed from everyday life; however, such a theoretical approach to risk quantification is the only fair and equitable approach available. Prior epidemiological studies of Pantex Plant workers also disclose no excessive incidence of cancer at Pantex Plant. The inference from these studies is that the incremental risk to workers and the public from Pantex Plant operations are very small. Results from the more theoretical approach used in the EIS are consistent with these empirical conclusions.

RC: 14.124
Doc: HT17/59

The data are one-sided. The use of prior studies and data in the draft EIS present only one side of the scientific debate about the effects of low-level ionizing radiation.

The presentation is very lopsided. Studies not cited suggest health effects including leukemia, thyroid cancer, and multiple myeloma have been found in nuclear workers whose cumulative dose for their total working years was between 2.5 and 5 rem. On page 4-205, it is reported that the average annual dose of workers at Pantex is 111 millirem. If we take a worker who is at the plant for 25 years, then 111 millirem times 25 years is a cumulative dose of approximately 2.775 rem. This value is within the range for which health effects were observed in these studies. Moreover, if we take the Pantex control level of 500 millirem per year for most workers, 900...weapons operation workers, we get cumulative doses over a 25-year working life of 12.5 rem and 22.5 rem, respectively. These values are all much higher than the levels at which health effects are observed in these studies.

The agency should reevaluate the risk to workers from low-level radiation exposures using the risk factors reported in these studies.

Response: *See discussion in section 1.3.10 of this volume regarding the radiological risk factors.*

RC: 14.125
Doc: HT17/60

... As the scientific uncertainty highlights, the standards used by EPA, NRC, and DOE are not protective standards. They are politically negotiated standards that allow workers and communities in the vicinity of a nuclear facility to bear a higher cancer risk for the social benefits that are believed to come from the facility.

Response: *See response to comment 14.116.*

RC: 14.126
Doc: HT17/61

The Acquavella study referred to, of 1985, relies on a weak methodological approach and data sources that compares workers to the community at large. The cancer registry data are not a credible source of data for detecting radiation effects in the community surrounding nuclear facilities.

Response: *See discussion in section 1.3.10 of this volume regarding the radiological risk factors.*

RC: 14.127
Doc: HT17/62

The draft EIS relies on inappropriate data to make risk estimates and comparisons in the communities surrounding the Pantex Plant. Again, the most optimistic picture is painted with selective use of evidence and methods. More rigorous studies are needed to more effectively estimate these risks.

Response: *See discussion in section 1.3.10 of this volume regarding the planned follow-up study by NIOSH.*

RC: 14.128
Doc: PC-017/4

What studies have been made on the short-term and the long term health and safety of those of us living near the plant, agricultural workers on and around the plant, and the workers [at] the plant? Have past Pantex workers' health been studied? Have there been follow-up health studies been made on the workers? How were the health and safety studies done? When? What are the results? No decision of the future of Pantex can be made until answers to these questions are assessed. Answers can only be found after adequate studies have been made.

Response: *See discussion in section 1.3.10 of this volume regarding health effects inclusive of past, present and future health studies.*

RC: 14.129
Doc: PC-017/5

We are told the activities at the plant have no and will not have any effect or at most limited effect on the Pantex workers and on the neighbors and agricultural workers, yet studies have not been made for those conclusions. We are relatively certain that past activities have been a serious threat to both workers and neighbors. The DOE and the contractors seem very reluctant to admit to those health and safety concerns. They appear to get very upset when any instances of health and safety get out. Why? Should not the public be kept informed of such matters? If not, why not?

Response: *Each year, the Pantex Plant publishes a Site Environmental Report. It includes a reporting of all impacts to the environment and the public. The Pantex Plant Safety Information Document (Pantex 1996a), contains a listing of past accidents and events and explanations of their consequences.*

RC: 14.130
Doc: PC-017/8

Most of us cannot afford to spend anywhere near what the DOE can and does to keep from paying claims. [For] example, the John Bell compensation case in which Mr. Bell was made very ill because of uranium toxic fumes while he was drilling a uranium plug from a warhead. The DOE spent hundreds of thousands of dollars to keep from paying about a $85,000 claim.

Response: *See response to comment 14.102.*

RC: 14.131
Doc: PC-017/9

In the event of a disaster that causes damages to our agricultural products and/or land, and/or inability to market our products because of possible contamination, will the DOE pay for those damages at a fair market value in a timely manner? Will they pay willingly without our having to take them to court? Will the DOE pay us for the lose of our top soil and clean the damaged soil?

Response: *See response to comment 14.102.*

RC: 14.132
Doc: PC-017/14

Is there a greater risk to farmers who are plowing and working the soil and harvesting of crops near the site than to the general public? What studies have been done to determine the potential of greater exposure? Should not these studies be done? Is there a danger to our children playing in their [sandboxes] or their swimming pools?

Response: *See response to comment 14.119.*

RC: 14.133
Doc: PC-017/15

Page 4-104 discusses collective dose to surrounding population in a 50-mile radius. Would not [people] living next to the plant, especially those downwind be expected to receive a greater dose than someone who lives in Vega to the west, up wind, and about 40 miles away? Would not people downwind receive higher doses than those generally up wind? If not, we ask for your proof.

Response: *People downwind of a release would receive a greater dose than those upwind of a release. People closer to the site will receive a greater dose from a release than a person in Vega.*

RC: 14.134
Doc: SG-012/4

Vol. 1, page 5-65, 5.5.2 Resources Discussed in Detail, 5.5.2.1 Human Health, Impacts of Storing 20,000 pits, "The combined worker dose from unloading storage of 20,000 pits at the Manzano WSA would be 283 person-rem distributed over the 30 people directly involved material movement." If there is a collective effective dose of 283 person-rem, which is a sum of a population of 30 workers, then the average effective dose per worker is 9.43 rem. The maximum yearly allowable dose for radiation workers is 5 rem, according to DOE order 5480.11 "Radiation Protection for Occupational Workers" (1992, DOE). The projected radiation dose for these workers is in excess of the yearly allowable dose. The DEIS statement should be clarified and the calculation (inclusive of the population numbers) on person-rem provided.

Response: *The 283 person-rem projected exposure is for the transfer of 20,000 pits over an approximately 10-year time period. It is not, as the commentor suggests, a yearly exposure.*

RC: 14.135
Doc: SG-012/5

The term "person-rem" should be defined in the glossary section.

Response: *This term has been added to Chapter 10.*

RC: 14.136
Doc: SG-012/6

Vol. 1, page 5-65, 5.5.2 Resources Discussed in Detail, 5.5.2.1 Human Health, Impacts of Storing 20,000 Pits, and Impacts of Storing 8,000 Pits. Population doses and risk estimates from accidental releases are based on current populations. Pits are placed in interim storage for 20 years, for instance, and projected population growth is not reflected in the estimated doses (nor is risk) over this time period. Albuquerque has had a high increase in population in the last 20 years.

Response: *It is DOE's policy to evaluate site-wide NEPA documents at least every five years to determine whether the existing EIS remains adequate and whether to prepare a new site-wide EIS or supplement the existing EIS (10 CFR 1021.330).*

RC: 14.137
Doc: SG-012/8

Does the close proximity of the pit storage to weapons presently stored in the Manzano WSA pose an increase in potential nuclear accidents? Why would they not pose a problem?

Response: *Weapons are not stored in the Manzano Weapons Storage Area.*

RC: 14.138
Doc: FG-003/13

EPA believes that the FEIS should provide more documentation as to potential groundwater impacts should an earthquake harm the plutonium pit facility or render it inaccessible. In particular, we are concerned that DOE may have concluded that leaving the plutonium pits inside the P-Tunnel (should it collapse) may have less environmental impact than attempting to retrieve the pits from inside a collapsed P-Tunnel (due to wording in the Pantex DEIS that impacts to workers and the public from radionuclide releases would be "negligible" because the plutonium containers would be sealed inside the collapse tunnel). Additionally, potential NTS impacts to groundwater, such a scenario, were not discussed in the Pantex DEIS. We recommend that the FEIS provide more information of the depth to groundwater in the Device Assembly Facility and P-Tunnel areas and whether keeping plutonium pits in a collapsed tunnel may ultimately cause a migration of radioactivity to groundwater.

Response: *The analyses of this EIS focuses on immediate or near term effects on the environment and do not address potential impacts over hundreds or thousands of years. In this specific example, DOE has not concluded that, in the event of a tunnel collapse, pits should be left entombed rather than retrieved.*

DOE would evaluate the circumstances of any accident after it occurred to formulate the appropriate response. Since the response to each accident is highly dependent upon the actual accident that occurs and the associated immediate risks, it is not appropriate to develop detailed accident specific plans in advance. General responses to emergency conditions are contained in the Nevada Test Site (NTS) emergency preparedness plans. Should the site be selected for interim storage, those plans would be updated to include the storage activities. A search is ongoing for more data on depth to groundwater at both sites.

RC: 14.139
Doc: FG-003/16

The Pantex Summary (Table S-2) identifies the environmental impacts associated with the alternative pit storage relocation sites. For NTS, the range of potential accident scenarios are limited to two: puncture of a pit due to a forklift accident and an aircraft crash. Potential seismic hazards at NTS are not recognized in Table S-2, as they were in Volume I. We, therefore, recommend that Table S-2 be modified to recognize NTS seismic hazards. Table S-2 should also reflect seismic conditions that may exist at the proposed interim pit sites in South Carolina, New Mexico and Washington State. Modifications to Table S-2 should be incorporated into the FEIS.

Response: *As discussed in volume I, section 5.2.2.1, the human health risk from accidents at the NTS is dominated by handling accidents. The contribution to risk from seismic events is negligible. As described in volume I, section 5.3.2.1, the relative risk from earthquakes at Savannah River Site is over two orders of magnitude below the risk from a forklift accident. Volume I, section 5.4.2.1 describes the relative risk from earthquakes at Hanford Site to be negligible. As described in volume I, section 5.5.2.1, radioactive release from a Manzano storage facility would not result from an earthquake as long as the rock overburden remained intact and the doors leading to the storage facility remained closed. As identified in volume I, Summary Table S-2, the risk at all four alternative sites is dominated by a forklift accident.*

RC: 14.140
)oc: HT16/11

It just occurred to me just as I was listening to you talk about whether or not there would be less exposure if the pits were left on site rather than transporting them, and I wondered if the repackaging were not part of the long-term storage in that option if they were to be left on site. And,...if so, if repackaging is a part of the action, that would be part of the analysis also? Because it would provide the same worker exposure as taking it out of the bunkers and moving it to a new location.

Response:

Pits are planned to be repackaged into AT–400A containers no matter which alternative is chosen. The onsite transfers required for this activity are discussed in volume I, section 4.12. Onsite movements of pits differ significantly from offsite pit shipments. Because of the limited speeds for onsite transfers, the restraint procedure required for pit containers is less complex and less time consuming than the restraint procedure for offsite shipments. Because of the additional complexity of the restraint procedure, dose estimates for offsite transfers are greater than the estimates for onsite transfers.

RC: 14.141
Doc: HT16/12

... If Pantex is chosen for long-term storage, then the workers would actually be exposed to the same activity, bringing them [the pits] out of the bunkers as they would if they were taken out and moved to another location.

Response:

Onsite movements of pits differ significantly from offsite pit shipments. Because of the limited speeds for onsite transfers, the restraint procedure required for pit containers is less complex and less time consuming than the restraint procedure for offsite shipments. Because of the additional complexity of the restraint procedure, dose estimates for offsite transfers are greater than the estimates for onsite transfers.

RC: 14.142
Doc: PC-031/3

There is certainly no community health study upon which DOE can even base the assertions they make. The public, Pantex workers, and former workers deserve adequate health studies of the cumulative impact and adverse health affects resulting from combined exposures to radiological substances, hazardous chemicals, toxic releases, and daily emissions. DOE can not expect to be credible and has no basis to assert "no significant impact" until proper studies have been done.

Response:

Past, present, and future health studies involving Pantex Plant are discussed in volume I, section 4.14.1 of this document. To date, these studies indicate that there have been no significant excess cancer mortality incidences in the Pantex Plant area related to Pantex Plant operations. There have been no verifiable indicators as to any short- or long-term health impacts at the Pantex Plant Site. Public exposure to radiological effluents has conventionally been of extremely small quantity due to DOE safeguards and the nature of the missions conducted at the facility.

.C: 14.143
Doc: PC-025/71

Page 4-205. Isn't it more accurate that the majority of Pantex Plant workers receive no detectable (or observed) radiation exposures?

Response: *The commentor is correct. There is a lower limit below which radiation exposures are nondetectable from background radiation.*

RC: 14.144
Doc: PC-025/72

Section 4-14. What's the big deal with the analysis? The death rate for us all is 100 percent. In the event of a serious accident resulting in deaths, shortened life spans, loss of the Ogallala [aquifer], loss of agriculture, or other damages, what are DOE's commitments to citizens of Amarillo (and others) for the damages? Is the answer "Nothing, it was an act of god, war, the contractor was at fault?" I am serious when I ask this question—What are DOE and its contractors committed to should something go wrong? The people in Amarillo should know as well as the rest of us. Please don't answer the question with safety policy BS.... I want the answer to make the lawyers hurt a little bit from sticking their collective necks out. One hundred percent restitution? What the country can [bear]? What the lawyers can squeeze out? What the politicians can get? We the People will do what is right, just, and in the finest tradition of America? What is the insurance?

Response: *DOE would respond to immediate emergency conditions in accordance with the Pantex Plant Site emergency preparedness plans. The Department would evaluate the circumstances of any accident after it occurred to formulate the appropriate response. Since the response to each accident is highly dependent upon the actual accident that occurs and the associated immediate risks, it is not appropriate to develop detailed accident specific plans in advance. Long-term commitments in terms of clean-up levels or possible compensation would be in accordance with applicable laws, regulations, and direction by the President and Congress.*

RC: 14.145
Doc: PC-025/73

Table 4.14.2.1-2. Frequency of Scenario uses carefully chosen words like Anticipated, Unlikely, et cetera. Please include the mathematical representation in the table...for the purpose of improved clarity. Please explain where the risk of a tornado is in table 4.14.2.1-2. Where is a [lightning] strike event? It is a well known fact that one is more likely to be hit by [lightning] than winning the lottery. Isn't a release of mercury likely? What about an accidental shooting? What is the risk of an employee being killed by an automobile onsite? Where is electrocution of an employee or a construction worker? What about confined space entry problem?

Response: *Natural phenomena events include weather-related occurrences (e.g., tornadoes and severe winds) and earthquakes. They are accounted for in the accident analysis by being included as initiating events that results in a failure and release (e.g., tritium reservoir failure). In volume I, section 4.14, Table 4.14.2.1-2, natural phenomena are identified as possible initiators in Scenarios 3, 4, 7, 8, and 10. The risk from tornadoes and lightening strikes is dominated by the risk from earthquakes for all sites. The other events mentioned in the comment (mercury release, accidental shooting, automobile casualty, electrocution, and confined space entry) are not risk dominant.*

RC: 14.146
)oc: PC-025/74

Page 4-223. Should consider the Annual Risk to be calculated for the Texas Panhandle, I believe that is more representative of the Pantex area. Also consider showing the Annual Risks for Oklahoma, New Mexico, and Kansas.

Response:

The annual fatal cancer risk in Potter, Randall, and Carson Counties surrounding Pantex Plant is 1.7 x 10^{-3} LCF/year. Nationwide, the cancer risk is slightly higher. It is more appropriate to compare the Pantex Plant human health impacts with the annual fatal cancer risk in the vicinity of Pantex Plant since that is the area assessed in the EIS.

RC: 14.147
Doc: PC-025/75

In Scenario 7 on Page 4-231, how many reservoirs (or what percentage) fail during the scenario? Does the hydrogen released explode (like the Valujet oxygen problem) and propagate? What is the inventory of sympathetic explosive, flammable, and combustible material in the adjacent buildings to the vault. Any weapons in the adjacent buildings that could result in a Scenario 9 event? What about stored/moving to being stored pits that would be near the vault and result in a Scenario 8 event? Would the damaged reservoirs react like missiles? Would this result in further release from other reservoirs? If the vault is breached, are others killed due to the hydrogen gas fire and reservoir missiles? How many people would be killed by the concussion blast of the aircraft impact and flammable material explosions resulting after the crash? How many people are likely to be in the area? What documentation is available to prove all the tritium is not released in a massive explosion? The estimated number of tritium container breaches is consistent with plutonium container breaches resulting from an aircraft crash? Are the reservoirs designed stronger than the [plutonium] cans? In the event of a total release of tritium in the vault, a Scenario 8 event, and a Scenario 9 event, what is the probability and the consequence (in curies and fatal cancer probability)?

Response:

In Scenario 7, all of the reservoirs in the building are assumed to fail due to overheating. The hydrogen (tritium) release is oxidized in the flames but does not explode. The adjacent building 12-42 contains flammable and combustible materials which are ignited. These materials are the heat source that cause the reservoirs to fail. Due to the small size of the reservoirs, they would not behave like missiles.

During any aircraft crash, the number of people killed in the impact area would depend on the type of aircraft, time of impact, and typical occupancy of the structure being impacted. The assessment did not quantify the number of potential fatalities but only recognizes that fatalities would occur if such an event were to happen.

The tritium reservoirs are robust but are not designed to the same standards as the AT–400A plutonium storage container. The risk associated with an aircraft impact into 12-42 South Vault is bounded by the risk of Scenario 7 because the frequency of Scenario 7 is greater than the frequency of an aircraft impact into 12-42 South Vault.

RC: 14.148
Doc: PC-025/76

What is the concussion blast resulting from impact? What is the kill zone from the impact and the resulting fire? What is the number of plant causalities?

Response:

See response to comment 14.147.

RC: 14.149
Doc: PC-025/77

The eleven scenario analyses are flawed since [they do] not allow for multiple scenarios resulting from one initial event. As an example, many aircraft accidents involve two planes; however, this analysis looks at only one impact location. Further, a plane could lose an engine, as it breaks apart, into a weapon magazine while the remainder slams into a pit storage facility. Aircraft impact into tritium vault resulting in damage to pit and or weapon being moved and in near vicinity of ground zero.

Response:

In the Draft DOE Standard for Aircraft Crash Analysis (DOE 1996g), the probability density function, used for computing the probability that an aircraft will crash, is based on national averages of all types of aircraft crashes including incidences where two aircraft were involved. Thus, this aspect has been considered in the methodology. In terms of the debris from one crashing aircraft striking multiple facilities, the analysis includes aircraft dimensions (wingspans), building dimensions (length, width, and height) and locations, and geometric factors which allow an aircraft to impact multiple facilities. The engines possess the density and structural integrity to cause significant building damage and were modeled as the primary penetrators for the facilities of interest. The rest of the aircraft is not as capable of causing building damage to the majority of the Pantex Plant facilities included in the analysis.

RC: 14.150
Doc: PC-025/95

Accident analysis is flawed because severe weather is not analyzed.

Response:

As discussed in volume I, section 4.14.2.1, severe weather is included in the evaluation of natural phenomena event initiators.

RC: 14.151
Doc: SG-003/1

In Section 4.14.2.1 (page 4-219...) and in Figure 4.14.2.1-1 (page 2-224), a classic error is made in explaining potential latent cancer fatalities. The error is to use risk estimates for exposures to large populations and to assume that applying that risk estimate to a specific group of workers allows for definitive conclusions about that group. In this example, the figure provides the correct explanation. The text is misleading and might cause confusion in the community by indicating that the 330 plant workers would suffer a certain number of cancers.

Response:

Further clarification of the interpretation of risks has been provided in section 1.3.10 of this volume.

RC: 14.152
Doc: SG-003/2

Health effects are important to understand. The section on continued operations talks about health effects for workers. A statement is made that workers would experience additional cancers. In the figure, a different explanation is used.

	The statement in the figure is that an average number of cancers could occur if many groups of workers were exposed. The final statement was that the most likely outcome is zero cancers. What is the correct explanation?
Response:	*Further clarification of the interpretation of risks has been provided in section 1.3.10 of this volume.*

RC: 14.153 **Doc: SG-003/5**	Appendix D, Human Health, does very little to explain how the impact to human health is derived or calculated. This appendix is more of an explanation of the risk assessment methodology than human health.
Response:	*Duplicate comment. See response to comment 14.087.*

RC: 14.154 **Doc: SG-003/6**	The U.S. Department of Energy's Office of Emergency Management (NN 60) and the Office of Emergency Response (DP 23) fund the DOE's Atmospheric Release Advisory Capability (ARAC) which is housed at the Lawrence Livermore National Laboratory. ARAC's computer models, which have worldwide acceptance, have been called into service in many real-time responses to both real and potential accidental releases of radioactive material. The Three-Mile Island nuclear power plant accident in 1978, the 1986 Chernobyl disaster in the former Soviet Union, and the U.S. Air Force Titan II missile accident in Damascus, Arkansas are just a few examples. In addition, the ARAC models have been utilized in every nuclear weapons accident exercise since NUWAX 79. Pantex Plant is an "ARAC Site" and is linked to the ARAC center in Livermore via a computer-to-computer connection. ARAC operators are familiar with Pantex operations and can respond in a matter of a few minutes with a computer model graphic output showing the trajectory of the plume of contamination in the event of an accident. When, and if, a real accident occurred at Pantex it would be the ARAC models and the ARAC capability that DOE would call upon to response in real time. Since ARAC is funded by DOE Headquarters and is ready to respond to a radiological accident at Pantex, why did DOE choose to use a model like ERAD to assess consequences for this EIS?
Response:	*See response to comment 14.085.*

RC: 14.155 **Doc: SG-003/8**	Enhancement of public safety, protection of public health and the prevention of environmental degradation are crucial factors for assessing Pantex Plant mission accomplishment. Texans must be assured that these issues will receive sufficient attention prior to any decisions regarding plant operations. Thorough and complete assessment of consequence analyses to a satisfactory confidence level is required to support the decisions under consideration.
Response:	*See response to comment 14.118.*

RC: 14.156 **Doc: SG-003/9**	In the Summary, page S-9, right column, it is stated that 8.1 E-6 Latent Cancer Fatalities (LCF) per year would result from and aircraft crash into a facility with a weapons high explosive detonation. Scenario 3, described in Volume I, page 4-229 conflicts with this statement, indicating that the increased risk is 1.8 E-11

latent fatal cancers per year. Table 3.14.2.1-4 in Volume I page 4-228, Excess Cancer Fatality Risk for Scenario 3 lists 5.1 E-6. These figures need to be verified, reconciled, and, if necessary, corrected.

Response: *The accident figures have been revised and verified.*

RC: 14.157
Doc: SG-003/10

In the Summary, page S-10, left column, it states that from an aircraft crash into Zone 4 facilities, 1.5 E-6 LCF per/yr for 20,000 pits and 9.8 E-7 LCF per yr for 8,000 pits would result. Table 4.14.2.1-4, Volume 1, page 4.228, Scenario 9 lists 6.0 E-8 excess cancer fatality risk. For Zone 4 weapons storage, 6.8 E-7 LCF/yr is given on page S-10. Scenario 3 in Table 4.14.2.1-4 lists 5.1 E-6 excess cancer fatality risk. Page 4-250 lists the increase in fatal cancer risk as approximately 2.2 E-11 increase in fatal cancer risk (compared to a baseline risk of 1.5 E-3 per yr). These figures need to be verified, reconciled, and, if necessary, corrected.

Response: *These figures have been verified and have been corrected in the EIS. Scenario 9 risk estimates are dominated by a seismic event effecting Zone 12 rather than by an aircraft crash into Zone 4. The risk estimates for Scenario 3 include aircraft crashes into both Zone 4 and Zone 12 buildings. The fatal cancer risk referred to on page 4-250 of the Draft EIS is for an average individual which is obtained by dividing the risk to the entire population within the region of influence (ROI) by the number of people within the ROI.*

RC: 14.158
Doc: SG-003/13

In the Summary, Table S-1, page S-20, gives a 4 E-12 increase in fatal cancer risk, whereas in the same table, on page S-26 a duplicate entry gives 3 E-12. Volume I, page 4-229, Scenario 3 lists an increased risk of 1.8 E-11 LCF per year. Table 4.14.2.1-4, Scenario 3 gives 5.1 Excess Cancer Fatality Risk. Volume II page 4-250, right column lists 2.2 E-11 increase in fatal cancer risk (per yr). These figures need to be verified, reconciled, and, if necessary, corrected.

Response: *The entry in volume I, Summary, Table S-2 on page S-26 of the Draft EIS is not a duplicate of the entry in Table S-1 on page S-20. The entry in volume I, Summary, Table S-2 of the final EIS addresses the impact from pit storage only. The entry in Table S-1 was in error and has been corrected. The accident excess cancer fatality risks have been verified.*

RC: 14.159
Doc: SG-003/14

In the Summary, Table S-2, page S-25 right column, sixth line, between "in" and "0.04", insert "0.11 LCF and".

Response: *Agreed. The summary has been amended.*

RC: 14.160
Doc: SG-003/15

In Volume I, page 4-155, right column, the projected population in the ROI in 2055 ranges between 214,353 and 246,464. Figure 4.14.2.1-1, page 4.223 gives the ROI population of 267,107 for risk estimates. Volume II, page D-28, left column, gives the population in the ROI as 267,107 for fatal cancer estimates.

An explanation of the different populations is necessary, or one of the ROI needs to be re-named.

Response: *The region of influence (ROI) for the socioeconomic analysis is defined on page 4-155 as the four counties surrounding Pantex Plant. The ROI for the human health analysis is the offsite population within an 80-kilometer (50-mile) radius of Pantex Plant as depicted in volume I, section 4.14, Figure 4.14.1–1. The text calling out Figure 4.14.1-1 in volume I has been modified by adding the following sentence so that the ROI for the human health analysis is more clearly defined: "This circular area surrounding Pantex Plant is the Region of Influence (ROI) for the human health analysis."*

RC: 14.161
Doc: SG-003/16

In Volume I, page 4-215, right column, the statement concerning the Pantex Epidemiologic Surveillance 1994 Annual Report should be updated to indicate that the report has been released. (The 1995 Annual Report may also be available by the time the Final Report is issued.)

Response: *Agreed. The EIS reflects the release of the 1994 Annual Report.*

RC: 14.162
Doc: SG-003/17

In Volume I, page 4-223, Figure 4.14.2.1-1, fifth line from bottom, incorrectly refers to Table 4.14.2.1-3. The correct reference is Table 4.2.1.1-4. A similar error was noted in Volume II, Appendix E, page E-23, left column at the end of paragraph E.3.1.6.

Response: *Agreed. These corrections have been made in the EIS.*

RC: 14.163
Doc: SG-003/39

... The risk from ingestion of hazardous substances should also be included when calculating risk to onsite workers. The EIS only accounts for risk from inhalation.

Response: *The risk from ingestion of hazardous substances was not included because the risk to onsite workers is dominated by the inhalation pathway.*

RC: 14.164
Doc: HT17/74

Without better data from these types of analyses, large uncertainties remain embedded in the draft EIS—and these are not mentioned or addressed. These are different kinds of uncertainties than what I mentioned in #2 above. Those were scientific uncertainties. Now I am talking about uncertainties in the data. A third kind of [uncertainty occurs] in measurements (because of lack of precision in instrumentation).

Response: *A discussion of uncertainties and the method of incorporating uncertainties in the accident risk assessment is provided in volume II, section D.6.*

RC: 14.165
Doc: HT17/75

There are also inter-individual sensitivity issues to the public. For example, studies (not reported in the draft EIS) have found that prenatal x-rays, averaging between 20 mr [and] 400 mr have been found to double the risk of childhood cancer (Stewart and McMahon). Other studies have found effects from low-level radiation exposure (e.g., Kerber 1993). By the way, on page D-4 the

Agency states that "since nondestructive examination using x-rays and gamma rays is a well established industrial practice, this contribution to worker risk is negligible." It may be a well established industrial practice, but there are newer studies that suggest the risks of low-level exposure from x-rays may not be so benign—they clearly are not safe because, again, there is no safe level of radiation exposure.

Response: *The risk factors used in the EIS to estimate the health impacts of radiation exposure are obtained from the 1990 report of the National Academy of Science's Committee on the Biological Effects of Ionizing Radiation, usually referred to as the BEIR V report (NAP 1990). The studies of Drs. Alice Stewart, Brian MacMahon, and Richard Kerber were included in their assessment of the health impacts. While the risks associated with nondestructive examination are negligible, nevertheless the worker exposure from this source is accounted for in the overall worker radiation exposure.*

RC: 14.166
Doc: HT17/76

The draft EIS uses BEIR III and BEIR V reports (pages D-1 and D-2). The risk factors derived from these reports are based on the hypothetical man. Thus, they do not adequately account for inter-individual sensitivity to exposures of radiation. There is no analysis of inter-individual sensitivity in the draft EIS, except the insufficient claim that conservative numbers and scenarios are used. This is not an analysis of inter-individual sensitivity. It is a way of obscuring uncertainties—again. The DOE should recalculate risk factors using a more sophisticated analysis of inter-individual sensitivity among workers and men, women, children—it is also an issue for environmental justice. For example, the composition of the workforce at Pantex is 20 percent minority (see below for more comments about environmental justice).

Response: *The risk factors presented in the BEIR–V report have been endorsed by both national and international radiation protection organizations as the best description that can be provided at this time of the risk of cancer resulting from a specified dose of ionizing radiation. These organizations include the National Committee on Radiation Protection and Measurements and the International Commission on Radiological Protection. The risk factors utilized in the EIS have also been endorsed and adapted by other federal regulatory agencies including the Environmental Protection Agency and the Nuclear Regulatory Commission. Details of the uncertainties in these risk factors, including inter-individual sensitivity is available in the following report: BEIR–V National Research Council, "Health Effects of Exposure to Low Levels of Radiation," National Academy Press, Washington, DC, 1990 (NAP1990).*

RC: 14.167
Doc: HT17/77

The accident scenarios analysis presents the most optimistic view possible. All administrative control and safety programs are assumed to function properly at all times (e.g., air locks). Numerous examples of malfunctioning or improperly used safety and emergency response equipment and procedures, malfunctioning emergency back-up systems, human errors, et cetera have led to accidents in a variety of industries—some of them highly regulated, such as the nuclear power industry, aircraft carriers, offshore oil drilling facilities, airlines, space travel (space shuttle), et cetera. In many cases, the failures were of the type that were anticipated but they occurred in sequences or combinations that were not, or the failure rates turned out to be higher than anticipated. Many of the failures can be associated with "human reliability" issues (Tuler et al 1988, Tuler et al 1991, Tuler et al 1992, Kasperson et al 1995), and many...more.

Response: *See response to comment 14.123.*

RC: 14.168
Doc: HT17/78

In the draft EIS there is no way to know how much attention was given to human error/reliability analysis in the evaluation of accident rates or consequences. As I noted above, the document assumes that all emergency response and administrative safety programs/control function at 100 percent at all times. Can the Agency provide data to support this claim? Do they have data about the rates of incidents—human errors in different tasks that are relevant to this study? What is their definition of "recordable" (i.e., reportable) incidents? What is included in Table 4.14.1.4-1? What are the data for events which did not result in a lost worker day?

Response: *Human error/reliability was evaluated and is often the initiator for many of the scenarios addressed in the EIS. The document does not assume that all emergency response and safety systems function at 100 percent at all times. Pantex-specific data, nuclear industry data, and general industrial data were used to obtain human error rates for various tasks. Pantex Plant reports occupational injuries and illnesses in accordance with Title 29 CFR, Part 1904. As indicated in volume I, section 4.14, Table 4.14.1.4–1, not all recordable cases resulted in lost workdays.*

RC: 14.169
Doc: HT17/79

The Agency should describe in detail its safety and emergency response plans and training programs for onsite employees and for offsite personnel (including those in the transportation system). Have any analyses/evaluations been conducted on the reliability and effectiveness of response? Can they supply data about the failure rates associated with the safety and emergency response elements (mechanical and human)?

Response: *The safety and emergency response plans and training programs for onsite employees and for offsite personnel (including those in the transportation system) are voluminous, and inappropriate for verbatim inclusion in the EIS. Moreover, the conservative accident consequence assessments in the EIS ignore worker and public evacuation. Hence, details pertaining to safety and emergency response plans and training programs are not germane to the EIS human health evaluations. Failure rates associated with the safety and emergency response elements (mechanical and human) are used as the basis for the accident risk assessment in the EIS.*

RC: 14.170
Doc: HT17/80

Has the DOE completed task analyses of the high risk tasks; e.g., assembly and disassembly of pits and explosive components?

Response: *Detailed task analyses are completed on the assembly and disassembly of each weapon system. Pantex-specific data, nuclear industry data, and general industrial data were used to obtain human error rates for various tasks performed at Pantex Plant.*

RC: 14.171
Doc: HT17/81

Generally, how has the DOE studied and evaluated human error in the tasks done at Pantex?

Response: *See response to comment 14.170.*

RC: 14.172
Doc: HT17/82

In addition, the agency uses a baseline "activity level" of 2,000 assemblies, disassemblies, testings, et cetera per year. They say that the mix does not matter when calculating impacts—which I presume means risks from exposure from either incident free exposure or accident related exposure (page 3-2). There must be a failure rate in these tasks. It might be small but it is not zero. They may be initiating events for accidental exposures, or higher than normal "incident free" exposures. My question is whether there is any reason to believe that failure rates (human errors) in these tasks may be different? Is it "harder" to take a weapon apart than to put it together? I think of a bike or car, where bolts are stripped, pieces stick together, get old, et cetera. Can this happen? The mix of "activities" will probably change as dismantlement occurs. Does the Agency have disaggregated failure rate data for the different "activities" included in the operations done at Pantex? Produce the analysis showing that there are no differences in the failure rates associated with the different activities?

Response: *The mix of weapons operations refers to the relative portions of weapon assemblies and disassemblies. The risk from exposure is different between incident-free exposure and accident-related exposure.*

There are differences between assembly and disassembly. Failure rates for the specific activities involved in the assembly and disassembly of particular weapon systems are classified. Bounding failure rates for the assembly/ disassembly process were obtained from Pantex Plant safety documents.

RC: 14.173
Doc: HT17/83

Finally, I began this part by saying that the accident scenarios are all optimistic scenarios in the sense that no (or no significant) exposures result. The Agency should go through the exercise and show us what might be the effects of accidents that are not controlled perfectly—what might be exposure pathways, exposure levels, and health effects of such a scenario? Even if the possibility is small, we would like to see what the consequences are.

Response: *See response to comment 14.123.*

RC: 14.174
Doc: HT17/84

As you say, risk is the product of probability of occurrence and magnitude of consequences. What if worker exposure occurred because contamination did escape from air locks?

Response: *Consequences to involved and uninvolved workers are provided in volume I, section 4.14.*

RC: 14.175
Doc: HT17/85

What accidents have occurred at the plant? As shown in Table 4.14.1.4-1, what were these accidents? Can the DOE provide us with descriptions and any results of post-accident evaluations (including the methods of evaluation)? What worked well in containing them, and what did not? In other words, what features of the accident were not anticipated to occur together or with high frequency?

Response: *The Pantex Plant Safety Information Document (Pantex 1996a) provides additional information on the accidents, incidents and off-normal or unusual occurrences at Pantex Plant. This information provides the basis for Pantex-specific accident and failure rates.*

RC: 14.176
Doc: HT17/86

There is no system of community monitoring for contamination offsite? There is an implicit assumption that releases will only occur in controlled areas [or] that detection devices will observe every possible release. This does not seem to be a valid assumption.

Response: *Onsite monitors are placed to detect contaminates before offsite impacts occur. Soil sampling is ongoing to detect historical contamination.*

RC: 14.177
Doc: HT17/87

There is no analysis (as far as I remember right now) of synergistic effects among radiation exposures and chemical exposures and among chemical exposures with different types of contaminants. The DOE should deal with this issue in the EIS, citing and evaluating studies that address synergistic effects of chemical exposures of different types. What analysis have they done to justify a claim that this is not a significant issue?

Response: *See discussion in section 1.3.10 of this volume regarding chemical and radiological synergism.*

RC: 14.178
Doc: HT17/88

The DOE only addresses inhalation exposure. But this is a bit confusing. "Inhalation is the only pathway accounted for in the assessment of chemical and radiological AIRBORNE hazards from normal operations" (pg. 4-205). Does this mean that there are exposure pathways of non-airborne hazards? For example, through groundwater contamination? Are these included in the analysis anywhere? Likewise, are there other pathways in accidents (non-normal operations)? Are these included in the accident analyses? How? What data do you have to support the claim that airborne hazards and inhalation exposure is the only significant pathway?

Response: *Additional details on long-term pathway issues have been added to volume I, section 4.14.1.*

RC: 14.179
Doc: CO-005/6

The entire approach to human health in the draft EIS is flawed. We are being asked to comment on a document which seems to be driven by the goal of reassuring the public that there are no health risks associated with the Pantex Plant. It uses only optimistic scenarios of exposure, statistical methods that obscure potential risks and problems, evidence used is one-sided, a very theoretical presentation which suggests more exactness in scientific knowledge than is supportable, and seems designed to lend credibility where it is not necessarily due.

Response: *See response to comment 14.123.*

RC: 14.180
Doc: CO-005/7

Moreover, the theoretical approach is difficult to wade through—it obscures and hides assumptions and it is meaningless to public concerns because it is removed from everyday life experiences (e.g., pg. D-2, brief attempt to explain individual risk in terms of latent cancer fatalities).

Response: *See discussion in section 1.3.10 of this volume regarding radiological risk factors.*

RC: 14.181
Doc: CO-005/8

The data are one-sided. The use of prior studies and data in the draft EIS present only one side of a scientific debate about the effects of low-level ionizing radiation. The [presentation is] very lopsided. Studies not cited suggest that health effects, including leukemia, thyroid cancer, and multiple myeloma, have been found in nuclear workers whose cumulative dose for their total working years was between 2.5 [and] 5 rem (Geiger et al 1992; Gilbert 1994; Kendall 1992; Kneale 1993; Wing 1991).

Response: *See discussion in section 1.3.10 of this volume regarding radiological risk factors.*

RC: 14.182
Doc: CO-005/9

On page 4-205 it is reported that the average ANNUAL dose to workers at Pantex is 111 mrem. If we take a worker who is at the plant for 25 years, then 111 mrem x 25 years = a cumulative dose of approximately 2.8 (2.775) rem. This value is within the range for which health effects were observed in these studies. Moreover, if we take the Pantex control level of 500 mrem/year for most workers and 900 mrem/year of weapons operation workers we get cumulative doses over a 25-year working life of 12.5 rem and 22.5 rem, respectively. These values are all much higher than the levels at which health effects were observed in these studies.

Response: *See discussion in section 1.3.10 of this volume regarding radiological risk factors.*

RC: 14.183
Doc: CO-005/11

Moreover, as the scientific uncertainty highlights, the standards used by EPA, NRC, and DOE are not protective standards. They are politically negotiated standards that allow workers and communities in the vicinity of a nuclear facility to bear a higher cancer risk for the social benefits that are believed to

	come from the facility. These standards should not be used to suggest that there are safe doses of radiation—there are NO safe doses of radiation. This is a commonly agreed point at this time in the scientific community.
Response:	*See response to comment 14.116.*
RC: 14.184 **Doc: CO-005/12**	The Aquavella 1985 Study relies on a weak methodological approach and data sources (e.g., it compares workers to community at large). The critiques of this study are discussed in more detail in Dead Reckoning by Geiger et al 1992.
Response:	*See discussion in section 1.3.10 of this volume.*
RC: 14.185 **Doc: CO-005/13**	More about one-sided data. Cancer registry data are not a credible source of data for detecting radiation effects in communities surrounding nuclear facilities (Sage 1994). This is a study that was done by Michael Sage, Director of CDC/ATSDR. Cancer registry data in Texas are discussed in the draft EIS on page 4-215.
Response:	*Cancer risk data for the communities surrounding Pantex Plant were used to provide a relative risk comparison between the cancer risks posed by operations at Pantex Plant and the cancer risks from other causes. The effects of radiation exposure are modeled on national and international recommendations.*
RC: 14.186 **Doc: CO-005/14**	The draft EIS relies on inappropriate data to make risk estimates and comparisons in the communities surrounding the Pantex plant. Again, the most optimistic evidence and methods. More rigorous studies are needed to more effectively estimate risks—better exposure assessments, assessment of historical releases, and exposure pathways.
Response:	*See response to comment 14.185.*
RC: 14.187 **Doc: CO-005/15**	The draft EIS uses BEIR III and BEIR V reports (page D-1 - D-2). The risk factors derived from these reports are based on the hypothetical man. Thus, they do not adequately account for inter-individual sensitivity to exposures of radiation. There is no analysis of inter-individual senstivity in the draft EIS, except the insufficient claim that conservative numbers and scenarios are used. This is not an analysis of inter-individual sensitivity. It is a way of obscuring uncertainties--again. I would direct the Agency to a growing body of research literature on ways to address inter-individual sensitivity. The agency should recalculate risk factors using a more sophisticated analysis of inter-individual sensitivity. This is not just necessary for inter-individual sensitivity among workers and men, women, children--it is also an issue for environmental justice. For example, the composition of the workforce at Pantax is 20% minority.
Response:	*See response to comment 14.166.*
RC: 14.188 **Doc: CO-005/16**	Describe in detail the safety and emergency response plans and training programs for onsite employees and for offsite personnel (including those in the

	transportation system). What analyses/evaluations [have] been conducted on the reliabilty and effectiveness of response? Can DOE supply data about the failure rates associated with the safety and emergency response elements (mechanical and human)?
Response:	*See response to comment 14.169.*
RC: 14.189 **Doc: CO-005/17**	Have you completed task analyses of the high risk tasks; e.g., assembly and dissassembly of pits and explosive components? Generally, how has DOE studied and evaluated human error in the tasks done at Pantex?
Response:	*See response to comment 14.170.*
RC: 14.190 **Doc: CO-005/18**	The accident scenarios are all optimistic scenarios in the sense that no (or no significant) exposures result. Go through the exercise and show us what might be the effects of accidents that are not controlled perfectly—what might be exposure pathways, exposure levels, and health effects of such a scenario? Even if the possibility is small, we would like to see what the consequences are. In your words risk is the product of probability of occurrence and magnitude of consequences. What if worker exposure occurred because contamination did escape from air locks? What accidents have occurred at the plant? What were these accidents as shown in Table 4.14.1.4-1? Provide us with descriptions and any results of post-accident evaluations (including the methods of evaluation). What worked well in containing them, and what did not? In other words, what features of the accident were not anticipated to occur together or with high frequency?
Response:	*Duplicate comment. See response to comment 14.167.*
RC: 14.191 **Doc: CO-005/19**	There is no analysis of synergistic effects among radiation exposures and chemical exposures and among chemical exposures with different types of contaminants. We ask that this issue be included in the EIS, citing and evaluating studies that address synergistic effects of chemical exposures of different types. What analysis have been done to justify a claim that this is not a significant issue?
Response:	*See discussion in section 1.3.10 of this volume regarding chemical and radiological synergism.*
RC: 14.192 **Doc: CO-005/20**	The agency only addresses inhalation exposure. But this is a bit confusing. "inhalation is the only pathway acounted for in the assessment of chemical and radiological AIRBORNE hazards from normal operations" (page 4-205). Does this mean that there are exposure pathways of non-airborne hazards? For example, through groundwater contamination? Are these included in the analysis anywhere? Likewise, are there other pathways in accidents (non-normal operations)? Are these included in the accident analyses? How? Provide the data to support the claim that airborne hazards and inhalation exposure is the only significant pathway.

Response: *Details on alternate pathways have been added to volume I, section 4.14.1.*

RC: 14.193
Doc: PC-025/20

Also wetlands should be identified for the same reason. Like children and the elderly, aren't wetlands sensitive areas requiring analysis? Since Pantex playas are points of recharge to groundwater, under an accident scenario, would not 1,000 playas in the ROI pose a significant pathway to the groundwater? If an accident occurred, what is the maximum amount of plutonium, risk to the public, and other impacts to the groundwater from the playa pathway? What is the impact if all groundwater in the ROI becomes contaminated with trace amounts of plutonium? Where are the nearest dairy cows? Should that be discussed due to high risk pathway to small children?

Response: *Additional detail on alternative pathways has been added to volume I, section 4.14 of this document.*

3.15 Aircraft Accidents

RC: 15.001
Doc: HT05/6

... On the airplane accident scenario, was that scenario based on the flight paths now? Or did you take into effect that the flight paths could be changing when they get a new radar system out there at the Amarillo airport?

Will that show up in the final analysis, the final draft?

Response:

See discussion in section 1.3.11 of this volume.

RC: 15.002
Doc: HT05/7

I've heard that Delta [Airlines] no longer flies into Amarillo and that American Airlines has down-sized the aircraft that they're using. Does this have an impact on the numbers that you have provided? Is it being considered in future iterations of the model or what?

Response:

To our knowledge, a Delta Airlines shuttle continues to fly into Amarillo. Continental Airlines discontinued service into Amarillo. American Airlines used to fly MD-80s into Amarillo, but discontinued these in favor of Fokker 100s. This information will be accounted for in the RAMS data, but not necessarily in the FAA airport operations data because of the four categories this data is broken into. That is, although American Airlines replaced the MD-80s with Fokker 100s, they still constitute Commercial Air Carriers. The only difference that will be seen in the FAA data is whether or not American Airlines increases or decreases its flights per day into and out of Amarillo. Future iterations of the calculation will take this into account.

RC: 15.003
Doc: PC-021/1

It is implied that the probability of an aircraft hitting a facility would be unacceptable if it exceeded 10^{-7}. DOT (FAA) Aircraft Systems Safety Analyses tend to place events with probabilities greater then 10^{-7} in the category of "improbable" and require that such an event not create any hazard. If the probability is the range, 10^{-9}, it is considered "highly improbable" and the event may result in a hazard but no loss of life. An event of probability, 10^{-13}, is considered "extremely improbable." No event that would be considered as "catastrophic" or resulting in the loss of life may exceed this order of magnitude in probability of occurrence. Since the perforation of or the scabbing of a structure containing nuclear weapons material is considered as having the potential for causing an explosion, this event must be considered as "catastrophic."

Response:

The value of 10^{-7} has been chosen by the DOE as a bounding value for aircraft accident analysis. The selected frequency categories used in the Pantex EIS are as follows:

- *Anticipated ($x \geq 10^{-2}$ per year)*
- *Unlikely (10^{-2} per year $> x \geq 10^{-4}$ per year)*
- *Extremely Unlikely (10^{-4} per year $> x \geq 10^{-6}$ per year)*
- *Not reasonably foreseeable (10^{-6} per year $> x$)*

It can be seen that the value of 10^{-7} is on the fringes of the "not reasonably foreseeable" range. However, for conservatism, this value was used as a boundary. In the context of the Appendix E text, the value of "$>10^{-7}$" implies falling into one of the above four ranges. Also see discussion in section 1.3.11 of this volume.

RC: 15.004
Doc: PC-021/2

The characterization of mode of operations is much improved over that in the original analysis, though I do have some question regarding the relative values of γ. I find it somewhat surprising that the value for military aircraft is lower than that for commercial aircraft. This is particularly troubling since fighter, attack, and training aircraft tend to have a somewhat higher overall accident rate.

Response:

The analysis used for the Pantex Draft EIS aircraft accident analysis was that contained in the Draft DOE Standard (DOE 1995z) for "Accident Analysis for Aircraft Crash into Hazardous Facilities." The values used for the analysis came directly from this document. The values of γ are part of the Solomon model which has been eliminated in its use in the Final EIS. In-flight aircraft were analyzed using the new non-airport model.

RC: 15.005
Doc: PC-021/3

The impact angle used in the analysis is 15 degrees. This approach ignores the possibility of higher angle impacts such as those demonstrated by the United Airlines Boeing 737 in Colorado Springs, the US Air Boeing 737 in Pennsylvania, the American Eagle ATR72 in Indiana, and more recently, the Valujet DC-9 in Florida. (Incidentally, at least three of these accidents occurred during the "in-flight" phase of flight.)

Response:

See discussion in section 1.3.11 of this volume. Additionally, the Final EIS uses guidance provided by the Draft DOE Standard (DOE 1996g) on aircraft crashes. This Standard uses even more conservative impact angles of five to seven degrees dependent on the flight mode and aircraft category. It should also be noted that the structural penetration calculations included aircraft striking the structures via skidding into the walls as well as direct hits onto the roofs. Direct high impact angle hits represent a small fraction of the risk.

RC: 15.006
Doc: PC-021/4

General aviation turbojets have wingspans of up to 90 feet.

Response:

The range of values listed in Table E.2.2–1 of volume II of the Draft EIS came directly from the Draft DOE Standard (DOE 1995z) for "Accident Analysis for Aircraft Crash into Hazardous Facilities." This value does not significantly affect the analysis results since the average weighted representative wingspan for aircraft near Pantex was used, and maximum wingspans were used for the other candidate storage sites. The Draft DOE Standard (DOE 1996g) wingspans are listed in Table E.2.2–1 of the Final EIS.

RC: 15.007
Doc: PC-021/5

I question the accuracy of the stated equation for the speed of sound in soil. This is stated as:

$C_s = \{(E_s \cdot g) \div \rho\}^{0.5}$ where

C_s = the speed of sound in soil (ft/sec)

E_s = the modulus of elasticity of soil = 470,000 lb/ft^2

ρ = the density of soil = 130 lbs/ft^3

g = the acceleration due to gravity = 32 ft/sec^2 (actually, g = 32.174 ft/sec^2)

Using these values, I calculate the speed of sound in soil to be 340 ft/sec. I find this to be quite low in light of the Sea Level, ISA value for the speed of sound in air (1,116 ft/sec). Unfortunately, I do not have ready access to references regarding the values of E_s and ρ.

Response:

Using the values provided, the speed of sound in soil does result in a value of 340 ft/sec. An independent source was reviewed for application of the speed of sound in soil and it indicated that the speed of sound in soil was approximately 39 percent of that in air. This value is dependent on the type of soil but shows the above overburden equation referred to by the commentor is applicable.

RC: 15.008
Doc: PC-021/6

It should be noted that the 4,800 feet Mean Sea Level (MSL) ceiling for the prohibited airspace over the Pantex Plant equates to approximately 1,200 feet Above Ground Level (AGL).

Response:

This has been corrected in the Final EIS.

RC: 15.009
Doc: PC-021/7

It is stated that helicopters have been omitted as a hazard "because they are forbidden from flying in the airspace over Pantex Plant and have little potential to penetrate facilities of interest." This is an incorrect statement. Helicopters are prohibited from operating over the Pantex Plant at altitudes of less than 4,800 ft MSL. They are free to overfly the plant at higher altitudes. Further, some helicopters operate at extremely high weights and flight speeds. For example, let me submit the Sikorsky MH-53.

Response:

According to information obtained from the Amarillo Tower, helicopters are prohibited from flying over the Pantex Plant at altitudes less than 4,800 MSL (1,200 AGL). The only exception to this rule is the Southwestern Public Service (SPS) helicopter which does powerline inspection and maintenance. However, they must call the Tower for permission to do so. Information obtained for the Draft EIS was incorrect, and as a result helicopters were not considered in the Draft EIS. Helicopters have been included in the Final EIS aircraft analysis.

RC: 15.010
Doc: PC-021/8

There is a typographical error in which the Saab SF340 is referred to as the SF34.

Response: *In reading aircraft data from the RAMS data, some aircraft designators are abbreviated. It is our understanding that the SF340 and the SF34 are the same kind of aircraft. The text has been modified in the Final EIS to read SF340.*

RC: 15.011
Doc: PC-021/9

What category of operation do test flights by aircraft from the modification and maintenance facilities at Amarillo International Airport fall under?

Response: *See discussion in section 1.3.11 of this volume. These flights are included in the RAMS data and are included in the FAA data as part of the takeoff and landing operations at the Amarillo International Airport.*

RC: 15.012
Doc: PC-021/10

RAMS data from 25 days in May 1995 were used to determine the spectrum of overflights on each high-altitude jetway. Since this data is recorded by computer, why was the sample only 25 days? What was the reasoning behind the choice of May 1995? Was this period truly representative, or was this selection made as a means of weighting a particular result? Seasonal changes in both air traffic and preferred routings could result in different answers.

Response: *At the time the analysis was completed for the Draft EIS, high-altitude RAMS data from 25 days in May 1995 was all that was available. The non-airport model in the Draft DOE Standard (DOE 1996g) does not require this data.*

RC: 15.013
Doc: PC-021/11

Are stated distances to airways the distances to the airway centerline or to the edge of the airway. In general, federal airways extend 4 nautical miles to either side of the centerline. As they are defined by the VORTAC's, at some distances they may be somewhat wider than this minimum value.

Response: *The distances given are from the centerline of the airways to each of Zones 4 and 12. Airways are not considered in the Final EIS analysis.*

RC: 15.014
Doc: PC-021/12

All commercial operations from Runway 04 were assumed to be bound for Dallas on the 105-degree airway. What about test flights from the maintenance and modification facility located [at the] Amarillo International Airport?

Response: *This conservative assumption was based on information obtained from the Amarillo Tower concerning the trend of aircraft taking off on Runway 04 to follow routes bordering the plant along Highways 60 and 683. With the issuance of the new Draft DOE Standard (DOE 1996g), there is no consideration of airways, so this assumption is not needed. See discussion in section 1.3.11 in this volume. The test flights are included in the RAMS data and are included in the FAA data as part of the take-off and landing operations at the Amarillo International Airport.*

RC: 15.015
Doc: PC-021/13

Again, I am surprised that the value of γ for military aircraft, particularly the small sub-category, is lower than that for air carriers. Again, combat and training aircraft tend to have a higher accident rate than airliners.

Response: *The analysis used for the Pantex Draft EIS aircraft accident analysis is that contained in the Draft DOE Standard (DOE 1995z) for "Accident Analysis for Aircraft Crash into Hazardous Facilities." The values of γ are part of the Solomon model which has been eliminated in its use in the Final EIS. In-flight aircraft were modeled using the new non-airport model contained in the Draft DOE Standard (DOE 1996g).*

RC: 15.016
Doc: PC-021/14

[The] general aviation turbojet wingspan is too small. Examples of up to 90 feet are easily found, especially in the ranks of new products.

Response: *The values listed in Table E.3.1.4–2 of volume II of the Final EIS are both Draft DOE Standard (DOE 1996g) and average weighted representative wingspans for aircraft flying around Pantex Plant.*

RC: 15.017
Doc: PC-021/15

Airliner landing skid distance is given as 1,860 feet while general aviation turbojet landing skid distance is quoted as 37 feet. The landing speeds of both classes of aircraft are comparable so the skid distance must be treated as comparable. In fact, any general aviation aircraft that only skids 37 feet must have either been moving very slowly or impacted something very solid. With a 15-degree impact angle, this is unrealistic and misleading.

Response: *The values listed in Table E.3.1.4–2 of volume II of the Draft EIS came directly from the Draft DOE Standard (DOE 1995z) for "Accident Analysis for Aircraft Crash into Hazardous Facilities." They have been updated in the Final EIS per the latest version of the Draft DOE Standard (DOE 1996g).*

RC: 15.018
Doc: PC-021/16

Impact velocities stated in table are unrealistic. A general aviation turbojet moving as slowly as 152 ft/sec (90 knots) is indeed in serious trouble. These aircraft are fully as fast as airliners and many military aircraft. If an airliner can impact the facility at 422 ft/sec (250 knots), it must be assumed that general aviation turboprops and turbojets can as well. These aircraft are certified to the same regulations (FAR Part 25) as air transports and tend to operate in a similar manner.

Response: *The values listed in Table E.3.1.4–7 of volume II of the Draft EIS came directly from support material for the Draft DOE Standard (DOE 1995z) for "Accident Analysis for Aircraft Crash into Hazardous Facilities." They have been updated per the latest version of the Draft DOE Standard (DOE 1996g). This support material is listed in the references at the back of Appendix E.*

RC: 15.019
Doc: PC-021/17

Stated probabilities for damage exceed guideline maximum by two orders of magnitude.

Response: *The probability of damage is thus in the "extremely unlikely" range. The guidelines quoted by the commentor are FAA guidelines. This analysis used guidelines provided by the Draft DOE Standard (DOE 1996g).*

RC: 15.020
Doc: PC-021/18

As you can see, there are still a rather large number of inaccuracies in the analysis. I recognize that the Aircraft Accident Analysis has been performed in accordance with the guidelines presented in the Draft DOE Standard, "Accident Analysis for Aircraft Crash into Hazardous Facilities." However, it is my contention that this methodology itself is still lacking in a number of areas.

Response:

The Draft DOE Standard (DOE 1996g) is in the process of being finalized. Based on the concerns raised at several of the public meetings, it has been revised accordingly.

RC: 15.021
Doc: PC-021/19

I cannot dispute the contention that the likelihood of an aircraft crashing into a facility containing nuclear material is remote. My question for you now is, what if the unlikely happens? If a light aircraft impacts an earth berm-protected igloo after sliding off most of its speed, the answer is most likely "nothing." Alternatively, if the aircraft is large and/or impacts the structure at a high velocity, the potential exists for a catastrophe of tremendous proportions.

Response:

While it is true that a large aircraft has the potential to damage a facility, this does not necessarily result in a release of radioactive materials since many of the critical Pantex structures have super stout construction and earth overburden. However, in the structural analysis methodology, consideration of super stout structures, using the given equations, results in a conservative structural assessment. See volume I, section 4.15.7, for a discussion of additional levels of conservatism in the Final EIS.

RC: 15.022
Doc: PC-021/20

Moreover, the analysis only predicts the probability of and partial damage potential of an accident. No attention is given to the scenario of an intentional crash into the facility by a suicidal pilot. Where once this would have been unthinkable, the events of recent years have shown that the unthinkable can and does happen. After all, who would have anticipated the bombing of the World Trade Center, the bombing of a Federal office building or the suicide of a distraught student pilot by crashing his airplane into the White House. As I pointed out in my comments on the Aircraft Accident Analysis, the prohibited airspace over Pantex extends only up to approximately 1200 ft above ground level. Under these circumstances, even basic single-engine general aviation aircraft beginning at a cruising speed of 90 knots (152 ft/sec) can go from legal flight to being imbedded in a hazardous facility in less than 8 seconds. There is simply no way to stop such an attack without undue danger to all air traffic in the area.

Response:

The Draft DOE Standard (DOE 1996g) states that it "does not include consideration of malicious acts (e.g., sabotage, terrorism, and war). The available data on aircraft crashes do not support statistical assessments of such acts. Further, such acts are not unique to aircraft, nor are they initiated by failures and errors associated with aircraft."

RC: 15.023
Doc: PC-021/21

Further, the recent Valujet accident in Florida leads me to raise the question of emergency use of the runways at Amarillo International Airport. The proximity of Amarillo to the major East-West routes and the availability of an extremely long runway makes for an attractive option in the event of an in-flight emergency. In such an event, an aircrew is permitted to waive all regulations in the attempt to perform a safe landing. With the prevailing southerly winds, and the location of the Pantex plant, the chances [of] an aircraft making an overflight of the hazardous facilities while already in a degraded state are extraordinarily high. Will the facilities at Pantex swallow and contain a crashing airliner as effectively as the Florida Everglades?

Response:

The Draft DOE Standard (DOE 1996g) is applied based on normal operations, as well as emergency conditions that may occur to aircraft in the vicinity of a given facility. These emergency conditions are accounted for statistically in the probability density function (pdf). The probability of hitting a facility is calculated based on these operations. The scenario described above would not be applicable to Pantex due to the difference in topography.

RC: 15.024
Doc: PC-021/22

The presentation of pages of probabilities does little to address the "What ifs" of the hazard presented by normal aircraft operations in the vicinity of hazardous facilities. Perhaps of more importance, these probabilities do nothing to address the possibility, though remote, of malicious intent. Further, normal aircraft safety analyses tend to address only the hazard to the aircraft and its occupants, with some consideration given to the event that injury might occur if the aircraft or its components strikes individuals on the ground. It is important to note that only limited damage to other than the aircraft itself is addressed. In the event that an aircraft hits and perforates a facility containing fissile material for nuclear weapons the potential for damage is not limited to the immediate vicinity. In this case, we are dealing with the potential for widespread impact, including regions far downwind of the accident site.

Response:

The Draft DOE Standard (DOE 1996g) states "The focus is on analyzing the risk posed to the health and safety of the public and onsite workers from a release of hazardous material following an aircraft crash. Thus, this is not a standard on aviation safety and does not consider the risk to the occupants of the aircraft, the risk to individuals inside a building affected by the crash into the building, or the risk to other individuals on the ground, either within or outside a facility boundary, who might be directly impacted by the crash... This standard does not include consideration of malicious acts (e.g., sabotage, terrorism, and war). The available data on aircraft crashes do not support statistical assessments of such acts. Further, such acts are not unique to aircraft, nor are they initiated by failures and errors associated with aircraft." Consequence analysis was completed for fissile materials release, regardless of the initiating event. This analysis can be found in volume II, section D.4.2.

RC: 15.025
Doc: CO-008/1

Page E-3, E.2.1. What is the relationship between the "j" value and the probability of the aircraft penetrating the magazine?

Response: *The only relationship between the "j" value and the probability of the aircraft penetrating the facility is the fact that the "j" index divides the aircraft into categories for use in the four factor formula for determination of hit probability. The category j = 1 "Commercial: Air Carrier" will have a larger engine weight and diameter than the category j = 6 "General: Fixed-wing, reciprocating, single engine" and thus may have the potential to penetrate a given facility.*

RC: 15.026
Doc: CO-008/2

Page E-3, E.2.1. Why is the term "scabbing" used on page E-3, paragraph 1, when the term "spalling" is used on Page 4-249 to describe the same phenomenon? Please explain the different terms.

Response: *Spalling is a local damage that signifies the ejection of target material from the front face of the target. Scabbing is a local damage that signifies the peeling off (or ejection) of material from the back face of the target. The terminology on page 4-249 of volume I of the Draft EIS was incorrect and has been corrected in the Final EIS.*

RC: 15.027
Doc: CO-008/3

Page 4-241, Paragraph 3. What is the monitoring procedure and the maximum time frame the magazines remain open?

Response: *Once magazines have undergone their periodic inventory check, they are locked up for 18 months. During this inventory, the doors to the facility are only open for a few hours. During the lockup time, the doors are monitored through alarms as to unauthorized entry. Limiting Condition of Operation (LCO) information in the Zone 4 SAR states that only three magazines are allowed open at one time.*

RC: 15.028
Doc: CO-008/4

Page 4-241, Paragraph 3. Do pilots flying at night use the Pantex lights as a landmark, instead of using the [VORTAC]?

Response: *All pilot training programs must be approved by the FAA and flight instruction must be performed by an FAA licensed instructor. These flight training programs teach, among other things, fundamental techniques of flying and navigation as well as the rules of flight. All flights must be performed in accordance with either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR). Both sets of rules govern flight at night, since the distinction is height of cloud ceiling and visibility (i.e., distance one can see) rather than whether it is day or night.*

If a pilot were flying at night under VFR conditions, one would expect the pilot to take advantage of the lights of the Pantex Plant in the same way he or she would take advantage of other landmarks such as the lights of the Amarillo International Airport, lights of the City of Amarillo and other communities, lights of the prison, etc. That would be to use the spatial pattern of lights (and any unique aspects of particular light sources) as navigation reference points to determine one's position and enable the pilot to either confirm progress along the desired course or to make corrections to intersect the desired flight path. It should not be inferred that because the lights of Pantex (or any other visible *location) are used as reference points, that the aircraft then flies over them. Rather, the lights are used to help the pilot mentally envision where the aircraft is in relation to where the pilot wants to be. It should also be noted that lights can be seen from great distances at night with the exact distance dependent upon the atmospheric visibility and aircraft altitude (above ground level at that point in time. Typically, under normal VFR conditions in the vicinity of Amarillo, the rotating beacon and the high intensity approach lights of the Amarillo International Airport would be visible from much further than 10 miles. Thus, under these conditions, there would be no need for a pilot to fly over the Pantex Plant or VORTAC as a means of finding his or her way to the airport for a landing.*

If a pilot were flying at night under IFR conditions, one would not expect a pilot to use Pantex Plant as a landmark. Instead, the pilot would rely upon instruments inside the cockpit to navigate from point to point. Since the locations of cities and other ground installations such as the Pantex Plant do not appear on IFR navigation charts, trying to see and use the lights of Pantex as a navigation reference would be pointless. Instead, the pilot would seek to fly along the centerline of a particular directional signal from an FAA radio navigation facility, such as the Amarillo VORTAC.

RC: 15.029
Doc: CO-008/5

Page E-5, E-2.2. Why is the 15-degree impact angle used in the analysis and the possibility of higher angle impacts ignored. The Value Jet DC9 in the Everglades had an impact angle of about 75 degrees.

Response: *See discussion in section 1.3.11 of this volume regarding angle of impact.*

RC: 15.030
Doc: CO-008/6

Page E-8, E-3.1, Paragraph 1 and Page E-11, E-3.1.2. Please add the statement, "The 4800 feet Mean Sea Level ceiling over the Pantex Plant equals to only 1200 feet above ground level."

Response: *Correction has been made in the Final EIS.*

RC: 15.031
Doc: CO-008/7

Page E-11, E.3.1.2. Why state that helicopters are "omitted" as a hazard because they do not fly over the plant? Neighbors observe them flying over the plant regularly. Helicopters often operate at high weights and high speeds.

Response: *See response to comment 15.009.*

RC: 15.032
Doc: CO-008/8

Page E-11, E.3.1.2. Are aircraft or post maintenance operational test flights from modification and maintenance facilities at the Amarillo Airport included in the report? These planes tend to circle over the plant repeatedly.

Response: *See discussion in section 1.3.11 of this volume regarding Amarillo International Airport operations.*

RC: 15.033
Doc: CO-008/9

Page E-15, 3.1.3, Paragraph 1. Why were only 25 days in May, 1995, used? To give a more accurate picture of over-flights, why not use 30 days, 60 days, 6 months?

Response: *See response to comment 15.012.*

RC: 15.034
Doc: CO-008/10

Page E-15, 3.1.3, Paragraph 1. Do the distances of Federal airways vary?

Response: *The widths of the Federal airways do vary. The high altitude beacon beam is projected upward from the ground, and it expands with altitude.*

RC: 15.035
Doc: CO-008/11

Page E-15, 3.1.3, Paragraph 1. Are distances measured from the centerline or from the edge of the [VORTAC]? How far from the centerline do they extend?

Response: *The distances given are from the centerline of the airways to each of Zones 4 and 12. An airway model is not used in the Final EIS.*

RC: 15.036
Doc: CO-008/12

Page E-15, E.3.1.3. It is a false assumption that all commercial operations from Runway 04 are always bound for Dallas on the 105-degree airway?

Response: *This conservative assumption was based on information obtained from the Amarillo Tower concerning the trend of aircraft taking off on Runway 04 to follow routes bordering the plant along Highways 60 and 683. With the issuance of the new Draft DOE Standard (DOE 1996g), there is no consideration of airways, so this assumption is not needed.*

RC: 15.037
Doc: CO-008/13

Page E-15, E.3.1.3. How many test flights for the modification and maintenance facilities at the airport use Runway 04?

Response: *See discussion in section 1.3.11 of this volume regarding Amarillo International Airport operations.*

RC: 15.038
Doc: CO-008/14

Page E-30, figure E.2.2-1. General aviation turbojet wingspans of up to 90 feet are common now, particularly among newer aircraft. Why are they not included?

Response: *See response to comment 15.006.*

RC: 15.039
Doc: CO-008/15

Page E-33, Table E.3.1.4-2. The skid distance of airliners and turbojets are comparable. Airliners use 1860 feet, but 37 feet is used for general aviation turbojets. That being the case, a higher angle impact would be expected. The 37 feet at a 15-degree angle is unrealistic and misleading. Please reevaluate and define the aircraft categories and the skid distances of general aviation turbojets. Also, be consistent within the correlating tables, i.e. E.2.2-1 and E.3.1.4-2.

Response: *The values listed in Table E.3.1.4-2 of volume II of the Draft EIS came directly from the Draft DOE Standard (DOE 1995z) for "Accident Analysis for Aircraft*

Crash into Hazardous Facilities." Since turbojets are not the dominant risk, this value does not affect the analysis results. The Final EIS uses the Draft DOE Standard (DOE 1996g) which has updated skid distances.

RC: 15.040
Doc: CO-008/16

Page E-22, E.3.1.6, Paragraph 2. Is the crash scenario in [the] EIS different from that in Storage and Disposition PEIS? If it is, please explain why.

Response:

Yes, the crash scenario is different from that in Storage and Disposition PEIS. It is explained in volume I, section 4.15.5.3, that if any of the storage alternatives associated with this PEIS were implemented, there would be a change in the aircraft crash probability. Any of these alternatives would involve the removal of all pits from Zone 4, which would reduce the aircraft accident probability. For impact analysis, see the Final PEIS.

RC: 15.041
Doc: HT13/54

When you did your aircraft crash analysis from Pantex, you assumed it would be in what kind of container?

Response:

To elaborate on the response given at the public hearing, in the Draft EIS aircraft analysis, the AL–R8 container was assumed. The AT–400A would provide much more protection than the AL–R8, thus the analyses presented are conservative.

RC: 15.042
Doc: HT12/31

... a large fraction of the accident analysis is directed towards airplane accidents — airplane crash dispersing material. And you go through that at Savannah River, which is very improbable and low consequence should it happen, and you consider that a bounding accident. I question whether it is in fact a bounding accident for a Class I facility like the P-Area reactor. I don't know that you've analyzed the bounding accidents.

Response:

The aircraft crash scenario at the Savannah River Site is not a bounding accident for the P-Reactor. As is stated in the Final EIS, the probability of aircraft crash into the P-Reactor was calculated as 1.2×10^{-6} for all types of aircraft using the methodology outlined in the Draft DOE Standard (DOE 1996g). The probability of releasing material from P-Reactor, given the hit, was calculated as $\leq 9.2 \times 10^{-9}$.

RC: 15.043
Doc: PC-024/12

Page 5-10, left column, Section 5.2.1.12, Aircraft Accidents, 1st paragraph. ...The airspace [over NTS] is now highly restricted due to the past nuclear testing program and the activities of the surrounding U.S. Air Force's Nellis Air Force Range (NAFR). This may not remain so if there are major changes in the operating status of these facilities [that] are now under review in respective EISs.

Response:

The issue of restricted airspace over NTS was revisited in the Final EIS.

RC: 15.044
Doc: CO-006/1

The 1994 "Finding of No Significant Impact" arising from the Environmental Assessment found an airplane crash/accident occurring at Pantex to be an "incredible event" not justifying the preclusion of additional storage at Pantex. Even so, the plant subsequently worked with the Department of Defense and the FAA to reduce flights paths over Pantex, and took other steps to ameliorate the situation. However, the Draft EIS does not account for the reduced flights thereby exaggerating the probability for airplane accidents at Pantex and their resulting impacts, and, incredibly, increases the probability of a crash from the 1994 "FONSI." In the recent hearings, Nan Founds responded to this concern by saying that DOE is formulating its own analysis not dependent on FAA data, but also stated there were serious problems with DOE's analysis, which would be addressed. In its initial analysis, DOE is ignoring not only credible work already completed, but also the obvious reduction in accident potential for use in determining the ES&H of siting new functions at Pantex. This undermines the perceptions for fair and equal criteria for use in accurately comparing the various sites under consideration. We urge DOE to correct the analysis and avoid the wrongful preclusion of Pantex for consideration of additional functions.

Response: *See discussion on aircraft crash in section 1.3.11 of this volume comparing results of the previous analysis.*

RC: 15.045
Doc: HT15/1

... I pose a question for DOE. Why in the prepared draft environmental impact assessment did the analysis of aircraft accidents cease...at the four factor analysis? [I] request that, before the final EIS is published,...the probability risk assessment be conducted.

Response: *The aircraft analysis did cease with the four factor formula per se. However, the structural analysis results in Appendix E of volume II were used to determine the release probability. These release probabilities were then used in the Human Health sections to determine risk.*

RC: 15.046
Doc: HT15/2

The analyses that have been done have been done on the basis of historical data. And the purpose of that analysis is to predict the likely impact on the future operations at Pantex. We know the future of some of the risk factors in the aircraft accident rating. We know, for example, that GPS approaches already exist, so some aircraft are now flying different routes. We know that the T-37 flights from Reese Air Force Base ceased this month. And we know that the T-37 flights, T-38 flights, and the B-1 flights from Reese will cease in December. So we know a number of the aircraft, that in the four factor model have driven this outcome of about 4×10^{-5} for probability of an aircraft accident in a year, will not exist in the future. And I recommend that in the final impact analyses, those things that we know be included in the analysis so that we can all together look at the most accurate possible aircraft accident prediction.

Response: *As it stands, the Draft DOE Standard (DOE 1996g) does not allow for the consideration of Global Position System (GPS) approaches and aircraft flying different routes. Also, until the RAMS data can reflect the change in these military aircraft, and until the Federal Aviation Administration (FAA) airport operations data reflect the change, there is no way to incorporate the change* *into the model and apply it to Pantex Plant. These changes would reduce the risk at Pantex Plant and therefore the EIS is conservative.*

RC: 15.047
Doc: HT15/3

In the draft standard appendix, it [discusses] the generic crash rates for each aircraft category and subcategory [according to] accident reports published by the FAA in the RSD and by the United States military craft. ...You don't reference that published data. Is that data available and can we get a copy of that data?

Response: *The information is included as references in the "Data Development Technical Support Document for the Aircraft Crash Risk Analysis Methodology".*

RC: 15.048
Doc: HT15/4

You said the evaluation techniques used to estimate crash rates are documented in References 1 and 2. But those references are also in the draft and they're not available to us here.

Response: *This information is located in the Technical Support Document, which followed approximately two months after the release of the Draft DOE Standard (DOE 1996g).*

RC: 15.049
Doc: HT15/5

The methodologies that you used to convert FAA or military accident data into crash probability [estimates]. Is that methodology available for our review?

Response: *See response to comment 15.048.*

RC: 15.050
Doc: HT15/6

... Until we've had a chance to look at your data and an opportunity to do analysis, how do we know that the crash probability distribution or the crash rates per landing probabilities reflects military operations, other military people, military pilots [in] this analysis?

Response: *See response to comment 15.048.*

RC: 15.051
Doc: HT15/7

Were you able to determine the small military operations that are actually from Reese Air Force Base?

Response: *The number of small military operations from Reese Air Force Base could not be determined separately, but the total number of small military aircraft was determined.*

RC: 15.052
Doc: HT15/8

The initiative Tom Williams spoke about in the reduction initiative, is that taken into account in your application to the standard in the EIS or will it?

Response: *See discussion in section 1.3.11 of this volume. Additionally, a brief statement in volume I, section 4.15.1.3, discusses a previous analysis of the relative risk reduction associated with the overflight reduction measures.*

RC: 15.053
Doc: HT15/9

... "Small military [aircraft] tends to be the controlling hit probability in the environmental impact statement. [Since] there's such a wide variety of aircraft types, why can't we actually do the analysis subcategory. Why can't we actually identify individual aircraft types and use available crash rates?

Response: *This was done for large and small military crash rates in the Final EIS, and it did not change the results more than five percent.*

RC: 15.054
Doc: HT15/11

... We've talked several times this morning about the safety factors. The safety factors are there and they're not quantified. Is it possible to produce a document that says this is our best estimate and this is the uncertainty that remains in the assessment?

Response: *The authors of the Draft DOE Standard (DOE 1996g) indicated that this could not be done.*

RC: 15.055
Doc: HT15/12

Since these numbers as point estimates will be used to make your decision, I think it's important that we be able to tell the senior decision-makers when we have a lot of confidence in a number and when it's sort of a fuzzy number. When you stay conservative, you create another problem. If I focus exclusively on one risk in life to the exclusion of others, I can bring that risk to very near zero, but my risks in other areas go up.

Response: *For the Final EIS an effort was made to characterize the level of conservatism inherent in the aircraft crash analysis.*

RC: 15.056
Doc: HT15/13

Given the limited availability of the final analysis numbers, I find it very difficult to try to guess what the impact might be in the refinement of the standard. And I haven't heard this morning any kind of estimates as to whether or not the refinement of the standard and the supporting documents might provide some clarification on this fuzziness Dr. Rock talked about, this conservatism. Is it generally agreed upon that there will be some reduction in that numerical risk probability or is there any kind of feeling that anyone has on this?

Response: *Due to the changes made in the Draft DOE Standard (DOE 1996g) and the additional level of detailed analysis, the risk results were shown to decrease. For the Final EIS an effort has been made to characterize the level of conservatism inherent in the aircraft crash analysis.*

RC: 15.057
Doc: HT15/14

That does provide the decision-maker some measure of comfort, if you will, in the conservatism of the numbers, but it does the exact opposite to the local citizens. It provides them [with] a sense that the plant may not have been as safe as indicated over all the years that it's been in existence, which I don't believe is the case. I believe that there's a point somewhere in between that is more like the real answer to this problem. And that needs to be stated.

Response: *See discussion in section 1.3.11 of this volume comparing the results of the previous analysis.*

RC: 15.058
Doc: HT15/15

... We're looking at two and a half months...for the information to be available to do those calculations and present that data. There won't be enough time to look at that and to say we accept this or we agree with this. It really places the state reviewers in a difficult position at this point. I think it's impossible, actually. And I'm wondering about the date that the EIS is driven [toward]...I think [there is] some question as to what dates they [EIS and other two PEISs] will be available.... Are they on track? Is this still concrete or is there a possibility that we might allow for more comprehensive review of the information to provide the level of certainty...

Response:

This comment was made prior to the availability of the Draft DOE Standard (DOE 1996g) for Aircraft Crash Analysis and its associated technical support documentation. Subsequently, the State of Texas formally requested an extension of the review and comment period for the aircraft crash analysis. At the time of this response, the Department had not reached a decision regarding the request for extension. As of July 22, the Draft Standard (DOE 1996g) was made available. To maintain the schedule for the Final EIS, the State of Texas reviewers were provided copies of the Draft Standard and invited to participate in the final analysis.

RC: 15.059
Doc: HT15/16

What we want is...accurate information in the EIS. And if that calls for a delay in order to get the right numbers in there, then we are going to formally request that the site-wide EIS delay until those right numbers are clear.

Response:

See response to comment 15.058.

RC: 15.060
Doc: HT15/17

If I hear you correctly, you're saying that you are driven by a deadline. And if later information comes in after that deadline you'll make those adjustments. And what we're saying is we're not bound to that deadline. We'd rather have the right information. And if that takes a couple of months, we're willing to move that deadline back.

Response:

See response to comment 15.058.

RC: 15.061
Doc: HT15/18

So it will give a range and best estimate and worst case estimate, and if we're really lucky, the lowest accident estimate? If you only put it in the introduction and you don't put it with the numbers so that the numbers are self-evident—all of us have had enough experience with the media—I understand the headline will lead to an incorrect assumption.

Response:

This comment pertains to the Draft DOE Standard (DOE 1995z) and not to the Draft EIS. Due to the changes made in the Standard and the additional level of detailed analysis, the risk results were shown to decrease. For the Final EIS an effort has been made to characterize the level of conservatism inherent in the aircraft crash analysis.

RC: 15.062 **Doc: HT15/19**	... I want to thank the DOE for the hard work on reducing and minimizing the risks, to the extent possible. The committee that Tom Williams has worked on changed the approaches to the airport. But to build on the last comment there, I'm afraid that in a very important process like an EIS process,...(inaudible) and should be. I'm reminded somewhat of the scientific information that was put out by groups that later proved incorrect, like a food scare abut eggs are good for you or bad for you, whatever. We get these maybe presumptive announcements about the risk factor that don't concur necessarily with previous ones and they've not undergone the type of scrutiny that good science work demands. And that is what the State of Texas is asking for today, is to try and do that kind of peer review based on documents that will be coming in in the future. Going back to meet the consistency, people need to understand what the risks are and grasp that, including the new level of conservatism.... The accumulative effect of that [conservatism] changes the number radically from what was the risk published in previous studies. I think there needs to be, as Dr. Rock mentioned,...annotation in the document itself if you're going to remain fixed on those numbers. And I think the public deserves a very good explanation of why this number may not square with previous numbers, because the number of planes flying over there and the types of planes hasn't changed.
Response:	*See discussion in section 1.3.11 of this volume comparing the results of the previous analysis.*
RC: 15.063 **Doc: HT15/20**	If you know that steps are being taken to minimize that risk or the number of overflights over Zone 4 in the future, maybe there should be a number for what the risk will be in those outcomes if it is, indeed, reduced through mitigation steps. And I think those are things that could serve the public well and will make them feel more comfortable.
Response:	*See discussion in section 1.3.11 of this volume regarding the Amarillo International Airport operations.*
RC: 15.064 **Doc: HT15/21**	... I guess the only comment I had is [that] the numbers look very much different than they did in past studies. And what I'm hearing from you is [that] really things are extraordinarily conservative and minimized, but that's not what's conveyed in the text. ...Maybe there's some way to convey that more clearly in the text.
Response:	*See discussion in section 1.3.11 of this volume comparing the results of the previous analysis.*
RC: 15.065 **Doc: HT15/22**	... where you referred to the Zone 4 overflight work initiatives quantifying the results, does that mean this would be Volume 1? The initiatives are described in section 4.14.5.4, but there's no numbers applied there. There's no reduction, I guess, in the estimates.

Response: *The 82 percent reduction from the Overflight Working Group initiatives is documented in volume I, section 4.15.6. It is estimated that implementation of the MOU, the offset localizer, relocation of the VORTAC and 65 percent use of the GPS will result in an 82 percent cumulative risk reduction. This 82 percent reduction was estimated using the Solomon Model.*

RC: 15.066
Doc: HT15/23

... It looks like there was a whole year that you were able to draw information off of, April '95 to March '96. [Why did you use] 244 days instead of 365?

Response: *The Draft EIS analysis used one year (1994) of FAA data to determine the number of airport operations and 76 days of RAMS data to determine the representative wingspans, engine weights, and diameters. For the Final EIS, six and one half years (January 1990 through June 1996) of FAA data were reviewed and the maximum number of aircraft for the four categories collected (Air Carrier, Air Taxi, Military, and General Aviation) was used. To characterize the representative wingspans, engine weights, and diameters, RAMS data from January 19, 1995 to January 18, 1996 was collected. For this time period 330 of 365 days of data were collected. The remaining 35 days were not available due to the equipment being moved or the RAMS system was not in operation. The missing 35 days would not change the results of the analysis. If 1995 FAA operations data are used instead of the maximum data, the probability of hitting a facility is reduced by 15 percent.*

RC: 15.067
Doc: HT15/26

The other observation I'd like to make is that statistics are a fascinating thing. They are not a solution. They are no guarantee. So the aircraft crash probability to be quite low is one thing. But it is that such things don't happen can happen.

Response: *The comment author is correct. The Final EIS uses the best available model and data. The Department believes that the risks are quantified with sufficient accuracy to allow decision makers to make correct decisions.*

RC: 15.068
Doc: HT15/27

I think the most impressive thing to me are the mitigation efforts that the Department is undertaking, as well as made. I want to know, is it possible that the Department of Energy will then stop those mitigation efforts and we will not try to move aircraft from flying over the plant.

Response: *The DOE is committed to the aircraft risk reduction issue. The mitigation measures will proceed regardless of the values presented in the EIS.*

RC: 15.069
Doc: HT15/28

One of the effort of Pantex in moving overflights further toward the northwest corner of the plant, I can't help but observe that's where the nuclear reactor might be and that there are other facilities that are going to have to be taken into account so that we know this is considered under this aircraft crash analysis versus the aircraft analysis that related to the current EIS.

Response: *The risk of this potential facility to aircraft will be evaluated in tier NEPA documents to the Storage and Disposition of Weapons-Usable Fissile Materials PEIS should it become necessary.*

RC: 15.070
Doc: HT15/29

... There are those times when there are accidents that do happen and that are beyond the control of any of the mechanical problems that possibly could go wrong with an aircraft. And this was just an issue that we were wondering if it has been factored in and how it was going to be factored in.

Response: *In this analysis, mechanical failure is one of the initiators considered in the aircraft accident analysis. Mechanical failure contributors are reflected in the crash rates presented in the Draft DOE Standard (DOE 1996g).*

RC: 15.071
Doc: HT15/30

... Since there are maintenance and modification of facilities at the Amarillo Airport, there are planes that are out on test flights and they do a lot of circling. And we wondered were there considerations that these are not aircraft that are in tip-top flying shape given...in the document.

Response: *See discussion in section 1.3.11 of this volume regarding the Amarillo International Airport operations.*

RC: 15.072
Doc: HT15/31

I think that where we really are having difficulty with this on test flight is, to our knowledge, they are not all the time actually perfect aircraft that are taking off. And I do appreciate this thing that they have to be in a certain condition. But that does not mean they do not have a problem at the time of test flight. And these considerations, we thought, needed to be brought out in the document.

Response: *See discussion in section 1.3.11 of this volume regarding the Amarillo International Airport operations.*

RC: 15.073
Doc: HT15/32

I'd like to commend DOE and the FAA in their attempts to alleviate some of the concerns of the citizens on the probability of airplane crash in Zone 4 and Zone 12. I hate to show my ignorance in this, but could you, in plain English, tell us what the probabilities of a crash are? Is it one in a million? In previous studies that number was quoted around. Why has that increased? Does that take in those hit probability factors?

Response: *See discussion in section 1.3.11 of this volume. Additionally, the probability of an aircraft crash into Zones 4 or 12, as calculated in the Draft EIS, is 4×10^{-5} which is 40 in a million. The probability of an aircraft crash into Zones 4 or 12, as calculated in the Final EIS, is 3.1×10^{-5} which is 31 chances in one million. The corrected analysis, as well as other historic analyses, all agree that the aircraft crash hit probability for Pantex Plant is in the low to mid 10^{-5} range (approximately 10 to 40 chances in one million per year that an aircraft will hit Zones 4 or 12). It should be noted that hit probability is not an accurate representation of risk. Risk involves an aircraft crash which leads to a release of plutonium. Probabilities for an aircraft crash leading to a release are in the 10^{-6} range (approximately 1 to 9 chances in one million) or lower.*

RC: 15.074
Doc: HT15/33

In past studies, that skid area has been factored and reduced. ...Which skid factors are you using to determine [skid distances]?

Response:

The recommended skid distances given in the Draft DOE Standard (DOE 1995z) for each aircraft category were used in the Draft EIS. In some cases skid distances were subsequently reduced in the case where one building was shielded by another. The Final EIS uses skid distances updated in the Draft DOE Standard (DOE 1996g), and considered one building shielding another.

RC: 15.075
Doc: HT15/10

We're told that the support documents, the driving coefficient that control the outcome of the four factor detailed analysis, will not be available for two months. And we're being asked to wait. It's an issue of we're being asked to trust the support documents are fine, but we're not in a position to see for external peer review. My question is, can they be made available in a fashion that will keep this process in a time line and give us a reasonable opportunity to do a technical peer review?

Response:

See response to comment 15.058.

RC: 15.076
Doc: HT17/43

We're also very encouraged to see that the Department of Energy has taken steps, working with the local government of the City of Amarillo and the State of Texas, in reducing the number of aircraft overflights. I think that show their good-faith efforts to try to operate in as safe a manner as possible. We also appreciate the Department of Energy's openness policy.

Response:

The Department will continue its good-faith efforts and openness policy in an effort to operate in as safe a manner as possible.

RC: 15.077
Doc: SG-012/3

Vol. I, page 5-63, 5.5 Kirtland Air Force Base, 5.5.1.12 Aircraft Accidents, "An analysis was performed to determine whether expected bomb loads (one to four 909-kilogram [2000-pound] bombs) could damage the Manzano storage magazines in the event of an airplane crash. With the minimum cover of 9 meters of granite and earth, the magazines cannot be damaged by any foreseeable aircraft events." Vol. II, page E-26, Aircraft Accident Analysis, E.3.2.4 Structural Calculation, "A survey of contour maps reveals that the approximate overburden for the Manzano WSA is approximately 3.05 meters." Based on the aforementioned information, it is unclear which of the above statements is correct. If the second statement is correct, then the minimum overburden is 3 meters, and the analysis of the bomb loads should be further considered as a plausible accident analysis. Although a bomb load may not have impacts below 9 meters of granite, it may impact 3 meters.

Response:

Commentor is correct. The minimum overburden at Manzano WSA is 9 meters. This error has been corrected in the Final EIS.

RC: 15.078
Doc: HT16/15

My question has to do with Figure F-6.3.1 on Page F-19, Appendix F.... There is listed a variety of collisions that might occur during transportation [that] form the basis for the risk and the consequence analyses in that [appendix]. And I note that aircraft collisions with the transport train have not been considered, or at least they're not listed. The stage right trailer, the whatever trailer you would like to consider. I guess there's something hauling a trailer, so I think of it as a train. If we're really looking at 30,000 movements a year, which was the number referred to earlier in the discussion, the total exposure of all of those targets averaged over a year may match the total exposure of a single storage facility, in terms of hours of vulnerability. So it relates to an observation that I've had that, in analyzing the aircraft crash probability, there's been no consideration of the fact that the aircraft is only in a position to impact the target for a short duration, a very short proportion of its entire flight. Here we've got a slowly moving target that's only vulnerable for a short period of time and we've not worried about it. When you're moving the missile instead of moving the target, we worry about the sum total of all these passes. When we're moving the target more slowly, we say, well, it's in the open for such a short period of time that it's negligible.

Response: *To elaborate on the response given at the public hearing, aircraft impacts into a moving vehicle containing weapons or weapon components were considered in the analysis. The potential for this accident is discussed in section 4.12.2 of volume I. Assuming a trailer was continually parked within Zone 4, an aircraft impact frequency of less than 1×10^{-7} per year was calculated. The risk from this accident using a frequency of 1×10^{-7} per year is presented in section 4.12.2 of volume I.*

RC: 15.079
Doc: PC-025/78

Doesn't Amarillo have an airshow with flyovers during high risk maneuvers? Was this accounted for? If the incident rate for an airshow is higher than the general aviation conditions set forth in section 4.16, how does DOE justify [that] the current NEPA analysis meets the intent of NEPA. In the last ten years how many airshow (US and worldwide) accidents have occurred relative to section 4.15 parameters in determining frequency of crashes? Assuming an airshow high velocity impact with at least two impact scenarios per year over the period of this EIS, what are the impacts to the public from releases?

Response: *Amarillo International Airport does have airshows on occasion, with aircraft performing high risk maneuvers. However, the probability density function contained in the Draft DOE Standard (DOE 1996g) includes crash frequencies based on national averages, which include those as a result of airshow crashes. As a result, this scenario has been considered in the current analysis.*

RC: 15.080
Doc: PC-025/79

In Scenario 7 on Page 4-231. What is the maximum tritium release in curies? Why isn't a direct high velocity aircraft crash into the vault considered?

Response: *Aircraft impacts into the tritium vault are considered in the analysis. However, aircraft impacts are not risk dominant compared with the seismic event. The typical source term for this event is 3.9×10^{7} curies (Ci).*

RC: 15.081
Doc: PC-025/80

General comment, section 4.15. The VORTAC serves no real purpose. A crippled plane goes where it wants to. What is FAA and DOE going to do if the only way to bring a crippled plane in is over the plant? Shoot the plane down?

Response:

The probability density function contained in the Draft DOE Standard (DOE 1996g) includes crash frequencies based on national averages. These crash frequencies are based on national statistics which include "crippled" aircraft if they resulted in a crash. Thus this hypothetical scenario has been addressed in the analysis.

RC: 15.082
Doc: PC-025/81

I would argue the total number of yearly flight operations is incorrect. Because neither the number of satellites or the Space Shuttle operations are included. I believe satellites have a nearly 100 percent orbital failure rate. Thus, a high velocity satellite impact is reasonable.

Response:

The Near Airport analysis outlined in the Draft DOE Standard (DOE 1996g) includes consideration of normal airport operations. Whereas the non-airport high altitude overflight model in the Standard considers impacts from high altitude aircraft. Spacecraft (the Shuttle, satellites, etc.) ground impacts are statistically insignificant compared to conventional aircraft flights. It should be noted that the majority of spacecraft burn up in reentry, prior to impacting the ground.

RC: 15.083
Doc: PC-025/82

Table 4.15.2-2 information seems impossible given the recent Valujet accident where the plane blasted through a limestone formation. If the impact forces of that plane were used in analyzing impacts at Pantex, what would change? Was the maximum velocity used in determining damage? Velocity is squared in the force equation correct? The calculations on page E-19 are flawed by using slow moving aircraft. The LLNL report seems contrived to show the damage would be minimal by using the 70th percentile velocities turning takeoff or landing. NEPA requires you to assess reasonable situations. Since the probability of an aircraft crash is independent of the damage it causes. I would argue a high velocity impact of a massive plane is just as likely as a small plane at low speed, thus NEPA requires you to analyze the impact of the most damaging scenario, please comment.

Response:

See discussion in section 1.3.11 of this volume regarding angle of impact and response to comment 15.005.

RC: 15.084
Doc: PC-025/83

General comment, sections 4.15 and 4.16. Please provide information on the level of QA/QC defending the analyses of these sections. I would like the same information as requested on water and air quality sections of this EIS.

Response:

The QA/QC of the referenced sections of the Draft EIS, as well as the entire document was conducted in accordance with the Tetra Tech Quality Assurance Program Plan, document number CB-1000, May 22, 1995. The program is *tailored for preparation of the EIS and to meet DOE Order 5600.6C and NQA-1 as appropriate. For detailed information, refer to these documents.*

The assessments (including methodologies, models, and results) of aircraft accidents in section 4.15 of volume I were subject to a multiple level of technical peer review to ensure technical validity. Included in this review process was: (1) the analyst's immediate supervisor, (2) the functional area manager, (3) technical experts from the Amarillo Area Office, and (4) technical experts from the Albuquerque Operations office.

Additionally, the assessments (including methodologies, models, and results) of aircraft accidents in section 4.15 of volume I were exposed to extensive peer reviews. These reviews included two workshops occurring over several weeks along with independent supporting analysis by the workshop participants. The participants included representatives from DOE, Sandia National Laboratories, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the Defense Nuclear Facility Safety Board, as well as nuclear safety experts from private organizations.

Additionally, these assessments were peer reviewed by DOE Headquarters Technical Safety Review Panel. This group is made up of safety experts throughout the DOE complex whose main responsibility is providing safety analysis guidance to Pantex Plant.

During the public review process, the assessments (including methodologies, models, and results) of the aircraft accidents in section 4.15 of volume I were reviewed by a group of independent scientists from Texas A&M University and the University of Texas.

RC: 15.085
Doc: CO-008/17

Pages E-5 and E-16, E.2.1 and E.3.1.4. Why is the value of "y" [γ] for military aircraft lower than that for commercial aircraft?

Response: *See response to comment 15.015.*

RC: 15.086
Doc: CO-008/18

Pages E-5 and E-16, E.2.1 and E.3.1.4. The proximity of Amarillo to the major east-west routes, and the availability of an extremely long runway makes for an attractive option in the event of an in-flight emergency for both military and commercial overflights. In such an [event], an aircraft is permitted to waive all regulations in the attempt to perform a safe landing. With the prevailing southerly winds, and the location of the Pantex Plant, the chances of an aircraft making an overflight of the hazardous facilities, while already in a degraded state, are extremely high. Will the facilities at Pantex be prepared for such an emergency?

Response: *The probability density function contained in the Draft DOE Standard (DOE 1996g) includes crash frequencies based on national averages. These crash frequencies are based on national statistics, which include emergency landings if they resulted in a crash. Thus this hypothetical scenario has been addressed in the analysis. Additionally, the FAA and DOE have established a "hotline"* *between the air traffic control tower and the Pantex Plant operations center to provide for immediate emergency communication should the need arise.*

RC: 15.087 **Doc: MG-001/1**	I am concerned about the "plane crash" analysis. As Mayor, I have been deeply involved in efforts to reduce overflights over the plant, and other preventative measures. How can it be that the probability of a crash causing a release has increased since your 1994 Finding of No Significant Impact, after Pantex and the Amarillo Airport? Even the DOE officials at the hearings conceded that their analysis had serious problems, and needed to be corrected. I urge your office to correct these errors, and act to avoid wrongfully depriving Pantex of future functions for which it may be selected.
Response:	*See discussion in section 1.3.11 of this volume regarding the results of the previous analysis.*

RC: 15.088 **Doc: SG-003/90**	As of this date, July 11, 1996—the eve of the closing of the comment period for the draft EIS—those personnel from Tetra Tech responsible for preparing the Final EIS have not (1) received the DOE standard, (2) have not received the final technical support documentation, and (3) have [no] idea if the probability of an aircraft crash into a Pantex plutonium storage facility is 1 or 100 in a million. Therefore, at the close of this comment period, we can not verify their results because none is available. What is known is that everything published in the draft EIS will be changed based upon the new DOE standard.
Response:	*See discussion in section 1.3.11 of this volume. Additionally, concerns 1 and 2 are correct. However, for the Draft EIS, Tetra Tech personnel calculated the probability of a crash into either Zone 4 or 12 [as] 4×10^{-5} or 40 in one million, which is similar in magnitude to what has been calculated in the past in previous aircraft crash analyses done for the Pantex Plant. This is documented in the Final EIS.*

RC: 15.089 **Doc: SG-003/91**	The aircraft crash rates are fixed in the DOE standard; however, [we] do not have access to either the Technical Support Documentation nor the data from which the accident crash rates (usually reported as accidents per hundred thousand flying hours) have be calculated into a crash probability for each takeoff, for each landing, or an in-flight rate per square mile. This calculation requires many assumptions and several different steps. From interviews, we have determined that draft DOE standard does a credible job in establishing these crash rates. However, since DOE contractors have denied access to both the data and the technical support documentation, we request that that the following points of potential errors be addressed by the DOE contractor, reviewed by a competent authority, and be included in the Final EIS.
Response:	*Crash rates are given in the Technical Support Documentation for the Draft DOE Standard (DOE 1996g), which has been made available.*

RC: 15.090
)oc: SG-003/92

Military aircraft perform touch and go landings for proficiency training only with an instructor on board. Additional landing practice is accomplished as a low approach with the wheels not touching the runway. The civilian tower counts this low approach as two operations (1 takeoff and 1 landing) but no record of a landing is recorded in the military records. We request details of how this discontinuity in the raw data is accounted for in the DOE standard. We request that following data be published in the Final EIS for all military aircraft with significant impact at the Pantex facility: accident and crash rates per hundred thousand flying hours; average hours per sortie; average landings and low approaches per sortie; and number of crashes attributed to landing, takeoff, and in-flight categories.

Response:

Military records are not accounted for in the Draft DOE Standard (DOE 1996g). We do not plan to gather this information because the Draft DOE Standard does not use this information. The information contained within the Draft DOE Standard is based on FAA records. Crash rates for various aircraft categories are given in the Technical Support Documentation for the Standard, which has been provided to the commentor.

RC: 15.091
Doc: SG-003/93

It was pointed out in interviews that there are 422 off-airport crashes per year of general aviation aircraft in the United States [that] are considered in the calculation of the probability in-flight crash rate. This data may be true, but it would be overly conservative to assume the probability of crash into a vacant or farming square mile was equal to the probability of crash into a built-up [area] such as the Pantex compound. Many general aviation crashes are the result of engine failure, nearly all general aviation aircraft have flight controls that function without power and pilots are trained to attempt forced landings in those emergencies. No pilot given a in-flight situation where some flight control remains, would aim at the Pantex compound rather than away from the reinforced structures at the compound. Given the good weather conditions at Amarillo and the relatively open spaces surrounding the Pantex compound, the crash site cited in the DOE standard would be greatly reduced for the local application of in-flight general aviation aircraft.

Response:

The suggestion of reducing the crash rate cited in the Draft DOE Standard (DOE 1996g) for the local application of in-flight general aviation aircraft has been taken under consideration, but is conservative given the fact that this factor cannot be quantified.

RC: 15.092
Doc: SG-003/94

In general we feel the DOE standard is a tremendous improvement in accuracy over the previously used Solomon model for predicting the probability of an aircraft crash into a facility. The Solomon model was far too overly conservative in the estimate of the contribution of high altitude overflight aircraft. Since this new DOE standard corrects the in-flight contribution of the Solomon model, we would logically expect that the probability of an aircraft crash into the Pantex plutonium storage facilitates should decrease from previous studies that used the Solomon model. We request that the Final EIS provide some narrative description of the new calculation of hit probability in comparison to the previously conducted studies and a short justification for the differences in the findings.

Response: *Information on previous aircraft analyses is presented in section 4.15.1.3 of volume I of the Final EIS. This information is presented in both tabular and narrative form. See also discussion in section 1.3.11 of this volume.*

RC: 15.093
Doc: SG-003/95

After reviewing the draft EIS and conducting interviews, we recommend that the DOE standard in its application to the Pantex facility be localized for the conditions and aircraft traffic in the following ways: A. The small military aircraft subcategory which makes up a large portion of the traffic at Amarillo Airport must be studied by specific aircraft types. The T-38 and T-1 aircraft, which are the dominate aircraft types in the traffic stream, must have separate hit probabilities as well as separate release probabilities.

Response: *The current analysis can treat all large and small military aircraft types on an individual basis for crash rates. There is a less than five percent difference in the results.*

RC: 15.094
Doc: SG-003/96

B. The closure of Reese AFB in Lubbock, Texas by December 1996 will have a significant effect on the forecast T-1 and T-38 traffic at Amarillo Airport and therefore attempts must be made to use the actual forecast numbers rather that past history for these aircraft.

Response: *It is difficult to forecast what the closure of Reese Air Force Base will do to the numbers of T-1s and T-38s. These aircraft may relocate to another facility and yet still fly into Amarillo. An accurate description of the numbers of these aircraft would show up in the RAMS and FAA data. The current analysis is conservative with respect to the closure of this Base.*

RC: 15.095
Doc: SG-003/97

C. The collection of RAMS data at Amarillo Airport has provided the Department with a very good record of the number and types of aircraft and their ground track in comparison to the Pantex facility. This data should be used when necessary to adjust DOE standard crash rates, which are based upon a total average of all airports throughout the United States. The takeoff ground tracks for Runway 04 do not follow the typical pattern assumed when the data was collected for the DOE standard.

Response: *The RAMS data has been used for the Final EIS to determine dominant aircraft on an individual basis to adjust the crash rates to be more representative. There is a less than five percent difference in the results.*

RC: 15.096
Doc: SG-003/98

D. When Using the RAMS data, insure that military aircraft that are in formation be counted as multiple aircraft rather than as a single aircraft.

Response: *The RAMS data distinguish military aircraft flying in formation as individual aircraft. Each aircraft has a unique identification beacon that the RAMS records.*

RC: 15.097
Doc: SG-003/99

The Pantex facility has super stout structures and consideration of the structural capacity and resistance to aircraft penetration should be accurately modeled.

Response: *Analysis of structures is done using the Chang equations provided in the Draft DOE Standard (DOE 1996g). Application of these equations to these super stout facilities gives a conservative result. Section 4.15.7, volume I of the Final EIS discusses this conservatism.*

RC: 15.098
Doc: SG-003/100

The effective aircraft crash skid length should be localized to consider the local conditions at the Pantex facility.

Response: *See response to comment 15.074.*

RC: 15.099
Doc: SG-003/101

The FAA and DOE have agreed to several mitigation measures to reduce the probability of aircraft impact into Pantex and we applaud those efforts. The draft EIS provided an estimate of the effectiveness of these measures using the Solomon model which were significant. Although the application of this new model in the DOE Standard will probably estimate the effectiveness of these measures as insignificant, we believe they are significant and should be estimated separately.

Response: *See discussion in section 1.3.11 of this volume. Additionally, the DOE is committed to the aircraft risk reduction issue. The mitigation measures will proceed regardless of the values presented in the EIS.*

RC: 15.100
Doc: SG-003/102

We recommend that DOE continue to collect radar data at the Amarillo airport as a mitigation item for the Site Wide EIS. We highly recommend that the current method of tracking radar should be improved with DOE funding a state-of-the-art system that is equal to the noise monitoring systems installed at many major airports in the U.S. This system should be automated and integrated with a geographical information system and turned over to the airport for their use in airport planning.

Response: *It is anticipated that the RAMS project will continue, and the recommendation stated will be taken into consideration.*

RC: 15.101
Doc: SG-003/103

First, let me start by observing that the Department of Energy (DOE) has created the best available models for assessing the probability of an aircraft accident at any point in the country. Second, DOE is to be congratulated for using their models in their Environmental Impact Assessments. Third, DOE is continuing to improve their aircraft accident models. Unfortunately, this continuous improvement poses difficulty for those who try to comment on the Draft EIS for Pantex. A major shift in modeling assumptions occurred between

July 1995 and July 1996. The predicted annual risk of an aircraft accident in any square mile has increased as a result of changes in the model, not as a result of changes in the aeronautical environment in the vicinity of the Pantex Plant. The aircraft accident risk depends as much on the aeronautical environment as it does on the assumptions of the model used for predictive purposes. The final EIS must clearly portray both effects. It is important that this issue be addressed in the Executive Summary as well as in the EIS itself.

Response: *A major shift in the modeling between the July 1995 and July 1996 versions of the DOE Standard involved the consideration of in-flight/high altitude aircraft. The July 1995 Standard utilized a non-airway model, whereas the July 1996 Standard utilizes a non-airport model. The major difference between the two involves the combination of three terms of the four-factor formula [NPf(x,y)] in the non-airport model to give a DOE site-specific value to be used to calculate hit probability. Regarding the aeronautical environment, it is known that the number of T-38s flying into the Amarillo International Airport from Reese Air Force Base will decline when this base closes. This will most likely result in a change in the aeronautical environment indicated by the commentor. However, it is unknown whether these T-38s from Reese will migrate to another Base and still continue to use Amarillo Airport for their training. Until the RAMS and FAA data reflect this change in numbers of T-38s, the change cannot be reflected in the analysis.*

RC: 15.102
Doc: SG-003/104

The discussion in the EIS points out that an Aircraft Accident can be an initiating event in a scenario that leads to public exposure to radioisotopes. Because this is a very unlikely event, the authors attempt to quantify the probability of the event. The Draft EIS used the Draft DOE Guidelines for Aircraft Accident Prediction (July 95, Revised). During the period of public comment, HQ DOE announced its intent to publish final guidelines, now promised for mid-July 1996. Further, DOE wants the Final EIS to be based on the final guidelines. The new paradigm is that aircraft accident locations are best predicted on the basis of the locations of previous accidents. The location probability density function is a smoothed average over the whole nation for en route accidents. For near airport accidents it is a smoothed function of all accidents as a function of distance and direction from a composite runway. This is a major change from the draft guidelines and prior accident models. These assumed the impact location would be near the point along an established "flyway" where an aircraft encountered difficulty and used probability factors with dimensions of accident probability per mile of flight. Preliminary calculations show that the new model predicts accident rates 2 to 10 times higher than the older models. Since the Pantex EIS will be the first to use the new DOE Aircraft Accident Guidelines, and since it may be used to compare predicted accident probabilities at Pantex to those at other DOE facilities, how does DOE intend to explain the changed paradigm to members of the public and to senior decision makers?

Response: *Since the release of the latest version of the Draft DOE Standard (DOE 1996g), it has been shown that the results for the aircraft crash analysis have decreased* *from the Draft Standard (DOE 1995z) and Draft EIS. The Draft DOE Standard (DOE 1996g) was applied to the alternative storage sites considered in the EIS. This was not done for the Draft EIS. Many of the previous analyses conducted for these sites were conducted with methodologies that have since been proven inadequate for a proper characterization of the risk due to aircraft crash.*

RC: 15.103
Doc: SG-003/105

In cooperation with FAA, DOE has initiated several mitigation measures to reduce the probability of an aircraft accident involving Pantex facilities. These include moving the back course localizer 6 degrees west and creating GPS instrument approaches that move takeoff and landing operations more than 2 miles away from Pantex. Plans exist to move the VOR onto the airport from its present location near the Pantex fence line. This will reroute high altitude traffic away from Pantex facilities. Unfortunately, the new accident model, based only on the history of previous aircraft accidents, is unable to demonstrate reduced accident probabilities from mitigation measures. From conversations with Kamiar Jamali, DOE did not intend this model to be used for mitigation design. It is designed to provide a common basis for comparing one DOE location to another. Nevertheless, as existence proof for the benefit of mitigation measures, note that the White House is surrounded by a no-fly zone. Request that DOE insure that the final EIS give appropriate credit for mitigation measures completed and contemplated. See the next comment for a suggestion.

Response: *Please see response to comment 15.104.*

RC: 15.104
Doc: SG-003/106

To better understand the true flight environment at Amarillo, DOE installed the RAMS system to record the flight tracks of every aircraft operating near the Pantex Plant. This data has been analyzed by Dr. Y.T. Lin of Sandia labs. In his paper, "Assessment of Aircraft Risk Reduction at Pantex Plant," he uses actual RAMS data to compute the probability density function for aircraft distance from Zone 4 for all recorded aircraft, Dr. Lin uses his data to make three relevant points: 1) It shows dramatic differences in overflight activity on days when the USAF is flying compared to days when there are no military flights. 2) Only a small fraction of all flights approach within 2 miles of Zone 4. 3) The daily total of high altitude and low altitude en route flights provide no clue as to the location of the VOR or of the FAA route structure. These flights are better modeled as uniformly distributed. Can Dr. Lin's approach to analyzing RAMS data be used to demonstrate efficacy of mitigation measures?

Response: *Dr. Lin's approach could be used to analyze the effect of the mitigation measures. However, this would be inconsistent with the Draft DOE Standard (DOE 1996g), as written.*

RC: 15.105
Doc: SG-003/107

The proposed DOE Standard 3014-96, uses a hierarchical accident analysis scheme starting with simple, conservative models and progressing towards complex, accurate models. A screening level of risk <1E-6/yr is recommended. If at any point in the progression, the aircraft crash probability falls below this level, no further analysis is required. It is presumed that other initiating events become more important than aircraft accidents at this probability level. There are two problems with this approach. First, it leads some to believe that only when the aircraft accident probability is below 1E-6/(sq mi/yr) has an adequate margin of safety been provided. Second, the base accident rate for general aviation aircraft is on the order of 500/yr over 4,000,000 sq mi, or about 1E-4/(sq mi/yr). There are four other categories of aircraft in the DOE guidelines, each with their own accident rate: large military, small military, commercial air carrier and commercial air taxi. Thus, the total aircraft accident probability in the continental United States is above the screening rate, and full analysis is mandated by the DOE standard. DOE should very clearly explain the meaning of their screening level and of any aircraft accident probabilities computed for the Pantex EIS. The Pantex EIS will be the first to use the new geographic based guidelines. Other DOE laboratories and locations have analyzed their aircraft accident risk using earlier draft guidelines. Since DOE claims the aircraft accident model is designed to compare relative risk among DOE facilities, the revised predictions for all DOE sites should be included in the Pantex EIS. This means that the new guidelines need to be applied to all DOE operating locations so that Pantex can be viewed in proper relationship to the others.

Response: *The screening criteria has been more clearly defined in the Draft DOE Standard (DOE 1996g), and this Standard has been applied to all alternative sites in the Final EIS.*

RC: 15.106
Doc: SG-003/108

Although the geographic modeling approach is an interesting exercise, the EIS should also contain complete Amarillo Aircraft accident data from 1970 to 1996. This data should then be explained in the context of the aircraft accident model. That is, based on the accident model, is the real experience an expected outcome? Suggest using the binomial distribution to estimate the confidence in the predicted accident rate. Use confidence interval principles to determine if the location and frequency of observed accidents are in reasonable agreement with the model.

Response:. *Your suggestion has been taken into consideration. Attempts have been made to quantify uncertainty and compare predicted results with historic accident data in the Final EIS.*

RC: 15.107
Doc: SG-003/109

Personnel at HQ DOE understand the difficulty of explaining the aircraft accident probabilities to the public. In a lively discussion at SAIC on 9 Jul 96, hosted by Tim Haley and chaired by Kamiar Jamali, the suggestion was made that EIS analyses not report the aircraft accident probabilities. These probabilities are intermediate results from the model and do not indicate public health risk. An accident is merely a potential initiating event. The suggestion was that the EIS should focus on the release probabilities, instead. This movement from "hit probability" to "release probability" involves many intermediate layers of modeling. First, one must assume the angle of impact for the aircraft. Second, assume an impact velocity and compute the skid distance during which the aircraft retains sufficient kinetic energy to penetrate a storage magazine or transport trailer and storage container. Third, compute the probability that an aircraft will impact within the dangerous skid distance from the facility heading toward that facility. Fourth, compute the probability that a fire or a dense part of the aircraft will penetrate or destroy the facility. Clearly, the probability that all of the above events occur together is many orders of magnitude smaller than the simple probability that an aircraft hits near a critical facility or transporter. It is also clear that values assigned to the coefficient for each step affect the confidence interval about the point estimate of the release probability. The understandable tendency is to assign worst case values to all parameters to create an upper bound on the estimated release probability. For purposes of communicating to the public, it is desired to have an estimate of the central tendency, the median or the mean value of the release probability as well. Include both the worst case and the mean value of the release probability due to aircraft accidents. The difference between point estimates of the worst case and of the typical case will give public officials an internally consistent estimate of the safety factors built into the prediction algorithm used.

Response: *An effort has been made in the Final EIS to provide the requested additional information. It is our belief that the aircraft crash scenario was analyzed to the point where it was demonstrated that aircraft crash risk is one to two orders of magnitude less than other risks associated with Pantex Plant operations.*

RC: 15.108
Doc: SG-003/110

Not all structures proposed for storage and handling operations at Pantex are constructed in the manner and with the materials assumed in the DOE structural vulnerability analysis. That analysis seems to assume standard rebar reinforced concrete construction techniques. At Pantex there are some facilities that are more stout and some that are less stout than the analysis in the draft EIS seems to assume. Bundling the stout structures into the analysis probably creates a pessimistic estimate of the true risk of release. Suggest DOE obtain data from a test involving crashing an F-4 into a section of a commercial reactor containment vessel. Use that data as a basis for assessing the likelihood that a small military aircraft crash could be an initiating event for a release incident in a stout structure. Then assess the effect on the overall risk to Pantex operations.

Response: *See response to comment 15.097.*

RC: 15.109
Doc: SG-003/111

The present model seems to assume that an accident that results in internal spalling of a structure will produce a release. This assumption seems overly conservative for pits stored in approved storage or shipping containers. Again, the data from the F4 Crash Test may provide valuable clues to the appropriateness of the analytical assumptions in the release models. Clarify in the EIS the release probability from spalling incidents. This may be one of the factors leading to an overly pessimistic assessment of the consequences of an aircraft accident. Since pits will be stored without chemical explosives, spalling seems an unlikely source for damaging both the storage container and the cladding on the pit.

Response: *This suggestion has been included in the Final EIS. Concrete scabbing leading to release is more fully characterized and more accurate results are presented in the Final EIS.*

RC: 15.110
Doc: SG-003/112

In the aircraft accident consequence analysis, the DOE model assumes that either a direct impact or a skidding impact can lead to a release. The model assumes that the aircraft (or its dense structures acting as kinetic missiles) retains dangerous velocities for the entire skid. In reality, the velocity slows continuously during the skid. The target area is computed from the actual facility dimensions, the aircraft wingspan and the skid distance. The skid distance is the dominant factor in target area. Why not use a linearly decreasing velocity as a conservative means for estimating remaining kinetic energy during a skid? This would dramatically reduce the area involved in target zones and would refine the point estimate of critical aircraft accident probability.

Response: *See response to comment 15.074.*

RC: 15.111
Doc: SG-003/113

The structural damage modeling assumes all aircraft in a single FAA category pose similar risk to structures. These categories are useful for licensing, air traffic control and taxing purposes, but may not be ideal for accident analysis. For example, both a T-37 and an F-15 are included in the small military category. The T-37 has much less kinetic energy than an F-15, and has much smaller components that could become missiles. The damage potential of a T-37 matches that of many general aviation aircraft better than it does an F-15. Nevertheless, the default portions of the DOE guidelines treats them identically. Why does DOE use FAA categories rather that a more technical criteria to group aircraft? Suggest a product of wing loading and gross weight as a better metric. Aircraft with high wing loading always approach faster than those with low wing loading. Aircraft with high gross weights always have more stout pieces in their structures and engines than aircraft with low gross weights.

Response: *The FAA categories have been used in the Final EIS, in accordance with the Draft DOE Standard (DOE 1996g). However, use of parameters specific to a certain aircraft type have been utilized. For instance, the T-38 and other dominant aircraft are addressed separately. There is less than a five percent difference in the results.*

RC: 15.112
Doc: SG-003/114

Dr. Lin's analysis of nearest point of approach for each flight trajectory provides an alternative for site-specific accident modeling. It is not likely that his work can be extended to a full analysis of RAMS data within the promised schedule for the final EIS. However, his work does suggest that a careful examination of consequence analysis assumptions may be in order. One is tempted to believe that aircraft flying directly over a facility may pose the greatest risk. However, any aircraft impacting a facility from within a cone above that facility must impact at a very large glide slope angle. At angles greater than 30 degrees, there is virtually no skid distance. Thus the facility floor plan is the target area for impact from above. Because this area is much smaller than that assumed in the DOE guidelines, the probability of this accident is much smaller. Can the distribution of the points of closest approach be used to determine both the slant range and the line of sight angle to critical facilities? The effective target area for each facility will depend strongly on the impact angle. This effect is not included in the DOE guidelines because they default to a specified point estimate of the impact angle. The basis for this assumption is apparently discussed in the technical support documents for the DOE Standard, but that is not yet published, and may not be published for several more months. A Monte Carlo analysis is likely the right means for accommodating this important effect.

Response: *A suggestion was made to the authors of the Draft DOE Standard to allow for the use of RAMS distances to the facilities of concern. The suggestion of a Monte Carlo analysis was taken under consideration. However, as the commentor has stated, these alternate methodologies are unlikely to be available with sufficient time to meet the schedule of the EIS.*

RC: 15.113
Doc: SG-003/115

A full risk assessment of aircraft accident potential would include a term for a collision between an aircraft and a transport trailer, either on site during transport between structures or off site during cross country transport. No such term is evident in the draft EIS. Suggest that the probability of an aircraft accident impacting a transporter be computed. Due to the short duration of exposure while in transit, it is expected that this risk will be shown to be negligible compared with other risks associated with fixed storage facilities.

Response: *See response to comment 15.078.*

RC: 15.114
Doc: SG-003/116

The tiered approach to aircraft accident modeling encourages the analyst to perform increasingly complex computations if the screening level has been exceeded in the prior step. The next step for the Pantex modeling effort involves using actual aircraft specific accident rates rather than using average accident rates for each of the identified five aircraft categories. It is also possible to use available accident rates for the most commonly observed aircraft in a category and to use the category specific rates for the remainder. If accident rates are assigned to specific aircraft (such as the USAF T-1, T-37 and T-38 aircraft), then verify that the appropriate rates are used for the remaining aircraft in that category. These may be derived from aircraft specific accident data or estimated by marginal analysis of the entire category to determine the portion of the accident rate appropriate to the remaining aircraft types.

Response: *Specific rates for large and small military aircraft have been used in the Final EIS. Results show a less than five percent change with additional level of detail.*

RC: 15.115
Doc: PC-028/11

Per Vol II, page E-23, para E.3.2. There is [no] automatic fire detection capability nor prompt response from local firefighters. This is a serious problem even if the rock overburden would shield the pit storage area from aircraft crashes. There is still the ground attendant problems of [a] mix of ground vehicles and equipment and humans.

Response: *Any damage that could be inflicted on the Manzano WSA bunkers is dominated by the aircraft accident scenario. As is stated in section E.3.2.4 of volume II, the pit storage at Manzano will be done in certified Type B containers. Minor damage to the facility due to aircraft crash is not anticipated to cause damage to the containers sufficient enough to cause a plutonium release. As a result, any damage that could be caused by ground personnel or vehicle accidents is not sufficient enough to cause a plutonium release.*

RC: 15.116
Doc: FG-002/1

Regarding the Pantex Site-Wide Draft Environmental Impact Statement, I believe the analysis of the "airplane crash" scenario is deficient. How can it be that the probability of a crash causing a release has increased since your 1994 Finding of No Significant Impact, particularly after Pantex and the Amarillo Airport have worked together to reduce overflights of the plant and taken other preventative measures? I urge the DoE to correct the analytical errors and act to avoid wrongfully depriving Pantex of future functions for which it may be selected.

Response: *See discussion in section 1.3.11 in this volume regarding the results of the previous analysis.*

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3.16 Intersite Transportation of Nuclear and Hazardous Materials

RC: 16.001
Doc: HT11/5

What would be the route that you would transport this to the test site?

Response:

For an elaboration on the response given at the public hearing, see discussion in section 1.3.12 of this volume.

RC: 16.002
Doc:HT11/6

What about...the freeway system?

Response:

For an elaboration on the response given at the public hearing, see discussion in section 1.3.12 of this volume.

RC: 16.003
Doc:HT11/7

Are these the transport system...highway route control monitors. Would they be managed so that they would fall into that category?... They can be managed such that they do not fall into the highway route control formula. If they fall into that category, we have lots of notifications for things like that. In fact, you have truck drivers in that situation that would not be allowed to leave their vehicles.

Response:

For an elaboration on the response given at the public hearing, see discussion in section 1.3.12 of this volume.

RC: 16.004
Doc: HT11/8

And then you would...be briefed on this if they were expecting to be highway routes. So my assumption is that they are not at this point expecting to load anything from highway routes in quantity. That doesn't have anything to do [with] Federal marshals; that has to do with notification of states....

Response:

For an elaboration on the response given at the public hearing, see discussion in section 1.3.12 of this volume.

RC: 16.005
Doc: HT11/12

How many shipments would come to the test site for the 8,000 versus the 20,000 container of pits?

Response:

To elaborate on the response given at the public hearing, the exact number of pit containers that would be transferred per Safe Secure Tractor Trailer is classified information. However, it would be between 20 and 30. This translates into between 400 and 600 shipments to transfer 12,000 pits.

RC: 16.006
Doc: HT11/13

And that would be over how long, what time period is that?

Response:

To elaborate on the response given at the public hearing, at the rate of approximately 2,000 pits per year, it would take about 10 years to relocate 20,000 pits and 4 years to relocate 8,000 pits.

RC: 16.007
Doc: HT11/14

And if there were an accident along the route, do you...have any emergency response ideas?...

Response:

To elaborate on the response given at the public hearing, the emergency response plans and programs for the Transportation Safeguards Division (TSD) are voluminous and inappropriate for verbatim inclusion in the EIS. In general, TSD's emergency response plans involve a tiered organizational response to radiological incidents. In Tier 0, local law enforcement and TSD couriers assess the severity of the accident and determine the need for radiological assistance. Tier I involves the deployment of Radiological Assistance Teams (RATs), a Regional Response Coordinator (RRC), and Public Affairs Office (PAO) personnel. These personnel will have appropriate monitoring and communications equipment to assess the radiological status of the incident. At Tier II, additional technical expertise is provided to the response group. At Tier III, the accident response group will assist in recovery, repackaging, and decontamination operations. These four tiers correspond, respectively, to the following levels: (0) no structural damage and no potential for public controversy, (I) status of unknown or limited damage, (II) excessive damage of Safe Secure Tractor Trailers (SST) or shipment, and (III) radiological release cleanup/repackaging required.

Additional national emergency response resources from around the Nation are available if the severity of an SST convoy incident warrants such a call.

RC: 16.008
Doc: HT11/15

And you'd be using common carriers or contract carriers?

Response:

To elaborate on the response given at the public hearing, commercial carriers are used for radioactive waste shipments from Pantex Plant to Nevada Test Site. Pits would be transported in Safe Secure Tractor Trailers.

RC: 16.009
Doc: HT11/20

The other thing is, during the risk assessment for transportation, was this the 1000 shipments over a six-year period? Was there any cumulative studies done on how that might impact with other shipments of waste proposed and currently planned through Nevada in terms of a cumulative impact risk assessment?

Response:

Details on cumulative impacts have been added to volume I, section 4.16.5.

RC:16.010
Doc: HT11/21

What would you say [is] the amount of shipments at this time per week into the Nevada Test Site?... Do you have an approximate [number]?

Response:

To elaborate on the response given at the public hearing, Pantex waste shipments are minimal compared with other sites that ship to the Nevada Test Site (NTS). The maximum yearly shipment to NTS from Pantex was 28 shipments. The projected shipment rate from Pantex is less than the average occurring over the past three years. More details of radioactive waste shipments to NTS can be found in the Waste Management PEIS or the NTS Sitewide EIS.

RC: 16.011
Doc: HT11/29

... Are they [of] legal weight?

Response:

To elaborate on the response given at the public hearing, Safe Secure Tractor Trailers (SSTs) are legal weight trucks. The class of general commerce vehicles that most closely matches the SST in physical characteristics and travel distribution is the 5-axle, tractor-semitrailer with a van cargo body and a 60–80,000 pound gross combination weight.

RC: 16.012
Doc: HT11/30

What routes would you use?

Response:

See discussion in section 1.3.12 of this volume.

RC: 16.013
Doc: HT11/31

... My name is Russell Dibartolo;...I'm with the Clark County, Nevada Department of Comprehensive Planning, Nuclear Waste Division. And my particular area has to do with impact assessment and review of Department of Energy impact assessments or...environmental impact statement activities.

One of the major things that we have found with a number of Department of Energy EISs or environmental assessments is that we feel that they unrealistically limit their regions of influence that are studied. If you studied, for instance, the Nevada Test Site within a 50-mile radius, you are leaving out with regard to any potential impacts or risks, over a million people or two-thirds of the population of the State of Nevada when you're dealing with shipments to the Nevada Test Site.

So one of the major requests we would have of you, the individuals preparing this particular EIS and others within the DOE complex, is that you take a very good look at the space between the sites. The [area] between the sites, [which] in this case is the Clark County metropolitan area also known as the Las Vegas valley metropolitan area.

We're primarily concerned with the routing of this material. There are certain areas in Clark County that we know of that are very high in accident rates. We know that there are a number of areas in Clark County where there's construction anticipated on the interstate and U.S. highways. This construction program [is] to last about 10 years. We know there's a high correlation between construction, congestion, and accidents, and we would like you to take that into account.

Response:

The region of influence as defined for the Nevada Test Site is not the same as the population distributions used in the transportation risk modeling. The transportation risk model uses 1990 census block data to determine the population distributions along Transportation Safeguards Division routes.

See general discussion on intersite transportation in section 1.3.12 of this volume for routing information.

RC: 16.014
Doc: HT11/36

You should also know that the Nevada Test Site has established for their EIS process a transportation advisory group, and within that group is a smaller subgroup or team that's called a protocol working group. This particular working group has already provided recommendations and census recommendations among a number of local governments and other interested individuals or groups that have already been sent to the Department of Energy prior to the comment deadline.

They are already working and addressing this, and this particular protocol working group or transportation advisory group has turned out to be a very good vehicle for our interactions. ...It's Frank DiSanza who is head of that program.... He works with DOE Nevada, and...they have...brought together that group. That group meets on an as-needed basis, generally once every two months. The transportation advisory group meets usually about once every quarter, and that's been going on for probably a little bit more than a year.

And it came up for shipments such as this. There were shipments that were planned to come in through North Las Vegas. North Las Vegas by accident heard about them. Turns out that they were just a very few shipments going to the test site cutting across Craig Road, which is a convenient way...—if you're going south on I-15 and you go north on U.S. 95, it's a very good cut-off.

North Las Vegas officials became very concerned about that, and I was working at the university then as a consultant and was brought in to help facilitate meetings. And...from the need that was seen for that, we developed this transportation advisory group, and it has worked very well.

Response: *See discussion in section 1.3.12 of this volume.*

RC: 16.015
Doc: HT14/4

... The transportation of plutonium and special nuclear materials to Hanford storage will require careful planning of routes and consideration of weather emergencies to minimize the likelihood of an accident. Emergency preparedness for minimizing the impacts of an accident will require financial support from DOE for State, tribal and local involvement, including adequate equipment and training. When materials are shipped, timely notification should be provided to the transportation agencies.

Response: *See discussion in section 1.3.12 of this volume.*

RC: 16.016
Doc: HT02-16/1

It is too dangerous to transport as well.

Response: *The risks associated with proposed pit shipments are described in volume I, section 4.16 of this volume.*

RC: 16.017
Doc: HT13/16

... To clarify, who is doing the certification?

Response: *To elaborate on the response given at the public hearing, the AT–400A container is currently undergoing certification testing at Sandia National Laboratories (SNL). The performance criteria that the package designer must use to assess Type B packaging against these empirically established hypothetical accident test conditions of the transport are prescribed in the Nuclear Regulatory Commission regulations (10 CFR 71.73) and are discussed in volume II, appendix F of this document.*

Following certification testing by SNL, DOE will develop a Safety Analysis Report for Packaging (SARP) for the AT–400A. SARP provides DOE with a detailed safety analysis and risk assessment of the container's performance for its intended mission and expected useful lifetime. Following acceptance of the final SARP, DOE will issue a certification for the AT–400A. The schedule for SARP is not yet available.

RC:16.018
Doc: HT13/41

Will Lawrence Livermore and Los Alamos be shipping different sorts of compositions to Pantex and expecting them to do the machining and tooling?

[Unidentified Speaker: I would presume whatever the role that is identified for Livermore and Los Alamos in the stockpile stewardship and management that it will be supported by Pantex in their mission.]

Response: *To elaborate on the response given at the public hearing, transferring the HE fabrication mission from Pantex Plant to Los Alamos National Laboratory (LANL) and/or Lawrence Livermore National Laboratories (LLNL) would require an estimated 150 rebuilds to be shipped per year from the high explosive (HE) fabrication site to the weapons assembly/disassembly site. The accident risk from transporting this material would be no greater than the risk encountered by the public from industry's transport of similar explosives. Transferring all or part of the HE fabrication mission from Pantex to LANL and/or LLNL would require an estimated 12 round trips per year to transport HE materials including the return of scrap HE to the laboratories.*

RC: 16.019
Doc: HT13/50

In that model, there are several options for how you input the human population numbers along the transportation route. Can you tell me,...for the input of population data into those model runs, which of those options were used? Are there some default values, such as rural is one person per square mile, urban is five persons per square [mile], suburban is 2.5, [or are there]...more specific ways to enter population data into the model?

Response: *The ADROIT code uses population information from the 1990 census. For incident free calculations, the uniform population density along transport routes was obtained by determining the maximum population density in census blocks perpendicular to each roadway segment extended out to 30 kilometers. This maximum population density was used as the uniform population density for that road segment. For accident calculations, 1990 census block data were used for the affected populations from postulated dispersal accidents.*

RC: 16.020 **Doc: HT13/51**	The default values are also calculated from the 1990 census. I think my question was more specific in that we have this route, I-40, between Amarillo and Manzano, and I am wondering whether actual population data for, let's say, a quarter mile, approximately, on either side of I-40 between Manzano and Pantex, is that the sort of information that was used, or was it just the default value plugged in where the default value also comes with the [1990] census, but it is like a statewide average or a regional average for rural and suburban?
Response:	*Please see response to comment 16.019.*

RC: 16.021 **Doc:HT13/52**	Could you give me an answer in sufficient time so I could submit a written comment about the values before the deadline?
Response:	*Please see response to comment 16.019.*

RC: 16.022 **Doc: HT13/57**	I just want to make sure I understood. Would you repeat what you said about the drop onto a spike in terms of transportation testing? Would you then explain why on page 4-256 of the document it says the puncture test is a free drop of 40 inches onto a 15-centimeter diameter steel pin? Again, to clarify, because I am trying to understand what is the information people should rely on, on page 4-256, the 30-foot drop test [that] you talked about, and this is a quote, "a 9-meter (30-foot) drop onto an unyielding surface." It is not onto a pin or a spike. It is onto a flat, unyielding surface. I just want to clarify what you are saying in relation to what is in the document. [Unidentified Speaker: In the document that was identified or accepted by the Department of Energy for its container certification, and I assume you are talking about the AT-400 certification, there are three tests that are done. One is a 9-meter or approximately 30-foot drop test. The other is a drop test on an unyielding object. The other test is a puncturing test where they drop it from a lesser distance, and I believe it is 40 or 50 centimeters, I am not sure, on the spike that they are talking about.] These tests are done in sequence, and then there is also a temperature test. Those tests are done and required by the NRC for certification of over-the-road transport of special nuclear material. [Unidentified Speaker: I do want to point out that in these documents, please go back for very specific measurements to the document.]
Response:	*The testing requirements for certification of Type B packages is provided in volume II, appendix F.*

RC: 16.023 **Doc: HT13/69**	So if you are transporting 8,000 pits, and somebody gets a hold of a shipment — I forget how may pits are on the typical shipment. [Ms. Founds: About 20.]

	So somebody got a hold of 20 pits and decided to poke holes in them.
Response:	*The threat of hijacking is taken seriously by DOE. The security policies, procedures, and resources in place minimize the threat to TSD shipments.*

RC: 16.024 **Doc: HT13/70**	What is the material that is so powerful? How thick is this?
Response:	*Design information for the AT–400A container is provided in volume II, appendix F.*

RC: 16.025 **Doc: HT13/71**	Somebody passed me this dice diagram, AL-R8, and this is what you were telling me was the container that was so secure that nobody could ever get a hole through it? It is a quarter-inch stainless steel, this new one that is proposed that isn't yet being used.... So you are saying you don't think it would be possible for anybody to get that container open following a transportation accident because of that quarter-inch of stainless steel? Well, again, the credibility of believing...that there would be no possibility whatsoever that that container could be breached under any sort of accident scenario.
Response:	*Potential offsite transportation accidents resulting in plutonium dispersal from AT–400A containers are described in volume I, section 4.16.4.*

RC: 16.026 **Doc: CO-003/5**	The transportation of plutonium and special nuclear materials to Hanford storage will require careful planning of routes and consideration of weather emergencies to minimize the likelihood of an accident. Emergency preparedness for minimizing the impacts from an accident will require financial support from DOE for State, tribal, and local involvement, including adequate equipment and training. When materials are shipped, timely notification should be provided to transportation agencies.
Response:	*See discussion in section 1.3.12 of this volume.*

RC: 16.027 **Doc: CO-010/2**	An additional area of concern would be the "major issue" of transportation of the excess plutonium materials to the Hanford Site. We believe that the Draft EIS needs to more fully evaluate the hazards and mitigation measures [that] would need to be implemented in support of the transportation of significant amounts of these materials to the Hanford Site.
Response:	*The Pantex EIS analyzed the risks associated with the shipment of pits to the Hanford Site. The EIS analysis considers all potential accidents that could lead to a release of hazardous material. The analysis considered all combinations (and inter-dependence) of puncture, crush, impact, and fire environments.*

RC: 16.028 **Doc: CO-006/3**	Accurate comparisons between all sites under consideration should once again make Pantex the preferred site. Maintaining and expanding the interim storage facilities at Pantex would all but eliminate the significant transport costs, and the attendant environmental and political risks involved with moving these

functions to [another] site. Eliminating the unnecessary transportation of radioactive materials, will translate into less cost and greater public safety and protection. Ignoring or miscalculating the risks and costs associated with weapons materials would be a serious omission.

Response: *A description of the transportation of plutonium pits and the expected increase in risk is presented in volume I, section 4.16. No attempt was made to estimate the cost of transporting pits.*

RC: 16.029
Doc: HT15/35

I don't believe that there was the same degree of detail according to the review of hazardous material as there may have been to the radiological aspects of transportation. ...Aspects of transportation [are discussed], but not in the potential for explosion, potential for HAZMAT spill, those sort of things in transportation in the transportation section. And I didn't see those addressed as potential candidate scenarios.

Response: *All hazardous material shipments are transported via commercial carriers in full compliance with applicable DOT regulations. Pantex Plant type operations do not consume or produce large quantities of hazardous chemicals. Consequently, the risks associated with Pantex Plant hazardous chemical shipments are no greater than those associated with other industrial facilities. Further information on the types and quantities of hazardous chemical shipments associated with Pantex Plant operations is available in the Safety Information Document (Pantex 1996a).*

RC: 16.030
Doc: PC-017/13

If transportation of toxic materials and/or radiation materials to other sites poses a threat to [people] along [the routes] of transportation and to other travelers along the roadways, why would the storage of those substances not pose a greater threat to the health and safety of residents and workers at or near Pantex? We will have long-term, 24 hours per day exposure, which will be much greater than the meeting of a fellow traveler along the interstate or the exposure of someone in a roadside park.

Response: *The storage of pits in Zone 4 magazines does not result in radiological doses to the communities surrounding Pantex Plant.*

RC: 16.031
Doc: SG-012/10

Transportation of the pits is a very serious task. What assurances exist for safe transportation? For example, are the transporters meeting speed limits, obeying other traffic rules and using defensive driving techniques to reduce transportation risks? If drivers are [not] complying with safe driving techniques, accident risks are increased. These concerns should be addressed in the DEIS.

Response: *Armed Nuclear Materials Couriers accompany each shipment containing special nuclear material. They also drive the highway tractors and escort vehicles while operating the communications and other convoy equipment. Couriers are required to obey all traffic laws. Transportation Safeguards Division (TSD) makes every effort to ensure its convoys do not travel during periods of inclement weather. Should the convoys encounter adverse weather,* *provisions exist for the convoys to seek secure shelter at previously identified facilities. The TSD has also imposed a maximum 55-mile per hour speed limit on its convoys, even if the posted speed limit is greater.*

RC: 16.032
Doc: MG-002/5

The Region of Influence (ROI) for the NTS alternative must be expanded to include the Clark County Urban Area through which all shipments are planned. As with other DOE EISs, the defined region of influence for the assessment of impacts is 50 miles. From Clark County's standpoint, this is a major flaw in the study since the bulk of the impacts would result from the transportation of the plutonium pits and not the storage itself. This is because the storage technology is relatively advanced and the possible NTS storage sites are [well] isolated and controlled. Use of the ROI practically guarantees findings of no impact. However, all highway routes that are under consideration for shipment of the plutonium pits pass through the most congested areas of the State of Nevada on roads that are undergoing major construction, and in areas where the number of accidents and accident rates are the highest in the State.

Response: *See response to comment 16.013.*

RC: 16.033
Doc: MG-002/6

Perceptions of Risk. The interstate route [I-15] historically used for DOE shipments to the NTS and now being considered for the additional Pantex shipments is within one-half mile of the Las Vegas Strip and downtown area. This is among the most popular tourist destinations in the country. This means that over 3,000,000 tourists who visit this area annually would be exposed to transportation safety risks and may perceive the area as dangerous and/or one to avoid, even under incident-free operation. Should even a minor incident (e.g., unanticipated stoppage) or accident occur in this area, perceptions of its seriousness may be amplified to a point that fewer people may choose this area as their pleasure or business destinations. Even a minor downturn in the tourist cycle could have a devastating effect on the southern Nevada economy. Although the effects of perceived risk are not easily quantifiable, this variable must be taken into account as routes are screened and evaluated.

Response: *We agree that perceived risks are not easily quantified. The socioeconomic impacts of such perceived risks are even more difficult to evaluate. However, a statement characterizing this potential has been added to the appropriate sections of the EIS.*

RC:16.034
Doc: MG-002/8

Accident Analysis and Emergency Management Measures. Another example of the serious constriction placed on impact assessment by a 50-mile ROI has to do with the analysis of accidents and need for emergency management measures. Because the ROI takes into account only on-site areas, the impacts are so small as to be judged insignificant, and transportation and emergency and emergency safety issues do not need to addressed. Further, the new storage/ transportation container, the AT-400A, now under development, has not had real world experience and its operational characteristics and vulnerability to acts of terrorism are open to question. Again, this becomes insignificant if impacts are not being considered outside the narrowly-defined ROI. In summary, we feel that all impacts that have been addressed in the DEIS must be reconsidered using at least a 100-mile radius from the Mercury entrance to the NTS in order to arrive at a realistic appraisal of potential impacts of relocation of the pits to that site. This would lead to a realistic appraisal of potential impacts due to transportation, the most public aspect of siting a storage area for plutonium pits (and other waste) at the NTS.

Response: *See response to comment 16.013.*

RC: 16.035
Doc: MG-002/9

While we accept the findings of the transportation risk analysis that is based on the probability of a occurrence times its consequences, we are not convinced of the validity of this approach for shipments to the NTS. The Clark County Urban Area, with Las Vegas as its hub, contains the major concentration of traffic and congestion in this mainly rural county. When the population, traffic, impedance, distance and other variables for links in the urban area are aggregated with those of all other links on a potential route, inside and outside Nevada, the relative weight and importance of the urban links is diminished. This then leads to a smoothing of the data and the usual result of insignificant risk. We ask that the DOE take another tack in assessing risk and resultant impact of transportation of nuclear materials, that of comparative risk assessment as endorsed by the U.S. Department of Transportation in its Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials, August 1992. This approach places emphasis on comparison of routes on variables that are important in decision-making processes, rather than on probability figures that are almost always insignificant and not interpretable to government decision-makers. For example, comparison may be made on exposure of special populations, impact on environmentally sensitive areas and even relative risk of negative perceptions. This type of analysis on prospective routes selected for analysis in cooperation with affected jurisdictions would provide understandable results and a higher level of confidence in DOE actions than is not the case. As you know, Clark County is willing to provide up-to-date information for your use in such an approach.

Response: *The transportation analysis used in the EIS evaluates accidents occurring in both rural and urban areas. The Pantex EIS evaluates impacts associated with the defined alternative of relocating pit storage from the Pantex Plant. Included in the analysis are impacts associated with transporting pits to alternative storage sites by DOE's Transportation Safeguards Division (TSD). DOE is not using the Pantex EIS to decide between routes that will be utilized by TSD and as such, comparative routing analysis is inappropriate for the Pantex EIS. Routes utilized by TSD are classified, compartmented information and may not be disseminated except to persons with appropriate security clearance and a need to know.*

TSD operations are in compliance with the requirements of 49 CFR 177 for selecting, notifying drivers of, and adhering to preferred routes. The majority of

TSD travel (90 percent) is over interstate highway; the remaining 10 percent is over routes that meet the conditions for deviating from the preferred route when safety or security dictate such deviation. Regulations permit TSD deviation from the requirements regarding notification of the routes used.

TSD personnel are briefed on construction, congestion, and severe weather along the route prior to travel. TSD crews make every effort to alter a route or change travel time to avoid potential traffic hazards.

There is no "smoothing" of the risk due to sparsely populated rural areas. The probability of a potential accident and the consequences of potential accidents are dominated by the urban areas.

RC: 16.036
Doc: SG-011/1

Please provide information on the metric ton amount of depleted uranium currently stored on the Oak Ridge Reservation (ORR) and the metric ton amount that will be shipped from the Pantex facility. Please provide the historical metric ton amount of depleted uranium at the ORR. Also provide information on the environmental impacts for the interim storage of depleted uranium at the ORR. The Division contends that if the historical levels of depleted uranium stored (interim) at the ORR are exceeded, additional NEPA documentation should be prepared to adequately address the impacts to human health and the environment.

Response:

The Pantex Plant EIS considers the environmental impacts associated with shipments of weapons and weapons components (including highly enriched uranium and depleted uranium) related to Pantex Plant operations. The record of decision for the Pantex EIS will detail DOE's plans for interim storage of plutonium components (pits). Impacts related to interim storage of depleted uranium at Oak Ridge Reservation are not relevant to the decisions resulting from the Pantex Plant EIS.

RC: 16.037
Doc: PC-025/10

If weapons are shipped around the world without an AT-400A style container, why does the [plutonium] require a special container? Doesn't a weapon pose the greater risk potential?

Response:

The risks associated with nuclear weapons shipments are discussed in volume I, section 4.14. Department of Transportation regulations and DOE orders require the use of a certified Type B package for plutonium pit shipments.

RC: 16.038
Doc: PC-025/84

General comment sections 4.15 and 4.16. Please provide information on the level of quality assurance/quality control (QA/QC) defending the analyses of these sections. I would like the same information as requested on water and air quality sections of this EIS.

Response:

The quality assurance/quality control (QA/QC) of the referenced sections of the Draft EIS, as well as the entire document, was conducted in accordance with the Tetra Tech Quality Assurance Program Plan (TT 1995). The program is tailored for preparation of the EIS and to meet DOE Order 5700.6C and NQA-1

(ASME 1994), as appropriate. For detailed information, refer to these documents.

The assessments (including methodologies, models, and results) of human health impacts for volume I, sections 4.14 and 4.16, as well as the aircraft accident assessment in volume I, section 4.15, were subjected to a multiple level technical peer review process to ensure technical validity. Included in this review process was: (1) the analyst's immediate supervisor, (2) the functional area manager, (3) technical experts from the Amarillo Area Office, and (4) technical experts from the Albuquerque Operations office.

Additionally, the assessments (including methodologies, models, and results) of human health impacts for volume I, sections 4.14 and 4.16 as well as the aircraft accident assessment in volume I, section 4.15 were exposed to extensive peer reviews. These reviews included two workshops occurring over several weeks along with independent supporting analysis by the workshop participants. The participants included representatives from DOE, Sandia National Laboratories, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the Defense Nuclear Facility Safety Board as well as nuclear safety experts from private organizations.

Additionally, these assessments were peer reviewed by DOE Headquarters Technical Safety Review Panel. This group is made up of safety experts throughout the DOE complex whose main responsibility is providing safety analysis guidance to Pantex Plant.

During the public review process, the assessments (including methodologies, models, and results) of human health impacts for volume I, sections 4.14 and 4.16, as well as the aircraft accident assessment in volume I, section 4.15, were reviewed by a group of independent scientists from Texas A&M and the University of Texas.

RC:16.039
Doc: PC-025/85

If the FL container is the only certified container available for shipment purposes, would DOE use the FL container to ease the 12,000 limit on Pantex if the AT-400A is not available? Is this a reasonable alternative requiring DOE to analyze the use of the FL containers to prevent a shutdown at Pantex?

Response:

The alternatives considered in this EIS are container independent. However, DOE considers the AT–400A container as the most likely to be used if the Secretary decides to choose a pit relocation alternative. DOE currently possesses a limited number of FL-containers (approximately 300). A significant fraction of these containers are in use at other facilities. The purchase of a large number of FL-containers is not practical from either a programmatic or a safety perspective. DOE has committed to the development of a container that will enable compliance with the latest Nuclear Regulatory Commission (NRC) Type B package certification testing requirements. The NRC recently modified the certification testing requirements for Type B packages. The AT–400A is being tested to meet these newer, more stringent requirements. However, no data currently exist to prove that the FL-container will meet the newer requirements.

The FL-container will retain its Type B certification based on previous certification testing. However, this certification will be valid only for those containers currently owned by DOE. DOE is committed to the development of a pit container that meets the latest regulatory requirements.

RC:16.040
Doc: PC-025/86

If the FL container is certified, why doesn't DOE order more FLs for storage purposes?

Response: *See response to comment 16.039.*

RC:16.041
Doc: PC-025/96

... How many AT–400A containers are in existence? Does this pose a problem, please analyze?

Response: *The design of the AT–400A container is currently being finalized. There are only a few prototype containers in existence. Full scale production is expected to begin at Pantex Plant in late 1996 or in early 1997.*

RC: 16.042
Doc: PC-025/97

... Is it not reasonable that the most harmful event is a collision [with] heavy truck resulting in a rollover and fire. It appears that the event tree is linear rather than dynamic. Thus the analysis overlooks the compounding effects and thus the maximum impacts.

Response: *All potential accidents that could lead to a release of hazardous material are included in the databases used in the analysis. The analysis considered all combinations (and interdependence) of puncture, crush, impact, and fire environments. Further detail on the methodology and supporting documents can be found in volume II, appendix F.*

RC: 16.043
Doc: CO-008/118

... How will the Texas Department of Public Safety and local emergency medical services be handled in the Intersite Transportation Impact Assessment? Will the safety analysis developed by DOE be acceptable to the Texas Department of Transportation?

Response: *See discussion in section 1.3.12 of this volume.*

RC: 16.044
Doc: CO-008/119

Page 4-262, Paragraph 3. Paragraph states, "These shipments are made in full compliance with all applicable DOT regulations." This is stated for hazardous material shipments on page 4-264, Paragraph 2, as well. As a general comment, the draft EIS makes assumptions about the equivalence of design requirements and operations. They assume that the design requirements for vehicles, packaging, etc. are met at all times. How do they know this? Numerous studies on compliance with regulations in the transportation industry show that there can be a significant difference between what is supposed to be and what actually is. Moreover, many of the databases that are used to assess the safety of hazardous materials transportation do not contain reliable and adequate data to make this assumption.

Response: *This statement that the draft EIS makes assumptions about the equivalence of design requirements and operations is incorrect. The analysis considers accidents resulting from improperly maintained equipment, human errors, and other failures to maintain vehicles properly. It is assumed in the analysis that DOE Transportation Safeguards Division (TSD) has accidents of similar severity and root cause as commercial trucking firms, which is a conservative assumption since TSD has not experienced an accident resulting from improperly maintained equipment. Further information on accidents considered and databases utilized can be found in the Sandia National Laboratories document "A Statistical Description of the Types and Severities of Accidents Involving Tractor Semi-Trailers," (SNL 1994b).*

RC:16.045
Doc: CO-008/120

Page 4-262, Paragraph 3. Provide data about the operational reliability of the equipment, tasks, etc. and about the reliability of the inspection and monitoring systems upon which safety relies. Are there data about inspection and monitoring reliability? Has DOE assessed the completeness and reliability of the databases upon which they base their claims? Show with data that there is no significant difference between design and operations in this system. What are the data?

Response: *The clearest indication of the operational reliability of the Transportation Safeguards Division (TSD) transportation system is its historical accident rate. The TSD accident rate is significantly lower than those of commercial trucking firms. The operating history with Safe Secure Tractor Trailers (SST) transport is sufficiently long to define an overall tow-away accident rate. The mean estimate for the rate of tow-away accidents involving an SST is 6.6×10^{-8} per mile. The tow-away accident rate for general commerce vehicles that most closely matches the SST in physical characteristics and travel distribution is approximately 2×10^{-6} per mile.*

It is assumed in the analysis that DOE TSD has accidents of similar severity and root cause as commercial trucking firms, which is a conservative assumption. Further information on accidents considered and databases utilized can be found in the Sandia National Laboratories document "A Statistical Description of the Types and Severities of Accidents Involving Tractor Semi-Trailers," (SNL 1994b).

RC: 16.046
Doc: CO-008/121

Page F-26, paragraph 2,...left [column].... It is fallacy to [say] that "Because of the stringent regulations...there has never been...." The stringent regulations contribute to the result of no documented deaths of significant injuries, but they are not the only reason. Luck, the smart response of personnel, and other intervening factors not related to the quality of training and inspection plays a role.

Response: *We agree with the comment as stated. Text has been changed for the Final EIS.*

RC: 16.047
Doc: CO-008/122

Page F-26, paragraph 2,...left [column].... Did DOE assess how different combinations of "initiating events" may lead to accidents that could result in release of hazardous/radioactive materials? What combinations of factors were used? Was there any attempt in the study to look at this issue?

Response: *See response to comment 16.042.*

RC: 16.048
Doc: CO-008/123

Appendix F, Tables and Figures F.5.1–F.5.3. In the event of a large increase in [activities], how will the current system of transportation (including inspections, loading, packaging—in short, all the activities associated with moving an object from one site to another) react? Will more inspections occur? Will more people be hired? Will more equipment be used? Or will the same number of inspections, equipment, and people be used to do more? How will this affect reliability in the system? (The research on human workload shows that increases in workload can increase failure/errors and that this may not occur in a linear fashion. Appendix F (tables and figures in F.5.1–F.5.3) [is] based on 100 observations—100 observations over how many years (i.e., what frequency of shipments)? Generally, there is good reason to suspect that as frequency of activities increase, one might observe more errors or more frequent errors.) Please provide clarification for exposure; i.e. what activity provides the most exposure. Clarify exposure incurred by the repackaging of pits.

Response: *The acceptance of a pit shipment campaign is not expected to increase accident occurrence in a non-linear fashion. The workload increase if pit shipments occur will not strain the resources of the Transportation Safeguards Division even at a maximum weapons activity level. The total workload will still be below peak levels of the past. In addition, TSD will operate using the same procedures, maintenance, and training as in the past. The 100 observations described in the document refers to a statistical sample not a number of physical inspections. The exposure incurred by the repackagement of pits will be discussed in volume I, section 4.14, of the Final EIS.*

RC: 16.049
Doc: CO-008/124

Page 4-262, Table 4.16.1.1-3. Data from radioactive waste shipments are limited for the years 1992–94 only. Thus, one might expect that the "Annual exceedence probability" (Figures in F5.1–F.5.3) would increase in the event the rates of shipping increase. What data were used to make the assumption that failure rates would increase in a linear fashion? How would the probabilities of accidents and the risks change if a non-linear relationship were assumed (increasing failures with increasing workloads and shipments)? Can DOE do this analysis? Why were data presented based on only 100 observations? Are there more data than these?

Response: *Figures F5.1–F.5.3 refer to Transportation Safeguards Division (TSD) shipments, not radioactive shipments. The acceptance of a pit shipment campaign is not expected to increase accident occurrence in a non-linear fashion. The workload increase if pit shipments occur will not strain the resources of TSD even at a maximum weapons activity level. The total workload will still be below peak levels of the past. In addition, TSD will operate using the same procedures, maintenance, and training as in the past. The 100* *observations described in the document refers to a statistical sample not a number of physical inspections.*

RC: 16.050
Doc: CO-008/125

Page 4-269, Table 4.16.2.1-1. Do the +/- factors around the base rate cover the extra shipments that would occur to send the materials to other sites? The description of action plans state that 2,000 weapons assemblies/disassemblies per year is the current activity level. Is this the base shipment schedule?

Response:

The +/- factors around the base rate bound a workload of 2,000 weapons operations per year with the subsequent intersite transportation. The base rate refers to the currently planned activity level for weapons operations, which is less than 2,000 operations per year.

RC: 16.051
Doc: CO-008/126

Page 4-269, Table 4.16.2.1–1. When assessing the risks in a transportation system, was the entire system, from design of components, regulatory context, inspections and monitoring, to preparing material for transportation, to loading, to shipping, etc., considered? [If] not, explain. The reason this is important has to do with how failures/errors at one time in the system operation can affect subsequent events. For example, if someone drives off the road when transporting one load, the consequences only affect that single load of material. However, if there is an incorrectly designed or tested package (e.g. shipping container), it would affect all shipments using that package. This has occurred in the high-level radioactive waste transportation system.

esponse:

The analysis was performed with a system perspective and considered all aspects of highway shipments. No attempt was made to model unidentified systematic problems. The DOE believes that the policies and procedures in place are sufficient to minimize the introduction of systematic problems into the DOE Transportation Safeguards Division system by correctly identifying and correcting any such problems that occur.

RC: 16.052
Doc: CO-008/127

Page 4-269, Table 4.16.2.1-1. Was a risk assessment completed for the total transportation system for improperly maintained equipment? Provide the data sources and the methodology used in this assessment. (It is not reasonable to assume that there will never be inspection failures.) How would such scenarios affect risk estimates?

Response:

Accidents with root causes of improperly maintained equipment were considered in the analysis. Further information on accidents considered and the databases used can be found in the Sandia National Laboratories document "A Statistical Description of the Types and Severities of Accidents Involving Tractor Semi-Trailers," (SNL 1994b).

RC: 16.053
Doc: CO-008/128

Page 4-256, Paragraph 1. There have been mistakes (errors) made in the design requirements and testing protocol of the DOT and NRC for packaging and testing, and thus in reported results. There are errors and failures in monitoring and inspections so that malfunctioning/corrupted packaging continue to be used although they do not satisfy the testing requirements. Has DOE addressed such scenarios in their analyses? If not, explain.

Response: *No attempt was made to model unidentified systemic problems. DOE believes that the policies and procedures in place are sufficient to minimize the introduction of systematic problems into the DOE Transportation Safeguards Division system by correctly identifying and correcting any such problems that occur.*

RC: 16.054
Doc: CO-008/129

Page 4-256, Paragraph 1. Regarding the adequacy of databases on pages F-18 and F-22, prior studies suggest that they may not contain complete or reliable data in all cases. ...Does DOE account for such inadequacies in their assessments? For example, what is the uncertainty of these databases? Making assumptions that reflect the uncertainties, in the data resulting from their incompleteness and lack of reliability. Please reassess the risk.

Response: *Uncertainties in data and the means of quantifying these uncertainties are described in the following documents:*

"A Statistical Description of the Types and Severities of Accidents Involving Tractor Semi-Trailers," (SNL 1994b).

"Determination of Influence Factors and Accident Rates for the Armored Tractor/Safe Secure Trailer," (SNL 1994a).

RC: 16.055
Doc: CO-008/130

Page F-19, Figure F.6.3.1-1. Safety analyses that do not directly address the role of human error in contributing to risks are weak. Human error is often found to be the single largest contributor to failure frequencies. This EIS seems to focus on mechanical failures. Is human error included in the failure rates that are used in event trees. How are they incorporated? How are assumptions made about human error rates in a greatly expanded transportation system (under scenarios of shipping pits to other sites and increased rate of dismantlement)?

Response: *Accidents resulting from human error are included both in the accident rate determination and in the accident severity determination. Further information on accidents considered can be found in the Sandia National Laboratories document "A Statistical Description of the Types and Severities of Accidents Involving Tractor Semi-Trailers," (SNL 1994b). The acceptance of a pit shipment campaign is not expected to increase accident occurrence in a non-linear fashion. The workload increase if pit shipments occur will not strain the resources of Transportation Safeguards Division (TSD) even at a maximum weapons activity level. The total workload will still be below peak levels of the past. In addition, TSD will operate using the same procedures, maintenance, and training as in the past.*

RC: 16.056
Doc: CO-008/131

Page F-19, Figure F.6.3.1-1. How many more shipments would there be each year (approximately) if the pits are shipped to SRS, NTS, etc? How much larger/smaller are these rates than current rates? Are these different rates used to estimate different failure rates in the assessment? Would risk estimates change at all, if times of shipments were changed (e.g., night time vs. day time vs. afternoon only vs. weekends, etc)?

Response: *The exact number of shipments per year is classified information. However, the workload increase if pit shipments occur will not strain the resources of the Transportation Safeguards Division (TSD) even at a maximum weapons activity level. The total workload will still be below peak levels of the past. In addition, TSD will operate using the same procedures, maintenance, and training as in the past.*

Operating environments, such as road type, road location, and time of day, play an important role in the observed accident rates of heavy trucks used in general commerce. These same factors influence the accident rate of the Safe Secure Tractor Trailers (SST) used by the Department of Energy to transport hazardous cargos within the continental United States. Because there is no limitation on the times that SSTs can travel, an average accident rate was determined appropriate for influence factors related to the time of day and days of the week. Additional details and discussions on how these influence factors were accounted for in the analysis is available in the Sandia National Laboratories report "Determination of Influence Factors and Accident Rates for the Armored Tractor/Safe Secure Trailer," (SNL 1994a).

RC: 16.057
Doc: CO-008/132

Page F-8. How many shipments are actually anticipated per year? If pits are shipped elsewhere, how would shipment rates differ from FY 1997?

Response: *The exact number of shipments per year by the Transportation Safeguards Division (TSD) is classified information. However, the workload increase if pit shipments occur will not strain the resources of TSD even at a maximum weapons activity level. The total workload will still be below peak levels of the past. In addition, TSD will operate using the same procedures, maintenance, and training as in the past.*

See responses to comments 16.005 and 16.006.

RC:16.058
Doc: CO-008/133

Page F-8. What are the estimates for subsequent years? How much change will there be in the system rate of shipments over the assessed period of time? If they are being shipped to another location for storage, this would increase the number of shipments per year.

Response: *See response to comment 16.057. Additionally, see responses to comments 16.005 and 16.006.*

RC: 16.059
Doc: SG-010/5

Embracing this strategy will reduce risks and risk perception issues associated with the unnecessary transportation of fissile materials on public roads and highways throughout the country. Clearly, a prolonged shipping campaign of plutonium pits along the Nation's highways, especially through large urban areas like Las Vegas, will cause significant adverse socioeconomic and cultural impacts even if no accidents occur.

Response: *See discussion in section 1.3.12 of this volume.*

RC:16.060
Doc: PC-028/7

Kirtland Air Force Base also serves as an International Airport. Major highways almost borders KAFB to the west and north. This places the transport of nuclear pits on, about, and above KAFB/Albuquerque. The air traffic is extremely high and the highway's are busy with Albuquerque, New Mexico, and Intra/Inter state traffic. The other alternative sites don't have this problem-select one of them.

Response: *All alternative sites involve shipment of pits over routes that pass through one or more cities with an international airport and busy highways. This is not unique to Kirtland Air Force Base (KAFB) or Albuquerque. A description of risk due to the transportation of pits to KAFB is presented in volume I, section 4.16.*

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3.17 Environmental Justice

RC: 17.001
Doc: HT08/2

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, President Clinton's February 11th, 1994 memorandum for the heads of all departments and agencies requires an analysis of environmental effects on low income and minority populations to include human health, social, and economic effects. Why does the draft of all three documents analyze only the human health effects of the Proposed Actions and not the social and the economic effects as required by the Executive Order?

Response:

Social and economic (Socioeconomic) impacts of the continued operations at Pantex Plant have been considered in volume I, section 4.11, Socioeconomic Resources. In the Environmental Justice section, the location of minority or low-income populations, identified in volume I, Figure 4.17.1–1, and Figure 4.17.1–2, leads to the conclusion that no disproportionately social and economic impacts occur on minority or low-income populations from Pantex Plant operations. The text in the volume I has been revised to state this conclusion. Section 4.17.2 of the Draft EIS provides discussion of beneficial economic impacts to both majority and minority populations. A good example of adverse social and economic impacts on minority or low-income community would be from the construction of a freeway through such a community. In the past, many freeway projects have divided these communities into detached neighborhoods with loss of social interaction, economic loss from declining property values, and disruption of social and economic life resulting from forced relocation of residents from the project area. No such adverse impacts are generated by the continued operations of the Pantex Plant.

Human health impacts from Pantex Plant operations are strongly tied to the geographic location of minority and low-income populations. If minority or low-income populations are concentrated in the immediate vicinity of the plant, there is a possibility that such a population could be disproportionately impacted. The Pantex EIS has analyzed the potential for offsite release in both routine and offsite conditions and has not identified a release scenario that would cause a disproportionate effect on any one population, including minority or low-income populations.

RC: 17.002
Doc: HT08/3

The socioeconomic [analysis] is a little bit different than the Executive Order covering what we just talked about, the environmental justice in minority populations. ...An analysis of the social and the economic [factors] have to go along with the health effects in the environmental justice analysis, not just the health effects.

Response:

See response to comment 17.001.

RC: 17.003
Doc: HT11/33

With regard to environmental justice, if you're shipping by -- through the interstate, or if you happen to use rail, both the interstate and the rail go along about the same route, more than 38 percent of the minority population of Clark County lives within a half mile of either of those routes. And so the impacts or risks might be a little bit higher.... Thirty-eight percent of the population along the railroad and interstate is minority or low-income. In Clark County the minority, low-income percentage is 11. So there's a substantial difference between the minority, low-income population along the routes and the general minority, low-income population of Clark County.

Response: *The environmental justice issue has been analyzed consistently within a 80-kilometer (50-mile) radius circle from the project location at each site under study. The issue of transportation safety has, however, been discussed in volume I, section 4.16, Intersite Transportation of Nuclear and Hazardous Materials. The routing of radioactive materials (including waste) being shipped on the nation's highways and roads is subject to regulations that are administered and enforced by the U.S. Department of Transportation. The primary objective of these regulations is to ensure that the motor vehicles transporting a regulated quantity of radioactive material are operated on routes that minimize radiological risk (49 CFR 397.101[a][1]). DOE will continue transporting radioactive materials in accordance with these regulations.*

RC: 17.004
Doc: CO-008/28

The current definitions/criteria of environmental justice do not take into account the people in rural areas who are politically handicapped in comparison with a large urban center. The weight of the population in the urban area impacts elected representation to such a degree that the minority rural voters, in effect, have little voice, even when they are most highly impacted by decisions. Definitions that are based on race/ethnicity or income alone do not address this problem. This is the situation that exists around Pantex, where neighbors, no matter how well organized, cannot "outweigh" the numbers and interests of urban Amarillo.

Response: *Comment is noted. Concerns of all individuals, whether belonging to majority or a minority and whether living in urban or rural areas are taken into consideration within the overall context of the assessment of potential impacts on the population within the project's Region of Influence. However, the analysis in the Environmental Justice section is provided to meet the requirements of Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations. Although no final guidance for implementing the Executive Order has been issued by EPA, guidance issued by the Council on Environmental Quality and the Department of Energy's own internal guidance were used to focus consideration of environmental justice on large enough groups belonging to minority or low-income populations and not on single or few rural voters. Communities in the Pantex region of influence have been defined as Census Tracts in the Amarillo urbanized area and rural Block Numbering Areas (BNAs) outside the urbanized area.*

RC: 17.005
Doc: CO-008/29

This comment is a duplicate of comment 17.001.

RC: 17.006
Doc: HT13/32

... When you are considering environmental justice, do you also consider the number of nuclear projects that are already within a state?...

I mean it is like I am up in Los Alamos, and they want to move Rocky Flats operations to Los Alamos. They want to shoot missiles. They want to dump radioactive waste in the Rio Grande. They want to put midlevel waste at WIPP. They want to do more—they want to expand the Alamogordo testing range. Shouldn't that be part of environmental justice to look at how many nuclear projects there are already in the state?

Response:

The analysis in the Environmental Justice section is provided to meet the requirements of the Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations. DOE follows site selection criteria for these types of projects. DOE looks at all projects currently existing and future projects across the country, and analyzes how they will affect a local area. Our analyses concluded that none of the proposed actions would result in either significant impacts to the entire affected populations or disproportionate adverse impacts to low-income or minority populations.

RC: 17.007
Doc: HT13/33

Isn't there an impact section that addresses the fact that there is no evidence that cumulative impacts will lead to a significant consequence to the people? Is that a part of the environmental justice?

Response:

Cumulative impacts have been discussed for each of the 17 environmental resources or issues in this EIS, including environmental justice.

RC: 17.008
Doc: HT12/4

And so, based on that, I have a comment that I am going to make later, but I think that it's really important particularly under the NEPA regulations and in effort by the Department of Energy to really bring the public more into this discussion that at some point we look at what is the weakness of our outreach strategy that does not allow us to bring more -- a diverse group of people from this area to these kinds of meetings.

Because based on what the gentleman just said -- and I just saw that in the summary that it does, in fact, state that a disproportionate burden would be borne by minorities as it's defined here and low-income people in this area, then they should be in greater numbers at this table to, one, learn what is at stake, what are the potential dangers, what are the benefits, et cetera, et cetera, but also to be here to raise their own questions and concerns and then be prepared to help make recommendations that will be factored into the final decision.

Because we can point to the successes of the plant, the positive role that it has played in this community, the fact that it is one of the largest employers, but there may be some other things that those regular citizens need to say that may in some way shape the final decision on these particular three EISs that's needed.

Response: *Your comment is noted. DOE has made significant changes in its community outreach programs and continues to improve upon its past practices in response to public input.*

RC: 17.009
Doc: HT12/9

... I'm curious, are there additional government policies that certain demographic groups as being less valuable, more expendable, whatever the term may be in, humane terms, as opposed to other populaces with regard to institutions like SRS?

Response: *To elaborate on the response given at the public hearing, the Nation's nuclear program has evolved over the past five decades in the context of National security requirements. Locations of nuclear facilities were not determined by the racial or ethnic characteristics of the population in the communities where facilities were located. The Federal government has, however, become more aware of the fact that certain Federal programs in the past have resulted in disproportionately high environmental impacts on minority and low-income populations. The President, therefore, issued Executive Order, 2898, in February 1994, to give environmental justice special consideration in locating Federal facilities in future.*

RC: 17.010
Doc: HT12/24

Okay. And then I had another question about the list, how come environmental justice is broken out and it's not included under cultural resources or socioeconomic resources? And having taught NEPA, we normally would put it under there and not have it by itself. And I noticed it was discussed in detail. There are only two things discussed in detail and the rest is [not]....

Response: *Your comment is noted. It is true that till recently, environmental justice was implicitly included in the socioeconomic resources, particularly in the social impact sections, when social impacts were evaluated separately from the economic impacts. With the issuance of the Executive Order 12898 in 1994, which calls for a discussion of environmental justice issue in all EISs, it has been given special attention and was, therefore, discussed in greater detail than has been the case in earlier documents.*

RC: 17.011
Doc: HT12/30

Another comment is you claim here and also in the document of the Savannah River section fully evaluated environmental justice. And I read the two or three pages on environmental justice and there are a lot of facts, there are no conclusions. ...Your companion EIS [SSM PEIS] ...makes all kinds of erroneous conclusions on environmental justice.... But you don't make none. And let you claim you --

Response: *In accordance with Executive Order 12898, we conducted an analysis to determine whether the project (interim storage of plutonium pits) would have disproportionately high and adverse human health or environmental effects on the minority and low-income populations and concluded that no such impacts*

	would occur. Please refer to the Stockpile Stewardship and Management PEIS for their response to your comment.
RC: 17.012 **Doc: CO-002/5**	This comment is a duplicate of comment 17.001.
RC: 17.013 **Doc: SG-012/7**	Vol. 1, page 5-69, 5.5.2.2 Environmental Justice. The entire section relies on 1990 census data. The "no impact" decision does not consider projected population growth in this location over the period of time that the pits may be in storage. Albuquerque, for example, has had a substantial increase in population during the last 20 years.
Response:	*The Environmental Justice section requires breakdown of population by minority and low-income groups at the lowest possible geographical level, such as Census Tract or Blocks. The 1990 census is the only source which provides data consistently for Pantex and the other four sites (Nevada Test Site, Savannah River Site, Kirtland Air Force Base, and Hanford). It gave us a common basis for analysis throughout this EIS. Socioeconomic impacts for the Albuquerque area, including population changes, are discussed in volume I, section 5.5.1.9.*
RC: 17.014 **Doc: MG-002/7**	... The population along the Interstate and nearby connectors includes a disproportionate number of minority and low-income individuals [38% minority and low-income, as compared to Clark County's 24%]. In addition, U.S. 95, the connector between the Las Vegas Urban Area and the NTS, serves the fastest-growing area of the country with regard to new residents and construction. Designation of a transport route for plutonium pits along this corridor may serve to slow down such growth or, possibly, result in a general lowering of property values. Use of a constricted ROI causes these important issues to be ignored. This is another example where a procedural convention virtually guarantees that potential impacts may not be identified.
Response:	*See response to comment 17.003.*
RC: 17.015 **Doc: PC-025/87**	General comment for section 4.17: What are the Minority and Low-Income areas by US congressional districts in the ROI? Does this show greater impact potential? What about by Texas legislature districts? Page 5-55 Materiel vs. Material?
Response:	*Environmental Justice analysis for minority and low income areas looks within an 80-kilometer (50-mile) radius circle centered in the southwest corner of Zone 4 of Pantex Plant. Minority and low-income population is presented at the lowest possible geographical level, i.e., Census Tract and Block numbering areas in the rural areas to identify maximum impacts. Data by U.S. Congressional districts, which are generally larger then Census Tracts, would show fewer areas with concentrations of minority or low-income populations. Moreover, minority and low-income data are not available in sufficient detail at the Congressional district and legislature district level.*

On page 5-55 the word material is spelled two different ways. The word spelled "materiel" used in the sentence "KAFB is an Air Force Materiel Command base..." means equipment, apparatus, and supplies, as guns and ammunition, of a military force. The word spelled "material" as used "nuclear material..." means the substance or substances out of which a thing is or can be constructed.

RC: 17.016
Doc: CO-008/30

How are individual minority sensitivities in the worker population assessed in the study? Do the training programs and safety information, materials to workers, and the community account for different literacy rates and/or primary languages? Does DOE have any data about the extent to which information about the Plant is known or understood, or the effects of radiation exposure are known/understood in the minority community? If so, provide the data.

Response:

Occupational Safety and Health Administration and implementing DOE Orders address safety and health issues for all workers at Pantex regardless of minority or income status, including radiation exposure. Volume I, section 4.17, Environmental Justice, discusses the potential for radiation effects on minority and low-income populations.

RC: 17.017
Doc: CO-008/31

Was exposure to contaminated clothing, for example by minority laundry workers, considered? If so, how?

Response:

Radiation and/or chemically contaminated clothing is not laundered but is disposed of in accordance with applicable regulations.

RC: 17.018
Doc: PC-008/2

This comment is a duplicate of comment 17.001.

RC: 17.019
Doc: PC-028/6

Page 5-69, para 5.5.2.2:...This section is listed as Environmental Justice. Of all the sites KAFB/Albuquerque has the highest, most diverse population, and putting the pit storage activity in KAFB adds [un]necessary risk to KAFB/ Albuquerque.

Response:

The Manzano Weapons Storage area at Kirtland Air Force Base is one of the five sites which have been analyzed in this EIS to identify environmental impacts of pit storage. One of these five sites will be identified as the pit storage site by the DOE after taking into consideration environmental, cost, technical, and other relevant factors.

RC: 17.020
Doc: HT17/89

The document is designed, again, to reassure. 20% minorities in the workforce is presented as a benefit of good hiring practices. Minority populations are assumed to live too far away (17 miles) to have any risk associated with them. How was inter-individual sensitivity to the worker population assessed in the study? It does not look like it was.

Response:

Analysis in the Environmental Justice section is provided at the Census Tract and Block Numbering Area levels. These are the smallest geographical units for

	which minority and low-income data are available. Inter-individual sensitivity to the worker population is dealt with as an administrative concern by the Pantex Plant management and is out of scope of the EIS analysis.
RC: 17.021 **Doc: HT17/90**	Do the training programs and safety/information materials to workers and the community account for different literacy rates [and] primary languages? Does the agency have any data about the extent to which information about the plant is known or understood, or the effects of radiation exposure are understood in the communities, minority and not?
Response:	*All maintenance and production technicians at the Pantex Plant must pass the Audit Basic Learning Examination (ABLE) which establishes, if passed, that they have the equivalent of an eighth grade English reading and math comprehensive level. U.S. citizenship is also required. All Pantex Plant employees, subsequent to hire, receive general employee training, which is given in English, covering general safety training at the plant to include basic understanding of radiation safety. DOE and Pantex Plant have initiated a broad program of improving communication with the public by providing fact sheets, speakers, exhibits, information fairs, open houses, and presentations with material geared to elementary school students. Pantex Plant also invites the general public to attend Pantex Plant Night each month to speak directly with plant personnel. The time and place is announced through the local media. In addition, specific inquires may be made to the Pantex Plant information office to obtain further information on training programs and plant safety.*
RC: 17.022 **Doc: HT17/91**	The agency did not address the issue of radiation exposure to laundry workers, etc. offsite or onsite. Often these kinds of exposures are predominately to minority populations.
Response:	*See response to comment 17.017.*
RC: 17.023 **Doc: HT17/92**	How are transportation routes related to minority communities?
Response:	*Transportation routes are selected with highest consideration given to public safety and security of the materials being shipped. Generally, these are interstate highways. Where DOE facilities are located away from interstates and alternate routes through communities are available, routes are selected to provide maximum safety and security and are not based on minority population distribution.*
RC: 17.024 **Doc: CO-005/21**	This comment is a duplicate of comment 17.020.
RC: 17.025 **Doc: CO-005/22**	How was inter-individual sensitivity to the worker population assessed in the study? It does not look like it was. Do the training programs and safety/ information materials to workers and the community account for different

literacy rates, primary languages. In the communities, how and who provides the information? Provide any data about the extent to which information about the plant is known or understood, or the effects of radiation exposure are known/understood in the communities (minority and not)?

Response: *See response to comment 17.021.*

RC: 17.026
Doc: CO-005/23

The document did not address the issue of radiation exposure to laundry workers, etc. offsite or onsite. Often these kinds of exposures are predominantly to minority populations.

Response: *See response to comment 17.017.*

RC: 17.027
Doc: PC-010/1

If pits in SSTs travel through Hispanic neighborhoods, residents could perceive that a threat to their health and safety.

Response: *The specific routes used by Safe Secure Tractor Trailers are classified for National Security. Safe Secure Tractor Trailers may, however, travel as much through neighborhoods belonging to majority population as through minority populations, including Hispanic neighborhoods. Pantex-related intersite transportation activities will result in a maximum annual collective general population dose of 0.40 person-rem per year (4.0 person-rem for ten years of operations). The health and safety risks are, therefore, considered minimal and would not affect Hispanic neighborhoods disproportionately.*

3.18 Irreversible and Irretrievable Commitments of Resources

RC: 18.001
Doc: HT12/2

I'm looking for a complete environmental assessment [that evaluates],...the total environmental picture including, as NEPA mentions repeatedly, impact on future generations and conservation of nonrenewable resources.

Response:

Volume I, section 4.18, discusses irreversible and irretrievable commitments of resources. Volume I, section 4.19, discusses unavoidable adverse environmental impacts. Radiological impacts are discussed and analyzed in volume I, sections 4.7, Air Quality and 4.14, Human Health.

3.19 Unavoidable Adverse Environmental Impacts

No comments received.

3.20 Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

No comments received.

3.21 Cumulative Impacts

RC: 21.001
Doc: HT10/1

My comment and question revolves around the term cumulative impact. As defined in the Council on Environmental Quality Guidelines, cumulative impact is the impact on the environment [that] results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency, Federal or nonfederal, or person undertakes such other action. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time. That's the comment.

Response:

As directed by the Council on Environmental Quality, a scoping process was employed to identify the scope and "significant issues" that needed to be addressed. The "scope" is defined to include both "connected," "cumulative," and "similar actions." Cumulative impacts are addressed and discussed in each resource area as well as with the alternatives.

RC: 21.002
Doc: HT14/3

... Equity impacts must be addressed in the assignment of new nuclear materials, including plutonium, to Hanford.

Response:

This comment on equity impacts is part of the series of points specifically related to long-term plutonium storage and disposition. The concept of equity is very difficult to apply within the specific scope of this EIS because: 1) transfer of pits to Hanford Site would be only an interim action of no more than 10 years, 2) the Hanford alternative is limited to only 8,000 pits and it is not progammatically feasible to consider smaller amounts at multiple sites, and 3) long-term storage and non pit form plutonium and plutonium pits are within the scope of the Storage and Disposition PEIS.

RC: 21.003
Doc: CO-010/3

We are pleased to note that the Draft EIS has not identified any significant environmental impacts from the use of existing Hanford facilities for this potential mission.

Response:

Volume I, section 5.4.1, assesses the environmental resources at Hanford Site that have the possibility to be impacted. The analyses indicate that the impacts to the resource areas would be minimal.

RC: 21.004
Doc: CO-009/2

Fundamental to DOE's further consideration of the roles Pantex should play relative to the changing missions of the nuclear complex is the unequivocal recognition that even accumulatively, there would be NO significant adverse environmental impacts from retention and potential expansion of the variety of missions possible for Pantex.

The summaries of the relevant draft EISs do not report this fundamental conclusion explicitly; rather, in some instances, the summaries misrepresent that conclusion, reporting, instead, effectively minuscule environmental

	potentialities that are characterized as "adverse" only because they do not equate to measurable "benefits." We suggest the rote language of EISs should be expanded to recognize effectively neutral outcomes (not merely "beneficial" or "adverse" consequences).
Response:	*Though the environmental "potentialities" (i.e., impacts) might seem "minuscule," 40 CFR §1502.2 states to "devote substantial treatment to each alternative considered in detail, including the Proposed Action so that reviewers may evaluate their comparative merits."*
RC: 21.005 **Doc: HT17/12**	Finally, I think the overall weakness is probably in the cumulative impacts. You've broken down the process into bits and pieces, where you look at, if this happens you lose this many jobs, and if this happens you lost this many jobs. There's a real lack of effort to try to tie those together and integrate that and say worst-case, best-case. And I think that would be really helpful for the public at large to find out what the future of the plant is.
Response:	*When the scoping period occurred for the Pantex EIS, there were numerous comments pertaining to socioeconomics (refer to DOE/EIS-0225-IP pages A-5 through A-9). These comments were then utilized to prepare the methodologies (see volume II, appendix A), which were then formulated into the body of the EIS. Many of the socioeconomic comments were related to the cumulative impacts of the Proposed Action and Alternatives. The Cumulative Impacts sections including volume I, sections 4.21, have been simplified for easier understanding.*
RC: 21.006 **Doc: HT17/47**	...One sort of succinct thing to deal with is in your cumulative impact sections, where you try to encompass the PEIS's that are floating around out there, when you deal with the Storage and Disposition PEIS, you describe storage and speak to that. And then you describe disposition and characterize it as sort of your bounding case that includes a reactor, and when there's a reactor, there's a MOX fuel site, a processing site, et cetera, et cetera. I ask you all to rework your storage definition. Storage does not mean that we won't have processing at Pantex. ...That, too, can be the scenario under storage. But to have storage set all by itself is inaccurate and it just won't do.
Response:	*The scope of this EIS includes interim storage of pits. The Stockpile Stewardship and Management and the Storage and Disposition PEISs evaluate long-term stockpile management and long-term storage and the final disposition of plutonium, respectively.*
RC: 21.007 **Doc: MG-002/2**	The EIS must take into account cumulative impacts on Clark County that may result from the selection of the Nevada Test Site (NTS) as a storage or disposal site for a number of DOE activities. Given the approach taken in the DEIS that identifies only impacts from this one activity, it is not possible to reliably estimate the impacts to a geographic area of jurisdiction that may result from a

	number of initiatives taken by DOE. That is, even though other related NEPA studies for storage or disposal of nuclear materials. Based upon the fact that the NTS is mentioned prominently in a number of ongoing DOE EISs, this latter situation is a distinct possibility.
Response:	*DOE recognizes the concerns as related to geographic cumulative impacts at the Nevada Test Site (NTS). The NTS EIS covers more specific issues concerning the cumulative impacts at this site; cumulative impacts from related NEPA studies at NTS are within the scope of the NTS EIS. For the Pantex EIS purposes, NTS was looked at in the context of interim storage, which had resulted in no significant impacts to the environment, in both its natural and physical aspects.*
RC: 21.008 **Doc: CO-008/135**	... Page 3-4. Would the six referenced upgrades require new, or additional, environmental documentation if the Proposed Action is implemented?
Response:	*There would be no additional environmental documentation for those six proposed projects. Page 3-3 of the EIS states, "Specifically, the Proposed Action includes...Performing all required facility upgrades, modifications, and replacement of facilities, and new proposed projects that are foreseeable at Pantex Plant, as described below." The section then goes on to discuss each of the six proposed projects.*
RC: 21.009 **Doc: SG-010/2**	In reference to the detailed analysis of potential environmental effects at the two sites under consideration for pit storage at the Nevada Test Site (the Device Assembly Facility [DAF] and the P-Tunnel Complex), we concur that pit storage at either of these sites would not have any direct "significant" environmental impacts on existing environmental resources. We note that new construction at the Test Site would occur within existing facilities [inside the DAF or P-Tunnel complex] and/or on adjacent lands that are already disturbed. Because of this, we have purposely forgone a detailed review of the "direct" environmental impacts presented in the DEIS. There are, however, certain "indirect" and largely cumulative impacts that could result from pit storage at the Nevada Test Site. For example, if plutonium pits were placed in the P-Tunnel complex, local and/or regional earthquakes could pose significant seismic risks that might lead to tunnel collapse. In this regard, we concur that, if Nevada is selected for pit storage, a separate assessment of the risks associated with seismic events would be required.
Response:	*If the P-Tunnel complex were to become the preferred option under the Relocation for Pit Storage alternative, DOE would consider performing a risk assessment for the facility.*
RC: 21.010 **Doc: CO-008/134**	The combined cumulative impacts resulting from adding the bounding alternatives in the other three PEIS documents to the Pantex EIS do not fully address all the combined effects. Give the combined cumulative impacts of all four documents in each individual category of the document.

Response: *Each alternative relating to the PEISs and the Pantex EIS has been addressed individually. Due to the fact that there will be four RODs, the readers are given the opportunity to review the cumulative impacts at each site and for the proposed/alternative activities. In volume I of this EIS, section 4.21 and chapter 5 discuss both the environmental and cumulative impacts as related to each candidate site. For further information relating to other sites listed as alternatives, please refer to the other PEISs.*

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3.22 Department of Energy Policy

RC: 22.001
Doc: HT11/25

How many pits are ready to be stored right now...that [need] to be decommissioned so that they can be stored somewhere? How many weapons are ready to be dismantled?

Response:

The actual number of weapons ready to be dismantled is classified information. The Pantex EIS evaluates, as an upper bound, the impacts associated with dismantlement of 2,000 weapons per year. There are no pits waiting to be stored.

RC: 22.002
Doc: HT01-02/1

I'm also concerned that we're focusing just on dragging out the life of the current weapons without taking positive steps toward replacing them. And it will be all too soon before the end of their design life is upon us. I think we've got a real question whether we are able to build nuclear weapons again and how.

Response:

Development of replacement nuclear weapons is not part of the Proposed Action or alternatives discussed in the Pantex EIS.

RC: 22.003
Doc: HT13/9

... One of the issues that a lot of us are concerned about when it comes to pits, wherever they are, is the availability of not only local and State inspection of these facilities but international inspection.

[There is] a lot of concern about pits both here and in Russia and in other places.... Folks want to know how they are handled to make sure they are not being misused, reused, put back in because these are, after all, supposed to be surplus pits that are not supposed to be for weapons anymore.

Response:

No specific program for International Atomic Energy Agency or other international surveillance and/or inspection has been established. DOE has implemented security measures to ensure pits would not be subject to misuse during storage and still be available for inspection.

RC: 22.004
Doc: HT13/10

Surplus pits. Pantex is a CERCLA site, but Sandia isn't yet. The question though is, how would international inspection be accommodated at the Manzano site, that is both at Presidential directive in terms of the nonproliferation policy, and it is also something the rest of us are interested in. ...I am interested in knowing how the access and accessibility of the site would be for international inspection.

Response:

To elaborate on the response given at the public hearing, DOE has not yet established procedures for international inspection of pits. However, at this time there is no reason to believe that any facilities would need modification to accommodate inspection. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) designation does not affect the potential for International Atomic Energy Agency inspection of pits.

RC: 22.005
Doc: HT13/11

So you don't know, among the five sites [that] you have shown, if there are advantages or disadvantages from an international inspection standpoint?

Response:

To elaborate on the response given at the public hearing, that issue was not a significant factor in selecting Pantex Plant as the preferred alternative for interim storage of plutonium pits. Neither would it have been a significant factor if any of the five alternate sites had been selected. However, the Department considers international inspection to be equally facilitated by all site alternatives. Technical and policy issues, such as those pertaining to nonproliferation, are part of the decision making process, but are not required to be part of the NEPA document as noted in 40 CFR 1501.2(b), 1501(b), and 1505.2. However, the environmental factors, together with the policy and technical factors will be available to the decision maker at the time of the decision; not just the environmental factors.

RC: 22.006
Doc: HT13/12

Just to be clear, the pits, for whatever interim period of time they are at whatever facility they are, need to be inspectable. That doesn't necessarily mean that somebody can come in and physically look at the pits. There are ways that pits can be inspected without physically being able to require to divulge the shapes and those kinds of things.

So as an affirmative statement, and one of the many flaws in this document, from my standpoint, is the fact that it doesn't evaluate that issue, does not set up at any and all for the possible sites inspection criteria as a serious flaw....

Response:

See response to comment 22.003. Additionally, the Department considers international inspection to be equally facilitated by all site alternatives. Technical and policy issues, such as those pertaining to nonproliferation, are part of the decision making process, but are not required to be part of the NEPA document as noted in 40 CFR 1501.2(b), 1501(b), and 1505.2. However, the environmental factors, together with the policy, technical, and cost factors will be available to the decision maker at the time of the decision, not just the environmental factors.

RC: 22.007
Doc: HT13/13

... I would also argue that the policy of the United States set by the President is that surplus materials...are supposed to be subject to international inspection.

Response:

Final determination has not been made on whether specific pits are surplus or part of the strategic reserve. The Pantex EIS addresses interim storage of pits without regard to their ultimate disposition. Further, the Department considers international inspection to be equally facilitated by all site alternatives. Technical and policy issues, such as those pertaining to nonproliferation, are part of the decision making process, but are not required to be part of the NEPA document as noted in 40 CFR 1501.2(b), 1501(b), and 1505.2. However, the environmental factors, together with the policy, technical, and cost factors will be available to the decision maker at the time of the decision; not just the environmental factors.

RC: 22.008
Doc: HT13/28

I have another question. Will there be any difference in the level of transparency in the plutonium pit disposition process if the plutonium pits are sitting on a DOD or DOE site in terms of international surveillance or in terms of the public being aware of what is happening with pits? Is there any difference in what the public will know?

The Department of Energy's secretary does have a policy of greater openness, which is not something I have heard from the Department of Defense and don't expect to hear it from the Department of Defense. I am wondering where there will be some difference should be pits be at Kirtland.

Response: *The Kirtland Air Force Base's Manzano Weapons Storage Area is under consideration as an alternative storage site within the Pantex EIS. If this alternative is selected it will become a DOE facility and will be operated accordingly; thus there would be no difference with respect to surveillance, openness, or public awareness.*

RC: 22.009
Doc: HT13/35

I guess the problem with the Department manager doing the risk [analysis] is that nobody trusts the Department of Energy. I think that if you had somebody independent doing the risk analysis, then it would be more palatable.

Response: *40 CFR 1502.24 requires agencies to ensure integrity of analysis in an EIS.*

RC: 22.010
Doc: HT13/36

I appreciate all your efforts, but there is just such a long history of deception here that it is hard to overcome and believe and trust data that comes out of the Department, and I am sorry that is true.

Response: *The preparers of the Pantex EIS have devoted considerable effort to ensure the accuracy of data used. These efforts are intended to result in a credible document that can withstand scientific and legal scrutiny. See discussion in section 1.3.14 of this volume for a summary of actions the Department has taken to improve public trust during the preparation of its EIS.*

RC: 22.011
Doc: HT12/10

... Right,...but everything seems to deal with policy. I mean, if we had some type of impact on the policy making from the beginning [because] it seems as if now [you] are backtracking and want some type of input from the community.... [You make decisions] behind our backs all the time and now you expect us to think [you are] not going to continue to do this behind our backs.... I'm sort of stuck on, why is it like that.

Response: *The Department is bound by the NEPA and the implementing Council of Environmental Quality regulations to not only allow, but actively seek, comments from Federal, State, and local agencies; Native Americans; citizens; and interested organizations. These efforts may appear convoluted and frequently result in many comments ranging from intense support for, to intense opposition to, a proposed action. See response to comment 22.005 for a summary of the actions the Department has taken to comply with NEPA and Council on Environmental Quality requirements.*

RC: 22.012
Doc: HT12/11

... That's my concern as well. ...What's our input, how do we know this is going to count. You already did what you wanted to do without asking for permission, [and] you're going to continue doing that. ...This part is just [really] a bunch of bull crap, we're just here.

So how we know what's going to be the outcome and [what] is the true outcome. If we say right now we don't want...to deal with this anymore, is it going to take place, are you going to ship it somewhere else, [is it] going to happen where we don't want it to happen. Or it's already voted where it's going to go.

Response: *DOE disagrees that it ignores input from agencies, other organizations, or individuals. Each comment on the Pantex EIS receives careful analysis whether presented in person, in writing, or via another mechanism. Analysis of comments does not always warrant taking the action recommended in a particular comment. The DOE decision maker does see and consider the comment along with other environmental, technical, policy, and national security issues and factors as part of the decision making process.*

RC: 22.013
Doc: CO-003/2

Appropriate local and regional public information and involvement programs must be conducted by the agencies to ensure that the public is fully informed of the risks, hazards, and impacts of such a program. This would be part of the national dialogue on all nuclear materials (noted above) prior to assignment of nuclear materials to a specific site.

Response: *By establishing the Storage and Disposition PEIS, Stockpile Stewardship and Management PEIS, and the Pantex EIS, consistent with Council on Environmental Quality regulations, developing reasonable alternatives subject to public comment, DOE does have confidence that a "national dialogue" has been reasonably established. DOE, with direction of the Office of the President, has attempted to raise the level of public awareness. Included in this national dialogue is an exchange of information as needed with State governors. DOE is proud to recognize the vast network of concerned, interested, and committed stakeholders throughout this nation.*

DOE recognizes that all its facilities and hazardous materials, including plutonium, require varying levels of operational and environmental controls to protect workers, the general public, and the environment. DOE has worked with EPA, States, employees, unions, stakeholders, and the general public to develop programs and commitments to better manage its facilities and hazardous materials, including wastes. All of these plans and commitments (e.g., Tri-Party Agreement) have been reviewed for the proposed sites to determine if there are any conflicts or restrictions that would inhibit these sites from serving as good locations for the facilities proposed in the EIS for interim pit storage. Nothing was found that would inhibit the alternative sites from performing the required missions, to include site cleanup.

RC: 22.014 **Doc: CO-009/1**	At this juncture in the proposed and appropriate downsizing of the nuclear complex, we again strongly encourage the Department and Administration to predicate all actions related to the nuclear complex on the conservative assumption that at least rogue-state or terroristic nuclear aggression against the United States is probable. U.S. vigilance and nuclear preparedness are key to coexistence with mad nations and persons. In turn, the Pantex Plant is, uniquely, a key to economically efficient continuing nuclear preparedness.
Response:	*The President has declared that the maintenance of a safe and reliable nuclear weapons stockpile will remain a cornerstone of national security policy for the foreseeable future.*
RC: 22.015 **Doc: PC-024/1**	Page S-4, right column, "Assembly of Nuclear Weapons," 11th line. Remove the word "classified" since virtually all the components in the "physics package" are classified. Check the DOE book "Drawing Back the Curtain of Secrecy" "Restricted Data Declassification Decisions 1946 to the Present (RDD-3), January 1, 1996. [Your] description should also mention the D-T Tube neutron generators.
Response:	*The word "classified" has been removed. Adding the phrase "D-T Tube neutron generators" is not necessary for the purpose of summarizing the description of the "physics package." Volume I, section 1.2.2, contains an expanded description of the "physics package."*
RC: 22.016 **Doc: PC-024/2**	Throughout the EIS replace the word "staged" with the word "stored."
Response:	*DOE believes that the EIS reasonably differentiates "staging" and "storage" activities as presented in volume 1, section 3.1.1.*
RC: 22.017 **Doc: HT16/31**	... It would probably be helpful to know where there are places where the plant is self-regulating, where there isn't an external regulator with regulatory authority, as opposed to oversight.
Response:	*Per Council on Environmental Quality regulations, volume I, chapter 6, Environmental Compliance Requirements for Implementing the Proposed Action and Alternatives, presents Federal and State statues, regulations, and orders applicable to each site evaluated in the EIS. The chapter identifies the responsible agencies. In addition, see response to comment 22.018.*
RC: 22.018 **Doc: HT16/33**	TNRCC would be more willing to embrace the Pantex mission within the State of Texas if DOE would promote independent regulatory oversight of radioactive source, special material and by-product material. We applaud DOE's willingness to share its information concerning radioactive contaminants; however, it is our opinion that the public would be better served and potential waste management errors minimized if the oversight authority was shared with the TNRCC. Now, we're well aware of—this might be a little too brutal—of

DOE's legal obstructionist attitude for the State picking up regulatory authority over radionuclides. We understand we do not have the authority. We also understand that EPA in their assertive program do have the authority. And we are working now with the EPA to pick up that authority, at least to piggyback on to it, not that we can assume it or they can give it to us, but we can certainly hold hands, in a sense, partner with the EPA in their assertive program while this NPL is decided, to get some oversight on radionuclides, not that we feel like it's a great issue. The issue is not that we feel there's a bunch of contamination out there. The issue is solely that...we think that DOE would do a better job with oversight. It's not an issue for Pantex necessarily. We feel that Pantex has done a pretty good job, far better than some of the other DOE sites. It's strictly our ability to do what we are asked to do by the citizens of Texas, which is to regulate and to watch and to concur or not to concur. We don't want to hurt DOE. We don't want to hurt Pantex. We just want to do our job. ...We're in the middle of an FFA negotiation right now. And this will be an issue that we're not going to drop.

Response: *The Secretary has created a Working Group on External Regulation. This group is presently reviewing various alternatives for external oversight of activities at DOE's nuclear facilities and will submit a report sometime in 1996.*

RC: 22.019
Doc: HT17/23

The world at this point needs alternative forms of energy, especially solar equipment, and it needs it very badly. Eventually we're going to have to decide which direction to go, whether we are going to go with nuclear power, and that would eventually involve some considerable reprocessing of plutonium or whether we will go for other means of electrical generation. I would like to see the Pantex Plant take the lead in producing alternative methods of generating electricity and not trying to deal with plutonium, which is essentially a waste material of the cold war and the nuclear arms race.

Response: *Final disposition of weapon-usable plutonium is within the scope of the Storage and Disposition PEIS. One alternative for disposition is using excess plutonium as fuel for nuclear reactors which would generate electricity. Although alternate energy sources are not included in the Proposed Action for the Pantex EIS, research on alternate energy sources is performed at a number of DOE facilities. A variety of information on the Department's alternate energy programs may be obtained by accessing the Internet home pages for the Alternative Fuels Data Center, the Energy Efficiency and Renewable Energy Network (EREN), and the Energy Information Administration. Alternative energy initiatives are included in "Department of Energy 1977-1994: A Summary History."*

RC: 22.020
Doc: PC-017/7

Will the DOE repair and/or replace or pay damages for all these damages? Will the DOE pay for the months of inconvenience and nerve wrecking experiences we have been through?

esponse: *The Department has a procedure for consideration of damage claims. Please contact Mason & Hanger Corporation legal department to initiate a claim.*

Resolution of the claim will be dependent upon a determination of the cause, extent of damage, and current law regarding liability. See response to comment 8.002 which immediately preceded comment 22.020 in the commentors' letter of June 25, 1996. Comment 8.002 expresses concerns about alleged damage from a high explosives detonation on October 4, 1995.

RC: 22.021
Doc: FG-003/15

The Pantex FEIS should also outline DOE's intentions regarding the retrieval of plutonium pits in such a situation, as well as the feasibility of monitoring the pit storage facility. The DEIS (Volume I, p. 5-17) gives the impression that the plutonium pits would remain entombed.

We ask that the FEIS provide further discussion regarding the wording on page 5-17 of volume I, that "Some mitigation of a tunnel collapse would be needed after a major seismic event. A separate assessment of the risk associated with the mitigation would be necessary..." The Pantex FEIS should better define what is meant by "some mitigation" and a "separate assessment" (would the separate assessment be a NEPA document?). The FEIS should discuss what risks would be analyzed in the separate assessment: radionuclide emissions, worker health and safety, ground water contamination, etc.

Response: *The Department's response would be determined after consideration of the circumstances that exist after the collapse and evaluation of the risks to the environment, the public, and workers involved in any recovery action.*

RC: 22.022
Doc: SG-002/2

We applaud DOE's willingness to share its information concerning radioactive contaminants; however, the TNRCC permit does not include radionuclide parameters. And as we have stated before, the TNRCC recommends that the DOE share regulatory oversight with another Federal or State agency to minimize the potential for further injury to natural resources.

Response: *See response to comment 22.018.*

RC: 22.023
Doc: PC-027/2

I don't understand the need to store 20,000 pits anywhere. If we are dismantling the nuclear weapons, then we should get rid of the pits, not store them. People who know about nuclear [material] should have the knowledge and imagination to come up with some use for the pits. Perhaps some nuclear function could use that material for some purpose. I can't see why we should need so many for "strategic reserve and surplus". What is the idea behind this storage, to snap them back into nuclear weapons should we decide to change the rules?

Response: *DOE agrees with the commentor that final disposition is preferred over long-term storage as identified in the Purpose and Need discussion of the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement (S&D PEIS). However, DOE is required to meet CEQ regulations prior to implementing the S&D PEIS programs including final disposition. The S&D PEIS discusses and analyzes the strategy and technologies for long-term storage and the final disposition of surplus weapons-usable plutonium.*

RC: 22.024 **Doc: SG-003/19**	We applaud DOE's willingness to share its information concerning radioactive contaminants; however, the TNRCC permit does not include radionuclide parameters. And as we have stated before, the TNRCC recommends that the DOE share regulatory oversight with another federal or state agency to minimize the potential for further injury to natural resources.
Response:	*See response to comment 22.018.*

RC: 22.025 **Doc: SG-003/20**	However, the DOE is one of the Federal Trustees for natural resources and has the responsibility of protecting those natural resources from further injury on behalf of the public. In order to protect those natural resources from further injury, the Trustees recommend that the DOE incorporate more stringent environmentally protective practices at the Pantex Superfund site.
Response:	*The Pantex Plant continues to implement a Pollution Prevention/Waste Minimization (PP/WM) program to reduce environmental impacts through waste avoidance and waste minimization. Volume II, appendix G, contains detailed information of the PP/WM program. The program was recently awarded the President's Closing the Circle Award.* *In addition to the plant's continuing effort to reduce pollution and minimize waste, DOE has agreed to further study potential alternatives to open burning of energetic materials at the Pantex Plant Burning Ground. Pantex Plant maintains a Resource Conservation and Recovery Act (RCRA) Contingency-RCRA Spill Prevention, Control, and Countermeasures (SPCC) Plan to responsibly protect Pantex Plant employees, the public, and the environment. The SPCC Plan is incorporated into Pantex Plant RCRA Part B Hazardous Waste Permit (HW-50284), which is subject to EPA and TNRCC regulatory oversight.* *As discussed in the EIS, EPA and TNRCC share the responsibility for RCRA and Comprehensive Environmental Response, Compensation, and Liability Act requirements including the establishment of restoration levels. Volume I, chapter 6, has been expanded to address the issue of Natural Resource Damage Assessments.* *In addition, see responses to comments 22.018 and 22.026.*

RC: 22.026 **Doc: SG-003/22**	Page 1-12; volume 1, section 1.2.2.3 Environmental Restoration. The information communicated in this text does not necessarily constitute restoration of the natural resources that have been injured as a result of the releases of hazardous substances at this site. In order to perform actual environmental restoration, the nature and extent of contamination must be determined to evaluate the potential injuries to natural resources. After such a determination, and in cooperation with the other Federal and State Trustees, restoration projects should be designed that will appropriately compensate the public for injury to natural resources. Performing remediation as needed to comply with all appropriate regulatory requirements does not necessarily

constitute compensatory restoration for injury to natural resources. In order to reduce DOE's residual liability for injury to natural resources, the State and Federal Trustees encourage DOE to continue to work with the Trustees during the remedial process so that appropriate restoration will be incorporated into remedial activities. Page 3-3 Performing environmental protection and environmental restoration activities. Please see specific comment #1.

Response: *DOE continues to work with EPA, TNRCC, employees, unions, stakeholders, and the general public to develop the Pantex Plant Environmental Restoration Program and its commitments to better manage its facilities and restoration activities. DOE is continuing to work with the trustees. As we move toward a Federal Facility Agreement, consultation will increase. Volume I, chapter 6, has been expanded to address the issue of Natural Resource Damage Assessments.*

RC: 22.027
Doc: SG-003/28

Page 4-37 Environmental Restoration Process at Pantex Plant. See comment #l.

Response: *See response to comment 22.026.*

RC: 22.028
Doc: PC-025/5

Of interest [is] why stored plutonium at Pantex [is] not considered solid waste as defined in 40 CFR 261.2 (a)(l), (a)(2), (a)(2)i, (a)(2)ii, (a)(2)iii, (2)(b), (2)(b)1, (2)(b)2, (2)(b)3, (2)(c), (2)(c)(1), (2)(c)(2), 2(d), or 2(e). Why open burning of HE is not RCRA treatment? When does stored plutonium meet the definition of land disposed (stored) as a solid waste? Why not if "accumulated speculatively", "inherently waste-like", scrap, dispositioned, recycled, studied, or burned? What would be the environmental impacts if stored plutonium meets the definition of a solid waste? I consider this a reasonable impact.

Response: *In response to Item 1: The Atomic Energy Act (AEA) of 1954, as amended, regulates plutonium storage. Furthermore, 40 CFR 261.4 (a)(4), the Resource Conservation and Recovery Act (RCRA) specifically excludes AEA source, special nuclear, or by-product material from regulation as a "solid waste." Therefore, stored plutonium is not a "solid waste" as defined by RCRA.*

In response to Item 2: See response to comment 22.029.

In response to Item 3: As identified in response to Item 1 above, plutonium does not meet the definition of a solid waste and, therefore, land disposal restrictions in 40 CFR 268 do not apply.

In response to Item 4: The environmental impacts of stored plutonium are analyzed and discussed in this EIS. The environmental impacts of stored plutonium are independent of statutory and regulatory framework.

RC: 22.029
Doc: PC-025/6

The sixth dash on Page 3-3. Why aren't HE components regulated by RCRA before burning? If I burn an experimental battery that contains lead and explosives but is a proprietary secret of my company, is that RCRA treatment? Request consultation with EPA and the U.S. Justice Dept. on the response.

Response: *Weapon components, materials, or parts of a component that are not being reused cannot be declared waste until they have been demilitarized and sanitized (D&S) in accordance with the Atomic Energy Act, as amended. Once materials are declared waste, they are managed in accordance with applicable Federal and State regulations. The environmental impacts from D&S operations have been specifically incorporated into impacts addressed in volume I, section 4.7, Air Quality, and section 4.13, Waste Management. D&S operations at the Burning Ground were included in the site-wide air modeling analysis. Solid waste generated as a result of D&S weapon components activities are included in the waste volume projections for the three levels of weapon activities. To account for fluctuations, waste projections include a 10 percent margin. D&S operations are part of the proposed continued operation of Pantex Plant as identified in volume I, section 3.1.1, and, therefore, D&S operations are bounded by environmental impacts presented in the Pantex Plant EIS.*

RC: 22.030
Doc: PC-025/66

... Volume I, section 4.13. Are pits a solid waste?

Response: *No, see response to comment 22.028.*

RC: 22.031
Doc: PC-025/67

... Page 4-193. Is demilitarization and sanitization of weapons components RCRA [treated]? Are classified weapon components that cannot be demilitarized and sanitized [and] sent to NTS, a solid waste? What is meant by declassified versus demilitarized and sanitized?

Response: *In response to Item 1: See response to comment 22.029.*

In response to Item 2: See response to comment 22.029.

In response to Item 3: For clarification purposes "declassified" has been changed to "demilitarized and sanitized."

3.23 National Environmental Policy Act Process/Procedures

RC: 23.001
Doc: HT02-08/1

Combining these three documents into a single opportunity for public input, together with the very short amount of time much of the material has been available, does justice neither to the NEPA process itself nor to the people and agencies that wish to make reasoned responses to these documents. At least in the case of the Stockpile Stewardship as well as the Storage and Disposition, the documents are substantive enough to require careful analysis. It is also an unavoidable conclusion that the hearing process envisioned by NEPA has been transformed by DOE into a format they feel they can more effectively control—that being the workshops. There is nothing wrong with workshops per se, but they do not meet the government's full responsibility to the public. That any of us at all are standing here to give testimony is only the result of citizen lobbying and the willingness of individuals to face down any obstacles to get their concerns into the public record.

Response:

Each of the documents has a public comment period, inclusive of public hearings/meetings as required by NEPA. During this time the public is encouraged to comment verbally at the hearings, in writing, by telephone, or by e-mail. The comment periods for these documents overlapped. It was felt that the public would be better served to have one meeting whenever possible to discuss as many of the documents as necessary, depending on the geographical location of the meeting. This format also addressed feedback to reduce the number of meetings the public had to attend. The effort was intended to provide the public with as much information as possible and to allow for as long a comment period as could be scheduled.

For the record, the workshop format used for the public hearing is, in fact, a response to stakeholder requests for this type of format. The entire hearing structure, including the joint presentation of the three EISs, the workshop format, the time periods for formal testimony, the provision of space for displays by citizen groups, and the two-day afternoon and evening sessions were planned by the Pantex Plant Citizens Advisory Board—not DOE.

RC: 23.002
Doc: HT02-08/2

The Site-Wide EIS, an effort brought about by citizen lobbying of the Department of Energy, has not really been in the public domain long enough for a detailed consideration. Unfortunately, the substance of the document itself may require much less time than the gravity of the issues warrants.

Response:

Although the Notice of Availability for the Draft EIS was issued less than a month before the first public hearing was conducted, the comment period was extended to July 12, 1996, during which time the public could submit comments in writing, by telephone, a technical exchange meeting, or via electronic mail. Council on Environmental Quality regulations require a minimum comment period of 45 days. For this EIS, DOE extended the comment period to 98 days. Comments were accepted as late as July 29, 1996.

RC: 23.003
Doc: HT02-07/1

I came over today trying to have an open mind, but I realize that after listening to the City, the State, Federal elected officials, this is a done deal. The most we can hope for is a safe facility.

Response:

The NEPA process requires a thorough evaluation of the Proposed Action, including a variety of alternatives. The decision to accept an alternative is not made by city, county, or Federal elected officials at public meetings such as this. The EIS evaluates the environmental effects of Pantex Plant operations as well as the effects associated with interim storage of pits at alternate locations. The final decision will be made by the Secretary of Energy, based on the findings in the document as well as public input from all areas (private, elected officials, organizations, etc.).

RC: 23.004
Doc: HT11/9

You don't happen to have a web site where we can access more information?...

Response:

We do not have a web site; however, the DOE Home Page can be accessed through the internet. The DOE Universal Resource Locator (URL) address on the internet is http://www.doe.gov. A list that links to DOE program offices can be found at http://apollo.osti.gov/html/servers/hqtitls.html. A map with DOE sites can be found at http://www.doe.gov/html/DOE/infolink/usdoemap.html. Additionally, specific inquiries on this EIS can be accessed through the Internet via nfounds@doeal.gov.

RC: 23.005
Doc: HT11/10

You have an internet address? Is that classified?

Response:

See response to comment 23.004. It is not classified.

RC: 23.006
Doc: HT11/11

What I wonder is, if I have any other questions, is there an area I can tap in and find frequently asked questions?

Response:

This Comment Response Document is one source for answers to frequently asked questions, another is the internet (nfounds@doeal.gov) and phone calls to the DOE EIS office in charge of this document (505-845-4351) or the Office of NEPA Policy and Assistance (1-800-472-2756). While we do not post a listing of frequently asked questions per se, DOE will respond to any questions that any member of the public may have. See response to comment 23.004.

RC: 23.007
Doc: HT11/34

... We were surprised by this meeting...—maybe there was public information or scheduling announcement that we missed. But...no matter whether it's Pantex or [it] has to do with the people that are doing NTS, EIS or any of the EISs where Nevada Test Site is involved, we would like to have a mechanism set up whereby Department of Energy representatives and representatives of local governments that may be affected like Clark County can meet so that we can have a briefing...[to] prepare ourselves for statements [that] in many cases might be statements of support, given that certain mitigation measures are taken or at least addressed.

Response: *On June 5, 1996 a video conference call was conducted between DOE officials, NTS officials, representatives from the State of Nevada Department of Transportation, the States Advisory Board, and representatives from Clark County, including the Nevada Department of Comprehensive Planning, Nuclear Waste Division, to discuss the EIS and transportation issues. DOE plans to continue interaction with the State and local agencies to solicit their views before decisions are made.*

RC: 23.008
Doc: HT11/35

And at this point I'd like to request a meeting among the management of Clark County, probably the Director of Comprehensive Planning, County Manager, and so on and representatives of Pantex to give us more detailed information. And I would like to also to request in your institutional program that there be periodic updates with identified state holders or units of local government that are affected.

Response: *See response to comment 23.007.*

RC: 23.009
Doc: HT11/37

... The other major concern is...the initial interaction and the ongoing mechanism for ongoing communication, that clear communication makes things a lot easier on both sides.

The person that you might address any correspondence to with regard to establishing a meeting with Clark County is Richard Holmes, H-O-L-M-E-S. He's the director of the Department of Comprehensive Planning for Clark County. His telephone number is area code 702, 455-5175.

Response: *We appreciate this point-of-contact for Clark County. See response to comment 23.007.*

RC: 23.010
Doc: HT14/2

... Appropriate local and regional public information and involvement programs must be conducted by the agencies to ensure that the public is fully informed of the risks, hazards and impacts of such a program. This would be part of the national dialogue on all nuclear materials prior to assignment of any nuclear materials to a specific site.

Response: *This is an excerpt from Advice No. 46 of the Hanford Advisory Board regarding the Storage and Disposition of Excess Weapons Usable Plutonium and Special Nuclear Materials. The NEPA process ensures that the public is involved in all phases of this type of large scale proposed project. Public hearings and comment periods allow an avenue for personal interaction with the individuals involved with these projects prior to a final decision concerning the assignment of nuclear materials to a specific site.*

RC: 23.011
Doc: HT02-01/2

Technical analyses will be available later. Cost analyses will be available later. We do not have access to the information necessary to render an informed opinion, and the Department tells us that is how it will be. For instance, DOE defends the absence of cost information by stating that NEPA does not require a Federal agency to supply cost analyses in a draft document. To that, I say "So what." Such information is necessary to the discussion and so must be made available.

The same applies to technical information. It is not possible that the Department has so little information that it can not give a clearer description of what the operations for dismantling pits and processing plutonium will involve. And no citizen should be satisfied with being put in the position of guessing.

Response: *The NEPA process is not a cost-benefit analysis process. Rather, the law requires that a NEPA document be prepared to ensure that environmental impacts are documented on the record before any decision is made on a major Federal action. Costs are not required in order to assess environmental impacts. Volume I, chapter 4, of the EIS describes the affected environment and the potential environmental impacts expected from the continued operations of Pantex Plant, as well as the associated interim storage of nuclear weapon components. Non-environmental issues such as a cost breakdown between the alternatives have not been developed for the Pantex EIS. It should be understood that Pantex Plant does not dismantle pits. Issues associated with dismantling pits and plutonium processing are not covered in this EIS. Long-term management of the nuclear stockpile is within the scope of the Stockpile Stewardship and Management PEIS, while long-term storage and the final disposition of plutonium is addressed in the Storage and Disposition of Weapons-Usable Fissile Materials PEIS.*

RC: 23.012
Doc: HT02-01/3

The decisions which these documents address are too important for us to allow the Department to go forward in this manner. Whether it is the case that the Department has the missing information yet is not revealing it, or whether the information is not complete, in either instance these draft documents are fundamentally deficient. The public deserves better. The law expects better. And the future must be based on something better.

Response: *The law requires consideration of all available relevant information. The information examined in this EIS is available to the public in two technical libraries established in Tetra Tech offices in Albuquerque, New Mexico, and Amarillo, Texas. These libraries contain more than 2,800 documents assembled in the course of preparing this EIS. The Pantex EIS provides a full and fair evaluation of all reasonable alternatives. Comments concerning the PEISs (Storage and Disposition, Stockpile Stewardship and Management, and Waste Management) are beyond the scope of this EIS; however, these concerns have been considered by the PEIS program staff and will be addressed in the PEIS comment response documents.*

RC: 23.013
oc: HT02-01/1

It was never the intention of our particular citizens' groups that you...not be able to respond. That's a misunderstanding that I hope we can clarify, and perhaps a rereading of the letters will serve to do that, letters that have been exchanged between the Department and four of the local citizens' groups.

Response: *The commentor is referring to the three DOE officials that were seated at the table with the meeting facilitator. These individuals participated as hearing officers, and as such, did not engage in dialogue or provide answers to the formal comments delivered by the 23 people that presented formal presentations. DOE officials did engage in dialogue during all the workshop sessions.*

RC: 23.014
Doc: HT01-04/1

I have to admit that stacking EIS on EIS on EIS has gotten a little bit confusing, at least for me and my staff.

Response: *The review periods for these documents were scheduled to overlap because of similarities and scheduling issues. The Department realizes the difficulty to the public to review these EISs at the same time and greatly appreciates the effort. We will take this under advisement for future projects.*

RC: 23.015
Doc: HT07/4

... I think that because the CEQ guidelines say that you are to identify what the significant impacts are, that if there are no significant impacts, you should state that in the EIS.

Response: *See section 1.3.15 in this volume for a discussion of significant impacts.*

RC: 23.016
Doc: HT05/9

With the first reconfiguration EIS proposal six or seven years ago, there was one EIS [that] covered the reconfiguration of the nuclear weapons complex. I'd like to know what the Department's rationale is for dividing among a number of EISs what essentially is one overall decision, which is what to do with the nuclear weapons complex as a whole.

Obviously, your site-wide EIS is a part only of the decision about what to do with pits now and in the future. Why is it that the Department has elected to split up the EIS process and to do fragmented segments?

Response: *The Reconfiguration Study, published in January 1991, envisioned several major initiatives, the principal ones being relocation of the plutonium manufacturing operations at Rocky Flats Plant to a new facility at another site, consolidation of nonnuclear operations, and either downsizing and modernizing other nuclear and research and development facilities in place or pursuing maximum feasible consolidation (DOE 1991a). However, the specific concepts then envisioned were rendered inappropriate by major changes in world events, particularly, the collapse of the Soviet Union. In Response, the Department restructured the reconfiguration concept into several separate but related program decisions that could be clearly defined and examined in detail. The Department also found that it was too difficult to examine all the programs in one PEIS. Thus, the Department restructured the reconfiguration concept into programs for nonnuclear consolidation, tritium supply and recycling, and stockpile stewardship and management. Decisions on the first two have been* *made (following NEPA analysis) and the third is scheduled to be made in the fall of 1996. In addition, a PEIS was developed to address a new issue—how to provide long-term storage and disposition of surplus nuclear materials resulting from weapons dismantlement. The decision on that program is also scheduled to be made in the fall of 1996.*

RC: 23.017
Doc: HT05/10

But I'd like my comment to go to the fact that what you have really done is made it impossible for the public to comment upon the overall program. You have no real programmatic environmental impact statement about which the public is instructed, educated and about which they can comment. And I seriously question whether the law really has been complied with.

Response: *As stated in the response to comment 23.016, the Department found that preparing one PEIS on the entire nuclear weapons program would have been so large and complicated that it would have been too difficult for anyone to digest.*

RC: 23.018
Doc: HT02-15/1

I'll reiterate what some other people have already told you, that trying to deal with three documents, actually in less than 30 days that people have had all three of them together to compare, is clearly not an adequate amount of time. And one must conclude [that] either the Department of Energy is in a very big hurry and therefore they won't give an adequate [amount of] time for public comment, or that they don't understand the difficulty of dealing with three documents like this.

Response: *See response to comment 23.001.*

RC: 23.019
Doc: HT02-15/2

... A number of people had expected that this format would also include time for DOE officials to respond on the record, and I continue to believe that that should be the case.

Response: *The "format" referred to is the presentation of formal comments at the Pantex public hearings in Amarillo, Texas. Individuals were given a 5-minute window to present a formal comment for the record, in front of DOE representatives. This was not meant to be a discussion session. The public was encouraged to discuss concerns with DOE representatives during the general (workshop) sessions as well as the individual EIS breakout sessions that were being conducted during the public hearings. We appreciate your input, and will consider your suggestions for future sessions. See response to comment 23.013.*

RC: 23.020
Doc: HT02-21/1

Everyone who works at Pantex is there by their own choice. Why, now, should the opinions of such a small group receive so much focus?

Response: *DOE places equal importance on every individual's opinion, and upholds each individual's, agency's, or organization's right to be heard. As outlined by NEPA, the public comment period and the public hearings are held to facilitate this opportunity.*

RC: 23.021
Doc: HT06/1

The first question is for all of the DOE and DOE contractor folks in the room, how many of them have completely read all three of the EISs? I see three, four, five, six, seven, eight hands, I think.

The point I would make is these folks, out of all the DOE and contractor folks in the room, these folks have had a lot longer to look at all three of these documents than the public [has had], and so you're putting the public in a very difficult position in terms of dealing with all these documents.

Response:

The draft EISs that are referred to in this comment were released for review by DOE and the contractors at the same time that they were released to the public. The review time for these documents is brief for the circumstances, but it is in accordance with that required by law.

RC:23.022
Doc: HT02-09/1

Many issues come into play in this very over-arching discussion. Not the least among them [is] the cost to us, the taxpayer, to produce these documents and to find them flawed in many ways. These documents are lacking important information in many areas that make it virtually impossible to even begin the discussion.

Response:

The draft phase of an EIS is designed to be a period when perceived shortcomings in the document are identified for resolution or further analysis. Public hearings and an accessible comment period provide an opportunity for individuals, agencies, and organizations to point out items that are unclear or situations and alternatives that may not have been addressed to the satisfaction of the commentor. A period of time exists between the draft and the final production of the document to address, and/or correct, these perceived shortcomings.

RC: 23.023
Doc: HT02-04/1

Are all of the important damage reports in the public domain, or are many vital documents concerning soil, air and groundwater contamination still being suppressed?

Response:

The Department provides to the public, upon request, any information that may be released under law. The law does exclude certain information relative to weapons design characteristics, for example, or that is exempt from disclosure by the Freedom of Information Act. Vital documentation has not been suppressed by the government; however, specific technical weapons information is not available to the public for security reasons.

Technical reports are located in the public reading rooms in Washington DC, Las Vegas, NV, Albuquerque, NM, Los Alamos, NM, Aiken, SC, Oak Ridge, TN, Amarillo, TX, Panhandle, TX, and Richland, WA. Inquiries concerning additional material concerning Pantex Plant can be directed to the DOE Albuquerque or Amarillo Area offices. Some environmental information is of a sensitive nature because of its relationship with certain projects, facilities, or missions. These reports are being studied and the information contained within them will be resolved after it is studied.

RC: 23.024 **Doc: HT13/14**	Just to clarify, I think it is legitimate to have varying selection criteria that go into less detail, but part of what an Environmental Impact Statement is required to do by law is to also evaluate the environmental impacts. So you could use potentially certain criteria to select the sites, but once you have selected them, whether it is Manzano, Nevada, Pantex, et cetera, you need to look at the environmental consequences. Part of the consequences, both environmental because inspection is going to be important from not only an international, but frankly from a national confidential standpoint, is the availability and the accessibility and how inspection could work. On the face of it, it seems to me, knowing something about all the five sites [that] you are looking at, that there are differing ways, at some sites, it would be easier to have international inspection, and some would be more difficult, and I think that should be analyzed.
Response:	*The Department considers international inspection to be equally facilitated by all site alternatives.*

RC: 23.025 **Doc: HT13/34**	I would suggest that [the] cumulative impact part of your Environmental Impact Statement should also include a cumulative psychological impact of all these projects on the people of New Mexico and how much people here are going to take before there is some kind of rebellion involved. We already know that cancer rates at Los Alamos, breast cancer rates, are 20 to 50 percent higher. We know that the child death rate there is higher than anywhere else in the state. We know a lot of bad things about Los Alamos. We are looking at the rest of our state and wondering if the rest of our state is going to go that way, too, so I would suggest a psychological impact also be part of the cumulative effect of projects in an area.
Response:	*Court precedents state that psychological impacts are not required for a valid NEPA analysis. The U.S. Supreme Court, in Metropolitan Edison Co., v. People Against Nuclear Energy (460 US 766 {1983}), held that psychological effects need not be considered in a NEPA evaluation. People Against Nuclear Energy, an organization of residents living in the area, claimed the commission should consider the severe psychological stress caused to its members by the nuclear reactor restart, especially in view of the failure of another reactor on the same site. While the Court did recognize that "human health may include psychological health," and conceded that risk to human health, including psychological health, came under NEPA, the Court believed that the psychological effects claimed raised policy questions that fell outside NEPA and that analysis of the psychological risks of the nuclear reactor restart were not required.*

C: 23.026 **Doc: HT13/38**	Well, I also feel that if Kirtland becomes your number one choice, that it is your obligation to hold a hearing here, not to just do this.

Response: *The hearing in Albuquerque fully complies with the letter and spirit of NEPA. Repetitive hearings on this same issue are at this time, considered neither necessary nor a prudent use of the public's time and taxpayers' dollars. Should a new, and previously, unaddressed alternative or significant environmental impact be discovered, the Department would consider additional public meetings.*

RC: 23.027
Doc: HT13/88

I just wanted to clarify the high explosive building with insufficient buffer. I used as an example what I would ask that this site-wide do, which is provide to people [with] an accurate description of the state of the plant, a Pantex Plant site-wide EIS.... I would like this document to contain an appendix or something that gives us an update on the status of the SARs at the plant, the facilities, and the status of whether or not they are in compliance with whatever DOE orders or whatever applies that DOE establishes to make these facilities meet whatever standards they have decided upon.

That is what I would like the site-wide to do. It is not to criticize the plant because in 1977, three people were killed, but it is telling that in 1996, you have a building that still has a similar problem, that people can get too close to it, so I would just like for this document to be complete enough that people can read the site-wide EIS and get an understanding of the plant and where it is going, mitigation, whatever is needed, and it goes forward from there. That is my question.

Response: *The Department has established policies to continually emphasize safety and encourage prompt resolution of any problems discovered. The cited incident is discussed in the response to comment 14.040.*

RC: 23.028
Doc: HT12/1

First of all,...if I suggested it, I didn't mean to, that cost should drive the decision, but I think NEPA itself mandates that they [costs] be considered. If you've got two that are close together in environmental protection, you better know what they cost and maybe—you mentioned proliferation, which is the reason for all of this exercise. Timing, timing is not mentioned here.... It could have an impact on the decision and the costs.

Response: *See response to comment 23.011.*

RC: 23.029
Doc: HT12/12

May I ask a policy question? By what process do you waive [weigh] strategic concerns against potential negative impact to local populations? I was just wondering [if there] was any particular formula, equation, process?

Response: *The Record of Decision represents a judgment weighing all relevant factors in the decision. There is no mathematical formula.*

RC: 23.030
Doc: HT12/13

But are you...working with any type of independent entity that's not in total opposition to DOE but, just in case you did a case study, let's say for instance, cancer. And...are you...bringing in outside resources to say well, this is not what...we're finding.

Well...that's where the problem may be at, because you...hired them.... We're raising some very serious questions then. [You] should be able to fund us with money for us to be able to go out and find [our] own independent study, own independent researchers, the individual that will research our problem for us. And then [together] we could sit at a round table and...come up with an answer....

But...for [you] to appoint us someone or say, well, I [have] this person here [and] you can call him and he'll help you out. [But]...that's not going to work because that's no different than [you] sending out doing the independent research yourself.

Response: *The Department does fund outside research when deemed appropriate to investigate matters about which in-house information is insufficient for decision-making. The commentor is referred to EPA's Office of Environmental Justice. This office provides grants to organizations specifically to study environmental justice issues. This EPA money would be completely independent of DOE and would directly address the commentor's issue. The last EPA notice of availability for funding was announced in the Federal Register on Thursday, June 13, 1996 (61 FR 30063), "Notice of Availability of FY 1996 Multimedia Environmental Justice Through Pollution Prevention Grant Funds." For further information, the commentor should contact EPA at (202) 260-4109.*

RC: 23.031
Doc: HT12/14

... A more narrow question is, is there a way to challenge the ROD, not to necessarily change it although it may get changed in your process, but his specific question is, what is the procedure to challenge a ROD if you feel that that decision is against your community.

Response: *Public comments, as outlined in 40 CFR 1503, are actively encouraged by DOE. All comments received during review of the draft document have been published and responded to in this volume of the EIS. These comments must be addressed in an EIS as outlined in 40 CFR 1503.4. The public may appeal a decision under 40 CFR 1506.10 and make their views known even after the publication of the final EIS. If a substantial opportunity exists to alter the decision, the decision can be made and recorded at the same time that the EIS is published. This gives a 30-day parallel period when the EIS is under both appeal and review. "No action shall be taken until the decision has been made public" (10 CFR 1021.315) as required by the recently revised DOE NEPA Implementing Procedures, published in the Federal Register on Tuesday, July 9, 1996 (61 FR 36222). The decision can be made public by means such as a press release or announcement in the local media.*

RC: 23.032
Doc: HT12/23

... On your evaluation list, I had a question about why you didn't discuss things in detail and why you did. For instance, the facilities in infrastructure at SRS are excellent,...but it says it's not discussed in detail.

Response: *Council on Environmental Quality regulations proscribe that NEPA documents avoid unnecessary detail. In the instance cited, there was no need for further detail.*

RC: 23.033
Doc: HT12/28

What I'm hearing Rick say to you is that he's reading another DOE document that's not badly out of date and it's different than what [your] EIS is saying and what you're telling us here. And in order to go forward from here you need to take that document and...make a review against your EIS, correct and modify as necessary. Isn't that what you're saying, Rick?

Response: *This EIS contains the most current information available.*

RC: 23.034
Doc: HT12/32

It is the conservatism that you put in the bounding accidents—[they] are way too conservative. They need to have some credibility even though they are bounding accidents. You can't just assume, like the safety analysis does, everything is the worse, NEPA doesn't allow that. NEPA says that you will develop reasonable but bounding accidents and I concluded from reading it before Bob raised the question here earlier in the day that the accidents were not reasonable. They were bounding, certainly. ...I could have said that the guys consume...or inhale the pit and, therefore, that's bounding, but that's certainly [not] the intent of a NEPA process.

Response: *The accidents analyzed are both bounding and the most credible of accidents that safety specialists can conceive for the circumstances that exist.*

RC: 23.035
Doc: CO-003/4

Equity impacts must be addressed in the assignment of new nuclear materials (including plutonium) to Hanford.

Response: *Equity along with environmental impacts, mission requirements, costs, and technical factors will be considered in the Record of Decision.*

RC: 23.036
Doc: CO-009/3

(However, we do request that the Department include in the record "dockets" for these EISs the comments by SPS relative to listed potential environmental concerns recited in the draft Tritium Production-related EIS of 1995. In those comments, SPS rebutted the overly sensitive, generally not really site-specific but knee-jerk and ill-informed, and frequently inaccurate characterizations of environmental "concerns" about expanded missions at Pantex. Clearly, those earlier characterizations of possibly "adverse" impacts, especially those related to uses of groundwater, now are rejected by DOE. Nonetheless, a replete record supportive of the Department's April 23, 1996, publicly articulated conclusion that NO significant adverse impacts would result, is appropriate.)

Response: *Each NEPA document prepared by the Department contains the most accurate information available at the time the document is produced.*

RC: 23.037
Doc: CO-009/4

We request—we are tempted to demand—that fair and open cost comparisons among the alternative sites for each function be used in analyzing sites, and that such accountings be shared with the public that [has] demonstrated interest in the nuclear complex.

Response: *See response to comment 23.011.*

RC: 23.038
Doc: PC-023/1

First of all, I appreciate that this report has addressed many concerns expressed by citizens' groups with regard to previous reports. The writers and compilers of the report should be complimented on their efforts in this process.

Response: *Thank you for the compliment. The Department will pass it on to the responsible preparers.*

RC: 23.039
Doc: PC-022/1

I would like to request [that] you hold public hearings in Albuquerque on the Pantex Storage of Nuclear Weapons Components, as our city is one of the possible sites.

Response: *The public hearing in Albuquerque was held on May 7, 1996.*

RC: 23.040
Doc: HT15/24

We really are interested, as the State is as well, in seeing that the evaluations are good science, good process and all those things, because I don't think any of us are interested in having the numbers be unreasonable for any reason or uninformed for any reason. So that is a problem for us. We do like the idea of being able to read the document and understand thoroughly from what is in the document, that we do think it's clear; there are not terms that are used that are not explained.

Response: *Thank you for the comment. That is always our objective and intent.*

RC: 23.041
Doc: HT16/39

... None of the documentation related to the pit reuse facility is available to the public in Albuquerque, which is where I live, because the DOE reading room has none of these documents available to the public.

Response: *The specific documentation requested contains data that cannot be released to the public.*

RC: 23.042
Doc: HT17/15

... There is an environmental justice section;... there probably ought to be an economic justice section, also, because I think those at risk populations would feel the effect of an economic slow down, while at the same time those agencies that help them would really suffer in terms of available funds. And that's more of a blanket statement and I don't know if that really falls under what your tasked to do under NEPA, but I think it's a failing not only related to Amarillo, but to all the communities that [you] are looking at.

Response: *Economic impacts are addressed in volume I, sections 4.11, 5.2.1.9, 5.3.1.9, 5.4.1.9, and 5.5.1.9.*

RC: 23.043
Doc:HT17/20

I only want to make two comments. And one is I guess to express frustration at being in the situation we're in so very often with Pantex and the Department of

	Energy in general of being asked to trust us; the documentation isn't complete, trust us; it's not ready yet, but it will be, trust us; we don't have the cost analysis yet, but it will come, trust us; it's classified, we can't tell you, but we assure you it's okay. And we find ourselves in this position time and time and time again.
Response:	*This EIS has been prepared with the most current information available at the time of preparation. Many of the changes from the Draft EIS to the Final involve updating information that has become available recently. All references made in the EIS are available to the public, save those classified or otherwise restricted references. The use of restricted references has been kept to a minimum in this EIS.*
RC: 23.044 **Doc: HT17/52**	I would like to know the legal connection, if any, of the information documents that you all have composed that go along with this site-wide [EIS]. There are three volumes that [you] have worked with, and I would like to know, when you sit down with a site-wide, do you really need to sit down with those three documents, too, to look at the whole thing? ...Legally, does this thing [EIS] have to stand by itself and are those merely reference documents and they haven't got the same stand-alone right?
Response:	*The Final EIS is the only official NEPA document. The other documents mentioned are references used in preparing the EIS.*
RC: 23.045 **Doc: HT17/54**	In your list of comments, scoping issues that were brought up in this document, [you] left off the nonproliferation concerns. And if you'll go back to your implementation, you will find out that in scoping, nonproliferation received more comments than human health, socioeconomics, transportation, air quality. It was very nearly at the top of the list.
Response:	*Subsequent to scoping, the Department determined that there would be no changes to facilities necessitated by non-proliferation procedures. Therefore, there are no impacts to analyze.*
RC: 23.046 **Doc: HT17/58**	We're forced here to comment on a very narrowly conceived document. We're in a [compromising] position, because we're forced to play on the Agency's ground, with no input into the design of a better draft EIS. Again, we're forced to be reactive, rather than to confront these issues up front in a collaborative, proactive manner.
Response:	*A public scoping period was conducted in May and June 1994 to obtain public input into the scope and design of the EIS.*
RC: 23.047 **Doc: HT17/65**	I think the document provides virtually no, none of the analysis that is necessary in terms of looking at the baseline operations of existing pit storage at Pantex. One of the things, one of the easy things that should be done...is taking your two and a half year old EA for pit storage of those pits and looking at what it said the impacts would be, [if] anything, other than the aircraft analysis, which seems to be the only thing you've even tried to look at, and saying, okay,

over the last two and a half years what does the real data show up in terms of what's actually happened. What [if] those analyses were right, what [if they] were wrong, what [if they] were overly conservative, et cetera.

Response: *The 1994 Environmental Assessment for Interim Storage of Plutonium Components at Pantex was considered and utilized in the production of the Pantex EIS. Baseline operations were also considered by utilizing the information provided in the Pantex Plant Environmental Information Document (Pantex 1996), the Safety Information Document (Pantex 1996a), and the Programmatic Information Document (Pantex 1996b) that were created by the plant as resource material. See response to comments 23.012 and 23.053.*

RC: 23.048
Doc: HT17/66

... I think it is both poor practice and, frankly,...hard to justify that in terms of looking at the baseline of existing impacts, the document provides no assessment of what the impacts of the operation have been to those nearby surrounding residents to the plant. There have been impacts, and they need to be analyzed. It's frankly disgusting that your only charting document of where these surrounding residences even are in the document are wrong, but there's much more wrong with the lack of analysis than that.

Response: *The Department believes that impacts have been properly assessed. The map in the Draft EIS did mislocate some residences. That has been corrected in the Final EIS. However, a check of the database shows that the grid coordinates of the residences in the air quality model are correct and that the effects described were correctly modeled and analyzed in the text.*

RC: 23.049
Doc: PC-017/2

How can you determine the safety and purity of our agricultural activities and products if no thorough studies have been done?

Response: *The available information from past studies, along with the analyses performed in this EIS provide adequate assessment of potential impacts to agriculture and human health risks.*

RC: 23.050
Doc: MG-002/1

We recognize that the DEIS follows the standard NEPA-mandated DOE format of identifying alternatives and then comparing and contrasting these alternatives by describing potential impacts on a number of environments. This standard format is well-recognized as a reliable and valid process to identify traditional impacts that may result from a major Federal activity such as that described in the DEIS. However, we feel that the approach falls short of addressing the concerns of those persons and institutions most affected by the proposed project, namely those located in proximity to the site of the proposed activity and those located along related transportation routes. Residents of Clark County and visitors to the area certainly fall within this definition and we would expect that their perceptions and concerns would be taken into account as the Pantex EIS is finalized and the record of decision is reached.

esponse: *Volume I, chapter 4, addresses the affected environment and the potential environmental impacts in an 80-kilometer (50-mile) radius around the Pantex*

Plant. Section 4.11, Socioeconomic Resources, and section 4.16, Intersite Transportation, address the commentor's specific concerns. Comments received in these areas have been considered and the final document has been updated where appropriate. All comments were considered in preparation of the Final EIS, which the Secretary considers in issuing the Record of Decision.

RC: 23.051
Doc: PC-025/1

In general, I do not understand how this EIS and its Proposed Action, No Action, and alternatives meets the intent of NEPA. Please explain how this 2,000, 1,000, and 500 level analysis meets the intent of NEPA. I believe the levels are not different enough to analyze, please comment. Plus don't the impacts at 2,000 cover 1,000 and 500 levels, please comment on this issue. Please explain why an EA or supplemental EIS aren't more appropriate. Please provide a technical response including regulatory citations detailing why this EIS meets the purpose of NEPA when the alternatives are so similar. Should the analysis look at one level of activity and then limit detailing the "what if's" at higher and lower levels if necessary. This would possibly reduce the size of the document by 50 percent.

Response:

The Pantex EIS was prepared to support the Proposed Action of continued operations and interim storage of up to 20,000 plutonium pits at Pantex Plant in accordance with the guidance provided in NEPA (42 U.S.C. Section 4321 et seq.) and the implementing Council of Environmental Quality Regulations (40 CFR 1500-1508). An environmental assessment is not a viable option for the Proposed Action, since the Secretary of Energy made a commitment to the Governor of Texas at the completion of the Environmental Assessment of Interim Storage of Plutonium Components at Pantex Plant that the storage of plutonium pits would not exceed 12,000 pits prior to completion of additional analysis in an environmental impact statement (herein referred to as the Pantex EIS). The rationale for the 2,000, 1,000, 500 activity levels bounding the Proposed Action and alternatives is provided in volume I, section 2.2 of this EIS.

RC: 23.052
Doc: PC-025/2

On Page 1-14 in the second column in the last paragraph. If the decision will be based on cost, technology, national security, and infrastructure considerations, which documents covering cost, technology, and national security will be used? This implies the decision maker will use the information to make the decision without public comment. Does that meet the intent of NEPA? Will they be available to the public? Do the documents exist? When will these documents be completed?

Response:

The analysis for this EIS has been conducted in accordance with CEQ regulations (40 CFR 1500-1508). NEPA ensures that environmental issues associated with a decision are adequately addressed. Cost, technology, national security, and infrastructure considerations are other decision making factors that DOE anticipates relative to this Proposed Action. These documents are prepared as needed prior to the Record of Decision.

RC: 23.053
Doc: CO-005/3

Provide us [with] the data that proves DOE has not already contaminated our soil, air and water. Show us the documents where you have fully assessed the impact nuclear and high explosive activities have had and will have in the future on regional agriculture. Until agriculture is fully assessed, the impacts from the range of alternatives cannot be adequately scrutinized.

Response:

See response to comment 23.023. More than 1,000 documents on Pantex Plant were considered in preparing the EIS. These documents are available upon request from the Department. The Department has already provided baseline information in the form of three documents made available to the public. These documents are: (1) Programmatic Information Document (Pantex 1996b); (2) Environmental Information Document (Pantex 1996); and (3) Safety Information Document (Pantex 1996a).

3.24 Miscellaneous

RC: 24.001
Doc: HT02-22/1

... When we think of Pantex as people, 3,500 people, most of whom are very highly qualified, having a real appreciation for the quality of life for their families, here in Amarillo, we have excellent educational facilities from kindergarten all the way through to graduate level.

We have excellent cultural facilities, symphony, art, opera and so forth. We have excellent climate. We're just about the right size for people who want to really become an integral part of a good community to raise their families.

And of several different sessions that I have heard over the last few years, I don't recall having anybody express any concern about the fact that those 3,500 people who work at Pantex, whomever they may be, need to have a place to live and work in a place where they have a high quality of life.

And I think that is something that DOE needs to remember after they've considered all the technical aspects, all the hard, cold facts, that we've got to recognize that those 3,500 people have an excellent place in which to live and do their work and raise their families.

Response: *Thank you for your comment.*

RC:24.002
Doc: HT13/74

... My comment...is that [the] safety analysis report [should] be made available as the previous safety analysis report for Zone 4 was made available to the public, and I specifically, Don Hancock, Southwest Research and Information Center here in Albuquerque, want to be [notified] when that safety analysis report is available.

Response: *The previous Zone 4 Safety Analysis Report (SAR) was released to the public in 1994 due to the fact that the Zone 4 Environmental Assessment cited this document heavily (DOE 1992f). As for future SARs, including the Zone 4, these documents are generally not available to the public due to the added cost in declassification. As for the EIS, this document relies heavily on the Programmatic Information Document (Pantex 1996b), the Environmental Information Document (Pantex 1996), and the Safety Information Document (Pantex 1996a).*

RC: 24.003
Doc: HT17/48

Another piece, though, that really does trouble me is the lack of context that this document builds. Jerry Johnson, in his introductory remarks, did more to sort of put the context out when we first started this meeting this morning, when he talked about in '89 it was this, in '91 we were talking about expanding, and by the time we got to '93 we were doing thus and so. A few lines, and yet it put far more perspective about what the department had been through, the nuclear weapons program has been through, and what brought Pantex to where we are today. For instance, instead of saying Pantex used to do staging and now we do storage, I think it would not take many more words to say that Pantex [staged] plutonium components until 1989, when the Rocky Flats plant closed, and at that time it began to hold them, and then say when storage actually initially began.

Response: *The context is stated in the summary section of the Pantex EIS as recommended by CEQ 1502.12.*

RC: 24.004
Doc: PC-025/88

... How many Information Document versions are there (i.e. 1995a, d, and h)? Why so many PCs? What does PC stand for? What does nd stand for? Is N441.1 correct?

Response: *There were numerous versions of the Information Documents (IDs). As the EIS was being produced, the most current ID was used; thus, the EIS lists different versions of the IDs. PC is an abbreviation for personal communication which was used as a reference; the abbreviation nd denotes no date. N441.1 stands for a DOE Order (N441.1) titled, "Radiological Protection for DOE Activities"; this Order is current as of March 1, 1996.*

RC:24.005
Doc: PC-025/89

... Why only CDRs as source? Nothing better?

Response: *DOE procedures have tied NEPA into the project review and approval processes. As a result, money is generally not approved for detail design until certain stages are completed in the NEPA process.*