QA: NA

MOL.20070613.0003

DOE/EIS – 0337F

WEST VALLEY DEMONSTRATION PROJECT WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

FINAL SUMMARY

December 2003

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Abstract:

The purpose of the *Final West Valley Demonstration Project Waste Management Environmental Impact Statement* is to provide information on the environmental impacts of the Department of Energy's proposed action to ship radioactive wastes that are either currently in storage, or that will be generated from operations over the next 10 years, to offsite disposal locations, and to continue its ongoing onsite waste management activities. Decommissioning or long-term stewardship decisions will be reached based on a separate EIS that is being prepared for that decisionmaking. This EIS evaluates the environmental consequences that may result from actions to implement the proposed action, including the impacts to the onsite workers and the offsite public from waste transportation and onsite waste management. The EIS analyzes a no action alternative, under which most wastes would continue to be stored onsite over the next 10 years. It also analyzes an alternative under which certain wastes would be shipped to interim offsite storage locations prior to disposal. The Department's preferred alternative is to ship wastes to offsite disposal locations.

Public Comments:

The WVDP Waste Management EIS was issued in draft on May 16, 2003, for public review and comment. A public hearing on the Draft EIS was held on June 11, 2003, at the Ashford Office Complex near the WVDP site. DOE received comments from 21 individuals, organizations, and agencies.

A complete copy of the WVDP Waste Management Final EIS can be viewed at:
http://www.wv.doe.gov/LinkingPages/RevisedEnvironmental%20Impact%20Statement.htm.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

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SUMMARY

1.0 INTRODUCTION

Background

As part of its ongoing West Valley Demonstration Project (WVDP), and in accordance with the West Valley Demonstration Project Act and previous U.S. Department of Energy (DOE or the Department) decisions, DOE proposes to:

- Continue onsite management of high-level radioactive waste (HLW) until it can be shipped for disposal to a geologic repository (assumed for the purposes of analysis to be the proposed Yucca Mountain Repository in Nye County, Nevada),

- Ship low-level radioactive waste (LLW) and mixed (radioactive and hazardous) LLW offsite for disposal at DOE or other disposal sites, and

- Ship transuranic (TRU) radioactive waste to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

The waste volumes that are the subject of evaluation in this EIS include only those wastes that are either currently in storage or that would be generated over the next 10 years from ongoing operations and decontamination activities. This EIS analyzes activities that would occur during a 10-year period.

The proposed actions and alternatives assessed in this environmental impact statement (EIS) are intended to address DOE's responsibilities under the West Valley Demonstration Project Act and are consistent with the terms of the Stipulation of Compromise reached with the Coalition on West Valley Nuclear Wastes and Radioactive Waste Campaign. Implementation of theses actions would allow DOE to make progress in meeting its obligations under the Act that pertain to waste management, and they are consistent with programmatic decisions DOE has made regarding the waste types addressed in this EIS. Those decisions and their respective EISs, as they apply to the WVDP, provide for shipping wastes from the West Valley site to other regional or centralized DOE sites for treatment, storage, and disposal, as appropriate. The Department has analyzed the potential environmental impacts associated with this proposal and reasonable alternatives in accordance with the National Environmental Policy Act (NEPA) and applicable NEPA regulations issued by the Council on Environmental Quality (Title 40 of the Code of Federal Regulations [CFR] Parts 1500-1508) and DOE (10 CFR Part 1021).

The scope of this EIS departs from that which was announced in a March 2001 Notice of Intent (NOI) (66 Fed. Reg. 16447 (2001)). The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI. DOE modified the scope of this EIS as a result of public comments received during scoping and the Department's further evaluation of activities that might be required, and independently justified, before final decisions are made on decommissioning and/or long-term stewardship.

The continuation of the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center*, also referred to as the 1996 Completion and Closure Draft EIS, will be accomplished with a revised *Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS*. An Advance NOI was issued on November 6, 2001 (66 Fed. Reg. 56090 (2001)), formalizing DOE's commitment to begin work on the

Decommissioning and/or Long-Term Stewardship EIS. An NOI was published on March 13, 2003 (68 Fed. Reg. 12044 (2003)).

The WVDP is located on the Western New York Nuclear Service Center (also referred to as the Center). The Center comprises 13.5 square kilometers (5 square miles) in West Valley, New York, and is located in the town of Ashford, approximately 50 kilometers (30 miles) southeast of Buffalo, New York. It was a commercial nuclear fuel reprocessing plant and was the only one to have operated in the United States. Figure S-1 shows the locations of the Center and the WVDP site within the State of New York.

The Center operated under a license issued by the Atomic Energy Commission (now the U.S. Nuclear Regulatory Commission [NRC]) in 1966 to Nuclear Fuel Services, Inc., and the New York State Atomic and Space Development Authority, now known as the New York State Energy Research and Development Authority (NYSERDA).

During reprocessing, spent nuclear fuel from commercial nuclear power plants and DOE sites was chopped, dissolved, and processed by a solvent extraction system to recover uranium and plutonium. Fuel reprocessing ended in 1972 when the plant was shut down for modifications to increase its capacity, reduce occupational radiation exposure, and reduce radioactive effluents. In 1976, Nuclear Fuel Services judged that over $600 million would be required to modify the facility to increase its capacity and to comply with changes in regulatory standards. As a result, the company announced its decision to withdraw from the nuclear fuel reprocessing business and exercise its contractual right to yield responsibility for the Center to NYSERDA. Nuclear Fuel Services withdrew from the Center without removing any of the in-process nuclear wastes. NYSERDA now holds title to and manages the Center on behalf of the people of the State of New York.

Types of Radioactive Waste at WVDP

There are four types of radioactive waste at the WVDP site:

- *High-level radioactive waste* is defined in the West Valley Demonstration Project Act as the high-level waste that was produced by the reprocessing of spent nuclear fuel at the Center. The term includes both liquid wastes and such other material as the NRC designates as high-level radioactive waste for purposes of protecting public health and safety.
- *Transuranic waste* is currently defined by NRC and DOE as waste containing more than 100 nanocuries of alpha-emitting isotopes, with half-lives greater than 20 years, per gram of waste. However, the West Valley Demonstration Project Act defined TRU waste as "material contaminated with radioactive elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations greater than *10* (emphasis added) nanocuries per gram, or in such other concentrations as the [NRC] may prescribe to protect the public health and safety." [In the event wastes are disposed of offsite, the applicable definitions at the disposal site will be used.]
- *Low-level radioactive waste* is radioactive waste that is not high-level waste, transuranic waste, spent nuclear fuel, or by-product tailings from processing of uranium or thorium ore. Depending on the degree of radioactivity present, low-level waste is defined in Nuclear Regulatory Commission regulations as Class A, B, C, or Greater-Than-Class-C low-level waste.
- *Mixed waste* is waste that contains hazardous waste regulated by the Resource Conservation and Recovery Act and radioactive material subject to the Atomic Energy Act.

In 1978, Congress enacted the Department of Energy Act (Pub. L. No. 95-238), which, among other things, directed DOE to conduct a study to evaluate possible federal operation or permanent federal ownership of the Center and use of the Center for other purposes. DOE issued the *Western New York Nuclear Service Center Study: Companion Report* to provide historical perspective and to identify options for the future of the Center. The Companion Report did not attempt to select an option for the

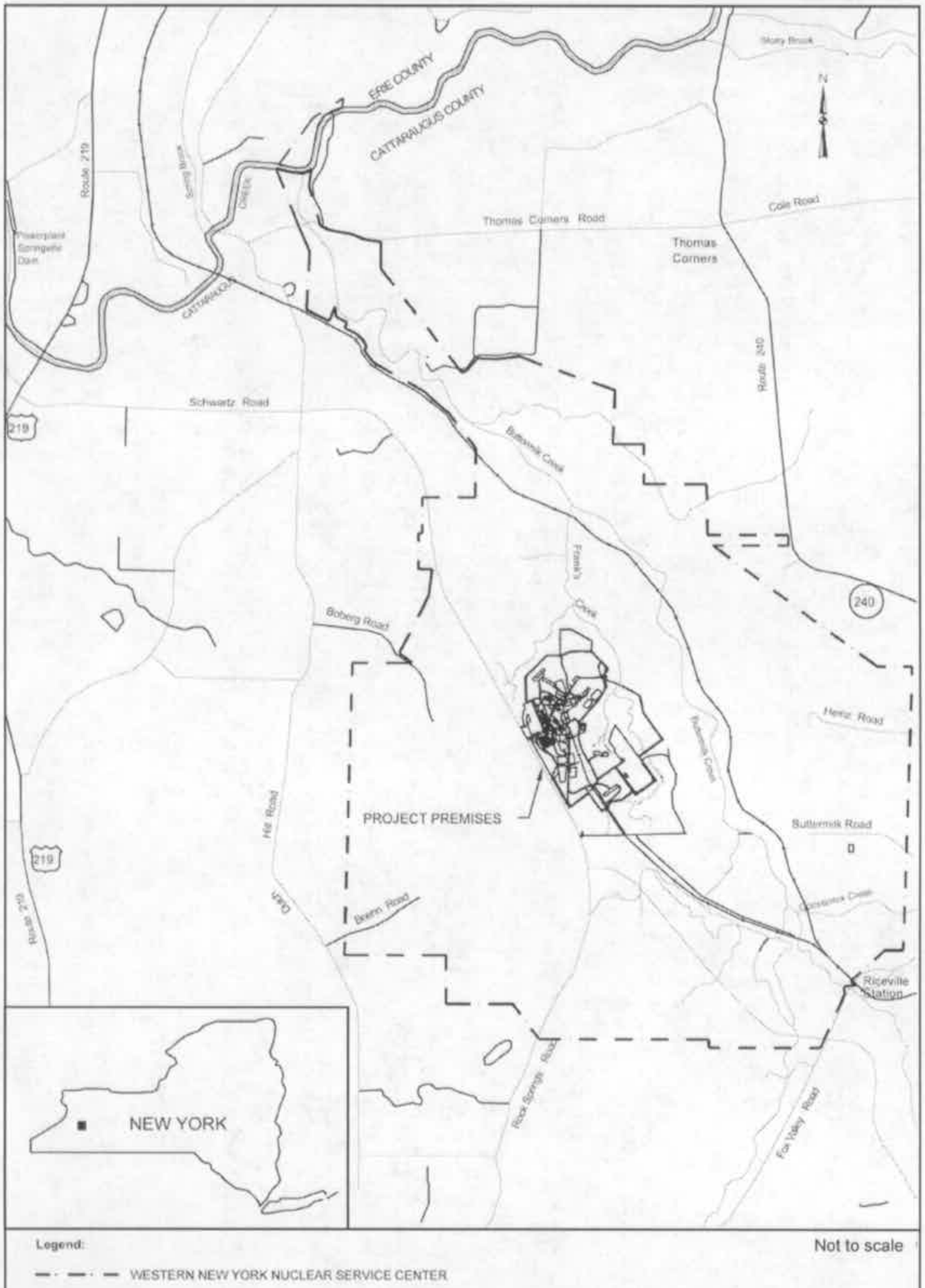

Figure S-1. Location of the West Valley Demonstration Project

future of the Center, although it included recommendations that development of technology to immobilize liquid HLW be started immediately. Congress subsequently passed the West Valley Demonstration Project Act (Pub. L. No. 96-368; 42 U.S.C. 2021a) in 1980.

The West Valley Demonstration Project Act requires DOE to demonstrate that the liquid HLW from reprocessing can be safely managed by solidifying it at the Center and transporting it to a geologic repository for permanent disposal. Specifically, Section 2(a) of the Act requires DOE to:

- Solidify HLW by vitrification or by such other technology that DOE deems effective,
- Develop containers suitable for the permanent disposal of the solidified HLW,
- Transport the solidified HLW to an appropriate federal repository for permanent disposal,
- Dispose of the LLW and TRU waste produced by the HLW solidification program, and
- Decontaminate and decommission the waste storage tanks and facilities used to store HLW, the facilities used for HLW solidification of the waste, and any material and hardware used in connection with the project in accordance with such requirements as the NRC may prescribe.

This EIS evaluates alternatives for meeting DOE's waste management responsibilities under the Act. DOE is preparing the Decommissioning and/or Long-Term Stewardship EIS to address decommissioning and closure alternatives.

Purpose and Need

In accordance with the directives in the West Valley Demonstration Project Act, DOE is responsible for the facilities used in connection with the WVDP HLW vitrification effort and for disposal of the LLW, mixed LLW, HLW, and TRU waste produced by the WVDP HLW solidification program. To fulfill its responsibilities under the West Valley Demonstration Project Act, DOE needs to identify a disposal path for the wastes that are currently stored onsite and that will be generated from ongoing operations and decontamination activities that will occur over the next 10 years. Decommissioning and/or long-term stewardship decisions will be made under the Decommissioning and/or Long-Term Stewardship EIS.

NEPA Compliance Strategy

In the early 1980s, DOE prepared an environmental assessment (EA) on the proposed disposal of certain radioactive wastes in two engineered disposal areas that would have been developed near and within an NRC-licensed disposal area. In 1986, the Coalition on West Valley Nuclear Wastes and Radioactive Waste Campaign filed a lawsuit challenging the EA and subsequent finding of no significant impact (FONSI) prepared by DOE. Under a Stipulation of Compromise that settled the litigation, DOE agreed that it would evaluate the disposal of Class A, B, and C LLW generated as a result of activities in a Completion and Closure EIS.

DOE began preparation of the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center*, also referred to as the 1996 Completion and Closure Draft EIS, in 1988 with the issuance of a NOI to Prepare an EIS. DOE and NYSERDA were joint lead agencies for the preparation of the EIS. The scope of that EIS includes, among other things, the management of Class A, B, and C LLW and TRU waste that is either stored onsite or that would be generated as a result of site closure activities. The Completion and Closure Draft EIS was issued in January 1996 for a 6-month comment period in accordance with the Stipulation of Compromise.

> ***Ongoing Operations***
>
> Under all alternatives, it is assumed that current levels of maintenance, surveillance, heating, ventilation, and other routine operations would continue to be required while the actions proposed under each alternative were performed. For this EIS, these actions are called *ongoing operations*. Although the impacts of these ongoing actions have been assessed in several previous NEPA documents and are characterized in the Annual Site Environmental Reports, the impacts on worker and public health of these ongoing operations have been included in this EIS using actual operational data from 1995 through 1999. Because ongoing operations would not vary among the proposed alternatives, the impacts from these actions would be the same across all alternatives.

The 1996 Draft EIS evaluated the environmental impacts of alternatives considered for completing the WVDP and closure or long-term management of facilities at the Center, but it did not specify a preferred alternative. Many of the public comments submitted on the 1996 Draft EIS stated that DOE and NYSERDA should have indicated the preferred alternative in the Draft EIS. Despite long negotiations, DOE and NYSERDA have been unable to reach an agreement on a preferred future course of action for the closure of the Center. This has delayed the development and issuance of the Completion and Closure Final EIS.

To allow the Department to continue to meet its obligations under the West Valley Demonstration Project Act, DOE is preparing two EISs: this *West Valley Demonstration Project Waste Management EIS* and the *Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS*. In March 2001, DOE published its strategy for completing the 1996 Completion and Closure Draft EIS and an NOI to prepare a Decontamination and Waste Management EIS (66 Fed. Reg. 16447 (2001)). This EIS was originally scoped as a revision of the 1996 Completion and Closure Draft EIS. In the NOI, DOE published for comment its position that its decisionmaking process would be facilitated by preparing and issuing for public comment a Revised Draft EIS that focused on DOE's actions to decontaminate the Project Facilities and manage WVDP wastes controlled by DOE under the West Valley Demonstration Project Act. As part of its strategy to address the full scope of the 1996 Completion and Closure Draft EIS, DOE also stated in the NOI its intention to prepare an EIS with NYSERDA subsequent to this one in order to address the decommissioning and/or long-term stewardship of the WVDP and the Western New York Nuclear Service Center.

During scoping for the Decontamination and Waste Management EIS, commentors noted that applicable NEPA regulations require an agency to consider connected actions together in the same EIS (40 CFR 1508.25(a)), and they argued that the decontamination and waste management actions proposed in the NOI were "connected" to the decommissioning and/or long-term stewardship actions that would be addressed in the second EIS. After further evaluation and as a result of the public comments, DOE has limited the scope of this EIS to onsite and offsite waste management actions, and only those decontamination actions previously addressed under NEPA (DOE/EIS-0081). The *Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS* will be the continuation of the Completion and Closure Draft EIS begun in 1988 and issued in draft form in 1996.

Public Involvement

The WVDP Waste Management EIS was issued in draft on May 16, 2003, for public comment (68 Fed. Reg. 26587). The 45-day comment period ended on June 30, 2003, although DOE also considered comments received after that date. A public hearing on the Draft EIS was held on June 11, 2003, at the

Ashford Office Complex near the WVDP site. DOE received comments from 21 individuals, organizations, and agencies.

Major issues raised in the public comments involve management of the HLW tanks and compliance with the Stipulation, WVDP Act and NEPA. Commenters stated that an action to place low-strength grout in the tanks for interim stabilization that was analyzed under Alternative B should more appropriately be analyzed under the Decommissioning and/or Long-Term Stewardship EIS. DOE agrees and has removed all reference to that activity in this Final EIS.

Commenters concerned about DOE's compliance with the Stipulation, WVDP Act and NEPA stated that the Stipulation and Act allow the preparation of only one EIS, that the Stipulation requires a 6-month public comment period, and that DOE's NEPA strategy of preparing two EISs to meet its responsibility under the Act and Stipulation is akin to segmentation not allowed under NEPA. In DOE's view, neither the Stipulation nor the Act requires the preparation of only one EIS. DOE will meet all of the commitments of the Stipulation by completing this Final Waste Management EIS and the Decommissioning and/or Long-Term Stewardship EIS now in progress. DOE will hold a 6-month public comment period on the Decommissioning and/or Long-Term Stewardship EIS, which is the continuation of the 1996 Cleanup and Closure EIS as described in Section 1.2.3. Regarding DOE's NEPA strategy, none of the alternatives or actions analyzed in this EIS will affect the reasonable range of alternatives available for the Decommissioning and/or Long-Term Stewardship EIS or preclude any decisions to be made under that EIS. DOE therefore does not believe that its NEPA strategy involves impermissible segmentation of the actions.

Other comments from stakeholders in states hosting DOE sites that could receive West Valley wastes expressed concern about receiving those wastes, particularly for interim storage of TRU waste and HLW. DOE's preferred alternative, Alternative A, is to ship LLW and mixed LLW to DOE sites for disposal, consistent with decisions made under the WM PEIS, and to ship TRU waste and HLW directly to WIPP and Yucca Mountain respectively for disposal, consistent with decisions under the EISs for those facilities. While not DOE's preferred alternative, Alternative B, which includes interim storage of West Valley's TRU waste and HLW, is a reasonable alternative and is therefore included in this Final EIS as required under NEPA.

DOE has made several changes to this Final EIS in response to individual public comments. Sidebars beside the text identify where all changes from the Draft to the Final EIS have been made, although sidebars are not used to indicate changes in figures. Appendix E contains DOE's response to all public comments received on the Draft EIS.

Project Facilities

The Project Facilities and areas storing the wastes evaluated in this EIS are shown in Figure S-2. These facilities and areas are:

- ***Process Building***, which includes approximately 70 rooms and cells that comprised the original NRC-licensed spent nuclear fuel reprocessing operations (one of the cells—the Chemical Process Cell—now serves as the storage facility for the vitrified HLW canisters);

- ***Tank Farm***, which includes the underground waste storage tanks, 8D-1 and 8D-2, and supporting systems for maintenance, surveillance, and waste transfer of the tank waste to the Vitrification Facility;

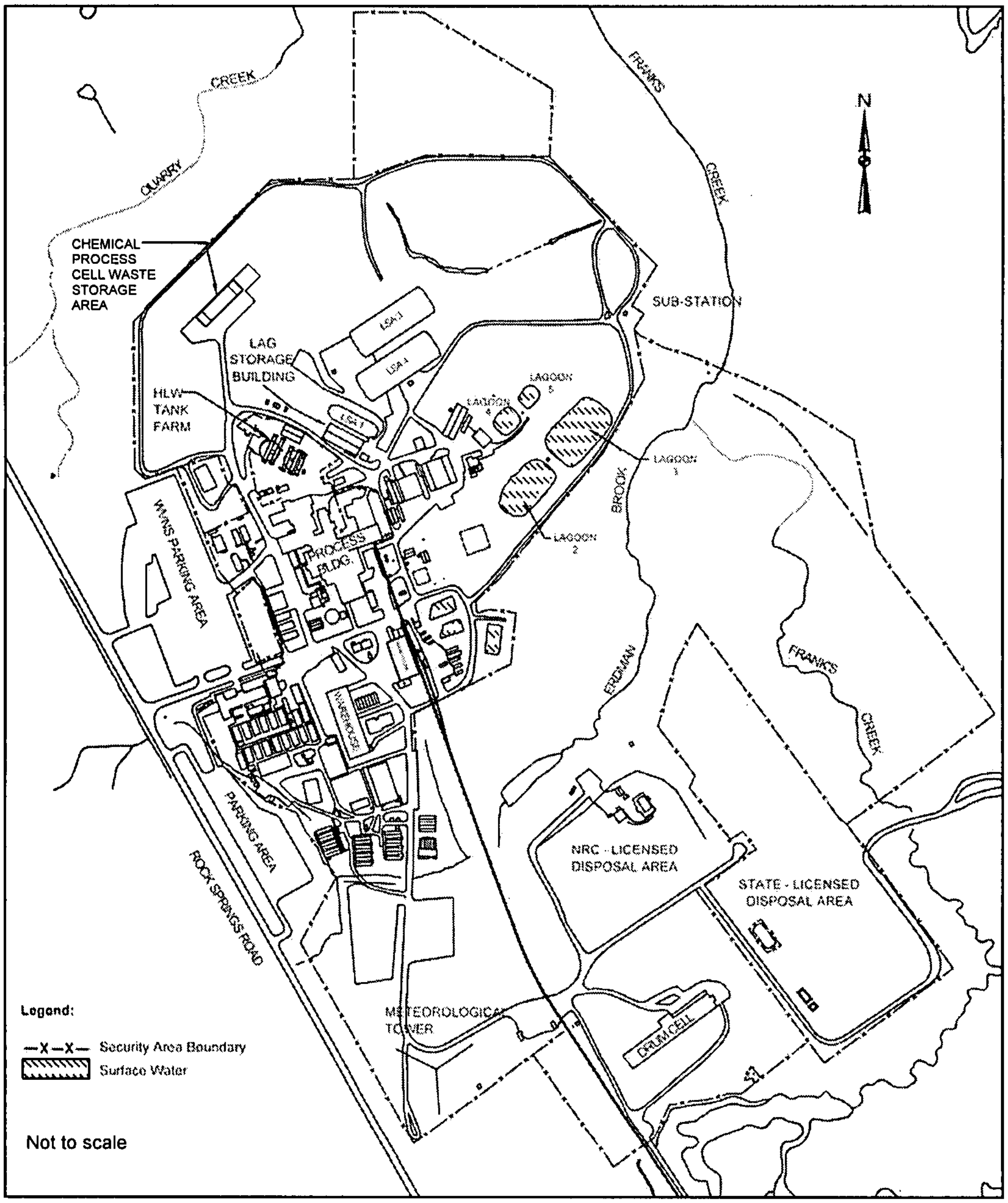

Figure S-2. West Valley Demonstration Project Facility Layout

- ***Waste Storage Areas***, which include several facilities such as the Lag Storage Building (LSB), Lag Storage Areas (LSA) 1, 3, and 4, and the Chemical Process Cell Waste Storage Area, are used to store and manage the radioactive wastes generated from WVDP activities; and
- ***Radwaste Treatment System Drum Cell*** (Drum Cell), which stores cement-filled drums of stabilized LLW produced by the Cement Solidification System.

2.0 DESCRIPTION OF ALTERNATIVES

The EIS analyzes three alternatives for the continued onsite waste management and shipment of wastes to offsite disposal, as described below. Based on the assumption that WVDP budgets remain comparable to current funding levels, it is anticipated that the actions proposed in this EIS would take approximately 10 years to complete; hence, the analyses in this EIS assume a 10-year operational period. Figure S-3 shows the locations of the waste disposal and/or interim storage sites under consideration in this EIS.

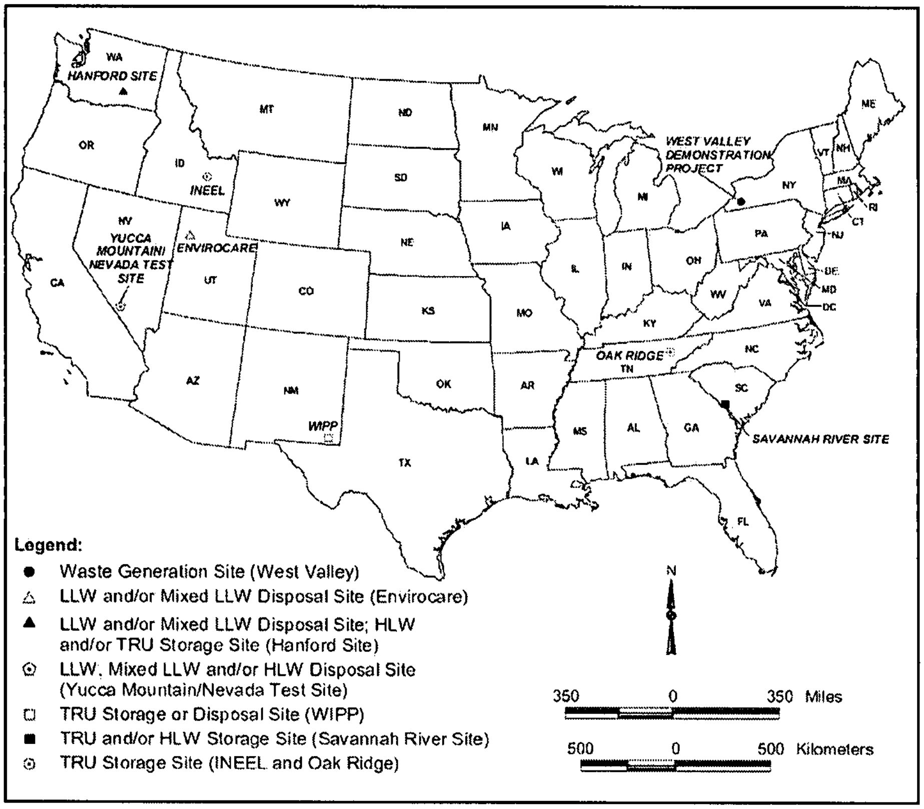

Figure S-3. WVDP Waste Disposal and/or Interim Storage Sites

Under the **No Action Alternative, Continuation of Ongoing Waste Management Activities,** waste management would include continued storage of existing Class B and Class C LLW, TRU waste, and HLW. Limited amounts of Class A LLW (4,060 cubic meters [145,000 cubic feet]) would be shipped to offsite disposal and the remainder would be stored onsite. Upon completion of ongoing efforts to remove wastes to the extent that is technically and economically practical, the waste storage tanks and their surrounding vaults would continue to be ventilated to manage moisture levels as a corrosion prevention measure. Waste transportation destinations proposed under the No Action Alternative are shown in Figure S-4.

Under **Alternative A, Offsite Shipment of HLW, LLW, Mixed LLW, and TRU Wastes to Disposal (Preferred Alternative)**, DOE would ship Class A, B, and C LLW (19,200 cubic meters [685,515 cubic feet]) and mixed LLW (221 cubic meters [7,889 cubic feet]) to one of two DOE potential disposal sites (in Washington or Nevada) or to a commercial disposal site (such as the Envirocare facility in Utah); ship TRU waste (1,372 cubic meters [49,000 cubic feet]) to WIPP in New Mexico; and ship HLW (300

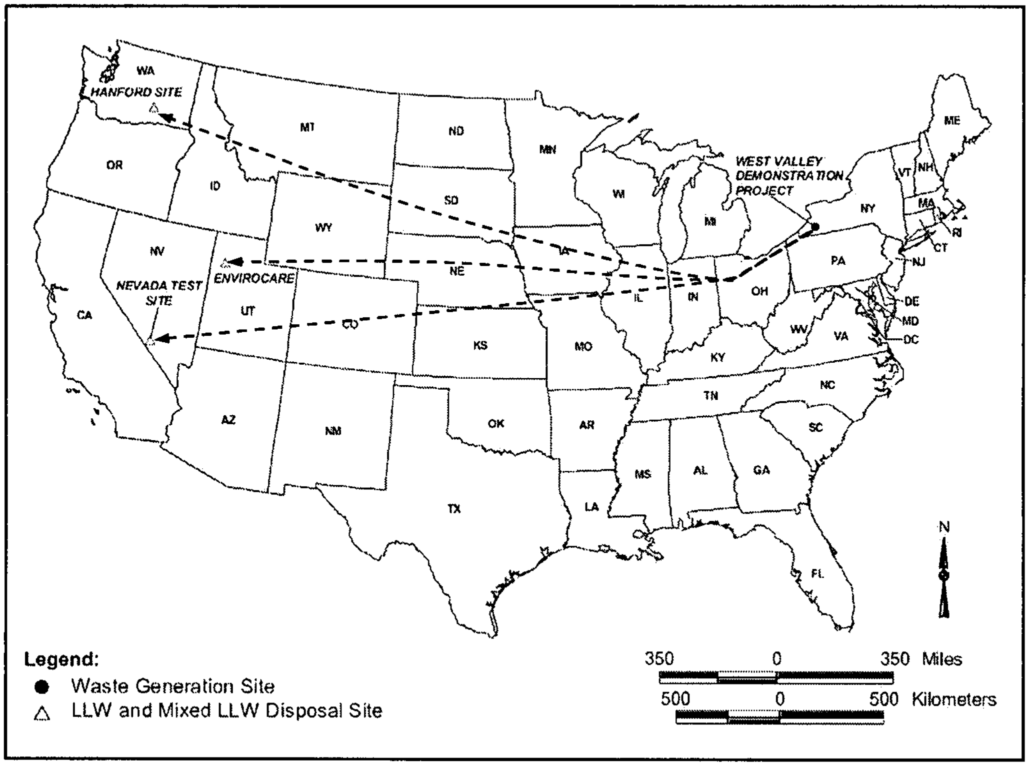

Figure S-4. Waste Destinations Under the No Action Alternative

canisters) to the proposed Yucca Mountain HLW Repository. LLW and mixed LLW would be shipped over the next 10 years. TRU waste shipments to WIPP could occur within the next 10 years if the TRU waste were determined to meet all the requirements for disposal in this repository. If some or all of WVDP's TRU waste did not meet these requirements, the Department would need to explore other alternatives for disposal of this waste.

Under DOE's current programmatic decisionmaking, offsite disposal of HLW would occur at the proposed Yucca Mountain HLW Repository sometime after 2025 assuming a license to operate is granted by NRC and NYSERDA signs a standard contract for the disposal of HLW in accordance with the Nuclear Waste Policy Act. Although this period would extend well beyond the 10 years required for all other proposed actions under this alternative, the impacts of transporting the HLW have been included in this EIS to fully inform the decisionmakers should an earlier opportunity to ship HLW present itself. The waste storage tanks would continue to be managed as described under the No Action Alternative. Waste transportation destinations proposed under Alternative A are shown in Figure S-5.

Under **Alternative B, Offsite Shipment of LLW and Mixed LLW to Disposal, and Shipment of HLW and TRU Waste to Interim Storage**, LLW and mixed LLW would be shipped offsite for disposal at the same locations as Alternative A. TRU wastes (1,372 cubic meters [49,000 cubic feet]) would be shipped for interim storage at one of five DOE sites: Hanford Site in Washington; Idaho National Engineering and Environmental Laboratory (INEEL); Oak Ridge National Laboratory (ORNL) in Tennessee; Savannah River Site (SRS) in South Carolina; or WIPP. TRU wastes would subsequently be shipped to WIPP (or would remain at WIPP) for disposal. HLW (300 canisters) would be shipped to SRS or Hanford for interim storage, with subsequent shipment to Yucca Mountain for disposal.

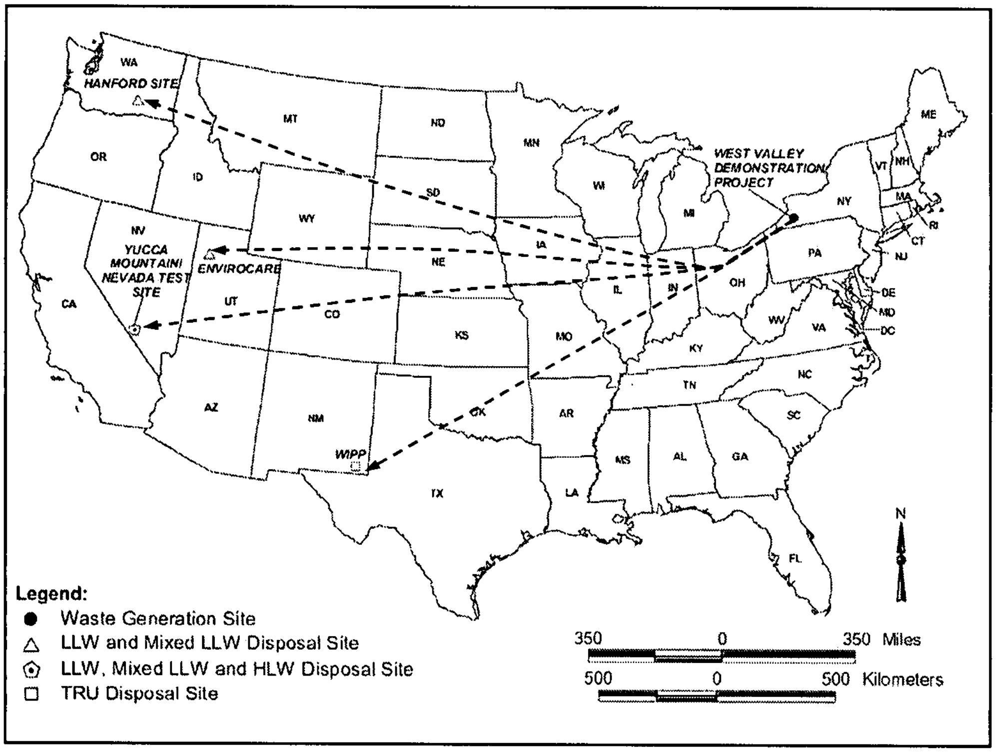

Figure S-5. Waste Destinations Under Alternative A

It is assumed that the shipment of LLW and mixed LLW to disposal would occur within the next 10 years, and that TRU waste and HLW would be shipped to interim storage during that same 10 years. Ultimate disposal of TRU wastes and HLW wastes would be subject to the same constraints described under Alternative A; however, the impacts of transporting these wastes to their ultimate disposal sites have been included in the impact analyses for this alternative. The waste storage tanks would continue to be managed as described under the No Action Alternative. Waste transportation destinations proposed under Alternative B are shown in Figure S-6.

Offsite Activities

In addition to activities that would occur at WVDP, DOE's proposed action and alternatives would involve activities at offsite locations as a result of the need for interim storage or disposal (see Figures S-4 through S-6). At interim storage sites, activities would include unloading and inspecting the WVDP waste containers and moving the containers to the storage area. Interim storage could require the siting, construction, and operation of additional storage capacity for the volume of WVDP wastes to be stored, depending on site storage capacity at the time. Activities at disposal sites would include unloading trucks or railcars, inspecting the waste containers, and moving the waste to the disposal areas for shallow land burial or deep geologic disposal, depending on the waste type. Offsite activities involving interim storage or disposal were addressed in previous NEPA documents or would be the subject of subsequent NEPA review, as needed.

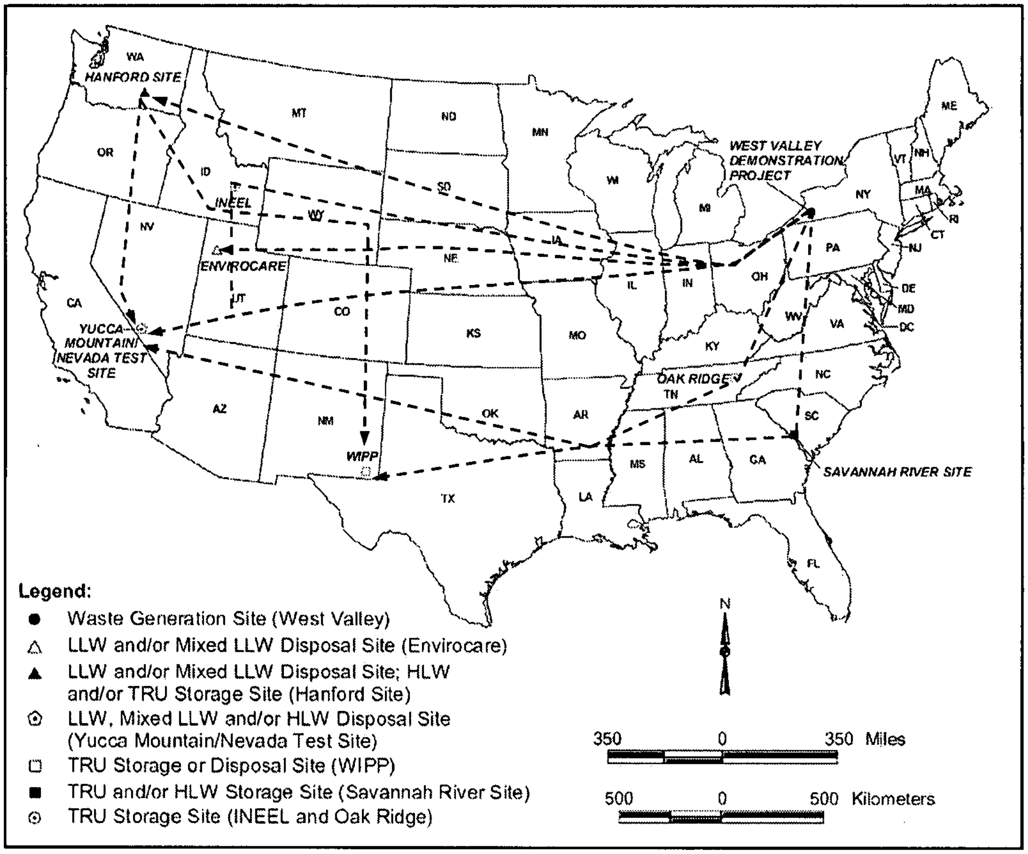

Figure S-6. Waste Destinations Under Alternative B

Alternatives Considered But Not Analyzed

In contrast with alternatives assessed in the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center* (DOE/EIS-0226-D), this EIS does not analyze any new onsite disposal of wastes or indefinite storage of currently stored wastes or wastes to be generated as a result of ongoing operations over the next 10 years. DOE has issued EISs and decisions that identify disposal sites other than the WVDP for each waste type considered in this EIS (see Section 1.7). These sites, identified in Alternatives A and B, already have existing or planned disposal capacity; they are safe, secure, and suitable from an environmental standpoint. In light of the current and anticipated availability of disposal facilities at these other sites, DOE presently does not consider an alternative to construct and maintain waste storage facilities at the WVDP to be practical or reasonable over time, because of continuing costs of construction of new facilities and maintenance of existing facilities.

3.0 AFFECTED ENVIRONMENT

This section characterizes the receptors and environmental media that may be affected by the proposed waste management activities.

Geology and Soils

The Western New York Nuclear Service Center is located on the Glaciated Allegheny Plateau section of the Appalachian Plateau Physiographic Province. This plateau has been subjected to the erosional and depositional actions of repeated glaciations, resulting in the accumulation of various glacial deposits over the area. Erosion resulting from streams and rivers and landslides currently are altering the glacial landscape. No geologic fold or fault of any consequence is recognized within the site area. From 1737 to 1999, there have been 119 recorded earthquakes within 480 kilometers (300 miles) of the WVDP site with epicentral intensities of Modified Mercalli Intensities V to VII; of these, 25 occurred within 320 kilometers (200 miles) of the WVDP site. The highest Modified Mercalli Intensity estimated to have occurred at the Center within the last 100 years was an Intensity of IV, which is similar to vibrations from a heavy truck that might be felt by people indoors, but do not cause damage.

Hydrology

Surface Water. The WVDP Facilities and its two water supply reservoirs (formed by blocking off two streams with earthen dams and located south of the main Project Facilities) lie in separate watersheds, both of which are drained by Buttermilk Creek. Buttermilk Creek, which roughly bisects the Western New York Nuclear Service Center, flows in a northwestward direction to its confluence with Cattaraugus Creek, at the northwest end of the Center. Several tributary streams flow into Buttermilk Creek at the Center. Buttermilk Creek flows into Cattaraugus Creek, which flows westward from the Buttermilk Creek confluence to Lake Erie, 63 kilometers (39 miles) downstream. Figure S-2 shows the surface water bodies on the Western New York Nuclear Services Center.

Neither Buttermilk Creek nor Cattaraugus Creek downstream of the WVDP site are used as a regular source of potable water. The steep-walled nature of the downstream valley and the region's annual precipitation combine to make irrigation from the creeks impracticable and unnecessary. Cattle from a neighboring dairy farm have access to Buttermilk Creek near the confluence of Cattaraugus Creek. Milk from the cattle is monitored for radioactivity on a routine basis. Cattaraugus Creek downstream of Buttermilk Creek is a popular fishing and canoeing/rafting waterway. As such, Cattaraugus Creek water, fish, and sediments are monitored as part of the WVDP environmental monitoring program.

Groundwater. The WVDP site is underlain by two aquifer zones, neither of which can be considered highly permeable or productive. The upper aquifer consists of surficial, gravelly deposits. The second aquifer zone consists of weathered, fractured, and decomposed shale and rubble at the contact between the overlying till and shale bedrock. Groundwater in the surficial unit tends to move in an easterly or northeasterly direction from the western boundary of the site, close to Rock Springs Road. Groundwater recharging the weathered shale and rubble zone tends to move eastward.

The Center is located within the Cattaraugus Creek Basin Aquifer System, a system that has been designated by the U.S. Environmental Protection Agency (EPA) as a sole or principal source of drinking water for the surrounding towns (52 FR 36102 (1987)). This means that all projects with federal financial assistance constructed in this basin are subject to EPA review to ensure that they are designed and constructed so as not to create a significant hazard to public health. WVDP waste management actions would not require any facility construction at the Center and are not expected to cause construction or any other impacts requiring EPA review on the surface water or groundwater resources described in this section.

Wells identified near the Western New York Nuclear Service Center serve residences and farms, and the maximum number of persons served per well was 10. Most of the wells are located on the higher elevations east and west of the Center, along the principal north-south county roads. A second concentration of wells is located on the lowlands north of the Center in the vicinity of Bond Road and Thomas Corners Road. The wells are upgradient of or are otherwise hydraulically isolated from groundwater at the site.

Water supplies north of the Western New York Nuclear Service Center and south of Cattaraugus Creek derive mainly from springs and shallow dug wells. The distribution of springs and the general geologic relationships indicate that the groundwater system here is disconnected from the WVDP site both hydraulically and topographically. Nonetheless, water supplies developed from bedrock wells in this same area downstream and downgradient of the WVDP site might be hydraulically connected to water originating on the site through the surface water system and shale exposures in the lower reaches of Buttermilk Creek.

Supply wells on the uplands bordering the Western New York Nuclear Service Center, such as along Route 240 and Dutch Hill Road, are completed in bedrock. A similar situation exists on the uplands east of the Center. Groundwater supplies in both of these areas can be assumed to be isolated hydraulically from groundwater in bedrock at lower elevations beneath the Center and the WVDP site.

Meteorology and Air Quality

The WVDP site is situated approximately 50 kilometers (30 miles) inland from the eastern end of Lake Erie in western New York State. The climate of western New York State is of the moist continental type prevalent in the northeastern United States. The climate is diverse due to the influence of several atmospheric and geographic factors or controls.

Western New York is bordered by two of the Great Lakes: Lake Erie on the west and Lake Ontario on the north. These exert a major controlling influence on the climate of the region. Topography also affects the climate. Elevations in western New York range from about 110 meters (350 feet) along the Lake Ontario shore in Oswego County to more than 610 meters (2,000 feet) in the southwestern highlands of Cattaraugus and Allegheny counties. The southern two-thirds of the region is composed of hilly, occasionally rugged terrain with elevations generally above 300 meters (1,000 feet). This area is interspersed with numerous river valleys and gently sloping plateau areas. Such topographic features may produce locally significant variation of climatic elements within relatively short distances.

Locally, severe thunderstorms would be the most likely event to cause wind damage at the site, particularly in late spring and summer. Thunderstorms occur about 30 days per year, with the most thunderstorms occurring in June, July, and August. Severe thunderstorms, with winds in excess of 22 meters per second (50 miles per hour), do occur in western New York every year. On the average, about one tornado can be expected to strike in western New York State annually. From 1950 to 1990, 17 tornadoes were reported within 80 kilometers (50 miles) of the WVDP site.

New York is divided into nine regions for assessing state ambient air quality. The WVDP site is located in Region 9, which is comprised of Niagara, Erie, Wyoming, Chautauqua, Cattaraugus, and Allegany counties. The WVDP site and the surrounding area in Cattaraugus County are in attainment with the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and New York State air quality standards contained in 6 NYCRR 257. The city of Buffalo, located about 48 kilometers (30 miles) from the WVDP site, is a marginal nonattainment area for ozone.

Ecological Resources

The Western New York Nuclear Service Center lies within the northern hardwood forest region. Its climax community forests are characterized by the dominance of sugar maple, beech, and Eastern hemlock. At present, the site is about equally divided between forestland and abandoned farm fields.

The U.S. Department of the Interior and the New York State Department of Environmental Conservation maintain lists of threatened and endangered species of wildlife that are protected under the Endangered Species Act of 1973 and the Fish and Wildlife Coordination Act of 1958. Except for occasional transient individuals, there are no federally listed or proposed endangered or threatened species in the vicinity of the WVDP. Based on population range maps, there are 12 federally threatened or endangered species with potential for occurring at the Western New York Nuclear Service Center, although they have not been observed on the site (Table S-1).

Table S-1. State and Federally Threatened or Endangered Animal Species Potentially Occurring at the Center

Species	Status
Birds	
Common tern	State threatened
Bald eagle	Federal threatened and state endangered; proposed for removal from the Federal Endangered Species list
Loggerhead shrike	State endangered
Northern harrier	State threatened
Osprey	State threatened; recommended for state special concern status
Peregrine falcon	State endangered
Piping plover	Federal and state endangered
Red-shouldered hawk	State threatened; recommended for state special concern status
Spruce grouse	State threatened recently; recommended for state endangered status
Mammals	
Indiana bat	Federal and state endangered
Herptiles	
Eastern massasauga	State endangered
Timber rattlesnake	State threatened

Field investigations in 1990 and 1991 recorded one species (Northern harrier) on the state list of threatened species and six state species of special concern (Cooper's Hawk, upland sandpiper, common raven, Eastern bluebird [recommended for unlisted status], Henslow's sparrow [recommended for threatened status], and vesper sparrow). State of New York "special concern species" are species of fish and wildlife found to be at risk of becoming endangered or threatened in New York. All of the noted species were observed in areas of the Western New York Nuclear Service Center outside the WVDP site. Moreover, none of these threatened species or species of special concern depend on areas within the WVDP boundaries for any aspect of their life cycle.

Field studies were conducted in the spring of 1992 to examine the Western New York Nuclear Service Center with respect to the current state and federal protected plant lists. No federally threatened or endangered species were identified. One each of New York State endangered and threatened plant species were reported in 1992 within the Western New York Nuclear Service Center. However, investigation at the location of the 1992 surveys in June and August 2000 could not confirm evidence of these species.

The U.S. Department of the Interior, Fish and Wildlife Service, maintains a file of habitat locations designated as critical to the survival of federally listed endangered or threatened species. Based on a review of the most recent listings, no such habitats occur in or around the site. Critical habitats are also designated by the New York State Department of Environmental Conservation, Bureau of Wildlife for areas found to be of significance to game and other important wildlife species. Such areas could include seasonally important wintering areas and breeding grounds. A 16-square-kilometer (6-square-mile) area encompassing the entire Western New York Nuclear Service Center site has been classified as critical habitat due to its extensive use as a whitetail deer (a game species) wintering area. The area has been designated because softwood shelter availability is rated intermediate, and food availability is rated good. Five other areas within a 16-kilometer (10-mile) radius of the site are similarly designated.

Examination of state and federal lists of threatened and endangered species and range maps, performance of field sampling and a literature survey, and interviews with local experts provided no indication that any threatened or endangered aquatic flora or fauna exist in the reservoirs, ponds, or streams on the Western New York Nuclear Service Center or in its vicinity.

The Western New York Nuclear Service Center has meadows, marshes, lakes, ponds, bogs, and other areas that are considered functional wetlands. Fifty-one such areas have been identified as wetlands under the jurisdiction of the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act. The site's topographic setting renders the likelihood of major flooding unlikely, and local run-off and flooding is adequately accommodated by natural and man-made drainage systems in and around the WVDP site.

Land Use and Visual Setting

Prior to 1961, much of the Center was cleared for agriculture. As a result, the Center now consists of a mixture of abandoned agricultural areas in various stages of ecological succession, forested tracts, and wetlands and transitional ecotones between these areas. The WVDP is an industrial facility that is visible from several miles away, depending on location. It is well lit at night.

Land use within 8 kilometers (5 miles) of the site is predominantly agricultural (active and inactive) and forestry uses. The major exception is the Village of Springville, which comprises residential/commercial, and industrial land uses. The industries within 8 kilometers (5 miles) of the site are light-industrial and commercial (either retail or service oriented).

Socioeconomics

Population. Data collected during the 2000 Census continue to indicate relatively stable overall population levels in the 12 counties surrounding the Western New York Nuclear Service Center. The total population in these counties has decreased by 3.3 percent since the 1990 census, with a loss of 1.9 percent in Erie County and 0.3 percent in Cattaraugus County. The total calendar year 2000 population within 80 kilometers (50 miles) was 1,535,963 (the population in Canada in 2001 within 80 kilometers of the WVDP site was 148,304).

Employment. DOE estimates that the waste management activities evaluated in this EIS would be accomplished by the existing work force with the technical capabilities now in use at the Western New York Nuclear Service Center. Based on the current employment of 500 persons at the Center, no increases in employment would be anticipated to implement any of the alternatives proposed for this project based on the assumed funding profile used as the basis for this analysis. Funding for the WVDP and the Center is subject to change on an annual basis, and decreases or increases in the levels of program funding and related increases or decreases in employment levels are always possible.

Public Services. The Cattaraugus County Health Department provides health and emergency services for the entire county, with the closest locations to the Western New York Nuclear Service Center being in the towns of Machias and Little Valley. A written protocol for WVDP-related emergency medical needs provides the basis for support in the event of emergency from Bertrand Chaffee Hospital and the Erie County Medical Center.

The Western New York Nuclear Service Center has its own reservoir and water treatment system to service the facility. The system provides potable and facility service water for operating systems and fire protection. The West Valley Volunteer Hose Company provides fire protection services to the Western New York Nuclear Service Center and the Township of Ashford. Responders are trained and briefed on a yearly basis by the Radiation and Safety Department at the Center, and they have some limited training and capability to assist in chemical or radioactive occurrences. The New York State Police and the Cattaraugus County Sheriff Department have overlapping jurisdictions for the West Valley area.

Transportation facilities near the WVDP site include highways, rural roads, a rail line, and aviation facilities. The primary method of transportation in the site vicinity is motor vehicle traffic on the highway system. All roads in Cattaraugus County, with the exception of those within the cities of Olean and Salamanca, are considered rural roads.

Rock Springs Road, adjacent to the site on the west, serves as the principal site access road. The portion of this road between Edies Road and U.S. 219 is known as Schwartz Road. Along this road, between the site and the intersection of U.S. 219, are fewer than 24 residences. State Route 240, also identified as County Route 32, is 2 kilometers (1.2 miles) northeast of the site. Average annual daily traffic on the portion of NY Route 240 that is proximate to the site (between County Route 16 - Rosick Hill Road and NY Route 39) ranges from a low of 440 to a high of 2,250.

Cultural Resources

The Project Premises, in which the proposed waste management actions would take place, contain 114 buildings and structures. The New York State Office of Parks, Recreation, and Historic Preservation has determined that facilities on the Premises are not eligible for inclusion in the *National Register of Historic Places*.

Offsite Activities

In addition to activities at WVDP, implementation of the proposed action or alternatives would involve activities at one or more offsite locations. The following briefly describes the affected environment at each of these sites.

Envirocare is a private facility licensed by the State of Utah (an NRC Agreement State) to accept Class A LLW. Envirocare is also a Resource Conservation and Recovery Act (RCRA) facility that is licensed by the State of Utah and the EPA to receive, possess, use, treat, and dispose of mixed waste. Waste material is disposed of in aboveground, engineered disposal cells that meet regulatory disposal requirements. The facility is located in Clive, Utah, approximately 80 kilometers (50 miles) west of Salt Lake City. Located in a remote area with an arid climate (annual precipitation is approximately 170 millimeters [7 inches] per year), Envirocare received its first DOE waste shipments in 1992 and has received waste shipments from 25 DOE sites. Envirocare is located adjacent to a major rail line and U.S. Interstate Highway 80.

The **Hanford Site** has a number of facilities, including retired plutonium production reactors, waste management and spent nuclear fuel processing facilities, and nuclear research and development laboratories. The site occupies approximately 1,450 square kilometers (560 square miles) of semi-arid desert land in southeastern Washington State, approximately 192 kilometers (119 miles) southwest of Spokane and 240 kilometers (150 miles) southeast of Seattle. The nearest city, Richland, borders the site on its southeast corner. The site is bounded on the east by the Columbia River, on the west by the Rattlesnake Hill, and on the north by Saddle Mountain. U.S. Highways 12 and 395, Interstate-82, and State Route 240 run near the Hanford Site. Two railroads also connect the area with much of the rest of the nation.

Currently, the focus of **INEEL** is environmental restoration, waste management, research, and technology development. Included within the boundaries of the site are the Naval Reactors Facility and Argonne National Laboratory-West. INEEL occupies 2,300 square kilometers (890 square miles) of desert in the southeastern portion of Idaho, approximately 44 kilometers (27 miles) west of Idaho Falls on the Eastern Snake River Plain. The site is bordered by mountain ranges and volcanic buttes. Land at INEEL is used for DOE operations (about 2 percent of the site), recreation, grazing, and environmental research. About 144 kilometers (90 miles) of paved public highway run through INEEL; railroads also serve the area.

The **Nevada Test Site (NTS)** has been the primary location for testing the nation's nuclear explosive devices since 1951. The site occupies 3,500 square kilometers (1,350 square miles) of desert valley and Great Basin mountain terrain in southern Nevada, 105 kilometers (65 miles) northwest of Las Vegas, Nevada. The only permanent onsite water bodies are ponds associated with wastewater disposal and springs. No continuously flowing streams occur on the site. Vehicular access to NTS is provided by U.S. Route 95 from the south. Interstate-15 is the major transportation route in the region. The major railroad in the area is the Union Pacific, which runs through Las Vegas and is located approximately 80 kilometers (50 miles) east of the site.

ORNL is part of the Oak Ridge Reservation (ORR), which also contains the Y-12 Plant, the East Tennessee Technology Park (formerly known as K-25), and the Oak Ridge Institute of Science and Education. ORNL's mission is to conduct applied research and development in support of DOE programs in fusion, fission, conservation, and other energy technologies. The ORR occupies 140 square kilometers (34,545 acres) and is located in the City of Oak Ridge, Tennessee, and 32 kilometers (20 miles) west of Knoxville, Tennessee, in the rolling terrain between the Cumberland Mountains and Great Smoky Mountains. The Clinch River and its tributaries are the major surface water features of the area. Interstate-40, located 2.4 kilometers (1.5 miles) south of the ORR boundary, provides the main access to the cities of Nashville and Knoxville. Interstate-75, located 24 kilometers (15 miles) south of the site, serves as a major route to the north and south. Several state routes provide local access and form interchanges with Interstate-40. Railroad service is also available in the area.

DOE activities conducted at **SRS** have involved tritium recycling, support for the nation's space program missions, storage of plutonium on an interim basis, processing of backlog targets and spent nuclear fuel, waste management, and research and development. SRS is approximately 20 kilometers (12 miles) south of Aiken, South Carolina in southwest-central South Carolina. It is on approximately 800 square kilometers (198,000 acres) of land in a principally rural area, with most of the land serving as a forestry research center. The primary surface water feature is the Savannah River, which borders the site for approximately 32 kilometers (20 miles) to the southwest. Six major streams flow through SRS into the Savannah River, and approximately 190 Carolina bays are scattered throughout the site. Interstate-20 is located approximately 29 kilometers (18 miles) northeast of SRS, providing the nearest interstate access to the site. Railroad service is also available through SRS.

WIPP is located in southeastern New Mexico, about 50 kilometers (30 miles) east of Carlsbad, New Mexico, in a relatively flat, sparsely inhabited plateau with little surface water. The constructed underground facilities include four shafts, an experimental area, an equipment and maintenance area, and connecting tunnels. These underground facilities were excavated 655 meters (2,150 feet) beneath the land surface. The site can be reached by rail or highway. DOE has constructed a rail spur to the site from the Burlington Northern and Santa Fe Railroad 10 kilometers (6 miles) west of the site. The site can also be reached from the north and south access roads constructed for the WIPP project. The south access road intersects New Mexico Highway 128 approximately 7 kilometers (4 miles) to the southwest of WIPP.

The **Yucca Mountain Repository** has been approved by the President and Congress for further development as the nation's first geologic repository for HLW and spent nuclear fuel. The site, located in the southwest corner of NTS, is in a remote area of the Mojave Desert in southern Nevada, about 160 kilometers (100 miles) northwest of Las Vegas, Nevada. The Yucca Mountain region is sparsely populated and receives only about 170 millimeters (7 inches) of precipitation each year. The area is characterized by a very dry climate, limited surface water, and generally deep aquifers. Shipments of HLW and spent nuclear fuel arriving in Nevada would travel to the Yucca Mountain site by truck or rail. At present, there is no rail access to the Yucca Mountain site. If material were shipped by rail, a branch line that connected an existing main line to the Yucca Mountain site would have to be built or the material would have to be transferred to heavy-haul trucks at an intermodal transfer station and transported over existing highways that might need upgrading.

4.0 ENVIRONMENTAL CONSEQUENCES

As noted above, the waste management activities assessed in this EIS would occur in the Process Building, the Tank Farm, Waste Storage Areas, and the Radwaste Treatment System Drum Cell. This EIS also evaluates activities in the onsite facilities used to store and prepare wastes for shipping, including loading containerized wastes onto transportation vehicles.

The waste management actions proposed under all alternatives would be conducted in existing facilities (or in the case of waste transportation, on existing road and rail lines) by the existing work force and would not involve new construction or building demolition. As a result, the scope of potential impacts that could result from the proposed actions is limited. Specifically, because there would be no mechanism for new land disturbance under any alternative, there would be no potential to directly or indirectly impact current land use; biotic communities; cultural, historical, or archaeological resources; visual resources; threatened or endangered species or their critical habitats; wetlands; or floodplains. Additionally, because the work force requirements are assumed to be the same under all alternatives (for example there would be no increases or decreases from current employment levels), there would be no potential for socioeconomic impacts. Therefore, these elements of the affected environment would not be impacted by any actions proposed under the alternatives.

Moreover, none of the onsite management activities under any of the alternatives would result in any new criteria air pollutant emissions (nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, lead, and particulate matter). Impacts of criteria air pollutant emissions resulting from transportation activities are incorporated in the transportation analysis.

Consistent with DOE and Council on Environmental Quality NEPA guidance, the analysis of impacts focuses on those limited areas in which impacts may occur from any action proposed by the three alternatives assessed in this EIS. These areas are human health (including both onsite workers and the offsite public) and transportation. DOE also examined the potential for environmental justice impacts.

Human Health Impacts

Waste management activities under each alternative would result in the exposure of workers to radiation and contaminated material and exposure of the public to very small quantities of radioactive materials. Because the proposed waste management actions would involve only the storage, packaging, loading, and shipment of wastes, the proposed activities would result in a statistically insignificant contribution to the historically low impacts of ongoing WVDP operations. As a result, the human health impacts to involved and noninvolved workers and the public are dominated by ongoing WVDP site operations; therefore, there is little discernible difference in the impacts that could occur among the three alternatives. The potential human health impacts are summarized below and demonstrate that the impacts from normal operations of each alternative would result in less than 1 cancer fatality among workers or the public.

> ***Measuring Radiation***
>
> The unit of radiation dose for an individual is the rem. A millirem (mrem) is 1/1,000 of a rem. The unit of dose for a population is person-rem and is determined by summing the individual doses of an exposed population. Dividing the person-rem estimate by the number of people in the population indicates the average dose that a single individual could receive. The potential impacts from a small dose to a large number of people can be approximated by the use of population (that is, collective) dose estimates.

Under the **No Action Alternative**, the worker population would receive a collective radiation dose of 150 person-rem, which would result in less than 1 (0.077) latent cancer fatality within that population. As under all alternatives, the population around the WVDP site would receive a collective radiation dose of 2.5 person-rem, which would result in less than 1 (1.5×10^{-3}) latent cancer fatality within that population. The maximally exposed individual located near the WVDP site would receive a total dose of 0.62 mrem over 10 years, which relates to a 3.7×10^{-7} probability (1 chance in 2.7 million) that this individual would incur a latent cancer fatality as a result of this exposure.

For **Alternative A**, the worker population would receive a collective radiation dose of 210 person-rem, which would result in less than 1 (0.11) latent cancer fatality within that population. The population around the WVDP site would receive a collective radiation dose of 2.5 person-rem, which would result in less than 1 (1.5×10^{-3}) latent cancer fatality within that population. The maximally exposed individual located near the WVDP site would receive a total dose of 0.62 mrem over 10 years, which relates to a 3.7×10^{-7} probability (1 chance in 2.7 million) that this individual would incur a latent cancer fatality as a result of this exposure.

For **Alternative B**, as would be the case under Alternative A, the worker population would receive a collective radiation dose of 210 person-rem, which would result in less than 1 (0.11) latent cancer fatality within that population. The population around the WVDP site would receive a collective radiation dose of 2.5 person-rem, which would result in less than 1 (1.5×10^{-3}) latent cancer fatality within that population. The maximally exposed individual located near the WVDP site would receive a total dose of 0.62 mrem over 10 years, which relates to a 3.7×10^{-7} probability (1 chance in 2.7 million) that this individual would incur a latent cancer fatality as a result of this exposure.

For all accidents under all alternatives, neither individual involved workers nor the maximally exposed individual, nor the general public near the WVDP site would be expected to incur a latent cancer fatality under any atmospheric conditions if an accident were to occur during waste management activities. Among the 12 accident scenarios evaluated, the projected latent cancer fatalities ranged from a high of 0.084 to a low of 4.5×10^{-6}. The frequencies of these accidents ranged from 0.1 to 10^{-8} per year. Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and*

Terrestrial Biota, the sum of fractions of the biota concentration guides for these accidents was less than 1. Therefore, the radioactive releases from these accidents are not likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

Transportation Impacts

Projected radiological and nonradiological impacts from routine, non-accident, offsite waste transportation were less than 1 latent cancer fatality among workers and the public for all three alternatives. Impact estimates from rail transportation were generally found to be slightly greater than, but similar to, the impacts from truck transportation. Impacts are also projected to be slightly greater for Alternative B due to the increased shipping required to move the TRU and HLW wastes to interim storage and subsequently to disposal locations.

Under the **No Action Alternative**, DOE would ship 4,100 cubic meters (145,000 cubic feet) of Class A LLW in 169 truck or 85 rail shipments. This would be expected to result in no fatalities, taking into account exposure to radiation and vehicle exhaust during incident-free shipping and traffic accidents not involving a release of radioactive material.

Latent Cancer Fatalities

Radiation can cause a variety of ill-health effects in people, including cancer. To determine whether health effects could occur as a result of radiation exposure from a particular activity and the extent of such effects, the radiation dose must be calculated. An individual may be exposed to radiation externally, through a radiation source outside of the body, and/or internally from ingesting or inhaling radioactive material. The dose is a function of the exposure pathway (for example, external exposure, inhalation, or ingestion) and the type and quantity of radionuclides involved.

After the dose is estimated, the potential health impact is calculated from current internationally recognized risk factors. The potential health impact for an individual, or the number of fatalities expected in a population, is stated in terms of the probability of a latent cancer fatality. A latent cancer fatality is a fatality resulting from a cancer that was originally induced by radiation but which may occur years after the exposure.

In an accident involving the release of radioactive material, the maximally exposed individual would receive a radiation dose of 4.6 rem from the maximum reasonably foreseeable transportation accident involving a truck shipment of Class A LLW. This is equivalent to a risk of a latent cancer fatality of about 2.8×10^{-3}. The probability of this accident is about 5×10^{-7} per year. The population would receive a collective radiation dose of about 1,300 person-rem from this truck accident involving Class A LLW. This could result in about 1 latent cancer fatality.

For the maximum reasonably foreseeable transportation rail accident involving Class A LLW, the maximally exposed individual would receive a radiation dose of about 9.2 rem. This is equivalent to a risk of a latent cancer fatality of about 5.5×10^{-3}. The probability of this accident is about 2×10^{-6} per year. The population would receive a collective radiation dose of about 2,600 person-rem from this rail accident involving Class A LLW. This could result in about 2 latent cancer fatalities.

Under **Alternative A**, DOE would ship about 21,000 cubic meters (742,000 cubic feet) of LLW, mixed LLW, TRU waste, and HLW canisters in 2,550 truck or 847 rail shipments over 10 years. These shipments would be expected to result in less than 1 fatality if either truck (0.79 – 0.82 fatality) or rail (0.60 – 0.68 fatality) shipments were used, taking into account exposure to radiation and vehicle exhaust during incident-free shipping and traffic accidents not involving a release of radioactive material.

For accidents in which the radioactive contents of the containers would be released, the maximally exposed individual would receive a radiation dose of about 25 rem from the maximum reasonably foreseeable truck or rail transportation accident with the highest consequences. This exposure is equivalent to a latent cancer fatality risk of 0.015. The population would receive a collective radiation dose of approximately 6,600 person-rem from this accident. This could result in about 4 latent cancer fatalities. Because it is unlikely that a severe accident would breach multiple shipping containers, a single shipping container was assumed to be breached in the maximum reasonably foreseeable accident in either the truck or rail accident; therefore, the consequences for the truck or rail accident are the same. The probability of a truck accident is 6×10^{-7} per year and the probability of a rail accident is 1×10^{-7} per year.

Under **Alternative B**, DOE would load the same 21,000 cubic meters (742,000 cubic feet) at the WVDP site of LLW, mixed LLW, TRU waste, and HLW canisters in 2,550 truck or 847 rail shipments over 10 years as it would under Alternative A. However, the total shipments to disposal sites would be higher under Alternative B (3,120 truck shipments or 1,079 rail shipments), because TRU waste and HLW shipments include interim storage destinations. The total shipments would be expected to result in less than 1 fatality if either truck (0.84 – 0.93 fatality) or rail (0.66 – 0.79 fatality) shipments were used, taking into account exposure to radiation and vehicle exhaust during incident-free shipping and traffic accidents not involving a release of radioactive material.

For accidents in which the radioactive contents of the containers would be released, the maximally exposed individual would receive a radiation dose of about 25 rem from the maximum reasonably foreseeable truck or rail transportation accident with the highest consequences. This exposure is equivalent to a latent cancer fatality risk of 0.015. The population would receive a collective radiation dose of approximately 6,600 person-rem from this accident. This could result in about 4 latent cancer fatalities. Since one shipping container was assumed to be involved either the truck or rail accident, the consequences for the truck or rail accident are the same. The probability of a truck accident is 8×10^{-7} per year and the probability of a rail accident is 3×10^{-7} per year.

Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, the sum of fractions of the biota concentration guides for the transportation accidents was less than 1. Therefore, the radioactive releases from the transportation accidents are not likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

Offsite Impacts

Impacts of waste management activities at offsite locations (Envirocare, Hanford, INEEL, NTS, ORNL, SRS, WIPP, and Yucca Mountain) have been addressed in earlier NEPA documents. For all waste types, WVDP waste represents less than 2 percent of the total DOE waste inventory. Human health impacts at all sites as a result of the management (storage or disposal) of WVDP during the 10-year period of analysis would be very minor (substantially less than 1 latent cancer fatality).

Environmental Justice

In accordance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations,* and applicable guidance, DOE also considered whether there could be any disproportionately high and adverse human health or environmental impacts on minority or low-income populations surrounding the WVDP site as a result of the implementation of any of the alternatives analyzed. Analysis of environmental justice concerns was based on an assessment of the impacts reported. No high and adverse impacts were identified, even taking into account possible subsistence fishing on the part of some residents of the Cattaraugus Reservation of the Seneca Nation of Indians.

For offsite locations, the potential that low-income or minority populations could experience disproportionately high and adverse environmental consequences at sites where waste management activities would occur was addressed in earlier NEPA documents. No such potential impacts were identified for any site.

Summary of Impacts

Tables S-2 and S-3 summarize the normal operational impacts for the 10-year period assessed in this EIS and potential accident impacts under the three alternatives analyzed in this EIS. Table S-4 summarizes the potential human health impacts at offsite locations.

5.0 CUMULATIVE IMPACTS

Past fuel reprocessing and radioactive waste disposal operations at the Center have resulted in airborne and liquid releases, some soil and groundwater contamination, limited sediment contamination in the creeks, and some detectible contamination off the site. The net impact from past operations to the regional population near the Center has been estimated to be approximately 13 person-rem. During reprocessing operations, the estimated cumulative exposure to the workforce was about 4,200 person-rem. The potential radiation dose to workers and the public from the implementation of Alternative A or B would be far lower than that experienced in the past and the resulting cumulative impacts would be very small.

There are ongoing operations at the WVDP site. These activities are those included in the No Action Alternative and Alternatives A and B and involve active hazardous waste management, operational support, surveillance, and oversight and other routine operations. These activities result in exposure of workers and the public to very low doses of radiation above background levels each year (0.1 percent of natural background annual exposure for the maximally exposed member of the public). The dose from ongoing operations, when added to the expected dose from the implementation of Alternative A or B, would remain very low.

No other ongoing or currently planned activities at the WVDP site would contribute to site cumulative impacts. There are no industrial facilities in the area that would present a hazard to WVDP or contribute to cumulative impacts. In the future, DOE or the NYSERDA may propose decommissioning and/or long-term stewardship activities that could impose environmental impacts at the site. However, at this time it is not known what, if any, contributions future decontamination and/or long-term stewardship actions may make to cumulative impacts.

It is reasonably foreseeable that waste generated as part of decommissioning and/or long-term stewardship activities would also be shipped offsite. Although the specific volume cannot be known at this time and would vary depending on the alternative selected, it is expected that the volume to be shipped offsite would be analyzed in the Decommissioning and/or Long-Term Stewardship EIS.

The shipment of radioactive wastes from WVDP to the disposal sites has the potential to affect people nationwide located along the highway and rail corridors between the site and the offsite disposal facilities. These potential impacts include the direct effect of radiation exposure to people using, working, and residing along the selected corridors and traffic accidents. Transportation workers and the general public using, working, and residing along the selected transportation corridors could also be affected by shipments of radioactive waste or materials from other sites. This situation would be particularly true for individuals residing along the major interstate highways used as access routes to the waste disposal sites. However, the potential cumulative impacts would be small. Further, there would be relatively few shipments of radioactive waste from WVDP to final disposal destinations (a maximum of 2,550 truck or 847 rail shipments under Alternative A or a maximum of 3,120 truck and 1,079 rail shipments under Alternative B), in comparison to other radioactive waste and materials shipments and truck shipments.

Table S-2. Summary of Normal Operational Impacts at West Valley

Impact Area	Unit of Measure	No Action Alternative	Alternative A - Preferred	Alternative B
Human Health Impacts[a]				
Public Impacts from Ongoing Operations				
MEI	LCF	3.7×10^{-7}	3.7×10^{-7}	3.7×10^{-7}
Population	LCF	1.5×10^{-3}	1.5×10^{-3}	1.5×10^{-3}
Worker Impacts				
Involved worker MEI	LCF	3.4×10^{-4}	1.3×10^{-3}	1.3×10^{-3}
Noninvolved worker MEI	LCF	3.0×10^{-4}	3.0×10^{-4}	3.0×10^{-4}
Involved worker population	LCF	2.1×10^{-3}	0.031	0.031
Noninvolved worker population	LCF	0.075	0.075	0.075
Total worker population	LCF	0.077	0.11	0.11
Transportation (from all causes – radiological and nonradiological; routine and accident conditions)				
Total	Shipments	169 (truck) 85 (rail)	2,550 (truck) 847 (rail)	3,120 (truck)[b] 1,079 (rail)[c]
Impacts				
Truck	Fatalities	0.034-0.041	0.79-0.82	0.84-0.93
Rail	Fatalities	0.042-0.049	0.60-0.68	0.66-0.79
Maximum Reasonably Foreseeable Accident				
Truck	LCF (probability)	1 (5×10^{-7})	4 (6×10^{-7})	4 (8×10^{-7})
Rail	LCF (probability)	2 (2×10^{-6})	4 (1×10^{-7})	4 (3×10^{-7})
Geology and Soils		No impact	No impact	No impact
Water Quality and Resources				
Groundwater		No impact	No impact	No impact
Surface water		No impact	No impact	No impact
Wetlands		No impact	No impact	No impact
Floodplains		No impact	No impact	No impact
Noise and Aesthetics		No impact	No impact	No impact
Ecological Resources				
Threatened and endangered species		No impact	No impact	No impact
Other plants and animals		No impact	No impact	No impact
Land Use		No impact	No impact	No impact
Socioeconomics		No impact	No impact	No impact
Environmental Justice		No impact	No impact	No impact
Cultural Resources		No impact	No impact	No impact

a. MEI = maximally exposed individual; LCF = latent cancer fatality (number of fatalities expected or probability).

b. Includes 270 TRU waste, and 300 HLW, truck shipments from interim storage to disposal. Alternative B would load the same number of truck shipments (2,550) at WVDP for shipment offsite as Alternative A.

c. Includes 172 TRU waste, and 60 HLW, rail shipments from interim storage to disposal. Alternative B would load the same number of rail shipments (847) at WVDP for shipment offsite as Alternative A.

Table S-3. Summary of Accident Impacts[a]

Accident	No Action Alternative[b]			Alternative A[b]			Alternative B[b]		
	Worker	MEI	Population[c]	Worker	MEI	Population[c]	Worker	MEI	Population[c]
	(LCF)			(LCF)			(LCF)		
Drum Puncture[d]	3.6×10^{-9}	1.4×10^{-9}	4.5×10^{-6}	6.0×10^{-8}	2.3×10^{-8}	7.2×10^{-5}	6.0×10^{-8}	2.3×10^{-8}	7.2×10^{-5}
Pallet Drop[d]	2.1×10^{-8}	8.4×10^{-9}	2.6×10^{-5}	3.5×10^{-7}	1.4×10^{-7}	4.4×10^{-4}	3.5×10^{-7}	1.4×10^{-7}	4.4×10^{-4}
Box Puncture[d]	4.3×10^{-8}	1.7×10^{-8}	5.4×10^{-5}	6.0×10^{-7}	2.3×10^{-7}	7.2×10^{-4}	6.0×10^{-7}	2.3×10^{-7}	7.2×10^{-4}
Drum Cell Drop	NA[g]	NA	NA	2.4×10^{-8}	9.6×10^{-9}	3.0×10^{-5}	2.4×10^{-8}	9.6×10^{-9}	3.0×10^{-5}
HIC[e] Drop	NA	NA	NA	7.5×10^{-7}	3.1×10^{-7}	9.6×10^{-4}	7.5×10^{-7}	3.1×10^{-7}	9.6×10^{-4}
CH-TRU Drum Puncture	NA	NA	NA	1.9×10^{-5}	7.8×10^{-6}	0.025	1.9×10^{-5}	7.8×10^{-6}	0.025
RHWF[f] Fire	NA	NA	NA	6.5×10^{-5}	2.6×10^{-5}	0.084	6.5×10^{-5}	2.6×10^{-5}	0.084
Collapse of Tank 8D-2 (Wet)[d]	1.2×10^{-6}	4.9×10^{-7}	1.5×10^{-3}	1.2×10^{-6}	4.9×10^{-7}	1.5×10^{-3}	1.2×10^{-6}	4.9×10^{-7}	1.5×10^{-3}
Collapse of Tank 8D-2 (Dry)[d]	1.4×10^{-6}	5.7×10^{-7}	1.8×10^{-3}	1.4×10^{-6}	5.7×10^{-7}	1.8×10^{-3}	1.4×10^{-6}	5.7×10^{-7}	1.8×10^{-3}

a. Based on atmospheric conditions (stability class and wind speed) that are not exceeded 50 percent of the time.
b. MEI = maximally exposed individual; LCF = latent cancer fatality (probability).
c. Collective dose to the 1.5 million people living within 80 kilometers (50 miles) of the WVDP site.
d. Ground-level release.
e. HIC = High integrity container.
f. RHWF = Remote-Handled Waste Facility.
g. NA = Not Applicable. Accident scenario could not occur under specified alternative.

Note: Of the 12 accidents analyzed, 5 could occur under any of the three alternatives and 7 could occur only under Alternatives A or B (see Appendix C). The accident impacts shown for the No Action Alternative primarily involve Class A LLW. The accident impacts shown for Alternatives A and B primarily involve Class C LLW.

Table S-4. Summary of Offsite Human Health Impacts

Site	No Action Alternative			Alternative A			Alternative B		
Envirocare[a]	Disposal of Class A LLW[b]			Disposal of LLW[c] and mixed LLW[d]			Disposal of LLW[c] and mixed LLW[d]		
	Worker	MEI	Population	Worker	MEI	Population	Worker	MEI	Population
	(LCF)			(LCF)			(LCF)		
	5.4×10^{-3}	6.9×10^{-6}	NA[e]	3.6×10^{-2}	5.1×10^{-5}	NA	3.6×10^{-2}	5.1×10^{-5}	NA
Hanford Site	Disposal of Class A LLW[b]			Disposal of LLW[c] and mixed LLW[d]			Disposal of LLW[c] and mixed LLW[d]		
	Worker	MEI	Population	Worker	MEI	Population	Worker	MEI	Population
	(LCF)			(LCF)			(LCF)		
	5.4×10^{-3}	6.9×10^{-6}	NA	3.6×10^{-2}	5.1×10^{-5}	NA	3.6×10^{-2}	5.1×10^{-5}	NA
							Interim Storage of TRU waste[f]		
							Worker	MEI	Population
							(LCF)		
							1.3×10^{-3}	3.4×10^{-8}	1.7×10^{-3}
							Interim Storage of HLW[g]		
							Worker	MEI	Population
							(LCF)		
							3.6×10^{-2}	NA	NA
INEEL	No activities			No activities			Interim Storage of TRU waste[f]		
							Worker	MEI	Population
							(LCF)		
							2.5×10^{-3}	5.1×10^{-8}	4.1×10^{-4}
NTS	Disposal of Class A LLW[b]			Disposal of LLW[c] and mixed LLW[d]			Disposal of LLW[c] and mixed LLW[d]		
	Worker	MEI	Population	Worker	MEI	Population	Worker	MEI	Population
	(LCF)			(LCF)			(LCF)		
	4.8×10^{-3}	3.0×10^{-16}	NA	3.2×10^{-2}	2.1×10^{-15}	NA	3.2×10^{-2}	2.1×10^{-15}	NA
ORNL	No activities			No activities			Interim Storage of TRU waste[f]		
							Worker	MEI	Population
							(LCF)		
							9.0×10^{-4}	1.4×10^{-8}	4.6×10^{-4}

Table S-4. Summary of Offsite Human Health Impacts (cont)

Site	No Action Alternative	Alternative A			Alternative B		
SRS	No activities	No activities			Interim Storage of TRU waste[f]		
					Worker	**MEI**	**Population**
					(LCF)		
					7.4×10^{-4}	2.1×10^{-10}	2.3×10^{-5}
					Interim Storage of HLW[g]		
					Worker	**MEI**	**Population**
					(LCF)		
					2.0×10^{-2}	NA	NA
WIPP	No activities	Disposal of TRU waste[f]			Interim Storage of TRU waste[f]		
		Worker	**MEI**	**Population**	**Worker**	**MEI**	**Population**
		(LCF)			(LCF)		
		1.0×10^{-2}	3.0×10^{-9}	3.0×10^{-6}	1.6×10^{-4}	6.9×10^{-7}	2.6×10^{-3}
					Disposal of TRU waste[f]		
					Worker	**MEI**	**Population**
					(LCF)		
					1.0×10^{-2}	3.0×10^{-9}	3.0×10^{-6}
Yucca Mountain Repository	No activities	Disposal of HLW[g]			Disposal of HLW[g]		
		Worker	**MEI**	**Population**	**Worker**	**MEI**	**Population**
		(LCF)			(LCF)		
		6.8×10^{-2}	3.1×10^{-7}	2.0×10^{-2}	6.8×10^{-2}	3.1×10^{-7}	2.0×10^{-2}

a. Impacts of disposal of Class A LLW and mixed LLW at Envirocare are assumed to be similar to impacts at Hanford.
b. The volume Class A LLW to be disposed of would be 145,000 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
c. The volume of LLW to be disposed of would be 685,515 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
d. The volume of mixed LLW to be disposed of would be 7,889 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
e. NA = Not available.
f. The volume of TRU waste to be stored or disposed of would be 49,000 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
g. The volume of HLW to be stored or disposed of is assumed to be 300 canisters for purposes of analysis; actual number of canisters is 275.

Sources: *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste,* DOE/EIS-0200-F (May 1997) and the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement,* DOE/EIS-0026-S-2 (September 1997).

Under Alternative A or B, there would be a very slight increase in radiation doses to the public and workers as a result of waste management activities, which could result in a very slight increase in excess cancer risk (approximately 1 in 3.3 million risk to the maximally exposed individual under both alternatives over 10 years). Offsite transportation of waste under Alternative A or B could also result in slight worker and public radiation exposure and the potential for traffic accident fatalities.

The actions contemplated in this EIS are also addressed in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F) and *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (WIPP Supplemental EIS II) (DOE/EIS-0026-S-2). These documents include analyses of impacts associated with transportation to the receiving sites identified in this EIS and potential cumulative impacts at DOE sites where WVDP waste would be stored or disposed of (see Section 1.7 of this EIS).

6.0 UNAVOIDABLE IMPACTS, SHORT-TERM USES AND LONG-TERM PRODUCTIVITY, AND IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Implementation of Alternative A or B would not create a conflict between the local, short-term uses of the environment and long-term productivity. All activities would occur in existing or planned facilities or would use existing or planned infrastructure resources such as roads and railways. Environmental resources such as land use, plants and animals, and wetlands would not be affected by implementation of either action alternative.

The only irreversible or irretrievable commitment of resources that would occur if Alternative A or B were implemented is the use of fossil fuels in the shipment of waste off the site and the use of land for the disposal of radioactive wastes. Up to 2,550 truck or 847 rail shipments would be required to ship all existing and newly generated LLW, mixed LLW, TRU waste, and HLW canisters off the site under Alternatives A and B, with an additional 570 truck or 232 rail shipments required to ship TRU wastes and HLW from interim storage locations to disposal sites under Alternative B. Both rail and truck shipments would require the consumption of diesel fuel and other fossil fuels such as gasoline and lubricants.

Implementation of Alternative A or B would also involve the use of offsite land previously committed for radioactive waste disposal facilities. The land-use requirements for the offsite disposal of LLW, mixed LLW, and TRU waste have been addressed in the WM PEIS and WIPP Supplemental EIS II. Land-use requirements for the offsite disposal of HLW are addressed in the *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250). This document is incorporated by reference.

7.0 CONCLUSION

Based on the analysis of the potential impacts documented in this EIS, DOE finds that implementation of any of the alternatives would result in very small impacts to human health or the environment. DOE also concludes that no disproportionately high and adverse human health or environmental impacts would be imposed on minority or low-income populations surrounding the WVDP site or DOE sites where WVDP waste would be stored or disposed of as a result of the implementation of any of the alternatives analyzed.

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QA: NA

DOE/EIS – 0337F

WEST VALLEY DEMONSTRATION PROJECT WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

FINAL

December 2003

Prepared by:

U.S. Department of Energy
West Valley Area Office
West Valley, NY

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Abstract:

The purpose of the *Final West Valley Demonstration Project Waste Management Environmental Impact Statement* is to provide information on the environmental impacts of the Department of Energy's proposed action to ship radioactive wastes that are either currently in storage, or that will be generated from operations over the next 10 years, to offsite disposal locations, and to continue its ongoing onsite waste management activities. Decommissioning or long-term stewardship decisions will be reached based on a separate EIS that is being prepared for that decisionmaking. This EIS evaluates the environmental consequences that may result from actions to implement the proposed action, including the impacts to the onsite workers and the offsite public from waste transportation and onsite waste management. The EIS analyzes a no action alternative, under which most wastes would continue to be stored onsite over the next 10 years. It also analyzes an alternative under which certain wastes would be shipped to interim offsite storage locations prior to disposal. The Department's preferred alternative is to ship wastes to offsite disposal locations.

Public Comments:

The WVDP Waste Management EIS was issued in draft on May 16, 2003, for public review and comment. A public hearing on the Draft EIS was held on June 11, 2003, at the Ashford Office Complex near the WVDP site. DOE received comments from 21 individuals, organizations, and agencies.

A complete copy of the WVDP Waste Management Final EIS can be viewed at:
http://www.wv.doe.gov/LinkingPages/RevisedEnvironmental%20Impact%20Statement.htm.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
CH-TRU	contact-handled transuranic (waste)
CTF	citizen task force
DOE	U.S. Department of Energy
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FONSI	finding of no significant impact
FY	fiscal year
HEPA	high-efficiency particulate air (filter)
HLW	high-level radioactive waste
INEEL	Idaho National Engineering and Environmental Laboratory
LLW	low-level radioactive waste
LSA	lag storage area
LSB	lag storage building
MOU	Memorandum of Understanding
mrem	millirem
NDA	NRC-licensed Disposal Area
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NRC	Nuclear Regulatory Commission
NTS	Nevada Test Site
NYSERDA	New York State Energy Research and Development Authority
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
RCRA	Resource Conservation and Recovery Act
RH-TRU	remote-handled transuranic (waste)
RHWF	Remote Handled Waste Facility
ROD	Record of Decision
SDA	State-licensed Disposal Area
SEQRA	State Environmental Quality Review Act
SRS	Savannah River Site
STS	supernatant treatment system
TRU	transuranic (waste)
TRUPACT-II	transuranic package transporter
WIPP	Waste Isolation Pilot Plant
WM PEIS	*Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste*
WVDP	West Valley Demonstration Project

MEASUREMENTS AND CONVERSIONS

The following information is provided to assist the reader in understanding certain concepts in this document.

UNITS OF MEASUREMENT

Measurements in this report are presented in metric units with English units in parentheses. Metric units were also used for measurements that are too small to be defined by English units or with data that were intended to be presented in metric units. Many metric measurements in this volume include prefixes that denote a multiplication factor that is applied to the base standard (for example, 1 centimeter = 0.01 meter). Table MC-1 presents these metric prefixes. Table MC-2 lists the mathematical values or formulas needed for conversion between metric and English units.

Table MC-1. Metric Prefixes

Prefix	Symbol	Multiplication Factor
deci	d	$0.1 = 10^{-1}$
centi	c	$0.01 = 10^{-2}$
milli	m	$0.001 = 10^{-3}$
micro	μ	$0.000\,001 = 10^{-6}$
nano	n	$0.000\,000\,001 = 10^{-9}$
pico	p	$0.000\,000\,000\,001 = 10^{-12}$

Table MC-2. Metric Conversion Chart

To Convert To Metric			To Convert From 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	0.3048	meters	meters	3.281	feet
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
square feet	0.092903	square meters	square meters	10.7639	square feet
square miles	2.58999	square kilometers	square kilometers	0.3861	square miles
Volume					
gallons	3.7854	liters	liters	0.26417	gallons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths then add 32	Fahrenheit

ROUNDING

Some numbers have been rounded; therefore, sums and products throughout the document may not be consistent. A number was rounded only after all calculations using that number had been made. Numbers that are actual measurements were not rounded.

SCIENTIFIC NOTATION

Scientific notation is based on the use of positive and negative powers of 10. A number written in scientific notation is expressed as the product of a number between 1 and 10 and a positive or negative power of 10.

Examples: 5,000 would be written as 5×10^3
0.005 would be written as 5×10^{-3}

NUMBERING CONVENTIONS

The following conventions were used for presenting numbers in the EIS text and tables:

- Numbers larger than 1 = expressed as whole numbers
- Numbers $\times\ 10^{-1}$ and 10^{-2} = expressed in decimal form

  Examples: 5×10^{-1} is expressed as 0.5
  5×10^{-2} is expressed as 0.05

- Numbers $\times\ 10^{-3}$, 10^{-4}, and smaller = expressed in scientific notation

CHAPTER 1
INTRODUCTION

> This chapter introduces the U.S. Department of Energy's proposal for onsite management and offsite transportation of radioactive wastes. This chapter describes the types of wastes that are present at the site, the site facilities, and the alternatives that the Department has analyzed to meet certain of its obligations under the West Valley Demonstration Project Act. This chapter includes brief discussions of other National Environmental Policy Act documents that are relevant to the proposed action and alternatives analyzed in this EIS.

As part of its ongoing West Valley Demonstration Project (WVDP), and in accordance with the West Valley Demonstration Project Act and previous U.S. Department of Energy (DOE or the Department) decisions, DOE proposes to:

- Continue onsite management of high-level radioactive waste (HLW) until it can be shipped for disposal to a geologic repository (assumed for the purposes of analysis to be the proposed Yucca Mountain Repository in Nye County, Nevada),
- Ship low-level radioactive waste (LLW) and mixed (radioactive and hazardous) LLW offsite for disposal at DOE or other disposal sites, and
- Ship transuranic (TRU) radioactive waste to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

The waste volumes that are the subject of evaluation in this environmental impact statement (EIS) include only those wastes that are either currently in storage or that would be generated over the next 10 years from ongoing operations and decontamination activities. This EIS analyzes activities that would occur during a 10-year period.

The proposed actions and alternatives assessed in this EIS are intended to address DOE's responsibilities under the West Valley Demonstration Project Act and are consistent with the terms of the Stipulation of Compromise reached with the Coalition on West Valley Nuclear Wastes and Radioactive Waste Campaign (Appendix A). Implementation of these actions would allow DOE to make progress in meeting its obligations under the Act that pertain to waste management, and they are consistent with programmatic decisions DOE has made (see Sections 1.7.1.2 and 1.7.1.4) regarding the waste types addressed in this EIS. Those decisions and their respective EISs, as they apply to the WVDP, provide for shipping wastes from the West Valley site to other regional or centralized DOE sites for treatment, storage, and disposal, as appropriate. The Department has analyzed the potential environmental impacts associated with this proposal and reasonable alternatives in accordance with the National Environmental Policy Act (NEPA) and applicable NEPA regulations promulgated by the Council on Environmental Quality (Title 40 of the Code of Federal Regulations [CFR] Parts 1500-1508) and DOE (10 CFR Part 1021).

The scope of this EIS is a departure from that which was announced in a March 2001 Notice of Intent (NOI) (66 Fed. Reg. 16447 (2001)). DOE modified the scope of the EIS as a result of public comments received during scoping and the Department's further evaluation of activities that might be required, and independently justified, before final decisions are made on decommissioning and/or long-term stewardship. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI. This change in scope is discussed further in Section 1.2, NEPA Compliance Strategy.

1.1 BACKGROUND

This section describes the Western New York Nuclear Service Center (the Center) and its associated facilities. Also discussed are the activities for which DOE is responsible under the West Valley Demonstration Project Act.

1.1.1 Western New York Nuclear Service Center

The Center comprises 14 square kilometers (5 square miles) in West Valley, New York, and is located in the town of Ashford, approximately 50 kilometers (30 miles) southeast of Buffalo, New York. It was a commercial nuclear fuel reprocessing plant and was the only one to have operated in the United States. Figure 1-1 shows the locations of the Center and the WVDP Site within the State of New York (USGS 1979).

The Center operated under a license issued by the Atomic Energy Commission (now the Nuclear Regulatory Commission [NRC]) in 1966 to Nuclear Fuel Services, Inc. and the New York State Atomic and Space Development Authority, now known as the New York State Energy and Development Authority (NYSERDA) (AEC 1966). Under the Energy Reorganization Act of 1974, the regulatory functions of the Atomic Energy Commission were given to the NRC, which became the licensing authority for the Center's operation.

During reprocessing, spent nuclear fuel from commercial nuclear power plants and DOE sites was chopped, dissolved, and processed by a solvent extraction system to recover uranium and plutonium. Fuel reprocessing ended in 1972 when the plant was shut down for modifications to increase its capacity, reduce occupational radiation exposure, and reduce radioactive effluents. At the time, Nuclear Fuel Services, the owner and operator of the reprocessing plant, expected that the modifications would take 2 years and $15 million to complete. However, between 1972 and 1976, there were major changes in regulatory requirements, including more stringent seismic and tornado siting criteria for nuclear facilities and more extensive regulations for radioactive waste management, radiation protection, and nuclear material safeguards. In 1976, Nuclear Fuel Services judged that over $600 million would be required to modify the facility to increase its capacity and to comply with these changes in regulatory standards (DOE 1978).

As a result, the company announced its decision to withdraw from the nuclear fuel reprocessing business and exercise its contractual right to yield responsibility for the Center to NYSERDA. Nuclear Fuel Services withdrew from the Center without removing any of the in-process nuclear wastes. NYSERDA now holds title to and manages the Center on behalf of the people of the State of New York.

In 1978, Congress passed the Department of Energy Act (Pub. L. No. 95-238), which, among other things, directed DOE to conduct a study to evaluate possible federal operation or permanent federal ownership of the Center and use of the Center for other purposes. DOE issued the *Western New York Nuclear Service Center Study: Companion Report* (DOE 1978) to provide historical perspective and to identify options for the future of the Center. The Companion Report did not attempt to select an option for the future of the Center, although it included recommendations that development of technology to immobilize liquid HLW be started immediately. Congress subsequently passed the West Valley Demonstration Project Act (Pub. L. No. 96-368; 42 U.S.C. 2021a) in 1980.

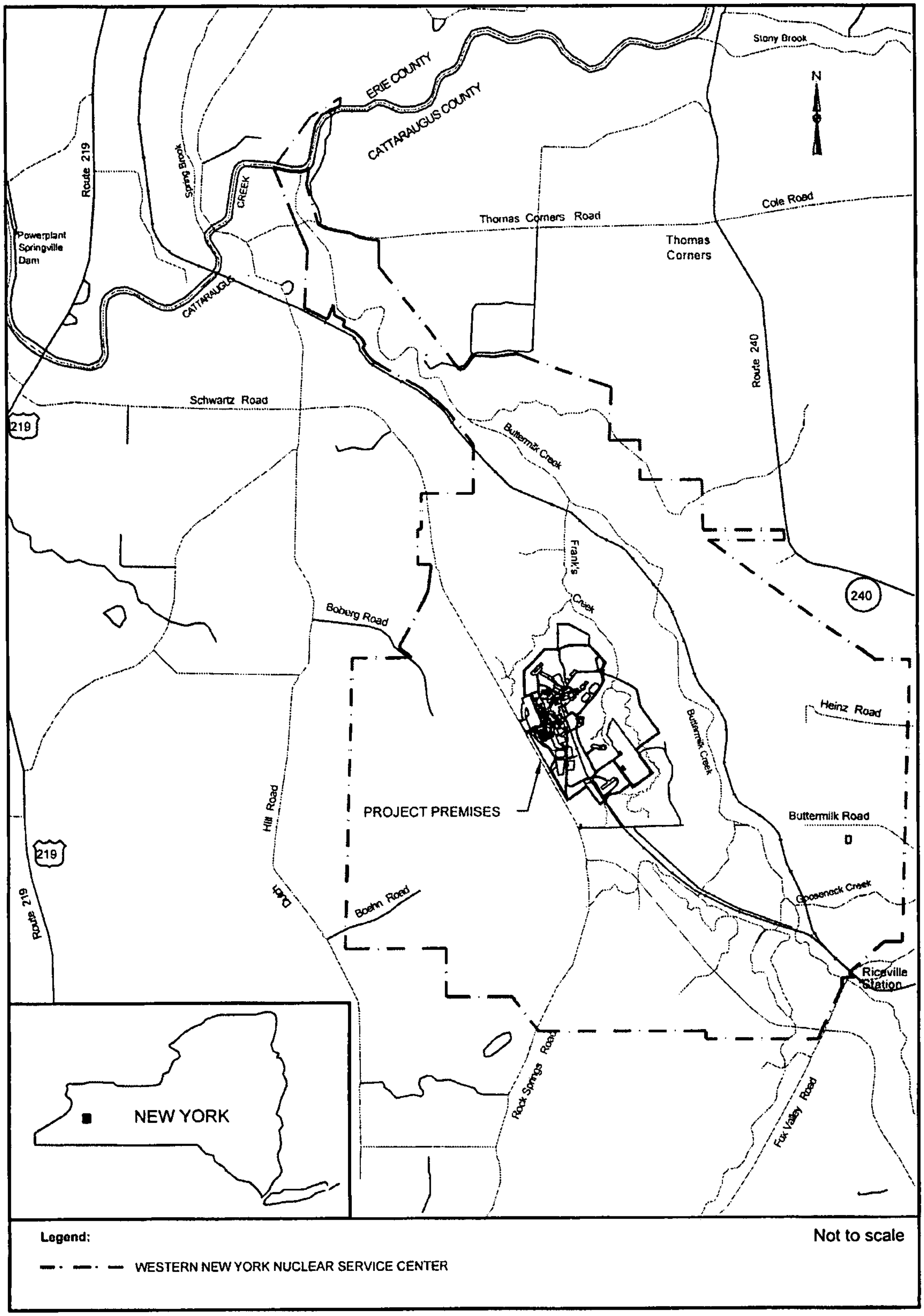

Figure 1-1. Location of the West Valley Demonstration Project

1.1.2 The West Valley Demonstration Project Act

The West Valley Demonstration Project Act requires DOE to demonstrate that the liquid HLW from reprocessing can be safely managed by solidifying it at the Center and transporting it to a geologic repository for permanent disposal. Specifically, Section 2(a) of the Act directs DOE to:

1. Solidify HLW by vitrification or such other technology that DOE deems effective,
2. Develop containers suitable for the permanent disposal of the solidified HLW,
3. Transport the solidified HLW to an appropriate federal repository for permanent disposal,
4. Dispose of the LLW and TRU waste produced by the HLW solidification program,[1] and
5. Decontaminate and decommission the waste storage tanks and facilities used to store HLW, the facilities used for HLW solidification of the waste, and any material and hardware used in connection with the project in accordance with such requirements as the NRC may prescribe.

In the 20 years since the West Valley Demonstration Project Act was enacted, DOE has succeeded in treating 2.3 million liters (600,000 gallons) of HLW by vitrification (combining liquid HLW with borosilicate glass) and has developed stainless-steel canisters suitable for its permanent disposal (actions 1 and 2). The potential environmental impacts of these activities were addressed in the *Environmental Impact Statement, Long-Term Management of Liquid High-Level Radioactive Wastes Stored at the Western New York Nuclear Service Center, West Valley* (DOE 1982).

Implementing actions 3, 4, and 5 will require additional waste management and closure activities. This WVDP Waste Management EIS evaluates alternatives for meeting DOE's onsite waste management and offsite transportation and disposal responsibilities under the Act. As discussed in more detail in Section 1.2, the future *Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS,* hereafter referred to as the Decommissioning and/or Long-Term Stewardship EIS, will address decommissioning and closure alternatives.

1.1.3 Site Facilities

Several terms are used in this EIS to describe areas, activities, and responsibilities at the Center. These were defined in the *Cooperative Agreement between United States Department of Energy and New York State Energy Research and Development Authority on the Western New York Nuclear Service Center at West Valley, New York, October 1, 1980* (DOE 1980b), amended September 18, 1981. The Cooperative Agreement terms, as used in this EIS, are:

[1] TRU waste is currently defined by NRC and DOE as waste containing more than 100 nanocuries of alpha-emitting isotopes, with half-lives greater than 20 years, per gram of waste. However, the West Valley Demonstration Project Act defined TRU waste as "material contaminated with radioactive elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations greater than *10* (emphasis added) nanocuries per gram, or in such other concentrations as the [NRC] may prescribe to protect the public health and safety." [In the event wastes are disposed of offsite, the applicable definitions at the disposal site will be used.]

- ***The Center*** – The 14-square-kilometer (5-square-mile) Western New York Nuclear Service Center in West Valley, New York.

- ***The Project or the WVDP*** – All activities undertaken in carrying out the solidification of the liquid HLW at the Center, including (1) solidification of liquid HLW; (2) preparation of the Project Premises and Project Facilities to accommodate action 1; (3) development of containers suitable for the permanent disposal of the HLW solidified at the Center; (4) transportation; (5) decontamination of facilities used for the Project and decommissioning of the tanks, other facilities at the Center in which the solidified wastes were stored, all Project Facilities, and other facilities, material, and hardware used in carrying out the solidification of the HLW at the Center; (6) disposal of LLW, mixed LLW, and TRU waste; and (7) all other activities necessary to carry out the foregoing.

- ***Project Premises*** – An area of approximately 0.8 square kilometer (200 acres) within the Western New York Nuclear Service Center made available to DOE for carrying out the WVDP. The Project Premises include the Project Facilities and the 0.02-square-kilometer (5-acre) NRC-Licensed Disposal Area (NDA).

- ***Project Facilities*** – The facilities that NYSERDA made available to DOE to be used in the solidification of the HLW at the Center.

- ***Retained Premises*** – The 13-square-kilometer (3,300-acre) portion of the Center, not including the Project Premises, retained by NYSERDA. The Retained Premises include the 0.06-square-kilometer (15-acre) State-licensed Disposal Area (SDA) adjacent to the NDA.

The Project Premises, SDA, and NDA are shown in Figure 1-2 (WVNS 2000).

1.1.3.1 Management Responsibilities at the Center

DOE and NYSERDA have individual and shared responsibilities for nuclear wastes, permits, licenses, environmental management, and stewardship activities at the Center. These responsibilities are conferred on DOE and NYSERDA by their respective statutory authorities and the compliance requirements of applicable federal and state regulatory programs. In general, DOE is responsible for completing the actions at the Center directed by the West Valley Demonstration Project Act, including transportation of nuclear wastes to appropriate facilities for disposal and decontamination and decommissioning facilities used in connection with the WVDP in accordance with requirements prescribed by the NRC. NYSERDA is responsible for the SDA and portions of the Center that would normally be subject to NRC commercial nuclear facility regulations.

New York State Environmental Quality Review Act (SEQRA)

SEQRA establishes the State of New York's requirements for reviewing state actions with potential environmental impacts. The statute is implemented in regulations promulgated by the New York State Department of Environmental Conservation at Section 6, Part 617, of the New York Code Rules and Regulations. SEQRA requires that all state agencies determine whether the actions they directly undertake, fund, or approve might have a significant effect on the environment. If it is determined that the action might have a significant effect on the environment, the agency must prepare or request an EIS. NYSERDA closure or long-term management activities at the Center are subject to the SEQRA review process. Because NYSERDA has no jurisdiction over the waste management activities that are the subject of this EIS, SEQRA provisions requiring the State to prepare an EIS do not apply in these circumstances.

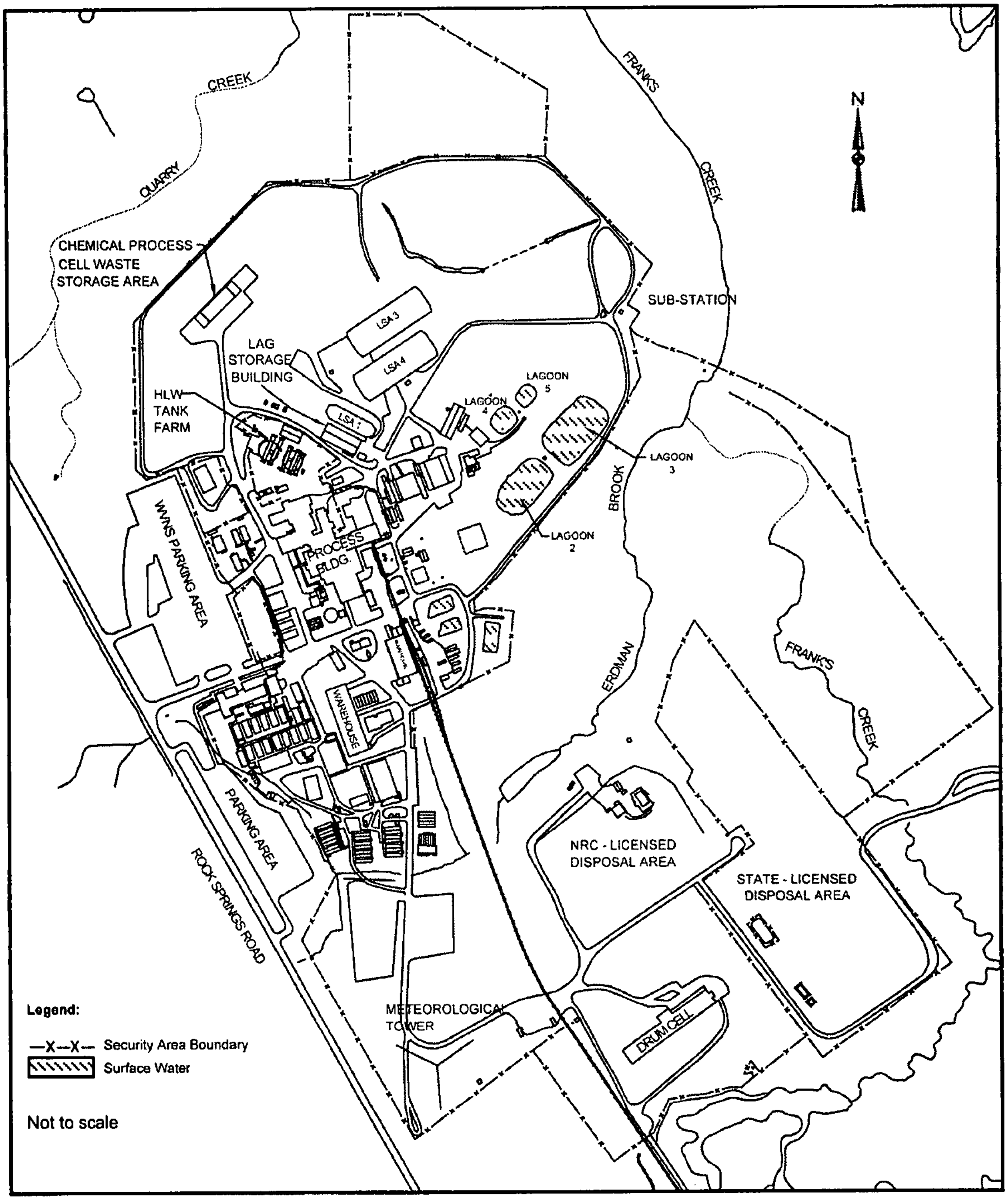

Figure 1-2. Project Premises, NDA, and SDA

Article III of the Cooperative Agreement between DOE and NYSERDA further defined their respective responsibilities to comply with the West Valley Demonstration Project Act. Generally, DOE has sole responsibility for carrying out the Project. This includes (1) exclusive DOE possession of the Project Premises and the Project Facilities used in carrying out the WVDP, and (2) responsibility for protection of public health and safety with respect to the Project Premises and Project Facilities for the duration of the WVDP. Current NYSERDA responsibilities under the Cooperative Agreement include (1) providing services to DOE in connection with the WVDP, and (2) participating in carrying out the WVDP as provided for in the Cooperative Agreement (DOE 1980b). NYSERDA is also responsible for making a timely application for an NRC license, as may be required for NYSERDA to assume possession of the Project Premises and Project Facilities upon completion of the Project (Article VI).

NYSERDA is not a joint lead agency for this WVDP Waste Management EIS, but it will participate as appropriate under Section 6.03 of the Cooperative Agreement between DOE and NYSERDA on the Center at West Valley, New York (October 1, 1980, amended September 18, 1981). However, NYSERDA will work with DOE, as a joint lead agency, in the preparation of the Decommissioning and/or Long-Term Stewardship EIS for the WVDP and the Center (see Section 1.2, NEPA Compliance Strategy).

The NRC also has limited responsibilities for activities at the Center under the West Valley Demonstration Project Act, under a related Memorandum of Understanding (MOU) with DOE (46 Fed. Reg. 56960 (1981)), and as the successor to the agency that issued the operating license to Nuclear Fuel Services, Inc. and NYSERDA (AEC 1966). The Act provides for informal NRC review and consultation in DOE plans and actions. The Act also directs NRC to prescribe decontamination and decommissioning criteria for the Project. The DOE-NRC MOU established the arrangements for NRC review and consultation, NRC review responsibilities, and NRC monitoring of WVDP activities (53 Fed. Reg. 53054 (1988)). Nuclear Fuel Services' operating license was terminated in 1982 after DOE assumed exclusive possession of the Project Premises and Project Facilities (Rouse 1982), and the NRC will again be involved in licensing the Project Premises and Project Facilities upon completion of the WVDP (DOE 1980b).

1.1.3.2 Project Facilities and Areas

The Project Facilities consist of all buildings, facilities, improvements, equipment, and materials located on the Project Premises. This EIS evaluates continued onsite management and offsite shipping of the LLW, HLW, and TRU waste for which DOE is responsible that is currently stored onsite in the four facilities or areas.

The Project Facilities and areas storing the wastes evaluated in this EIS and shown in Figure 1-2 are:

- ***Process Building***, which includes approximately 70 rooms and cells that comprised the original NRC-licensed spent nuclear fuel reprocessing operations (one of the cells—the Chemical Process Cell—now serves as the storage facility for the vitrified HLW canisters produced by the Project);
- ***Tank Farm***, which includes the underground waste storage tanks and supporting systems for maintenance, surveillance, and waste transfer of the tank waste to the Vitrification Facility.
- ***Waste Storage Areas***, which include several facilities such as the Lag Storage Building (LSB), Lag Storage Areas (LSA) 1, 3, and 4 (in the context of this EIS, lag storage refers to facilities used for temporary onsite storage of waste), and the Chemical Process Cell Waste Storage Area, are used to store and manage the radioactive wastes generated from WVDP activities; and

- ***Radwaste Treatment System Drum Cell*** (Drum Cell), which stores cement-filled drums of stabilized LLW produced by the Cement Solidification System.

The NOI to prepare this EIS (issued in March 2001) indicated that the disposition of large containers of soil estimated to have very low levels of radioactive contamination would also be addressed. However, the soils in these containers were shipped offsite for disposal in the summer of 2001, pursuant to earlier NEPA documentation (categorical exclusion ECL 96-01).

1.2 NEPA COMPLIANCE STRATEGY

This section describes DOE's past and present NEPA compliance activities, and the NEPA analysis and documentation the Department expects to undertake in the future. It also addresses why DOE has modified the scope of this EIS from that which was announced in the March 2001 NOI. The scope of this EIS is now limited to onsite and offsite waste management actions and only those decontamination actions previously addressed under NEPA (DOE 1982).

1.2.1 Litigation and NEPA Compliance History

In the early 1980s, DOE prepared an environmental assessment (EA) on the proposed disposal of certain radioactive wastes in two engineered disposal areas in addition to the NDA and SDA that would have been developed near and within the NDA. In 1986, the Coalition on West Valley Nuclear Wastes and Radioactive Waste Campaign filed a lawsuit challenging the EA and subsequent finding of no significant impact (FONSI) prepared by DOE (1986). DOE maintained that the EA and FONSI complied with all aspects of NEPA, but it entered into a Stipulation of Compromise with the Coalition in order to settle the litigation (DOJ 1987). This agreement imposed specific obligations on DOE regarding the scope and content of EIS documentation for Project Completion and Center Closure. In particular, DOE agreed that it would evaluate the disposal of Class A, B, and C LLW generated as a result of activities in a Completion and Closure EIS (see Section 1.5 for definitions of Class A, B, and C LLW). DOE also agreed that this EIS would begin by 1988 and proceed without undue delay and in accordance with applicable law.

DOE began preparation of the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center* (DOE 1996a), also referred to as the 1996 Completion and Closure Draft EIS, in 1988 with the issuance of a NOI to Prepare an EIS (53 Fed. Reg. 53052 (1988)). DOE and NYSERDA were joint lead agencies for the preparation of the EIS. The scope of that EIS included, among other things, the management of Class A, B, and C LLW and TRU waste that is either stored onsite or that would be generated as a result of site closure activities. The Completion and Closure Draft EIS was issued in January 1996 for a 6-month comment period in accordance with the Stipulation of Compromise.

The 1996 Draft EIS evaluated the environmental impacts of alternatives considered for completing the WVDP and closure or long-term management of facilities at the Center, but it did not specify a preferred alternative. Many of the public comments submitted on the 1996 Draft EIS felt that DOE and NYSERDA should have indicated the preferred alternative in the Draft EIS. Despite long negotiations, DOE and NYSERDA have been unable to reach an agreement on a preferred future course of action for the closure of the Center (GAO 2001).

To allow the Department to continue to meet its obligations under the West Valley Demonstration Project Act, DOE is preparing two EISs: this *West Valley Demonstration Project Waste Management EIS* and the *Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS.*

1.2.2 WVDP Waste Management EIS

In March 2001, DOE published its strategy for completing the 1996 Completion and Closure Draft EIS and an NOI to prepare a Decontamination and Waste Management EIS (66 Fed. Reg. 16447 (2001)). This EIS was originally scoped as a revision of the 1996 Completion and Closure Draft EIS (DOE 1996a).

In the NOI, DOE published for comment its position that its decisionmaking process would be facilitated by preparing and issuing for public comment a Revised Draft EIS that focused on DOE's actions to decontaminate the Project Facilities and manage WVDP wastes controlled by DOE under the West Valley Demonstration Project Act. As part of its strategy to address the full scope of the 1996 Completion and Closure Draft EIS, DOE also stated in the NOI its intention to prepare an EIS with NYSERDA subsequent to this one in order to address the decommissioning and/or long-term stewardship of the WVDP and the Western New York Nuclear Service Center. An Advance NOI was issued on November 6, 2001 (66 Fed. Reg. 56090 (2001)), formalizing DOE's commitment to begin work on the Decommissioning and/or Long-term Stewardship EIS. An NOI was published on March 13, 2003 (68 Fed. Reg. 12044 (2003)).

During scoping for the Decontamination and Waste Management EIS, commentors noted that applicable NEPA regulations require an agency to consider connected actions together in the same EIS (40 CFR 1508.25(a)), and they argued that the decontamination and waste management actions proposed in the NOI were "connected" to the decommissioning and/or long-term stewardship actions that would be addressed in the second EIS. After reconsideration, DOE has limited the scope of this EIS to onsite and offsite waste management actions, and only those decontamination actions previously addressed under NEPA (DOE 1982).

The waste management actions proposed in this EIS would not prejudge the range of alternatives to be considered or the decisions to be made for eventual decommissioning and/or long-term stewardship of the WVDP. Rather, these actions would allow DOE to make progress in meeting its obligations under the West Valley Demonstration Project Act that pertain to waste management (see Appendix A), and they are consistent with programmatic decisions DOE has made (see Sections 1.7.1.2 and 1.7.1.4) regarding the waste types addressed in this EIS. Those decisions and their respective EISs, as they apply to the WVDP, provide for shipping wastes from the West Valley site to other regional or centralized DOE sites for treatment, storage, and disposal, as appropriate. Additionally, there would be no irreversible or irretrievable commitments of resources that would prejudice decommissioning decisions. The Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS will be the continuation of the Completion and Closure Draft EIS begun in 1988 and issued in draft form in 1996.

1.2.3 Decommissioning and/or Long-Term Stewardship EIS

As a result of the change in scope and title of this WVDP Waste Management EIS, the *Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS* will be the continuation of the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center* (DOE 1996a), and will be reissued in draft as DOE/EIS 0226-R. This revised strategy is not reflected in the Advance NOI issued on November 6, 2001 (66 Fed. Reg. 56090 (2001)), for the Decommissioning and/or Long-Term Stewardship EIS, but has been included in the NOI, which was published on March 13, 2003 (68 Fed. Reg. 12044 (2003)).

1.3 PURPOSE AND NEED FOR AGENCY ACTION

In accordance with the directives in the West Valley Demonstration Project Act, DOE is responsible for the facilities used in connection with the WVDP HLW vitrification effort and for disposal of the LLW, mixed LLW, HLW, and TRU waste produced by the WVDP HLW solidification program. To fulfill its responsibilities under the West Valley Demonstration Project Act, DOE needs to identify a disposal path for the wastes that are currently stored onsite and that will be generated in the future. Decommissioning and/or long-term stewardship decisions will be made under the Decommissioning and/or Long-Term Stewardship EIS.

1.4 ALTERNATIVES

DOE's Proposed Action (that is, preferred alternative) in this EIS is to (1) continue onsite management of Project-generated waste controlled by DOE under the West Valley Demonstration Project Act until they can be sent to offsite disposal, (2) ship, over the next 10 years, all wastes with acceptable offsite disposal destinations, and (3) manage the emptied, ventilated HLW tanks until future decommissioning decisions are made.

> ***Ongoing Operations***
>
> Under all alternatives, it is assumed that current levels of maintenance, surveillance, heating, ventilation, and other routine operations would continue to be required while the actions proposed under each alternative were performed. For this EIS, these actions are called *ongoing operations*. Although the impacts of these ongoing actions have been assessed in several previous NEPA documents and are characterized in the Annual Site Environmental Reports, the impacts on worker and public health of these ongoing operations have been included in this EIS using actual operational data from 1995 through 1999. Because ongoing operations would not vary among the proposed alternatives, the impacts from these actions would be the same across all alternatives.

This EIS analyzes continued onsite waste management and shipment of wastes to offsite disposal. To address the full range of reasonable alternatives, this EIS evaluates three alternatives:

- No Action Alternative – Continuation of Ongoing Waste Management Activities;
- Alternative A (Preferred Alternative) – Offsite Shipment of HLW, LLW, Mixed LLW, and TRU Wastes to Disposal; and
- Alternative B – Offsite Shipment of LLW and Mixed LLW to Disposal, and Shipment of HLW and TRU Waste to Interim Storage.

These alternatives are described more fully in Chapter 2, Description of Alternatives; an overview of each is provided below.

Under the **No Action Alternative**, **Continuation of Ongoing Waste Management Activities,** waste management would include limited shipments of Class A LLW to offsite disposal and continued storage of the remaining Class A LLW, existing Class B and Class C LLW, mixed LLW, TRU waste, and HLW. These ongoing actions have been previously assessed in other NEPA documentation discussed in Section 1.7. Upon completion of ongoing efforts to eliminate all remaining liquids, the waste storage tanks and their surrounding vaults would continue to be ventilated to manage moisture levels as a corrosion prevention measure until decommissioning and/or long-term stewardship decisions are made based in part on the impact assessment provided by the WVDP Decommissioning and/or Long-Term Stewardship EIS.

Under **Alternative A, Offsite Shipment of HLW, LLW, Mixed LLW, and TRU Wastes to Disposal (Preferred Alternative)**, DOE would ship Class A, B and C LLW and mixed LLW to one of two DOE potential disposal sites (in Washington or Nevada) or to a commercial disposal site (such as the Envirocare facility in Utah), ship TRU waste to WIPP in New Mexico, and ship HLW to the proposed

Yucca Mountain HLW repository. LLW and mixed LLW would be shipped over the next 10 years. TRU waste shipments to WIPP could occur within the next 10 years if the TRU waste is determined to meet all the requirements for disposal in this repository; however, if some or all of WVDP's TRU waste does not meet these requirements, the Department would need to explore other alternatives for disposal of this waste.

Under DOE's current programmatic decisionmaking, offsite disposal of HLW would occur at the proposed Yucca Mountain HLW Repository sometime after 2025 assuming a license to operate is granted by the NRC and NYSERDA signs a standard contract for the disposal of HLW in accordance with the Nuclear Waste Policy Act. Although this period would extend well beyond the 10 years required for all other proposed actions under this alternative, the impacts of transporting the HLW have been included in this EIS to fully inform the decisionmakers should an earlier opportunity to ship HLW present itself. The waste storage tanks would continue to be managed as described under the No Action Alternative.

Under **Alternative B, Offsite Shipment of LLW and Mixed LLW to Disposal, and Shipment of HLW and TRU Waste to Interim Storage,** LLW and mixed LLW would be shipped offsite for disposal at the same locations as Alternative A. TRU wastes would be shipped for interim storage at one of five DOE sites: Hanford Site in Washington; Idaho National Engineering and Environmental Laboratory (INEEL); Oak Ridge National Laboratory (ORNL) in Tennessee; Savannah River Site (SRS) in South Carolina; or WIPP. TRU wastes would subsequently be shipped to WIPP (or would remain at WIPP). HLW would be shipped to SRS or Hanford for interim storage, with subsequent shipment to Yucca Mountain for disposal.

It is assumed that the shipment of LLW and mixed LLW to disposal would occur within the next 10 years, and that TRU waste and HLW would be shipped to interim storage during that same 10 years. Ultimate disposal of TRU wastes and HLW wastes would be subject to the same constraints described under Alternative A; however, the impacts of transporting these wastes to their ultimate disposal sites have been included in the impact analyses for this alternative. The waste storage tanks would continue to be managed as described under the No Action Alternative.

Figure 1-3 shows the locations of the waste disposal and/or interim storage sites under consideration in this EIS.

1.5 WVDP WASTES AND REGULATORY DEFINITIONS

DOE regulates radioactive wastes that are managed or disposed of at DOE facilities, or are otherwise the responsibility of DOE under the Atomic Energy Act. The NRC regulates commercial LLW disposal facilities such as Envirocare. Table 1-1 summarizes the DOE and NRC regulatory definitions of the major categories of wastes managed under the West Valley Demonstration Project Act.

1.6 OFFSITE ACTIVITIES

In addition to activities that would occur at WVDP, DOE's proposed action and alternatives would involve activities at offsite locations as a result of the need for interim storage or disposal. At interim storage sites, activities would include unloading and inspecting the WVDP waste containers and moving the containers to the storage area. Interim storage could require the siting, construction, and operation of additional storage capacity for the volume of WVDP wastes to be stored, depending on site storage capacity at the time. Activities at disposal sites would include unloading trucks or railcars, inspecting the waste containers, and moving the waste to the disposal areas for shallow land burial or deep geologic disposal, depending on the waste type. Offsite activities involving interim storage or disposal have been

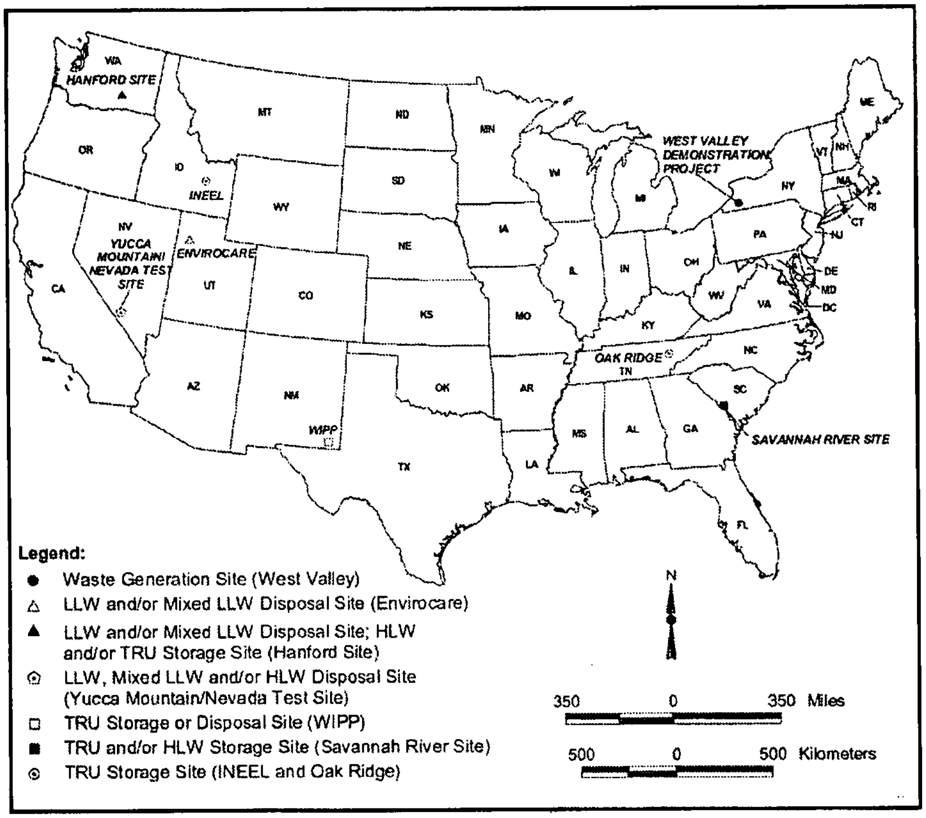

Figure 1-3. WVDP Waste Disposal and/or Interim Storage Sites

addressed in previous NEPA documents (see Section 1.7, Relationship with Other NEPA Documents) or would be the subject of subsequent NEPA review, as needed.

1.7 RELATIONSHIP WITH OTHER NEPA DOCUMENTS

Some of the actions proposed under the alternatives assessed in this EIS have been analyzed, at least in part, in the NEPA documents identified in this section. The NEPA analyses, as they relate to the actions proposed in this EIS, are briefly summarized in this section. Information from these earlier NEPA documents has been either extracted for use in this EIS or incorporated by reference.

1.7.1 Environmental Impact Statements

1.7.1.1 Final Environmental Impact Statement, Long-Term Management of Liquid High-Level Radioactive Wastes Stored at the Western New York Nuclear Service Center, West Valley (DOE/EIS-0081) (DOE 1982)

This EIS evaluated alternatives for long-term management of liquid HLW stored in underground tanks. The DOE Record of Decision (ROD) (45 Fed. Reg. 20694 (1982)) was issued to construct and operate facilities at the Center to solidify the liquid HLW into a form suitable for transportation and disposal in the federal geologic repository in accordance with the West Valley Demonstration Project Act. Related decisions, such as selection of a terminal waste form and final decontamination and decommissioning, were to be addressed in subsequent environmental analyses under NEPA. A supplement analysis to this

Table 1-1. Definitions Used in this EIS for Wastes Present at WVDP

Waste Category	Regulatory Definition(s)
HLW (Canisters of Vitrified HLW)	HLW is defined in the West Valley Demonstration Project Act as the high-level waste that was produced by the reprocessing of spent nuclear fuel at the Center. The term includes both liquid wastes that are produced directly in reprocessing dry solid material derived from such liquid waste and such other material as the NRC designates as high-level radioactive waste for purposes of protecting health and safety. Unless demonstrated otherwise, all HLW is considered mixed waste (containing both radioactive and hazardous components) and is subject to the requirements of both the Atomic Energy Act and Resource Conservation and Recovery Act (RCRA) (DOE 1999).
TRU Waste	TRU waste is currently defined by NRC and DOE as waste containing more than 100 nanocuries of alpha-emitting isotopes, with half-lives greater than 20 years, per gram of waste. However, the West Valley Demonstration Project Act defined TRU waste as "material contaminated with radioactive elements that have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and that are in concentrations greater than *10* (emphasis added) nanocuries per gram, or in such other concentrations as the [NRC] may prescribe to protect the public health and safety." [In the event wastes are disposed of offsite, the applicable definitions at the disposal site will be used.] TRU waste is classified, for handling purposes, as contact-handled (CH) TRU waste or remote-handled (RH) TRU waste, depending on the radiation dose rate at the surface of the waste container. CH-TRU waste has radioactivity levels that are low enough to permit workers to directly handle the containers in which the waste is kept. This level of radioactivity is specified as a dose rate of no more than 200 millirem per hour at the outside surface of the container. RH-TRU waste has a surface dose rate greater than 200 millirem per hour, so workers use remote manipulators to handle containers of RH-TRU waste.
LLW	LLW is defined as radioactive material that (a) is not HLW, spent nuclear fuel, TRU waste, or by-product material as defined in the Atomic Energy Act; and (b) the NRC classifies as LLW. Additional definitions of specific types of LLW appear below.
Class A LLW	Class A LLW is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A LLW must meet the minimum requirements set forth in 10 CFR 61.56(a). If Class A waste also meets the stability requirements set forth in 61.56(b), it is not necessary to segregate the waste.
Class B LLW	Class B waste refers to waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in 10 CFR 61.56.
Class C LLW	Class C waste refers to waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in 10 CFR 61.56.
Mixed Waste	Mixed waste contains hazardous components regulated under RCRA and radioactive components regulated under the Atomic Energy Act. Some LLW is mixed, as is some TRU waste and HLW. At WVDP, if necessary to meet waste acceptance criteria for disposal, mixed LLW is shipped off the site for treatment. For the purpose of analysis in this EIS, mixed LLW is assumed to be shipped directly to disposal after treatment.

EIS, completed in 1993 (DOE 1993), evaluated the impacts of modifications in the design, process, and operations since the 1982 EIS ROD. This supplement analysis did not address transportation, TRU waste, Class B and C LLW, waste disposal, or final decontamination and decommissioning of facilities.

A second supplement analysis, completed in 1998 (DOE 1998), addressed HLW solidification, management and interim storage of wastes, disposal of wastes, transport of wastes, general site operations, facility decontamination, and spent nuclear fuel storage. Though the second supplemental analysis discussed a "deactivation" process to substantially remove all waste from facilities in preparation for custodial care, the environmental impacts of this approach were not specifically evaluated. Current actions evaluated by the 1982 EIS and its supplemental analyses include Process Building head-end cell decontamination, construction of a load-in and load-out facility to support shipment of vitrified HLW, construction of a remote-handled waste facility, decontamination of the fuel receiving and storage area, and draining the water from the fuel storage pool.

The alternatives proposed in this EIS include some activities analyzed in the 1982 EIS and supplement analyses.

1.7.1.2 Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (DOE/EIS-0200) **(DOE 1997a)**

This EIS studied the potential nationwide impacts of managing LLW, mixed LLW, TRU waste, HLW, and non-wastewater hazardous waste generated by defense and research activities at 54 sites around the United States, including the WVDP. DOE analyzed decentralized alternatives (managing waste at sites where it currently exists), regionalized alternatives (managing waste at several treatment, storage, or disposal sites), and centralized alternatives (managing waste at one or two sites), in addition to the no action alternative for each waste type. Inventories of LLW, mixed LLW, TRU waste, and HLW at the WVDP were all considered in the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE 1997a).

DOE issued separate RODs for all of the waste types analyzed in the WM PEIS. For LLW, DOE decided to perform minimal treatment at all sites and continue onsite disposal of LLW at INEEL, Los Alamos National Laboratory, Oak Ridge Reservation (ORR), and SRS (65 Fed. Reg. 10061 (2000)). In addition, DOE decided to make the Hanford Site and Nevada Test Site (NTS) available to all DOE sites for LLW disposal. For mixed LLW, DOE decided to treat the waste at the Hanford Site, INEEL, ORR, and SRS, and to dispose of mixed LLW at Hanford and NTS (65 Fed. Reg. 10061 (2000)).

With respect to TRU waste, DOE decided that each site that has generated or would generate TRU waste would store it onsite prior to shipment to WIPP for disposal (63 Fed. Reg. 3629 (1998)). However, the Department may decide to ship TRU waste from sites where it may be impractical to prepare it for disposal to sites where DOE has or will have the necessary capability (the waste would be prepared for transportation at the generating site and would be shipped in conformance with all applicable regulations). The sites that could receive TRU waste from other sites are INEEL, ORR, SRS, and the Hanford Site.

DOE decided to store immobilized HLW at the sites where it was generated (that is, Hanford Site, INEEL, SRS, and WVDP) until it is accepted for disposal at a geologic repository (64 Fed. Reg. 46661 (1999)).

The analyses in the WM PEIS and the resulting RODs are relevant to actions proposed under all alternatives assessed in this Waste Management EIS.

1.7.1.3 Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DOE/EIS-0250) **(DOE 2002a)**

The proposed action in this EIS is to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain in southern Nevada. The repository would be used for the disposal of spent nuclear fuel and HLW currently in storage at 72 commercial and 5 DOE sites. The EIS analyses include the HLW from West Valley. The EIS evaluates the potential short-term and long-term impacts associated with repository disposal of spent nuclear fuel and HLW, and the transportation of these materials, including the HLW at West Valley, to the proposed Yucca Mountain Repository. The EIS also analyzes the potential impacts of a no action alternative in which DOE would not build a repository at Yucca Mountain, and the spent fuel and HLW would instead remain at the commercial and DOE sites. The final Yucca Mountain EIS was issued on February 9, 2002. This document is incorporated by reference.

1.7.1.4 Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement (DOE/EIS-0026-S-2) **(DOE 1997b)**

In October 1980, DOE issued the *Final Environmental Impact Statement for the Waste Isolation Pilot Plant* (DOE 1980a) on the proposed development of WIPP. The subsequent ROD (January 1981) established a phased development of WIPP, beginning with construction of the WIPP facility. DOE then issued the *Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant* (DOE 1990) that considered previously unavailable information. Based on the Supplemental EIS, DOE decided to continue phased development of WIPP by implementing test-phase activities. On October 30, 1992, the WIPP Land Withdrawal Act transferred the WIPP site from the U.S. Department of Interior to DOE. The 1997 Defense Authorization Act (September 23, 1996) amended the WIPP Land Withdrawal Act to make the Resource Conservation and Recovery Act (RCRA) hazardous waste land disposal prohibitions inapplicable to WIPP. DOE prepared the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (DOE 1997b) that updated information contained in the 1980 and 1990 EISs, incorporated the analysis of various treatment alternatives for TRU waste contained in the WM PEIS (DOE 1997a), and examined changes in environmental impacts due to new information or changed circumstances. In a ROD issued in January 1998 (63 Fed. Reg. 3624 (1998)), DOE decided to open WIPP for the disposal of TRU waste.

Under Alternatives A and B of this WVDP Waste Management EIS, TRU waste would be shipped to WIPP in accordance with the analyses in the 1997 EIS, if it was determined that the TRU waste met all the requirements for disposal in this repository.

1.7.1.5 Final Environmental Impact Statement for the Nevada Test Site and Off-site Locations (DOE/EIS-0243) **(DOE 1996b)**

This EIS evaluated the potential impacts that could result from mission activities at the NTS, including LLW and mixed LLW disposal. The NTS EIS evaluated waste management and environmental restoration activities and other mission activities for a 10-year period, including receipt of LLW and mixed LLW from other sites such as West Valley. Under Alternatives A and B of this WVDP Waste Management EIS, DOE would dispose of newly generated and existing LLW and mixed LLW at one of three sites, including NTS (pending issuance of an operating permit for mixed waste disposal under RCRA).

1.7.1.6 Draft Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement (DOE/EIS-0286D) **(DOE 2002b)**

This EIS evaluates waste management alternatives that may be implemented at the Hanford Site as a result of DOE decisions under the WM PEIS for LLW, mixed LLW, and post-1970 TRU waste. The LLW and mixed LLW waste inventories analyzed (that is, waste volumes and characteristics) for management at Hanford would include waste potentially received from other DOE sites, including the WVDP. Under Alternatives A and B of this EIS, DOE would dispose of LLW and mixed LLW at one of three sites, including Hanford. The Hanford Solid Waste EIS does not address interim storage of TRU waste or HLW generated offsite in its analysis.

1.7.1.7 Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement (DOE/EIS-0203-F) (DOE 1995a)

This EIS evaluated, among other things, the environmental impacts of receipt, storage, and treatment of TRU waste from offsite locations at the Idaho National Engineering Laboratory (now INEEL). Under Alternative D (Maximum Treatment, Storage, and Disposal) of the waste management alternatives for TRU waste, DOE assumed that up to 20,000 cubic meters (71,400 cubic feet) of TRU waste would be accepted from offsite generators on a case-by-case basis. Implementation of this alternative would require building additional storage

1.7.1.8 Savannah River Site Waste Management Final Environmental Impact Statement (DOE/EIS-0217-F) (DOE 1995b)

This EIS evaluated alternative strategies for managing radioactive and hazardous wastes at SRS that would protect human health, comply with environmental regulations, minimize waste generation, utilize effective and commercially available technologies for near-term management needs, and be cost effective. Under all alternatives, DOE considered the treatment and storage of TRU waste. For purposes of analysis of the maximum waste forecast, DOE assumed that waste from offsite locations would be shipped to SRS for treatment, storage, or disposal in accordance with the alternatives being considered in the draft Waste Management Programmatic EIS then in preparation and subsequently issued in September 1995.

1.7.1.9 Final Environmental Impact Statement for Treating Transuranic (TRU)/Alpha Low Level Waste at the Oak Ridge National Laboratory, Oak Ridge, Tennessee (DOE/EIS-0305-F) (DOE 2000)

In this EIS, DOE evaluated the proposed construction, operation, and decontamination and decommissioning of a waste treatment facility for the treatment of legacy ORNL TRU waste, alpha low-level waste, and newly generated TRU waste. DOE also considered interim storage of up to 7,768 cubic meters (274,324 cubic feet) of treated TRU waste at ORNL (Treatment and Storage Alternative, Cementation Treatment). The waste volume analyzed did not include waste generated at offsite locations and shipped to ORNL.

1.7.2 Environmental Assessments

The *Environmental Assessment and FONSI for the Treatment of Class A Low-Level Radioactive Waste and Mixed Low-Level Waste Generated by the West Valley Demonstration Project* (DOE 1995c) evaluated treatment activities conducted at West Valley and at commercial facilities in Tennessee, Utah, and Texas. The proposed action consisted of sorting, repackaging, and loading waste at the WVDP; transporting the waste for commercial treatment; treating the waste at the commercial facilities; and returning the residual waste to the WVDP for interim storage. Based on this EA, DOE determined that the proposed action was not a major federal action significantly affecting the quality of the human environment, within the meaning of NEPA, and that preparation of an EIS was not required.

1.7.3 Categorical Exclusions

Categorical exclusion refers to a category of actions that an agency has determined by regulation normally do not, individually or cumulatively, have a significant effect on the human environment. Such actions do not require an EA or an EIS. DOE has issued categorical exclusions for some ongoing decontamination and waste management actions at the WVDP that would occur under the alternatives described in this EIS. These include routine maintenance activities, offsite shipment of a total of

235 cubic meters (8,300 cubic feet) of mixed LLW for treatment and disposal, and offsite shipment of a total of 6,900 cubic meters (245,000 cubic feet) of Class A LLW for commercial disposal (10 CFR Part 1021, Subpart D, Appendix B).

1.8 PUBLIC INVOLVEMENT

DOE issued its NOI to proceed with a rescoped Decontamination and Waste Management EIS on March 26, 2001 (66 Fed. Reg. 16447), and a public meeting was held at West Valley on April 10, 2001, to explain the revised strategy to the public. Comments were received from the State of New York Office of the Attorney General, the Coalition on West Valley Nuclear Wastes, the Concerned Citizens of Cattaraugus County, the Nuclear Information and Resource Service and the Public Citizen/Critical Mass Energy and Environment Program (joint submittal), the West Valley Citizens Task Force, the League of Women Voters of Buffalo/Niagara, and three private citizens. Most commentors questioned DOE's need to revise its EIS strategy and rescope the 1996 Completion and Closure Draft EIS. As noted in Section 1.2, after further evaluation and as a result of public comments, DOE has limited the scope of this EIS to onsite and offsite waste management actions, and only those decontamination actions previously addressed under NEPA (DOE 1982). DOE's responses to comments received during scoping are included in Appendix B.

The WVDP Waste Management EIS was issued in draft form on May 16, 2003, for public review and comment (68 Fed. Reg. 26587 (2003)). The 45-day comment period ended on June 30, 2003, although DOE also considered comments received after that date. A public hearing on the draft version of this EIS was held on June 11, 2003, at the Ashford Office Complex near the WVDP site. DOE received comments from 21 individuals, organizations, and agencies.

Major issues raised in the public comments involve management of the HLW tanks and compliance with the Stipulation, WVDP Act and NEPA. Commenters stated that an action to place low-strength grout in the tanks for interim stabilization that was analyzed under Alternative B should more appropriately be analyzed under the Decommissioning and/or Long-Term Stewardship EIS. DOE agrees and has removed all reference to that activity in this Final EIS.

Commenters concerned about DOE's compliance with the Stipulation, WVDP Act and NEPA stated that the Stipulation and Act allow the preparation of only one EIS, that the Stipulation requires a 6-month public comment period, and that DOE's NEPA strategy of preparing two EISs to meet its responsibility under the Act and Stipulation is akin to segmentation not allowed under NEPA. In DOE's view, neither the Stipulation nor the Act requires the preparation of only one EIS. DOE will meet all of the commitments of the Stipulation by completing this Final Waste Management EIS and the Decommissioning and/or Long-Term Stewardship EIS now in progress. DOE will hold a 6-month public comment period on the Decommissioning and/or Long-Term Stewardship EIS, which is the continuation of the 1996 Cleanup and Closure EIS as described in Section 1.2.3. Regarding DOE's NEPA strategy, none of the alternatives or actions analyzed in this EIS will affect the reasonable range of alternatives available for the Decommissioning and/or Long-Term Stewardship EIS or preclude any decisions to be made under that EIS. DOE therefore does not believe that its NEPA strategy involves impermissible segmentation of the actions.

Other comments from stakeholders in states hosting DOE sites that could receive West Valley wastes expressed concern about receiving those wastes, particularly for interim storage of TRU waste and HLW. DOE's preferred alternative, Alternative A, is to ship LLW and mixed LLW to DOE sites for disposal, consistent with decisions made under the WM PEIS, and to ship TRU waste and HLW directly to WIPP and Yucca Mountain respectively for disposal, consistent with decisions under the EISs for those facilities. While not DOE's preferred alternative, Alternative B, which includes interim storage of West

Valley's TRU waste and HLW, is a reasonable alternative and is therefore included in this Final EIS as required under NEPA.

DOE has made several changes to this Final EIS in response to individual public comments. Sidebars beside the text identify where all changes from the Draft to the Final EIS have been made, although sidebars are not used to indicate changes in figures. Appendix E contains DOE's response to all public comments received on the Draft EIS.

1.9 CONTENTS OF EIS

This EIS consists of ten chapters and five appendices, as follows:

- *Chapter 1, Introduction:* This chapter provides background information regarding the proposed project and its purpose and need, the scope of the EIS, and NEPA-related issues.

- *Chapter 2, Description of Alternatives:* This chapter describes the alternatives proposed in this EIS and those that were considered but are not analyzed in detail. It also includes a summary of the potential impacts associated with each of the alternatives.

- *Chapter 3, Affected Environment:* This chapter describes the affected environment at the Project Premises and surrounding areas.

- *Chapter 4, Environmental Consequences:* This chapter describes the potential environmental impacts at the Project Premises and surrounding areas that could occur as the result of each of the proposed alternatives. An analysis of the environmental justice impacts associated with the proposed alternatives is also presented.

- *Chapter 5, Cumulative Impacts:* This chapter describes the cumulative impacts to the Project Premises and surrounding areas that would result from the proposed activities.

- *Chapter 6, Unavoidable Impacts, Short-term Uses and Long-term Productivity, and Irreversible and Irretrievable Commitments of Resources*: This chapter describes some of the additional considerations that must be analyzed as part of the NEPA EIS process.

- *Chapter 7, List of Preparers and Disclosure Statement:* This chapter includes a list of the individuals who prepared the EIS and their credentials. It also provides the certification by the contractor that assisted DOE in the preparation of this EIS that they have no financial or other interest in the outcome of the project as required by the Council on Environmental Quality (40 CFR 1506.5(c)) and DOE (10 CFR 1021).

- *Chapter 8, List of Agencies, Organizations, and Individuals Receiving Copies of This EIS:* This chapter includes a list of the federal, state, local, or tribal government agencies, various organizations, and members of the public who received copies of the draft version of this EIS.

- *Chapter 9, Glossary:* This chapter includes definitions for many of the technical terms used in this EIS.

- *Chapter 10, Index:* This chapter indexes key terms used in this EIS.

- *Appendix A, Specific Legal Requirements That Apply To West Valley Waste Management Activities:* This appendix provides the legislative and judicial language governing DOE's actions at the site.

- *Appendix B, Responses to Scoping Comments:* This appendix provides DOE's responses to comments received from the public and agencies during scoping.

- *Appendix C, Human Health Impacts*: This appendix describes the methodology used to analyze human health impacts.

- *Appendix D, Transportation*: This appendix describes the methodology used for the transportation analysis, including representative routes.

- *Appendix E, Responses to Public Comments:* This appendix contains the public comments received on the draft version of this EIS and provides responses to the issues raised.

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CHAPTER 2
DESCRIPTION OF ALTERNATIVES

This chapter describes the three alternatives that DOE has analyzed in this Waste Management EIS: the No Action Alternative (Continuation of Ongoing Waste Management Activities), Alternative A (Offsite Shipment of HLW, LLW, Mixed LLW, and TRU Waste to Disposal), and Alternative B (Offsite Shipment of LLW and Mixed LLW to Disposal, and Shipment of HLW and TRU Waste to Interim Storage). Descriptions of the facilities that would be affected and waste management activities that would be undertaken under each alternative are provided. This chapter ends with discussions of alternatives considered but not analyzed and a summary of the potential impacts under each alternative.

2.1 OVERVIEW OF ALTERNATIVES

This EIS addresses the waste management activities that DOE needs to conduct to meet its responsibilities under the West Valley Demonstration Project Act, as discussed in Section 1.1.2. Proposed waste management activities include the onsite management actions of continued temporary storage of waste and the shipment of wastes for offsite storage or disposal. Three alternatives have been defined for evaluation within this EIS; these alternatives represent the full range of waste management actions available to DOE and have been identified as:

- No Action Alternative – Continuation of Ongoing Waste Management Activities;
- Alternative A (DOE's Preferred Alternative) – Offsite Shipment of HLW, LLW, Mixed LLW, and TRU Waste to Disposal; and
- Alternative B – Offsite Shipment of LLW and Mixed LLW to Disposal and Shipment of HLW and TRU to Interim Storage.

The estimated timeframe for the actions assessed under these alternatives is a period of 10 years. Within that period, with the exception of the shipment of HLW directly from WVDP to a geologic repository (assumed for the purposes of analysis to be the proposed Yucca Mountain Repository near Las Vegas, Nevada), it is anticipated that available funding would allow the complete removal of all existing and any newly generated LLW and TRU wastes. HLW, whether shipped to Yucca Mountain directly from West Valley under Alternative A or from interim offsite storage under Alternative B, is not currently scheduled to be received by the repository until after 2025. The actions proposed under each alternative are summarized in Table 2-1.

Under the **No Action Alternative**, no new waste management activities would be performed beyond those activities that have been evaluated under NEPA in accordance with the provisions of the Council on Environmental Quality implementing regulations for NEPA (40 CFR Parts 1500-1508). DOE would provide continued operational support and monitoring of the facilities to meet the requirements for safety and hazard management. Waste management activities currently in progress would continue for onsite storage of existing Class A, B, and C LLW, mixed LLW, TRU waste and HLW wastes and offsite disposal of a limited quantity of Class A LLW at a facility such as Envirocare (a commercial radioactive waste disposal site in Clive, Utah), DOE's NTS in Mercury, Nevada, or the Hanford site in Richland, Washington. Under the No Action Alternative, active hazard management, operational support,

Table 2-1. Alternatives Matrix

Proposed Action	Alternative		
	No Action	Alt A – Preferred	Alt B
LLW			
Ship LLW to Envirocare, Hanford, or NTS	X(a)	X	X
TRU Waste			
Continue onsite storage	X		
Ship for disposal to WIPP		X	
Ship to Hanford, INEEL, ORNL, SRS, or WIPP for interim storage, then to WIPP for disposal			X
HLW			
Continue storing HLW onsite in Process Building	X		
Ship to Yucca Mtn directly		X	
Ship to SRS or Hanford for interim storage, then ship to Yucca Mtn			X
HLW Tank Management			
Ongoing management	X	X	X

a. Limited to 145,000 cubic feet (4,100 cubic meters) of Class A LLW.

surveillance, and oversight would continue at the current levels of activity. Upon completion of ongoing efforts to remove wastes to the extent that is technically and economically practical, the waste storage tanks and their surrounding vaults would be ventilated to manage moisture levels as a corrosion prevention measure. Waste transportation destinations proposed under the No Action Alternative are shown in Figure 2-1.

Alternative A (DOE's Preferred Alternative) would emphasize waste management actions focused on (1) the removal of currently stored wastes (existing waste) on the site and waste to be generated over the next 10 years and (2) shipment to offsite locations for disposal. Upon completion of waste removal, DOE would continue active operational support, surveillance, and oversight to safely manage remaining systems and hazards. All LLW types (the remaining Class A LLW and all Class B and C LLW) and mixed LLW would be prepared for disposal and shipped off the site. Under Alternative A, DOE would ship Class A, B and C LLW and mixed LLW to one of two DOE potential disposal sites (in Washington or Nevada) or to a commercial disposal site such as the Envirocare facility in Utah, ship TRU waste to WIPP in New Mexico, and ship HLW to the proposed Yucca Mountain HLW Repository. LLW and mixed LLW would be shipped over the next 10 years. TRU waste shipments to WIPP could occur within the next 10 years if the TRU waste is determined to meet all the requirements for disposal in this repository; however, if some or all of WVDP's TRU waste does not meet these requirements, the Department would need to explore other alternatives for disposal of this waste. Waste transportation destinations proposed under Alternative A are shown in Figure 2-2. The waste storage tanks and their surrounding vaults would be managed as under the No Action Alternative.

Under **Alternative B**, offsite shipment and disposal of existing wastes and newly generated LLW (the remaining Class A LLW and all Class B and C LLW) and mixed LLW would be transported to the same locations assessed under Alternative A. TRU wastes would be shipped to interim storage at one of five DOE sites: Hanford, INEEL, ORNL, SRS, or WIPP, with subsequent shipments from Hanford, INEEL, ORNL, or SRS to WIPP for disposal. HLW would be shipped to SRS or Hanford for interim storage, with subsequent shipments to Yucca Mountain for disposal. The waste storage tanks and their surrounding vaults would be managed as under the No Action Alternative. Waste transportation destinations proposed under Alternative B are shown in Figure 2-3.

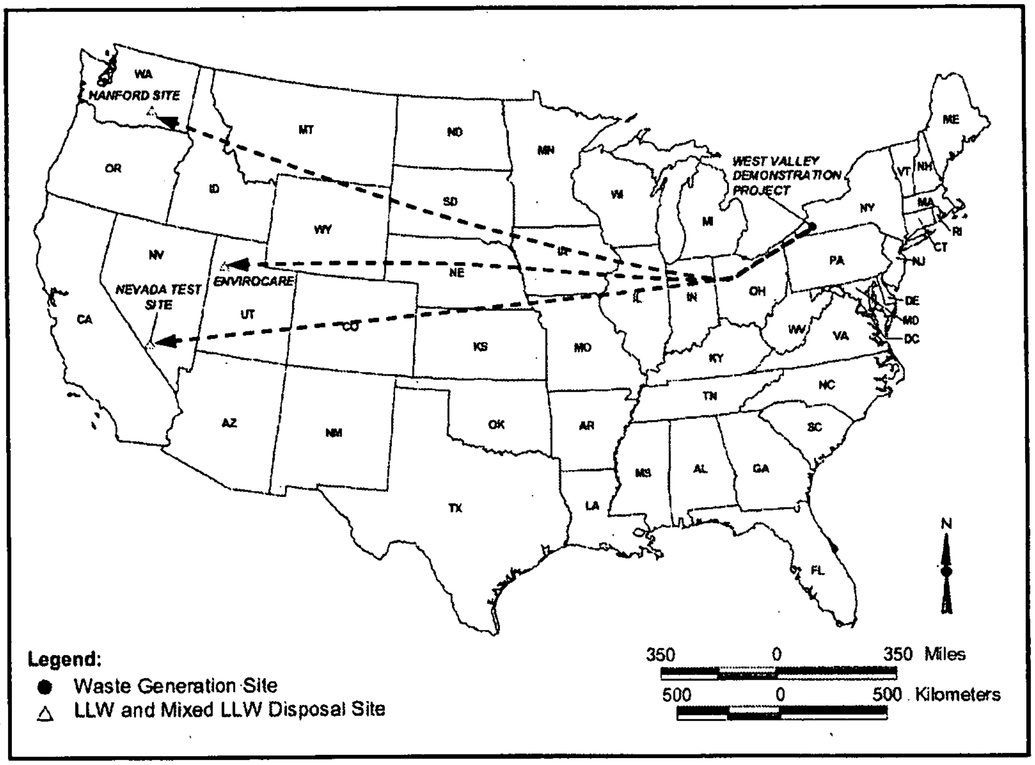

Figure 2-1. Waste Destinations Under the No Action Alternative

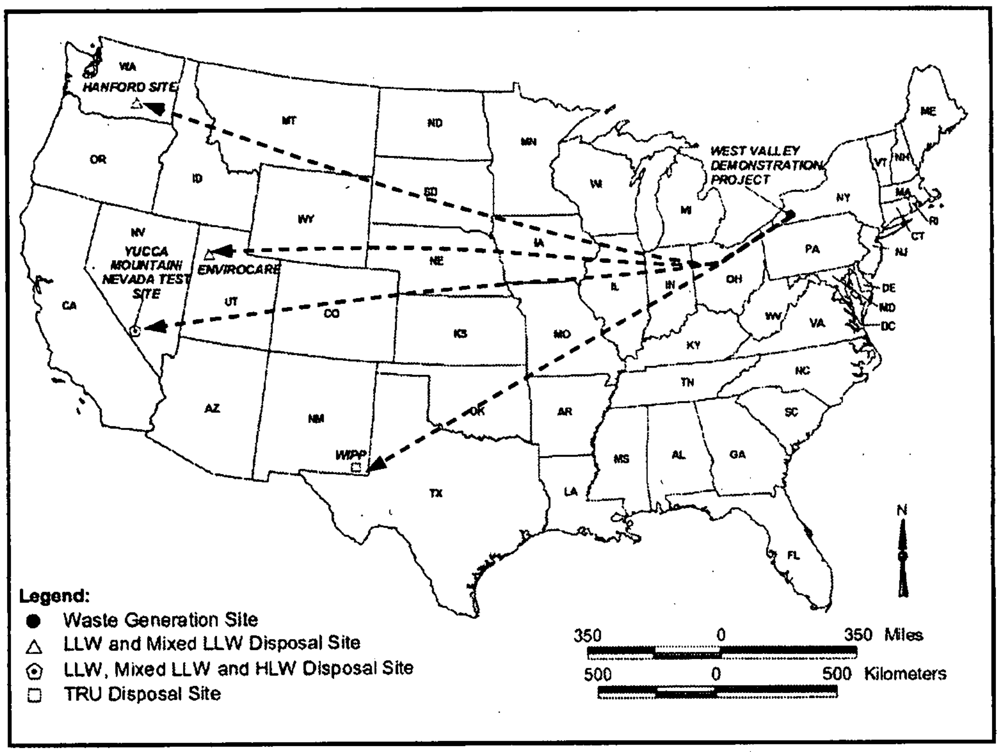

Figure 2-2. Waste Destinations Under Alternative A

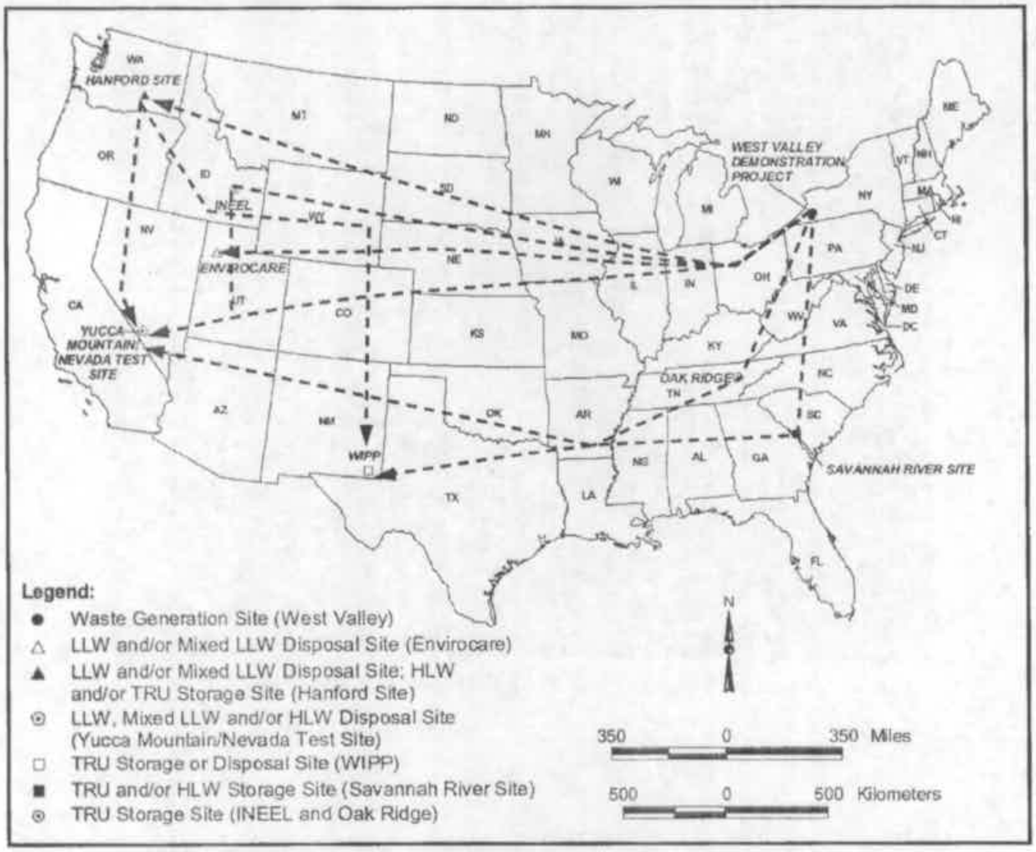

Figure 2-3. Waste Destinations Under Alternative B

2.2 ONSITE WASTE MANAGEMENT FACILITIES

Wastes subject to offsite shipping and disposal under the actions proposed in this EIS are stored in several WVDP buildings. An aerial view of the entire project premises is shown in Figure 2-4, and a schematic of the same view is shown in Figure 2-5. An overview of the site facilities is shown in Figure 1-2.

Vitrified HLW is stored in the Process Building (Figure 2-5). The vitrified HLW was the result of processing liquid wastes that were stored in tanks in the Tank Farm (Figure 2-6). LLW and TRU wastes are stored in the LSB; LSAs 1, 3, and 4; the Chemical Process Cell Waste Storage Area (Figure 2-7); and the Radwaste Treatment System Drum Cell (Figure 2-8). Volume reduction of oversized contaminated materials will occur in the Remote Handled Waste Facility (RHWF) that is currently under construction (Figure 2-7).

2.2.1 Process Building

The Process Building is a multi-storied building that was used from 1966 to 1971 to recover uranium and plutonium from spent nuclear fuel (Figure 2-5). The Fuel Receiving and Storage Area is a metal building attached to the east side of the Process Building. Spent fuel shipments were received, transferred to, and stored in the fuel storage pool inside the Fuel Receiving and Storage Area prior to their transfer to the Process Building. Removal of spent fuel from the Fuel Receiving and Storage Area was completed in July 2001. The Process Building is made up of a series of cells, aisles, and rooms constructed of

Figure 2-4. Aerial View of WVDP Site Facing Southeast

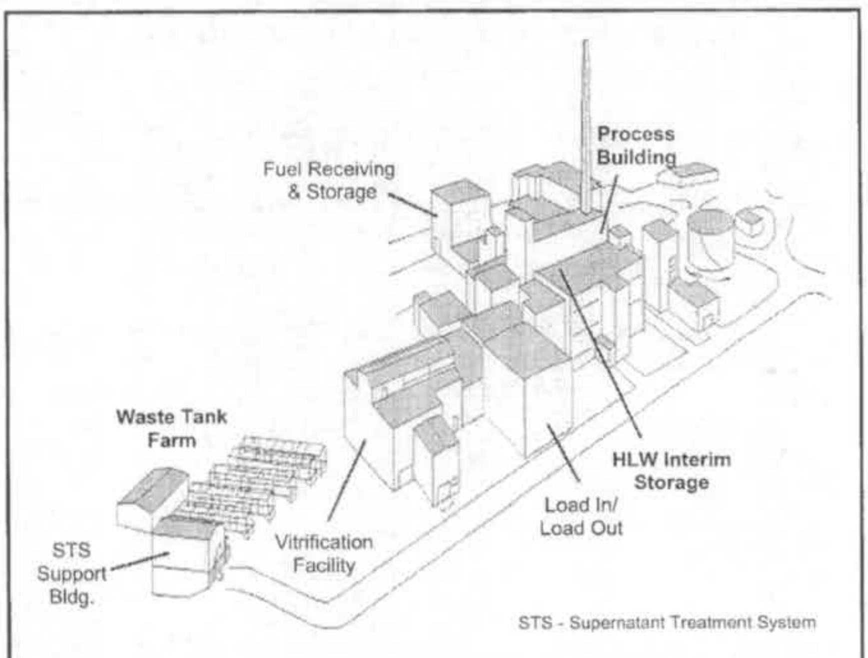

Figure 2-5. Schematic of WVDP Site Facing Southeast

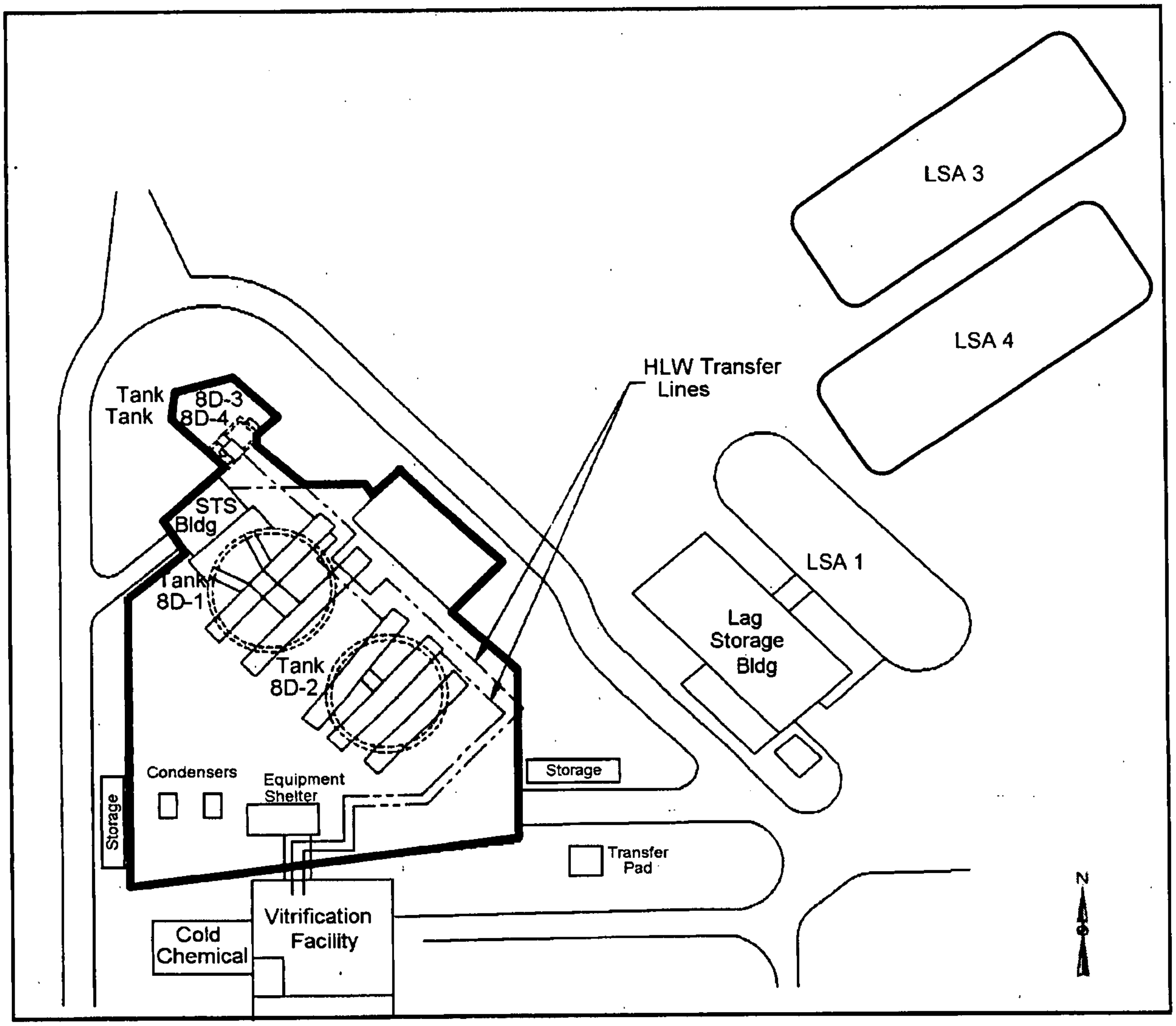

Figure 2-6. Tank Farm Area

reinforced concrete and concrete block. The cells were used for mechanical and chemical processing of spent fuel and management of radioactive liquid waste. Operations in the cells were performed remotely by operators from various aisles formed by adjacent cell walls (Marschke 2001).

From 1982 to 1987, the WVDP decontaminated cells and rooms to prepare them for reuse as interim storage space for HLW or as part of the Liquid Waste Treatment System. This involved such activities as removing vessels and piping from cells, removing contamination from walls, and fixing contamination in place. Among the areas decontaminated were the Chemical Process Cell, Extraction Cell 3, Extraction Chemical Room, and Product Purification Cell (Marschke 2001). The Chemical Process Cell is currently used for storage of 275 canisters of HLW in a borosilicate glass matrix produced in the Vitrification Plant.

2.2.2 Tank Farm

The Tank Farm (outlined in Figure 2-6) includes four waste storage tanks (8D-1, 8D-2, 8D-3, and 8D-4), a HLW Transfer Trench, and four support buildings. Built between 1963 and 1965, the waste

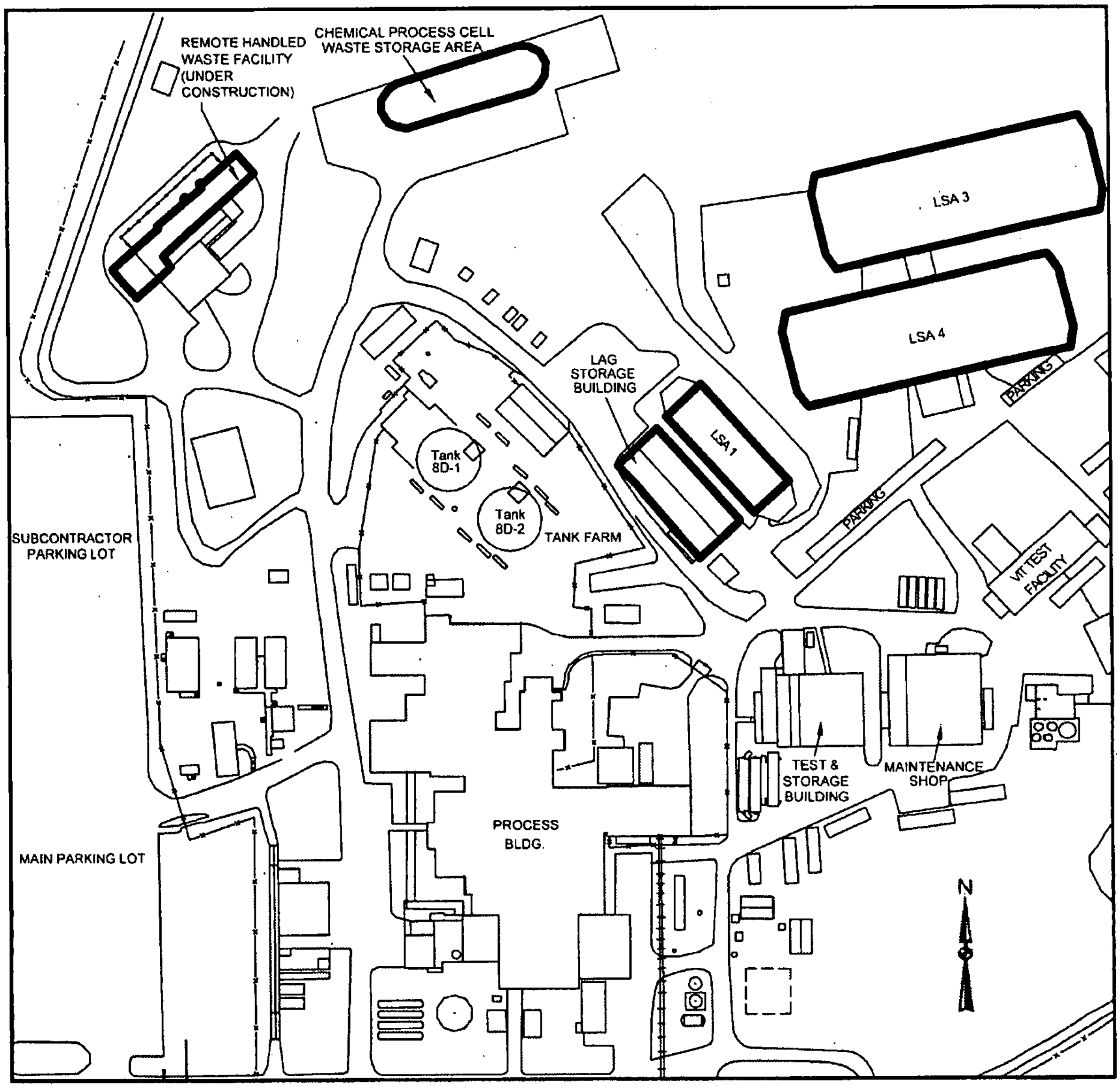

Figure 2-7. Lag Storage Building, Lag Storage Additions, Chemical Process Cell Waste Storage Area, and Remote Handled Waste Facility

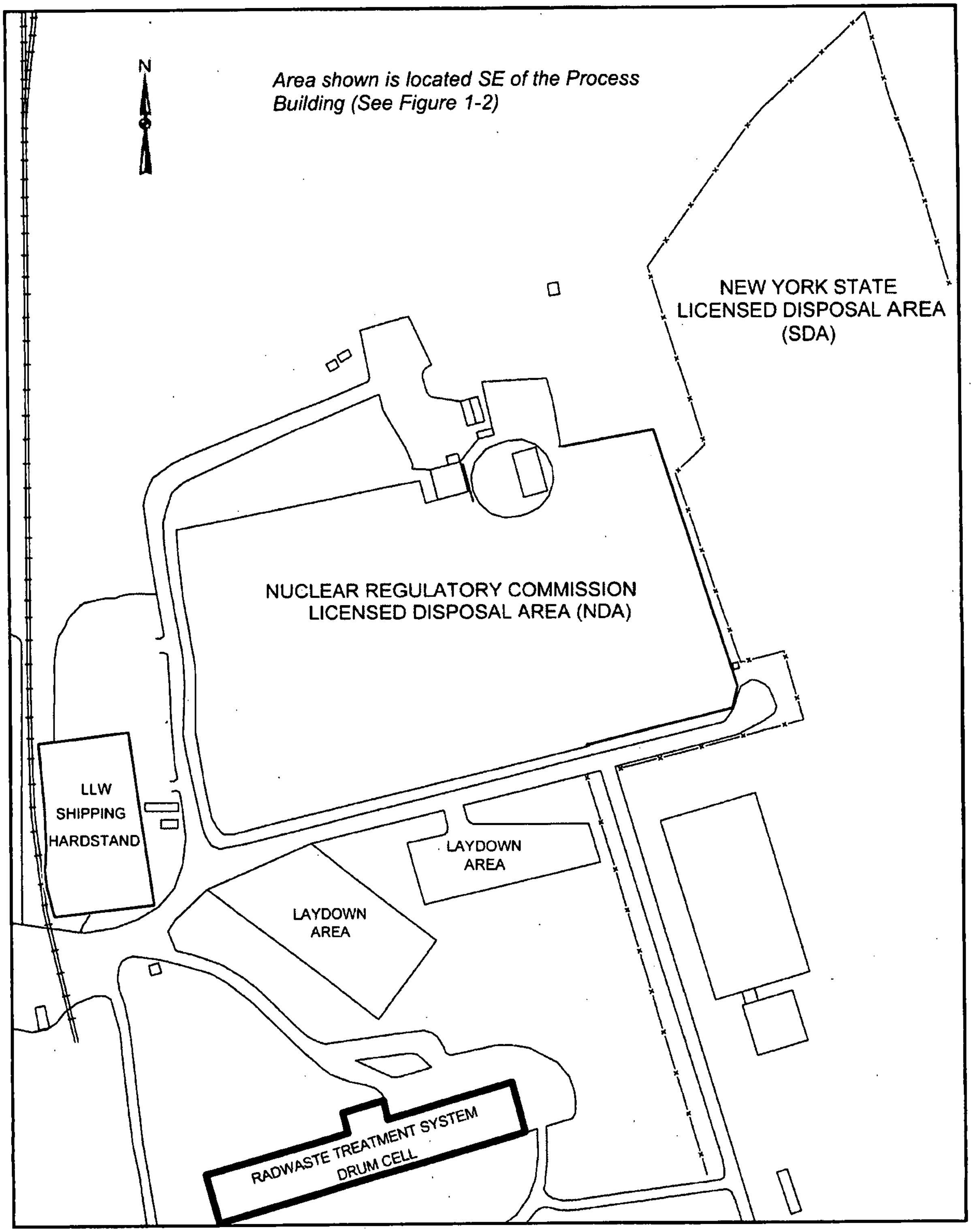

Figure 2-8. Radwaste Treatment System Drum Cell

storage tanks were originally designed to store liquid HLW generated during fuel reprocessing operations. The two larger tanks, 8D-1 and 8D-2, are reinforced carbon steel tanks. Each of these tanks has a storage capacity of about 2.8 million liters (750,000 gallons) and is housed within its own cylindrical concrete vault. Tank 8D-2 was used during reprocessing as the primary storage tank for HLW, with 8D-1 as its designated spare. Both were modified after the WVDP began to support HLW treatment and vitrification operations. The two smaller tanks, 8D-3 and 8D-4, are stainless steel tanks with a storage capacity of about 57,000 liters (15,000 gallons) each. A single concrete vault houses both of these tanks. Tank 8D-3, once designated as the spare for 8D-4, is currently used to store decontaminated process solutions before they are transferred to the Liquid Waste Treatment System for processing. Tank 8D-4, which was used to store liquid acidic waste generated during a single reprocessing campaign, is now used to collect liquids and slurries from the Vitrification Facility waste header. The HLW Transfer Trench is the 150-meter (500-foot)-long concrete vault containing double-walled stainless steel piping that conveys HLW between the Tank Farm and the Vitrification Facility. Upper sections of the pumps used to transfer the HLW through this trench are housed in stainless-steel-lined concrete pits above each tank vault (Marschke 2001).

Support buildings in the Tank Farm include the Supernatant Treatment System (STS) Support Building, Permanent Ventilation System Building, Con-Ed Building, and Equipment Shelter. The STS Support Building is a radiologically clean, two-story structure adjacent to Tank 8D-1. It houses equipment and auxiliary support systems used to operate the STS. A shielded valve aisle on the lower level of the STS contains remotely operated valves and instrumentation used to control system operations. The Permanent Ventilation System Building is a steel-framed and -sided structure near the north end of Tank 8D-2. It provided ventilation to the STS Support Building, pipeway; and more recently to the four waste storage tanks. Currently, however, it is offline and there is no plan to restart it. The Con-Ed Building is a concrete block building on top of the 8D-3/8D-4 vault. It houses instrumentation and valves used to monitor and control operation of these tanks. The Equipment Shelter is a one-story concrete block building immediately north of the Vitrification Facility. It houses the Tank Farm ventilation system that was used in the past to ventilate all four waste storage tanks (Marschke 2001). DOE manages these tanks in such a way as to minimize the risk of contamination leaching into the surrounding stream corridors.

2.2.3 Waste Storage Areas

The following sections describe the LSB, LSAs, and Chemical Process Cell Waste Storage Area. These are the areas in which LLW, mixed LLW, and TRU wastes are currently stored.

2.2.3.1 Lag Storage Building

The LSB is an interim status, mixed waste storage facility under RCRA. It is used to store containerized, contact-handled (CH) wastes (wastes with surface dose rates less than 100 millirem [mrem] per hour), including mixed waste, LLW, and suspect CH-TRU wastes (wastes suspected of containing transuranic radioisotopes) generated from WVDP operations (Marschke 2001).

The LSB is a pre-engineered, insulated, metal, Butler-style building located about 122 meters (400 feet) northeast of the Process Building (see Figure 2-7). Constructed in 1984, the LSB is supported by a clear span frame anchored to a 43-meter by 8-meter (140-foot by 60-foot) concrete slab. The listed waste storage operating capacity of the LSB under the RCRA permit (including a

Measuring Radiation

The unit of radiation dose for an individual is the rem. A millirem (mrem) is 1/1,000 of a rem. The unit of dose for a population is person-rem and is determined by summing the individual doses of an exposed population. Dividing the person-rem estimate by the number of people in the population indicates the average dose that a single individual could receive. The potential impacts from a small dose to a large number of people can be approximated by the use of population (that is, collective) dose estimates.

center aisle and operating space) is 1,331 cubic meters (47,011 cubic feet), and there are currently 202 cubic meters (7,134 cubic feet) of available storage space (Marschke 2001).

2.2.3.2 Lag Storage Addition 1

LSA 1, used to store LLW, is a flexible fabric structure about 122 meters (400 feet) northeast of the Process Building, next to and just east of the LSB (see Figure 2-7). It was constructed in 1987 to protect radioactive waste containers from wind and precipitation. LSA 1 has a pre-engineered steel frame over which vinyl fabric has been pulled and attached to create a weather-protective enclosure (Marschke 2001).

LSA 1 has a footprint that measures 15 meters by 58 meters (50 feet by 191 feet), and it is 7 meters (23 feet) high at the top center. The usable inside area is about 11 meters wide by 44 meters long by 4 meters high (37 feet by 144 feet by 14 feet). In 1999, a 4-meter (14-foot)-wide concrete corridor was added to the full length of the west side of the addition. The floor on the east side remains compacted gravel. The listed waste storage operating capacity is 1,287 cubic meters (45,454 cubic feet), and there are currently 235 cubic meters (8,282 cubic feet) of available storage space (Marschke 2001).

2.2.3.3 Lag Storage Additions 3 and 4

LSA 3 and LSA 4 are interim status, LLW and mixed LLW storage facilities under RCRA. They are twin, adjacent structures located about 152 meters (500 feet) northeast of the Process Building, just east of LSA 1 (see Figure 2-7). Originally built in 1991 and upgraded in 1996 (LSA 3) and 1999 (LSA 4), these structures provide enclosed storage space for waste containers. LSA 4 also contains the Container Sorting and Packaging Facility, which was added in fiscal year (FY) 1995. A shipping depot has been added to the south side of the structure (Marschke 2001).

LSA 3 and LSA 4 have sheet metal sides and roof over an internal structural steel frame anchored to a concrete floor. Each building's footprint is 27 meters by 89 meters (88 feet by 292 feet). Each building's outside walls rise vertically 8 meters (26 feet). Each concrete floor has a 15-centimeter (6-inch) curb around its perimeter. LSA 3 has an operating capacity of 4,701 cubic meters (166,018 cubic feet), while LSA 4 has an operating capacity of 4,162 cubic meters (146,980 cubic feet). There are currently 789 cubic meters (27,880 cubic feet) of available storage space in LSA 3, and 1,084 cubic meters (38,278 cubic feet) of available space in LSA 4 (Marschke 2001).

Located just inside and to the west of LSA 4's south wall roll-up door is the Container Sorting and Packaging Facility. This engineered area was added in 1995 for contact sorting of previously packaged wastes. The walls and ceiling of this 12-meter by 9-meter (40-foot by 28-foot) area are made of prefabricated, modular, 22-gauge stainless-steel panels. On the south side of LSA 4, there is a 21-meter by 28-meter (69-foot by 91-foot) enclosed shipping depot to enhance WVDP's ability to ship wastes off the site for disposal (Marschke 2001).

2.2.3.4 Chemical Process Cell Waste Storage Area

The Chemical Process Cell Waste Storage Area is an area about 274 meters (900 feet) northwest of the Process Building (see Figure 2-7). Originally built in 1985 as a storage area primarily for radioactively contaminated equipment packaged and removed from the Chemical Process Cell, it now consists of a Quonset-hut-style enclosure and its structural base frame. This enclosure, which is 61 meters (201 feet) long by 20 meters (65 feet) wide by 8 meters (25 feet) high at the center, is built from four major, independent sections. The two center sections are each about 19 meters (62 feet) by 20 meters (65 feet), and the two end sections are each about 12 meters (39 feet) by 20 meters (65 feet). Each section is bolted to the same foundation base and banded to the adjacent section. The structural base frame is an I-beam attached to a top plate of sixty anchors 2 meters (7 feet) long and 25 centimeters (10 inches) in diameter that are screwed into the ground (Marschke 2001).

Twenty-two painted carbon steel waste storage boxes of various sizes are stored within the Chemical Process Cell Waste Storage Area. These boxes, which contain contaminated vessels, equipment, and piping removed from the Chemical Process Cell, are stored in the center area of the enclosure. This center area is surrounded by 45 hexagonal concrete shielding modules. Each cavity contains twenty-one 55-gallon drums arranged as three 7-packs. These modules provide line-of-sight shielding around the 22 waste boxes they encircle. Four carbon steel waste boxes are placed on the east end of the enclosure, outside of the array of shielding modules but inside the metal enclosure for additional shielding. Nine carbon steel waste boxes are stored on the west end of the enclosure for the same purpose. These 13 waste boxes contain low dose LLW equipment and material removed from clean-up activities carried out in the Product Purification Cell and Extraction Cell 3 (Marschke 2001).

2.2.4 Radwaste Treatment System Drum Cell

The Radwaste Treatment System Drum Cell is a metal structure located about 610 meters (2,000 feet) south of the Process Building (see Figures 1-2 and 2-8). Established in 1986, it provides shielded, passive storage for about 19,900 square drums of cement-solidified LLW, each with a capacity of 269 liters (71 gallons), produced during Cement Solidification System operations. The Radwaste Treatment System Drum Cell includes a gravel basepad, a vertical perimeter internal shield wall, an enclosing temporary weather structure, shielded load-in/load-out area, operator office, and miscellaneous mechanical handling and operations support equipment (Marschke 2001).

The basepad is a layered construction of crushed stone on a geotextile mat placed on top of a 1- to 2-meter (3- to 6-foot) layer of compacted native clay. Moisture and settlement detecting instruments are installed in the clay layer. The Temporary Weather Structure is a pre-engineered metal-sided building that is 114 meters long (375 feet) by 18 meters (60 feet) wide by 8 meters (26 feet) high at the outside eave and totally encloses the 0.5-meter (20-inch) thick by 4.6-meter (15 feet) high concrete shield wall and stored drums. A 1,800-kilogram (2-ton) overhead crane that spans the building is used to move concrete drums into and out of their horizontal storage locations with a 900-kilogram (1-ton) drum grabber. A 696-centimeter (274-inch)-wide crane maintenance area occupies the full 18 meters (60 feet) on the west end. The floor of this area is gravel (Marschke 2001).

2.2.5 Remote Handled Waste Facility

Wastes that have high surface radiation exposure rates or contamination levels require processing using remote-handling technologies to ensure worker safety. These are referred to as remote-handled wastes and will be processed in the RHWF.

The RHWF is currently under construction, but when complete it will be a free-standing facility, approximately 58 meters (191 feet) long by 28 meters (93 feet) wide by 14 meters (45 feet) high. It is located in the northwest corner of the WVDP site, northwest of the STS Support Building and southwest of the Chemical Process Waste Storage Area (see Figure 2-7). Primary activities in the RHWF will include confinement of contamination while handling, assaying, segregating, cutting, and packaging remote-handled waste streams. The RHWF will cut relatively large components into pieces small enough to fit into standard types of waste containers.

The RHWF contains a receiving area, buffer cell, work cell, contact maintenance area, sample packaging and screening room, radiation protection operations area, waste packaging and survey area, operating aisle, office area, and the loadout/truck bay. The shield walls, doors, and windows of the RHWF will be constructed so that the radiation exposure rate in normally occupied areas will be no greater than 0.1 milliroentgen per hour.

The wastes to be processed in the RHWF are a variety of sizes, shapes, and materials, including structural steel, concrete, grout, resins, plastics, filters, wood, and water. These materials will be in the form of tanks, pumps, piping, fabricated steel structures, light fixtures, conduits, jumpers, reinforced concrete sections, personal protective equipment, general rubble, and debris. Waste from the RHWF will be packaged into 55-gallon drums and B-25 boxes.

2.3 NO ACTION ALTERNATIVE – CONTINUATION OF ONGOING WASTE MANAGEMENT ACTIVITIES

A no action alternative must be considered in all EISs to provide a benchmark against which the impacts of the proposed action and alternatives can be compared. For this project, the No Action Alternative means continuing with the waste management activities that were previously described in the *Final Environmental Impact Statement, Long-Term Management of Liquid High-level Radioactive Wastes Stored at the Western New York Nuclear Service Center, West Valley* (DOE 1982) and its two supplemental analyses, environmental assessments, and categorical exclusion documentation. These activities would include continued surveillance, maintenance, monitoring, and other operational support of facilities to meet requirements for safety and hazard management. A limited amount of Class A LLW would be shipped to NTS or to a commercial disposal site such as Envirocare (although shipments to Hanford are also included for the purposes of analysis). TRU waste would continue to be stored on the site. HLW would continue to be stored in the Process Building on the site. Management of the waste storage tanks would also continue as under current operations which provide for active ventilation of the tanks and the annulus surrounding the tanks that is filtered through multiple banks of high-efficiency particulate air (HEPA) filters before being discharged.

Under the No Action Alternative, waste management activities would include:

- Using the full capacity of the lag storage facilities (LSB and LSAs 1, 3, and 4). Currently, these facilities are at about 80 percent of their capacity.

- Processing waste from the Chemical Process Cell Waste Storage Area through the RHWF (see Figure 2-7) that is currently under construction, with the processed LLW being stored in one of the other onsite storage facilities. The RHWF will be used for segregating, size-reducing, repackaging, and otherwise preparing remote-handled radioactive wastes for transportation and disposal.

- Continuing onsite storage of all wastes, with the exception of 4,100 cubic meters (145,000 cubic feet) of Class A LLW wastes that would be shipped off the site.

- Ventilating the waste storage tanks and their surrounding vaults to manage moisture levels as a corrosion prevention measure.[1]

[1] Ventilation maintains a slight negative pressure inside the structures, tanks, vessels, and piping, which limits the potential spread of contamination from these systems. It also replaces moisture-laden air in the tanks with outside ambient air. The resulting air flow passes through a filter system to remove at least 99.95 percent of the particulates in the ventilation stream before being released to the environment through a stack equipped with continuous radiological monitors. The original Tank Farm Ventilation System was taken out of service in November 2001; the newer Permanent Ventilation System now ventilates Tanks 8D-1 and 8D-2 and provides backup ventilation to Tanks 8D-3 and 8D-4, which are normally ventilated by the vitrification process ventilation system.

Shipments under the No Action Alternative would be limited to 4,100 cubic meters (145,000 cubic feet) of Class A LLW addressed under previous NEPA documentation, until more extensive shipping can be assessed under the other alternatives in this EIS. Class A LLW is currently being shipped to Envirocare and NTS; however, for the purposes of analysis, shipments of these wastes to Hanford have also been assessed under the No Action Alternative. Table 2-2 identifies the number of containers and shipments required to dispose of up to 4,100 cubic meters (145,000 cubic feet) of Class A LLW.

Table 2-2. Waste Shipped Under the No Action Alternative

Waste Type	Container Type	Waste Shipped (cubic feet)[a]	Number of Containers	Number of Shipments
Class A LLW	Boxes	97,649	1,206	87 (truck) 44 (rail)
	Drums	47,351	6,878	82 (truck) 41 (rail)
Total		**145,000**	**8,084**	**169 (truck)** **85 (rail)**

a. To convert cubic feet to cubic meters, multiply by 0.028.

Class A LLW would be disposed of at Hanford, NTS, or a commercial disposal site such as Envirocare. Activities at those sites would include unloading trucks or railcars, inspecting the waste containers, and moving the waste to the disposal areas for shallow land burial. Waste handling and disposal activities at Envirocare are regulated by the NRC and the State of Utah under a Radioactive Material License (UT2300249). LLW handling and disposal activities at Hanford and NTS are described in the *Draft Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement* (DOE 2002b) and the *Final Environmental Impact Statement for the Nevada Test Site and Off-site Locations* (DOE 1996b), respectively.

DOE would conform with all federal and state regulations pertaining to the transport of hazardous/contaminated materials (federal regulations are described in Appendix D). Contingency plans for dealing with accidental releases during transportation would be in place prior to the start of the transportation campaign.

2.4 ALTERNATIVE A – OFFSITE SHIPMENT OF HLW, LLW, MIXED LLW, AND TRU WASTE TO DISPOSAL

Under Alternative A, DOE's Preferred Alternative, DOE would ship Class A, B and C LLW and mixed LLW to one of two DOE potential disposal sites (in Washington or Nevada) or to a commercial disposal site (in Utah), ship TRU waste to WIPP in New Mexico, and ship HLW to the proposed Yucca Mountain HLW repository. LLW and mixed LLW would be shipped over the next 10 years. TRU waste shipments to WIPP could occur within the next 10 years if the TRU waste is determined to meet all the requirements for disposal in this repository; however, if some or all of WVDP's TRU waste does not meet these requirements, the Department would need to explore other alternatives for disposal of this waste. HLW would continue to be stored on the site until 2025 or later, then shipped to the proposed Yucca Mountain Repository. Although this period would extend well beyond the 10 years required for all other proposed actions under this alternative, the impacts of transporting the HLW have been included in this EIS to fully inform the decisionmakers should an earlier opportunity to ship HLW present itself. The waste storage tanks would continue to be managed as described under the No Action Alternative.

Table 2-3 shows the number of containers that would be required and the number of offsite shipments that, by either truck or rail, would be needed to remove the waste under Alternative A. The waste

Table 2-3. Waste Volumes, Containers, and Shipments Under Alternatives A and B

Waste Type	Totals			
	Volume (cubic feet)[a]	Containers	Alternative A Shipments	Alternative B Shipments
LLW				
Class A, boxes	351,586	4,341	311 (truck) 156 (rail)	311 (truck) 156 (rail)
Class A, drums	83,014	12,058	144 (truck) 72 (rail)	144 (truck) 72 (rail)
Class B, high-integrity containers	38,500	428	428 (truck) 107 (rail)	428 (truck) 107 (rail)
Class B, drums	194	29	1 (truck) 1 (rail)	1 (truck) 1 (rail)
Class C, high-integrity containers	12,618	141	141 (truck) 36 (rail)	141 (truck) 36 (rail)
Class C, 55-gallon drums	6,198	901	91 (truck) 23 (rail)	91 (truck) 23 (rail)
Class C, 71-gallon drums	193,405	20,377	850 (truck) 213 (rail)	850 (truck) 213 (rail)
Total LLW	685,515	38,275	1,966 (truck) 608 (rail)	1,966 (truck) 608 (rail)
TRU[b]				
Contact-handled	40,000	5,810	139 (truck) 139 (rail)	278 (truck)[d] 278 (rail)[d]
Remote-handled	9,000	1,308	131 (truck) 33 (rail)	262 (truck)[e] 66 (rail)[f]
Total TRU	49,000	7,118	270 (truck) 172 (rail)	540 (truck)[g] 344 (rail)[h]
HLW				
HLW canisters		300[i]	300 (truck) 60 (rail)	600 (truck)[j] 120 (rail)[k]
Mixed LLW[c]				
Mixed A, drums	7,889	1,146	14 truck) 7 (rail)	14 truck) 7 (rail)
Total Volume	742,404			
Total Containers		46,839		
Total Shipments			2,550 (truck) 847 (rail)	3,120 (truck)[l] 1,079 (rail)[m]

Source: Marschke 2001

a. To convert cubic feet to cubic meters, multiply by 0.028.
b. Defined by NRC and DOE as waste containing more than 100 nanocuries of alpha-emitting isotopes, with half-lives greater than 20 years, per gram of waste.
c. Generally at WVDP, mixed LLW is shipped off the site for treatment at a commercial facility and from there to a disposal site. Any mixed LLW shipped off the site for disposal must meet the disposal facilities' waste acceptance criteria.
d. 139 CH-TRU shipments from WVDP to interim storage, 139 CH-TRU shipments from interim storage to disposal.
e. 131 RH-TRU shipments from WVDP to interim storage, 131 RH-TRU shipments from interim storage to disposal.
f. 33 RH-TRU shipments from WVDP to interim storage, 33 RH-TRU shipments from interim storage to disposal.
g. 270 TRU shipments from WVDP to interim storage, 270 TRU shipments from interim storage to disposal.
h. 172 TRU shipments from WVDP to interim storage, 172 TRU shipments from interim storage to disposal.
i. Assumed to be 300 for purposes of analysis; actual number of canisters is 275.
j. 300 HLW shipments from WVDP to interim storage, 300 HLW shipments from interim storage to disposal.
k. 60 HLW shipments from WVDP to interim storage, 60 HLW shipments from interim storage to disposal.
l. Includes 270 TRU waste, and 300 HLW, truck shipments from interim storage to disposal. Alternative B would load the same number of truck shipments (2,550) at WVDP for shipment offsite as Alternative A.
m. Includes 172 TRU waste, and 60 HLW, rail shipments from interim storage to disposal. Alternative B would load the same number of rail shipments (847) at WVDP for shipment offsite as Alternative A.

volumes used in this EIS were based on waste volumes that are currently in storage and projections of additional wastes that could be generated from ongoing operations over the next 10 years, as described in Section 2.3. These volumes were then escalated by about 10 percent to account for the uncertainties in future waste projections, packaging efficiency, and the choice of shipping container. Using this process, CH-TRU waste was escalated to 1,130 cubic meters (40,000 cubic feet) (from 1,020 cubic meters [36,000 cubic feet]), and RH-TRU waste was escalated to 250 cubic meters (9,000 cubic feet) (from 230 cubic meters [8,000 cubic feet]). LLW was escalated to 14,000 cubic meters (500,000 cubic feet) (from 13,000 cubic meters [450,000 cubic feet]), with the exception of the LLW volumes stored in the Drum Cell, which were not escalated because actual container counts are known. This escalated volume includes 223 cubic meters (7,889 cubic feet) of mixed LLW.

LLW and mixed LLW would be disposed of at Hanford, NTS, or a commercial disposal site such as Envirocare. Activities at those sites would include unloading trucks or railcars, inspecting the waste containers, and moving the waste to the disposal areas for shallow land burial. Waste handling and disposal activities at Envirocare are regulated by the NRC and the State of Utah under a Radioactive Material License (UT2300249). LLW and mixed LLW handling and disposal activities at Hanford and NTS are described in the *Final Waste Management Programmatic Environmental Impact Statement for Managing, Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE/EIS-0200) (DOE 1997a).

TRU waste would be disposed of at WIPP or DOE would explore other alternatives. TRU waste would arrive on tractor-trailer trucks or railcars. At WIPP, DOE would unload the waste, inspect the waste packages, prepare the packages to be moved underground, and then move them underground for disposal. Environmental and health impacts of TRU waste handling and disposal activities at WIPP are described in the WIPP Supplemental EIS II (DOE 1997b).

HLW would be disposed of at a geologic repository (assumed to be the Yucca Mountain Repository). Waste handling and disposal activities for HLW are described in the *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 2002a).

DOE would conform with all federal and state regulations pertaining to the transport of hazardous/contaminated materials (federal regulations are described in Appendix D). Contingency plans for dealing with accidental releases during transportation would be in place prior to the start of the transportation campaign.

2.5 ALTERNATIVE B – OFFSITE SHIPMENT OF LLW AND MIXED LLW TO DISPOSAL AND SHIPMENT OF HLW AND TRU WASTE TO INTERIM STORAGE

Under Alternative B, LLW and mixed LLW shipping would occur as characterized under Alternative A; however, TRU and HLW would be shipped to interim offsite storage. As would be the action under Alternative A, LLW and mixed LLW currently in storage would be prepared for disposal and shipped off the site to Hanford, NTS, or a commercial disposal site such as Envirocare. TRU waste would be shipped to Hanford, INEEL, ORNL, or SRS for interim storage, then to WIPP for disposal. TRU waste could also be shipped to WIPP for interim storage prior to disposal there. TRU waste disposal at WIPP would be subject to the same regulatory requirements described under Alternative A. HLW would be shipped to SRS or the Hanford Site for interim storage, with subsequent shipment to a HLW repository (assumed to be the proposed Yucca Mountain Repository for the purposes of analysis in this EIS). The waste volumes, containers, and shipments, from WVDP, would not change under Alternative B from those proposed under Alternative A. However, the additional shipments of TRU wastes and HLW from interim storage locations result in a higher total number of shipments for Alternative B.

As an alternative to the ongoing ventilation of the waste storage tanks under the No Action Alternative and Alternative A, under Alternative B the waste storage tanks and their surrounding vaults would be partially filled with a retrievable, controlled low-strength material (grout) to provide for interim stabilization of the tanks.

For the purposes of analysis in this EIS, DOE assumed that Tanks 8D-1 and 8D-2 and the annulus surrounding each tank would be filled to a depth of approximately 1 meter (40 inches) with grout. Using a conservative pumping rate of 8 cubic meters (10 cubic yards) per hour, it would take approximately 60 hours to fill each tank/vault. The addition of grout to the tanks would not constitute an irreversible action. The grout material would be formulated to be sufficiently flexible to provide shielding and would be retrievable should DOE decide to remove the tanks in the future. The formulation of this low-strength grout material would need to be developed and would be the subject of additional regulatory reviews (such as RCRA) before the interim stabilization action could be implemented. The grout material would also be developed to provide sufficient structural stability and radionuclide retention should DOE decide to close the tanks in place.

LLW and mixed LLW would be disposed of at Hanford, NTS, or a commercial disposal site such as Envirocare. Activities at those sites would include unloading trucks or railcars, inspecting the waste containers, and moving the waste to the disposal areas for shallow land burial. Waste handling and disposal activities at Envirocare are regulated by the NRC and the State of Utah under a Radioactive Material License (UT2300249). LLW and mixed LLW handling and disposal activities at Hanford and NTS are described in the *Draft Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement* (DOE 2002b) and the *Final Environmental Impact Statement for the Nevada Test Site and Off-site Locations* (DOE 1996b), respectively.

TRU waste would be shipped to Hanford, INEEL, ORNL, or SRS for interim storage, and then to WIPP for disposal. TRU waste could also be shipped to WIPP for interim storage prior to disposal there.

At the interim storage sites, the TRU waste would be unloaded, inspected, and moved to storage areas. Additional storage facilities may be needed at these sites, depending on the available waste storage capacity at the time. Up to 0.2 hectare (0.5 acre) of land might be required for facilities sufficient to safely store the 49,000 cubic feet (1,372 cubic meters) of TRU waste currently stored at WVDP. Siting, constructing, and operating TRU waste storage facilities at INEEL, ORNL, and SRS were addressed in the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE 1995a), the *Final Environmental Impact Statement for Treating Transuranic (TRU)/Alpha Low Level Waste at the Oak Ridge National Laboratory, Oak Ridge, Tennessee* (DOE 2000), and the *Savannah River Site Waste Management Final Environmental Impact Statement* (DOE 1995b), respectively.

Further, the WM PEIS (DOE 1997a) analyzed the potential environmental impacts associated with the possible treatment of TRU waste from offsite generators at WIPP prior to disposal. For that reason, DOE included WIPP as a potential location for interim storage of TRU waste generated at WVDP. A decision to ship TRU waste to WIPP for interim storage prior to disposal at WIPP would require siting, construction, and operation of TRU waste storage capacity at WIPP and additional NEPA review. Shipment of TRU waste from the interim storage facilities to WIPP and activities at that site are described in the WIPP Supplemental EIS II (DOE 1997b).

Interim storage of WVDP HLW at Hanford or SRS for interim storage prior to disposal at a geologic repository was analyzed as part of the Regionalized Alternatives in the WM PEIS (DOE 1997a).

DOE would conform with all federal and state regulations pertaining to the transport of hazardous/contaminated materials (federal regulations are described in Appendix D). Contingency plans for dealing with accidental releases during transportation would be in place prior to the start of the transportation campaign.

2.6 ALTERNATIVES CONSIDERED BUT NOT ANALYZED

In contrast with alternatives assessed in the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center* (DOE 1996a), this EIS does not analyze any new onsite disposal of wastes or indefinite storage of currently stored wastes or wastes to be generated as a result of ongoing operations over the next 10 years. DOE has issued EISs and decisions that identify disposal sites other than the WVDP for each waste type considered in this EIS (see Section 1.7). These sites, identified in Alternatives A and B, already have existing or planned disposal capacity; they are safe, secure, and suitable from an environmental standpoint. In light of the current and anticipated availability of disposal facilities at these other sites, DOE presently does not consider an alternative to construct and maintain waste storage facilities at the WVDP to be practical or reasonable over time, because of continuing costs of construction of new facilities and maintenance of existing facilities.

For purposes of analysis in this EIS, DOE selected potential sites for interim storage and disposal of TRU waste and HLW based on the WM PEIS (DOE 1997a), the WIPP Supplemental EIS II (DOE 1997b), and the associated RODs for these documents. For TRU waste, DOE analyzed Hanford, INEEL, LANL, ORR, Mound, NTS, SRS, and WIPP as potential storage sites for TRU waste. The TRU waste ROD stated that:

> "In the future, the Department may decide to ship TRU wastes from sites where it may be impractical to prepare them for disposal to sites where DOE has or will have the necessary capability. The sites that could receive such shipments of TRU waste are [INEEL, ORR, SRS, and Hanford]. However, any future decisions regarding transfer of TRU wastes would be subject to appropriate review under [NEPA] and to agreements DOE has entered into." 63 Fed. Reg. 3629 (1998).

Based on this analysis and documentation, DOE considered Hanford, INEEL, ORNL, and SRS as the potential interim storage locations under Alternative B for TRU waste generated at WVDP. Further, the WM PEIS (DOE 1997a) analyzed the potential environmental impacts associated with the possible treatment of TRU waste from offsite generators at WIPP prior to disposal. For that reason, DOE included WIPP as a potential location for interim storage of TRU waste generated at WVDP. A decision to ship TRU waste to WIPP for interim storage prior to disposal at WIPP would require additional NEPA review.

With respect to HLW, the HLW ROD stated that DOE had decided to store immobilized HLW at Hanford, INEEL, SRS, and WVDP (64 Fed. Reg. 46661 (1999)). In this WVDP Waste Management EIS, DOE examined the environmental impacts associated with shipping HLW generated at WVDP to Hanford or SRS for interim storage prior to disposal at a geologic repository. Although the impacts of shipping HLW to INEEL are not specifically analyzed in this EIS, DOE expects those impacts would be less than shipping to Hanford because the distance to INEEL is shorter and impacts are directly related to the miles traveled.

2.7 COMPARISON OF ALTERNATIVES

This section summarizes and compares the potential environmental impacts of the No Action Alternative, Alternative A, and Alternative B. As described previously, the waste management actions proposed under all alternatives would be conducted in existing facilities (or, in the case of waste transportation, on existing road and rail lines) by the existing work force over the next 10 years, and would not involve new construction or building demolition. As a result, the scope of potential impacts that could result from the proposed actions is limited. Specifically, because there would be no mechanism for new land disturbance under any alternative, there would be no potential to directly or indirectly impact current land use; biotic communities; cultural, historical, or archaeological resources; visual resources; threatened or endangered species or their critical habitats; wetlands; or floodplains. Additionally, because the work force requirements would be the same under all alternatives (for example, there would be no increases or decreases from current employment levels), there would be no potential for socioeconomic impacts. For these reasons, the potential for impacts under all the alternatives are limited to human health and transportation impacts. Interim storage of TRU waste and HLW at other DOE sites could require the siting, construction, and operation of additional storage capacity for the volume of WVDP wastes to be stored, depending on the storage capacity at those sites at the time. It is recognized that additional review of interim storage impacts at the receiving sites could be necessary prior to implementation of these actions assessed in this EIS under Alternative B.

Table 2-4 summarizes the normal operational impacts under the three proposed alternatives over the 10-year period analyzed in this EIS. Because the proposed waste management actions would involve only the storage, packaging, loading, and shipment of wastes and management options for the waste storage tanks, the proposed activities would result in a statistically insignificant contribution to the historically low impacts of ongoing WVDP operations. As a result, the human health impacts to involved and noninvolved workers and the public are dominated by ongoing WVDP site operations; therefore, there is little discernible difference in the impacts that could occur among the three alternatives. Table 2-5 summarizes the onsite accident consequences that could result from the proposed actions under each alternative. Chapter 4 provides a detailed assessment of impacts. Under all alternatives, the risk of a latent cancer fatality from the proposed actions that would occur onsite would be less than 1, whether under normal operating conditions or accidents. Offsite transportation of wastes would also result in less than 1 fatality from normal operations and accidents under all alternatives. Under maximum reasonably foreseeable transportation accidents, 1 latent cancer fatality could result from truck transportation, and 2 latent cancer fatalities could result from rail transportation, under the No Action Alternative. About 4 latent cancer fatalities could result from either truck or rail transportation under Alternative A or B.

The WM PEIS (DOE 1997a), the WIPP Supplemental EIS II (DOE 1997b), and the *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 2002a) analyzed potential environmental impacts associated with management (treatment, storage, or disposal) of LLW, mixed LLW, TRU waste, and HLW, including waste generated and stored at WVDP. Using data extrapolated from these earlier NEPA documents, Table 2-6 shows the potential estimated human health impacts of managing WVDP waste at Envirocare, Hanford, INEEL, NTS, ORNL, SRS, WIPP, and a geologic repository at Yucca Mountain. Appendix C, Section C.10, explains how these impacts were derived.

Table 2-4. Summary of Normal Operational Impacts at West Valley

(See Chapter 4 for further discussion of impacts)

Impact Area	Unit of Measure	No Action Alternative	Alternative A - Preferred	Alternative B
Human Health Impacts[a]				
Public Impacts from Continued Operations				
MEI	LCF	3.7×10^{-7}	3.7×10^{-7}	3.7×10^{-7}
Population	LCF	1.5×10^{-3}	1.5×10^{-3}	1.5×10^{-3}
Worker Impacts				
Involved worker MEI	LCF	3.4×10^{-4}	1.3×10^{-3}	1.3×10^{-3}
Noninvolved worker MEI	LCF	3.0×10^{-4}	3.0×10^{-4}	3.0×10^{-4}
Involved worker population	LCF	2.1×10^{-3}	0.031	0.031
Noninvolved worker population	LCF	0.075	0.075	0.075
Total worker population	LCF	0.077	0.11	0.11
Transportation				
Total	Shipments	169 (truck) 85 (rail)	2,550 (truck) 847 (rail)	3,120 (truck)[b] 1,079 (rail)[c]
Impacts (from all causes – radiological and nonradiological; routine and accident conditions)				
Truck	Fatalities	0.034 – 0.041	0.79 – 0.82	0.84 – 0.93
Rail	Fatalities	0.042 – 0.049	0.60 – 0.68	0.66 – 0.79
Maximum reasonably foreseeable accidents				
Truck	LCF (Probability)	1 (5×10^{-7})	4 (6×10^{-7})	4 (8×10^{-7})
Rail	LCF (Probability)	2 (2×10^{-6})	4 (1×10^{-7})	4 (3×10^{-7})
Geology and Soils		No impact	No impact	No impact
Water Quality and Resources				
Groundwater		No impact	No impact	No impact
Surface water		No impact	No impact	No impact
Wetlands		No impact	No impact	No impact
Floodplains		No impact	No impact	No impact
Noise and Aesthetics		No impact	No impact	No impact
Ecological Resources				
Threatened and endangered species		No impact	No impact	No impact
Other plants and animals		No impact	No impact	No impact
Land Use		No impact	No impact	No impact
Socioeconomics		No impact	No impact	No impact
Environmental Justice		No impact	No impact	No impact
Cultural Resources		No impact	No impact	No impact

a. MEI = maximally exposed individual; LCF = latent cancer fatality (number of fatalities expected or probability).

b. Includes 270 TRU waste, and 300 HLW, truck shipments from interim storage to disposal. Alternative B would make the same number of truck shipments (2,550) from WVDP as Alternative A.

c. Includes 172 TRU waste, and 60 HLW, rail shipments from interim storage to disposal. Alternative B would make the same number of rail shipments (847) from WVDP as Alternative A.

Table 2-5. Summary of Accident Impacts[a]

Accident	No Action Alternative[b]			Alternative A[b]			Alternative B[b]		
	Worker	MEI	Population[c]	Worker	MEI	Population[c]	Worker	MEI	Population[c]
	(LCF)			(LCF)			(LCF)		
Drum Puncture[d]	3.6×10^{-9}	1.4×10^{-9}	4.5×10^{-6}	6.0×10^{-8}	2.3×10^{-8}	7.2×10^{-5}	6.0×10^{-8}	2.3×10^{-8}	7.2×10^{-5}
Pallet Drop[d]	2.1×10^{-8}	8.4×10^{-9}	2.6×10^{-5}	3.5×10^{-7}	1.4×10^{-7}	4.4×10^{-4}	3.5×10^{-7}	1.4×10^{-7}	4.4×10^{-4}
Box Puncture[d]	4.3×10^{-8}	1.7×10^{-8}	5.4×10^{-5}	6.0×10^{-7}	2.3×10^{-7}	7.2×10^{-4}	6.0×10^{-7}	2.3×10^{-7}	7.2×10^{-4}
Drum Cell Drop	NA[g]	NA	NA	2.4×10^{-8}	9.6×10^{-9}	3.0×10^{-5}	2.4×10^{-8}	9.6×10^{-9}	3.0×10^{-5}
HIC[e] Drop	NA	NA	NA	7.5×10^{-7}	3.1×10^{-7}	9.6×10^{-4}	7.5×10^{-7}	3.1×10^{-7}	9.6×10^{-4}
CH-TRU Drum Puncture	NA	NA	NA	1.9×10^{-5}	7.8×10^{-6}	0.025	1.9×10^{-5}	7.8×10^{-6}	0.025
RHWF[f] Fire	NA	NA	NA	6.5×10^{-5}	2.6×10^{-5}	0.084	6.5×10^{-5}	2.6×10^{-5}	0.084
Collapse of Tank 8D-2 (Wet)[d]	1.2×10^{-6}	4.9×10^{-7}	1.5×10^{-3}	1.2×10^{-6}	4.9×10^{-7}	1.5×10^{-3}	1.2×10^{-6}	4.9×10^{-7}	1.5×10^{-3}
Collapse of Tank 8D-2 (Dry)[d]	1.4×10^{-6}	5.7×10^{-7}	1.8×10^{-3}	1.4×10^{-6}	5.7×10^{-7}	1.8×10^{-3}	1.4×10^{-6}	5.7×10^{-7}	1.8×10^{-3}

a. Based on atmospheric conditions (stability class and wind speed) that are not exceeded 50 percent of the time.
b. MEI = maximally exposed individual; LCF = latent cancer fatality (probability).
c. Collective dose to the 1.5 million people living within 80 kilometers (50 miles) of the WVDP site.
d. Ground-level release.
e. HIC = High integrity container.
f. RHWF = Remote Handled Waste Facility.
g. NA = Not Applicable. Accident scenario could not occur under specified alternative.

Note: Of the 12 accidents analyzed, 5 could occur under any of the three alternatives and 7 could occur only under Alternatives A or B (see Appendix C). The accident impacts shown for the No Action Alternative primarily involve Class A LLW. The accident impacts shown for Alternatives A and B primarily involve Class C LLW.

Table 2-6. Summary of Offsite Human Health Impacts

Site	No Action Alternative			Alternative A			Alternative B		
Envirocare[a]	Disposal of Class A LLW[b]			Disposal of LLW[c] and mixed LLW[d]			Disposal of LLW[c] and mixed LLW[d]		
	Worker	MEI	Population	Worker	MEI	Population	Worker	MEI	Population
	(LCF)			(LCF)			(LCF)		
	5.4×10^{-3}	6.9×10^{-6}	NA[e]	3.6×10^{-2}	5.1×10^{-5}	NA	3.6×10^{-2}	5.1×10^{-5}	NA
Hanford Site	Disposal of Class A LLW[b]			Disposal of LLW[c] and mixed LLW[d]			Disposal of LLW[c] and mixed LLW[d]		
	Worker	MEI	Population	Worker	MEI	Population	Worker	MEI	Population
	(LCF)			(LCF)			(LCF)		
	5.4×10^{-3}	6.9×10^{-6}	NA	3.6×10^{-2}	5.1×10^{-5}	NA	3.6×10^{-2}	5.1×10^{-5}	NA
							Interim Storage of TRU waste[f]		
							Worker	MEI	Population
							(LCF)		
							1.3×10^{-3}	3.4×10^{-8}	1.7×10^{-3}
							Interim Storage of HLW[g]		
							Worker	MEI	Population
							(LCF)		
							3.6×10^{-2}	NA	NA
INEEL	No activities			No activities			Interim Storage of TRU waste[f]		
							Worker	MEI	Population
							(LCF)		
							2.5×10^{-3}	5.1×10^{-8}	4.1×10^{-4}
NTS	Disposal of Class A LLW[b]			Disposal of LLW[c] and mixed LLW[d]			Disposal of LLW[c] and mixed LLW[d]		
	Worker	MEI	Population	Worker	MEI	Population	Worker	MEI	Population
	(LCF)			(LCF)			(LCF)		
	4.8×10^{-3}	3.0×10^{-16}	NA	3.2×10^{-2}	2.1×10^{-15}	NA	3.2×10^{-2}	2.1×10^{-15}	NA
ORNL	No activities			No activities			Interim Storage of TRU waste[f]		
							Worker	MEI	Population
							(LCF)		
							9.0×10^{-4}	1.4×10^{-8}	4.6×10^{-4}

Table 2-6. Summary of Offsite Human Health Impacts (cont)

Site	No Action Alternative	Alternative A			Alternative B		
SRS	No activities	No activities			Interim Storage of TRU waste[f]		
					Worker	MEI	Population
					(LCF)		
					7.4×10^{-4}	2.1×10^{-10}	2.3×10^{-5}
					Interim Storage of HLW[g]		
					Worker	MEI	Population
					(LCF)		
					2.0×10^{-2}	NA	NA
WIPP	No activities	Disposal of TRU waste[f]			Interim Storage of TRU waste[f]		
		Worker	MEI	Population	Worker	MEI	Population
		(LCF)			(LCF)		
		1.0×10^{-2}	3.0×10^{-9}	3.0×10^{-6}	1.6×10^{-4}	6.9×10^{-7}	2.6×10^{-3}
					Disposal of TRU waste[f]		
					Worker	MEI	Population
					(LCF)		
					1.0×10^{-2}	3.0×10^{-9}	3.0×10^{-6}
Yucca Mountain Repository	No activities	Disposal of HLW[g]			Disposal of HLW[g]		
		Worker	MEI	Population	Worker	MEI	Population
		(LCF)			(LCF)		
		6.8×10^{-2}	3.1×10^{-7}	2.0×10^{-2}	6.8×10^{-2}	3.1×10^{-7}	2.0×10^{-2}

a. Impacts of disposal of Class A LLW and mixed LLW at Envirocare are assumed to be similar to impacts at Hanford.
b. The volume Class A LLW to be disposed of would be 145,000 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
c. The volume of LLW to be disposed of would be 685,515 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
d. The volume of mixed LLW to be disposed of would be 7,889 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
e. NA = Not available.
f. The volume of TRU waste to be stored or disposed of would be 49,000 cubic feet. To convert cubic feet to cubic meters, multiply by 0.028.
g. The volume of HLW to be stored or disposed of is assumed to be 300 canisters for purposes of analysis; actual number of canisters is 275.

Sources: DOE 1997a, 1997b.

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CHAPTER 3
AFFECTED ENVIRONMENT

This chapter summarizes the existing environmental conditions at the Western New York Nuclear Service Center and the surrounding area. Drawing upon information generated for WVDP environmental programs, the 1996 Draft Closure EIS, and Annual Site Environmental Reports, this chapter characterizes the receptors and environmental media that may be affected by the proposed waste management activities described in Chapter 2. This chapter also characterizes, in less detail, the ecological resources, geology, socioeconomics, land use, and related aspects of the environment at the Western New York Nuclear Service Center that would not be affected by the actions described in Chapter 2. This approach is consistent with the Council on Environmental Quality's recommendations in their regulations for NEPA implementation (40 CFR 1502.15). For additional detailed descriptions of the affected environment, refer to the *West Valley Demonstration Project Safety Analysis Report - Project Overview and General Information* (WVNS 2000b) and the *West Valley Demonstration Project Site Environmental Report, Calendar Year 2000* (WVNS 2001).

The waste management actions proposed in Chapter 2 would have very little potential for impacts to workers, the public, or the environment on and around WVDP, because the actions would not involve additional discharges or releases, or new ground disturbance. The proposed actions would occur within existing buildings, or upon existing highways and rail lines. The packaging and handling of wastes for shipment would be accomplished within existing buildings with HEPA filtration systems that would reduce emissions to acceptable levels. The actions proposed in this EIS would involve no discharges of process effluents. The only receptors that would be impacted by the proposed waste management actions would be the workers actually involved in the packaging, loading, and shipping of the wastes, also referred to as involved workers. Other WVDP workers (noninvolved workers) and the public would have no potential exposure to the proposed waste management actions during routine operations and thus would be impacted only by ongoing WVDP operations or under accident scenarios. Nationally, the involved workers and the public could receive exposures along transportation routes.

Because the potential for impacts from the proposed actions assessed in this EIS is very limited, the description of the affected environment in this chapter has been reduced accordingly. This approach is consistent with DOE and Council on Environmental Quality NEPA guidance; both agencies recommend that an EIS focus only on that which is important for the impact analyses. A basic description of the region in which the Center is located has been provided to provide the reader with a broad overview of the potentially affected environment.

3.1 GEOLOGY AND SOILS

The Western New York Nuclear Service Center is located on the Glaciated Allegheny Plateau section of the Appalachian Plateau Physiographic Province. This 78,000-square-kilometer (30,000-square–mile) region is bounded on the north by the Erie-Ontario Lowlands, on the east by the Tughill Upland, on the south by the unglaciated Appalachian Plateau, and on the west by the Interior Lowlands. The Glaciated Allegheny Plateau has been subjected to the erosional and depositional actions of repeated glaciations, resulting in the accumulation of various glacial deposits over the area. Fluvial erosion (that is, erosion resulting from action or movement of a stream or river) and mass wasting (that is, the downslope movement of soil and rock material as the result of gravity) currently are altering the glacial landscape (WVNS 2000b). No geologic fold or fault of any consequence is recognized within the site area. The closest major structural zone is the St. Lawrence Rift Valley System, located about 480 kilometers (300 miles) to the northeast. The north-trending Clarendon-Linden Structure, located 50 kilometers

(30 miles) northeast of the site, is the only significant structural feature in the western New York region. From 1737 to 1999, there have been 119 recorded earthquakes within 480 kilometers (300 miles) of the WVDP with epicentral intensities of Modified Mercalli Intensities V to VII. Of the 119 recorded earthquakes, 25 occurred within 320 kilometers (200 miles) of the WVDP (WVNS 2000b). The highest Modified Mercalli Intensity estimated to have occurred at the Center within the last 100 years was an Intensity of IV, which is similar to vibrations from a heavy truck that might be felt by people indoors, but do not cause damage (DOE 1996).

3.2 HYDROLOGY

This section describes the existing hydrology at the Project Premises and surrounding area.

3.2.1 Surface Water

The WVDP facilities and its two water supply reservoirs lie in separate watersheds, both of which are drained by Buttermilk Creek (Figure 3-1). Buttermilk Creek, which roughly bisects the Western New York Nuclear Service Center, flows in a northwestward direction to its confluence with Cattaraugus Creek, at the northwest end of the Center. Several tributary streams flow into Buttermilk Creek at the Center. The flow length of Buttermilk Creek through the Center is about 7,600 meters (25,000 feet). About 2,700 meters (9,000 feet) of this is adjacent to the Project Facilities and the water supply reservoirs (WVNS 2000b).

Buttermilk Creek lies in a deep, narrow valley cut into glacial soils. A downstream portion of the creek has downcut to shale bedrock. The reach of stream to the east of the facilities has downcut through the Lavery till and the underlying Kent recessional units and is currently incising the Kent till. The stream invert drops from an elevation of 400 meters (1,300 feet) at the southern site boundary, to 370 meters (1,200 feet) at the northern edge of the Project Facilities, to 340 meters (1,100 feet) at the confluence with Cattaraugus Creek. The drainage area of the Buttermilk Creek basin was estimated to be 80 square kilometers (30 square miles) (DOE 1996). The drainage area to this point is estimated to be about 76 square kilometers (29 square miles) (WVNS 2000b).

Cattaraugus Creek flows westward from the Buttermilk Creek confluence to Lake Erie, 63 kilometers (39 miles) downstream. The total drainage area is estimated to be 1,360 square kilometers (520 square miles). A gauging station has been maintained at Gowanda, New York, since 1939. The drainage basin to this point is estimated to be about 1,120 square kilometers (430 square miles). The drainage area of Cattaraugus Creek upstream of the Buttermilk Creek confluence is 560 square kilometers (220 square miles) (WVNS 2000b).

The drainage basin on the Project Premises is relatively small, consisting of approximately 5 square kilometers (2 square miles). The outfall of the watershed (that is, the point where all surface runoff from the site reaches a single stream channel) is at the confluence of Frank's Creek and Quarry Creek, north of the main Project Facilities. The watershed extends in a southwest direction from this point. Ground cover consists of the main Project Facilities, forest, abandoned farmlands, and a small amount of active farmland.

The watershed on the Project Premises is drained by three named streams: Quarry Creek, Frank's Creek, and Erdman Brook (Figure 3-2; WVNS 2000a). Erdman Brook and Quarry Creek are tributaries to Frank's Creek, which in turn flows into Buttermilk Creek. Erdman Brook, the smallest of the three streams, drains the central and largest fraction of the developed WVDP premises, including a large portion of the disposal areas and the areas surrounding the lagoon system; the plant, office, and warehouse areas; and a major part of the parking lots. Following treatment, the WVDP's waste waters

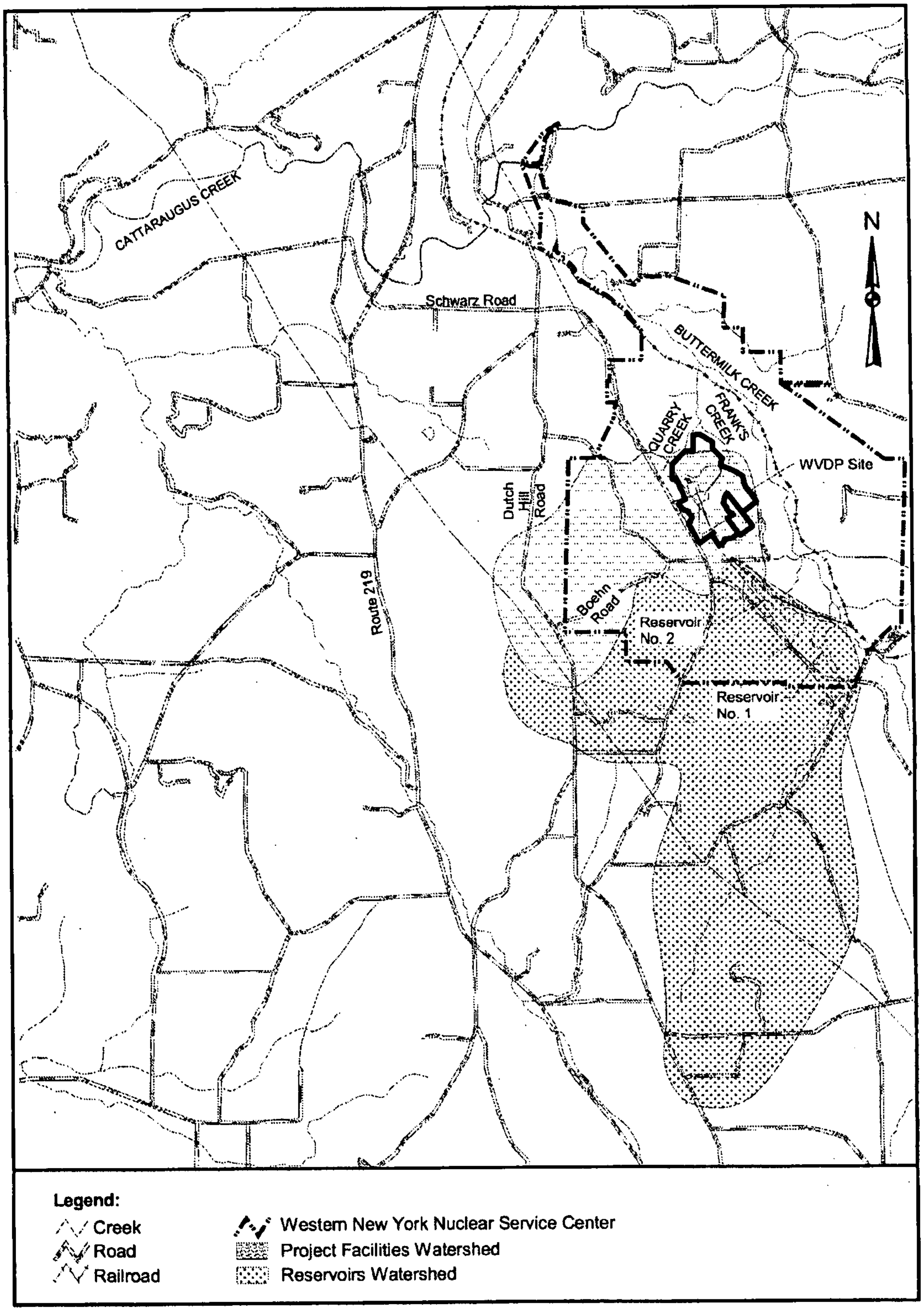

Figure 3-1. Watersheds on WVDP Premises

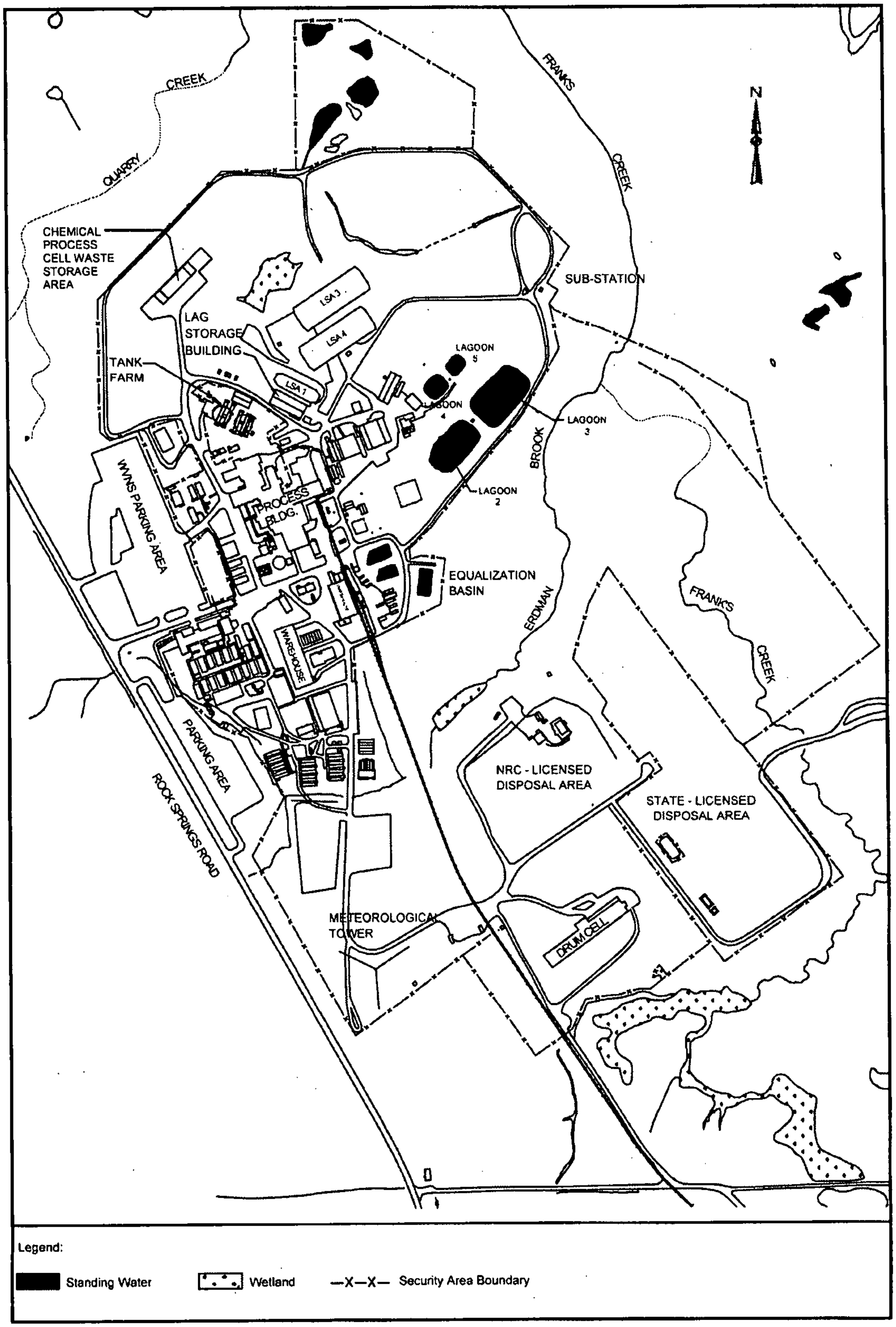

Figure 3-2. Surface Water on WVDP Premises

are also discharged to this brook. Erdman Brook flows from a height of over 430 meters (1,400 feet) west of Rock Springs Road to 400 meters (1,300 feet) at the confluence with Frank's Creek northeast of the lagoons. It flows for about 900 meters (3,000 feet) through the Project Facilities.

Quarry Creek, which drains the largest area of the three named streams, receives runoff from the tank farm, the north half of the northern parking lot, and the temporary radioactive waste storage tents. It flows from an elevation of 590 meters (1,900 feet) west of Dutch Hill Road to 380 meters (1,250 feet) at its confluence with Frank's Creek. The segment that flows along the north side of the project is about 900 meters (3,000 feet) in length.

A small dam formerly used for hydroelectric power and water impoundment is located on Cattaraugus Creek about 300 meters (1,000 feet) upstream of the Scoby Road bridge, southwest of Springville, New York. Neither Buttermilk Creek nor Cattaraugus Creek downstream of the WVDP are used as a regular source of potable water. The steep-walled nature of the downstream valley and the region's annual precipitation combine to make irrigation from the creeks impracticable and unnecessary. Cattle from a neighboring dairy farm have access to Buttermilk Creek near the confluence of Cattaraugus Creek. Milk from the cattle is routinely monitored for radioactivity. Cattaraugus Creek downstream of Buttermilk is a popular fishing and canoeing/rafting waterway. Cattaraugus Creek water is also used to irrigate tomato fields in Chautauqua County. As such, Cattaraugus Creek water, fish, and sediments are monitored as part of the WVDP environmental monitoring program (WVNS 2000a, WVNS 2000b).

The two water supply reservoirs, which are interconnected by a short canal, are located to the south of the main Project Facilities. They were formed by blocking off two tributaries to Buttermilk Creek with earthen dams. The south reservoir drains to the north reservoir, which then discharges to Buttermilk Creek through a sluice gate water-level control structure. The emergency spillway is located on the south reservoir. The reservoirs collect drainage from numerous small streams over a 13-square-kilometer (5-square-mile) drainage basin. The watershed ground cover is a mix of forest, cultivated fields, and pastures. Several small farm ponds are located throughout the basin.

Frank's Creek receives runoff from the east side of the WVDP, including the Drum Cell, part of the state radioactive waste burial area, and the former construction demolition and debris landfill. It flows into Buttermilk Creek about 600 meters (2,000 feet) downstream of its confluence with Quarry Creek. It flows from an elevation of 550 meters (1,800 feet) west of Rock Springs Road, to 380 meters (1,250 feet) at the Quarry Creek confluence, to 360 meters (1,200 feet) at the Buttermilk Creek confluence. About 1,800 meters (6,000 feet) of its length is adjacent to WVDP Facilities.

Supplemental information on surface water hydrology may be found in Volume III of the Environmental Information Document (Part 2) (WVNS 1993b). Additional information pertaining to the geomorphology of stream valleys, both onsite and offsite, is presented in Volume III of the Environmental Information Document (Part 1) (WVNS 1993a).

3.2.2 Groundwater

The Center is located within the Cattaraugus Creek Basin Aquifer System, a system that has been designated by the U.S. Environmental Protection Agency (EPA) as a sole or principal source of drinking water for the surrounding towns (52 Fed. Reg. 36102(1987)). This means that all projects with federal financial assistance constructed in this basin are subject to EPA review to ensure that they are designed and constructed so as not to create a significant hazard to public health. WVDP waste management actions would not require any facility construction at the Center and are not expected to cause construction or any other impacts requiring EPA review on the surface water or groundwater resources described in this section.

The WVDP site is underlain by two aquifer zones, neither of which can be considered highly permeable or productive. The groundwater flow patterns pertinent to the site relate to recharge and downgradient movement for these two aquifers. Groundwater in the surficial unit tends to move in an easterly or northeasterly direction from the western boundary of the site, close to Rock Springs Road. Most of the groundwater in this unit discharges via springs and seeps into Frank's Creek or into small tributaries of that creek (for example, Erdman Brook). Groundwater recharging the weathered shale and rubble zone tends to move eastward toward the thalweg of the buried valley (the locus of the lowest points in the cross-section of the buried valley), located about 300 to 350 meters (980 to 1,150 feet) west of Buttermilk Creek. Once attaining the thalweg, the direction of groundwater movement shifts to the direction of the thalweg, about 25 degrees west, and proceeds toward the northwest (WVNS 2000b).

Wells identified near the Western New York Nuclear Service Center serve residences and farms; the maximum number of persons served per well was ten. Most of the wells are located on the higher elevations east and west of the Center, along the principal north-south county roads. A second concentration of wells is located on the lowlands north of the Center in the vicinity of Bond Road and Thomas Corners Road. The wells are upgradient of or are otherwise hydraulically isolated from groundwater at the site (WVNS 2000b).

Water supplies north of the Western New York Nuclear Service Center and south of Cattaraugus Creek derive mainly from springs and shallow dug wells completed in Defiance Outwash, which overlie the Lavery till in this area. The distribution of springs and the general geologic relationships indicate that the groundwater system here is perched above the Lavery and that flow patterns are much the same as those that characterize the North Plateau at the WVDP. This hydrostratigraphic unit clearly is disconnected from the WVDP both hydraulically and topographically. Nonetheless, water supplies developed from bedrock wells in this same area downstream and downgradient of the WVDP might be hydraulically connected to water originating on the site via the surface water system and shale exposures in the lower reaches of Buttermilk Creek (WVNS 2000b).

Supply wells on the uplands bordering the Western New York Nuclear Service Center, such as along Route 240 and Dutch Hill Road, are completed in bedrock. A nominal 15 meters (50 feet) of till overlie a fractured bedrock aquifer on the summit levels west of the site; a comparison of screen depths and static water levels indicate that the aquifer is confined (WVNS 2000b). A similar situation exists on the uplands east of the Center, except that most of these wells intersect from 20 to 45 meters (66 to 150 feet) of the Kent till and ground moraine layers above their completion depths in shale bedrock. Groundwater supplies in both of these areas can be assumed to be isolated hydraulically from groundwater in bedrock at lower elevations beneath the Center and the WVDP (WVNS 2000b).

The Lavery till and underlying lacustrine sequence currently are not drawn upon for groundwater supplies, and there is no reason to anticipate that the till, given its hydraulic properties, ever will be considered a source of groundwater. The Lavery till layer and Kent recessional sequence unit directly beneath the Lavery till layer are generally regarded as containing all the potential routes for the migration of contamination to the surface water system and to offsite areas (WVNS 2000b).

3.3 METEOROLOGY AND AIR QUALITY

The WVDP is situated approximately 50 kilometers (30 miles) inland from the eastern end of Lake Erie in western New York State. The climate of western New York State is of the moist continental type prevalent in the northeastern United States. The climate is diverse due to the influence of several atmospheric and geographic factors or controls (WVNS 2000b).

Western New York is exposed to a variety of air masses. Cold dry air masses that form over Canada reach the area from the northwesterly quadrant. Prevailing winds from the southwest and south bring warm, humid air masses from the Gulf of Mexico and neighboring waters of the subtropical Atlantic Ocean. On occasion, cool, cloudy, and damp weather affects western New York through airflow from the east and northeast (WVNS 2000b).

The prevailing wind direction is southwesterly, and windspeed averages approximately 5.4 meters per second (12 miles per hour). The strongest winds occur from November through March and are generally southwesterly to west-southwesterly (DOE 1996). Figures 3-3 and 3-4 characterize the wind conditions for calendar year 2000 from onsite monitoring stations at 10 meters (33 feet) and 60 meters (197 feet) from the ground.

Western New York is bordered by two of the Great Lakes: Lake Erie on the west and Lake Ontario on the north. These exert a major controlling influence on the climate of the region. Topography also affects the climate. Elevations in western New York range from about 110 meters (350 feet) along the Lake Ontario shore in Oswego County to more than 610 meters (2,000 feet) in the southwestern highlands of Cattaraugus and Allegheny counties. The lake plain extends inland about 40 kilometers (25 miles) from Lake Ontario, but along Lake Erie it gradually narrows from about 16 kilometers (10 miles) in the Buffalo area to 8 kilometers (5 miles) or less in Chautauqua County. The southern two-thirds of the region is composed of hilly, occasionally rugged terrain with elevations generally above 300 meters (1,000 feet). This area is interspersed with numerous river valleys and gently sloping plateau areas. Such topographic features may produce locally significant variation of climatic elements within relatively short distances.

The winter climate of western New York is marked by abundant snowfall. The areas with the lightest snowfall, with average seasonal accumulations of 102 to 127 centimeters (40 to 50 inches), are the lower Chemung Valley, the western Finger Lakes, and northern Niagara County. The heaviest snowfall occurs in the eastern lee of Lake Erie, where the average total is in excess of 305 centimeters (120 inches). The snow season normally begins in mid-November and extends into mid- or late-March (WVNS 2000b).

Snowfall produced in the eastern lee of Lake Erie is a distinguishing and very important feature of western New York's climate. Heavy snow squalls frequently occur, producing from 0.3 to 0.6 meter (1 to 2 feet) of snow and occasionally as much as 1.2 meters (4 feet). Counties to the lee of Lake Erie are subject to these lake-effect snows in November and December, but in mid-winter, as the lake gradually freezes, these snows become less frequent. Areas south of Lake Ontario are exposed to heavy snow squalls well into February, as the lake generally retains considerable open water through the winter months (WVNS 2000b).

The summer season is cool in the southwestern highland but warm elsewhere. High temperatures and high humidity are infrequent during the summer and seldom persist for more than a few days at a time. Readings of 38 degrees Celsius (100 degrees Fahrenheit) or higher are rare. The range of temperature on summer days is commonly from 15 degrees Celsius (60 degrees Fahrenheit) at night to 27 degrees Celsius (the low 80s) in the afternoon (WVNS 2000b).

Summer season precipitation increases to the south, ranging from about 20 centimeters (8 inches) along the Lake Ontario shore to 25 to 30 centimeters (10 to 12 inches) in the counties along the Pennsylvania border. Showers and thundershowers account for much of the warm season rainfall, and the distribution pattern reflects the contrasting influences of the cool Lake Ontario waters to the north and the hilly terrain in the Southern Tier (WVNS 2000b).

The autumn season is marked by frequent periods of sunny, dry weather. With less cloud cover, temperatures from mid-September to mid-October frequently rise to between 15 degrees Celsius and

26 degrees Celsius (60 and 79 degrees Fahrenheit) in the daytime and cool to 1 degree Celsius below zero and 6 degrees Celsius (30s and low 40s Fahrenheit) at night. The comparatively warm waters of the Great Lakes reduce cooling at night to the extent that freezing temperatures in lakeside counties are normally delayed until mid-October or later (WVNS 2000b).

3.3.1 Severe Weather

The lack of significant amounts of recorded data at and near the West Valley site make it difficult to assess past occurrences of extreme winds. Large-scale factors such as intense low-pressure systems passing near the area have produced winds in excess of 27 meters per second (60 miles per hour) at Buffalo, New York, and would probably lead to similar conditions at the WVDP. Strong winds associated with the remnants of tropical storms and hurricanes do occasionally occur in western New York, but damaging winds due to these storms are extremely rare.

Locally, severe thunderstorms would be the most likely event to cause wind damage at the site, particularly in late spring and summer. Thunderstorms occur about 30 days per year, with the most thunderstorms occurring in June, July, and August. Severe thunderstorms, with winds in excess of 22 meters per second (50 miles per hour), do occur in western New York every year (WVNS 1993c).

The frequency and intensity of tornadoes in western New York are low in comparison to many other parts of the United States. An average of about two tornadoes of short and narrow path length strike New York State each year. From 1950 to 1990, 17 tornadoes were reported within 80 kilometers (50 miles) of the WVDP site (WVNS 2000b).

3.3.2 Ambient Air Quality

New York is divided into nine regions for assessing state ambient air quality. The WVDP site is located in Region 9, which is comprised of Niagara, Erie, Wyoming, Chautauqua, Cattaraugus, and Allegany counties. The WVDP site and the surrounding area in Cattaraugus County are in attainment with the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and New York State air quality standards contained in 6 NYCRR 257. The city of Buffalo, located about 48 km (30 mi) from the WVDP site, is a marginal nonattainment area for ozone (EPA 2002).

Air emissions of radionuclides from WVDP, are regulated by the EPA under the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations, 40 CFR Part 61, Subpart H, National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities. Annual reporting of the radionuclide emissions for calendar year 2000 was less than 0.1 percent of EPA's standards (WVNS 2001).

Current WVDP operations use two Cleaver Brooks boilers. These boilers are used to generate steam for heating and other processes at the site, and each have a capacity of 20.2 million British thermal units per hour. Together, these boilers use about 2 million cubic meters (70 million cubic feet) of natural gas and about 24,000 liters (6,300 gallons) of No. 2 fuel oil per year, and emit some criteria pollutants - nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter. The other two criteria pollutants, lead and ozone, are produced in insufficient quantities by the boilers for consideration in this analysis.

As shown in Table 3-1, the concentrations of criteria pollutants from the WVDP site emissions are well below the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and the New York State air quality standards contained in 6 NYCRR 257. It should be noted that the background concentrations used in Table 3-1 were from near Buffalo, New York; actual background

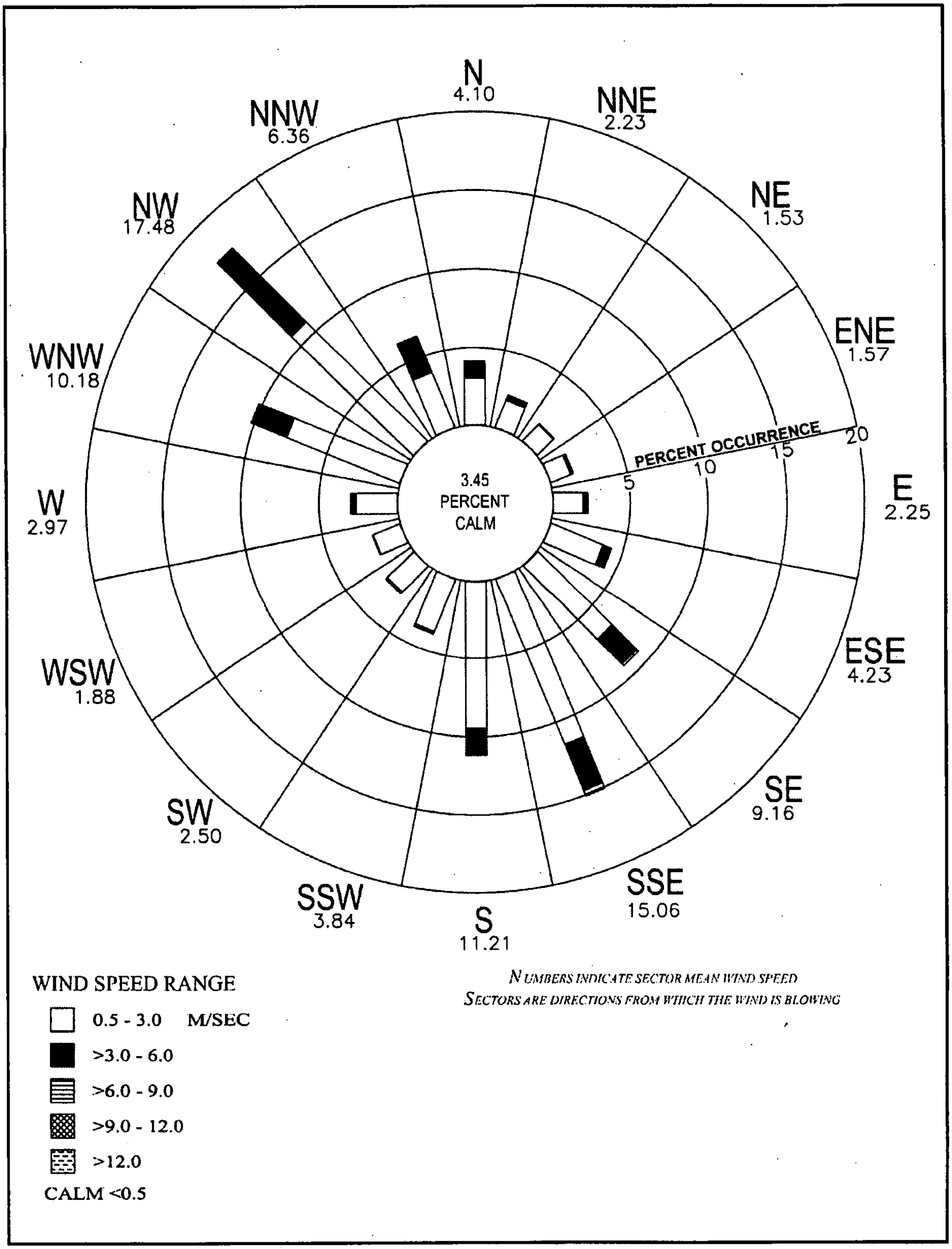

Figure 3-3. 10-Meter Wind Frequency Rose

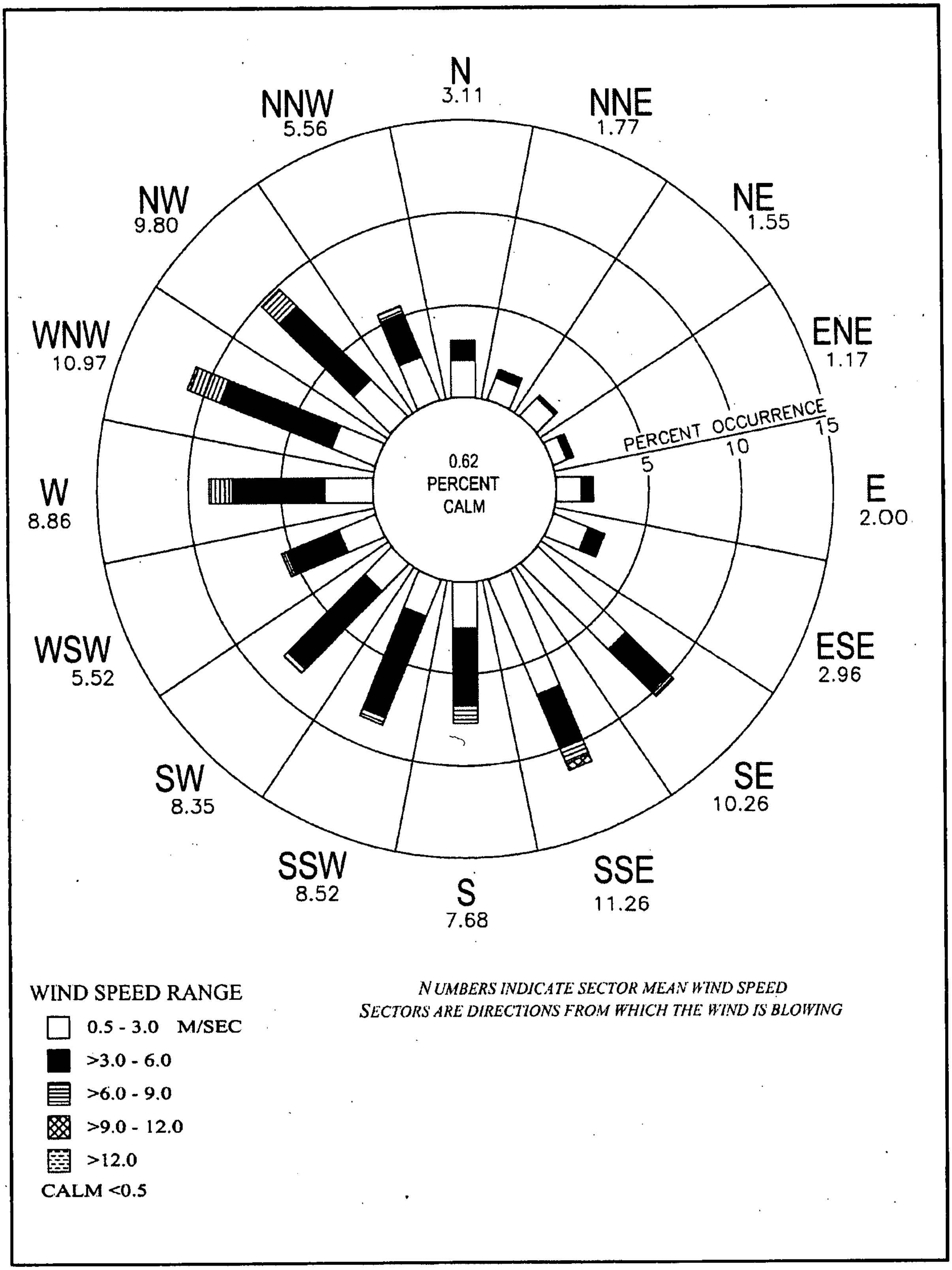

Figure 3-4. 60-Meter Wind Frequency Rose

Table 3-1. Criteria Pollutant Concentrations from WVDP Boiler Emissions and Regional Background

Criteria Pollutant	Averaging Time	Standard[a,b]	Concentration From WVDP Emissions[b,c]	Background Concentration[b,d]	Total Concentration[b]	Percent of Standard
Nitrogen dioxide	Annual	100[g,h,i] (0.053 ppm)	1.5	41	42	42
Carbon monoxide	1 hour	40,000[g,i] (35 ppm)	15	5,800	5,800	14
Carbon monoxide	8 hours	10,000[g,i] (9 ppm)	11	3,200	3,200	32
Sulfur dioxide	Annual	80[g,i] (0.03 ppm)	0.10	17	17	22
Sulfur dioxide	24 hours	365[g,i] (0.14 ppm)	0.50	63	64	17
Sulfur dioxide	3 hours	1,300[h,i] (0.5 ppm)	1.1	160	160	12
Particulate matter[e]	Annual	50[g,h]	0.11	21	21	42
Particulate matter[f]	24 hours	150[g,h]	0.56	61	61	41
Ozone	1 hour	235[g,h] (0.12 ppm)	(--)	210	210	89
Lead	Quarterly	1.5[g,h]	(--)	0.03	0.03	2

a. Standards from 40 CFR 50, National Primary and Secondary Ambient Air Quality Standards and 6 NYCRR 257, Air Quality Standards. Comparisons to the standards for particulate matter with an aerodynamic diameter less than 2.5 micrometers and the 8-hour ozone standard were not made because these standards have been remanded to the U.S. Environmental Protection Agency by the U.S. Court of Appeals.
b. Units in micrograms per cubic meter. Parts per million not calculated for substances that do not exist as a gas or vapor at normal room temperature and pressure.
c. The maximum criteria pollutant concentrations from WVDP boiler emissions were located 1,379 meters (4,524 feet) from the WVDP site.
d. Source: EPA 2001. Background concentrations were measured near Buffalo, New York.
e. Annual state standard is 45 to 75 micrograms per cubic meter according to level designation.
f. 24-hour state standard is 250 micrograms per cubic meter.
g. National primary ambient air quality standard.
h. National secondary ambient air quality standard.
i. New York State air quality standard.

concentrations near the WVDP site would be lower. WVDP emissions of nitrogen dioxide and sulfur dioxide are also well below the New York State Department of Environmental Conservation's annual emission cap of 90,700 kilograms (100 tons). Additionally, all other conditions of the permit continue to be met for other criteria pollutants (WVNS 2001). A more detailed analysis of these emissions is included in Section C.9 of this EIS.

3.4 ECOLOGICAL RESOURCES

This section describes the existing ecology at the Project Premises and surrounding areas.

The Western New York Nuclear Service Center lies within the northern hardwood forest region. Its climax community forests are characterized by the dominance of sugar maple, beech, and Eastern hemlock. At present, the site is about equally divided between forestland and abandoned farm fields. Plant communities found on the site have been categorized into five cover types: mixed hardwood forest, pine-spruce community, successional creek bank communities, late oldfield successional areas, and fields-meadows. The plant communities found on the site are characteristic of western New York. The relatively undisturbed nature of large portions of the Western New York Nuclear Service Center has allowed for natural succession of previous agricultural areas within its boundaries. Because neither the setting nor the former agriculture land use is unique, the forest communities that will eventually develop in the abandoned fields will be similar to others in the region (WVNS 2000b).

In an effort to manage the overpopulation of deer within the Western New York Nuclear Service Center with a goal of reducing the number of deer/vehicle collisions on roads around the Center, NYSERDA has allowed controlled hunting (during the deer hunting season) within the Center premises but not within the Project Premises. A deer management program that was implemented in 1998 resulted in the removal of all the deer within the WVDP premises (WVNS 2000b).

3.4.1 Special Status Species

Animals. The U.S. Department of Interior and the New York State Department of Environmental Conservation maintain lists of threatened and endangered species of wildlife (USFWS 2001; NYSDEC 2001) that are protected under the Endangered Species Act of 1973 and the Fish and Wildlife Coordination Act of 1958. Except for occasional transient individuals, there are no federally listed or proposed endangered or threatened species in the vicinity of the WVDP (USFWS 2001). Based on population range maps, threatened or endangered species with potential for occurring at the Western New York Nuclear Service Center include:

- Birds
  - Common tern - state threatened
  - Bald eagle - federal threatened and state endangered[1]
  - Loggerhead shrike - state endangered
  - Northern harrier - state threatened
  - Osprey - state threatened (recommended for state special concern status)
  - Peregrine falcon - state endangered
  - Piping plover - federal and state endangered
  - Red-shouldered hawk - state threatened (recommended for state special concern status)
  - Spruce grouse - state threatened recently (recommended for state endangered status)

- Mammals
  - Indiana bat - federal and state endangered

- Herptiles
  - Eastern massasauga - state endangered
  - Timber rattlesnake - state threatened

Field investigations in 1990 and 1991 recorded one species (Northern harrier) on the state list of threatened species and six state species of special concern (Cooper's Hawk, upland sandpiper, common raven, Eastern bluebird [recommended for unlisted status], Henslow's sparrow [recommended for threatened status], and vesper sparrow). State of New York "special concern species" are species of fish and wildlife found to be at risk of becoming endangered or threatened in New York (New York Code of Rules and Regulations Title 6, Part 182.2(i)). Typically, species of special concern are those whose populations are declining, often in association with critical habitat loss. All the noted species were observed in areas of the Western New York Nuclear Service Center outside the WVDP. Moreover, none of these threatened species or species of special concern depend on areas within the WVDP for any aspect of their life cycle. Eight birds, two mammals, and six herptiles on the special concern list may potentially

[1] Proposed for removal from the Federal Endangered Species list (USFWS 2001, NYSDEC 2001).

occur at the Center. Four of the listed birds (common loon, Northern raven, common nighthawk, and Eastern bluebird [recommended for unlisted status]) have been recorded at the Center. While suitable habitat for some of these species exists on the site, their presence at the Center (except in the case of the Eastern bluebird) is not due to the presence of critical habitat within the Center. The Eastern bluebird habitat has been artificially created by a substantial bluebird nesting box program; this program has proved very successful. During 1990, approximately 85 birds were fledged from boxes at the Center (WVNS 2000b).

Plants. Field studies from 1982 and 1983 revealed no plant species in the study area on either the state or federal protected plant lists. Field studies conducted by several groups since 1973 have also failed to record any such species. Field studies were conducted in the spring of 1992 to re-examine the Western New York Nuclear Service Center with respect to the current state and federal protected plant lists. No federally threatened or endangered species were identified. One each of New York State endangered and threatened plant species were reported in 1992 within the Western New York Nuclear Service Center (WVNS 2000b). A recent field botanical investigation was conducted in June and August 2000, in an effort to confirm the 1992 reported presence of a New York State endangered plant. No endangered plants were found in the location and area as reported in 1992 (Dames and Moore 2000a and 2000b).

Habitats. The U.S. Department of the Interior, Fish and Wildlife Service, maintains a file of habitat locations designated as critical to the survival of federally listed endangered or threatened species. Based on a review of the most recent listings and contact with the U.S. Fish and Wildlife Service, Cortland, New York field office (June 1997), no such habitats occur in or around the site (WVNS 2000b).

Critical habitats are also designated by the New York State Department of Environmental Conservation, Bureau of Wildlife. The state-designated critical habitats are areas found to be of significance to game and other important wildlife species. Such areas could include seasonally important wintering areas and breeding grounds. A 16-square-kilometer (6-square-mile) area encompassing the entire Western New York Nuclear Service Center site has been classified as critical habitat due to its extensive use as a whitetail deer (a game species) wintering area. The area has been designated because softwood shelter availability is rated intermediate, and food availability is rated good. Five other areas within a 16-kilometer (10-mile) radius of the site are similarly designated (WVNS 2000b).

Examination of state and federal lists of threatened and endangered species and range maps, performance of field sampling and a literature survey, and interviews with local experts provided no indication that any threatened or endangered aquatic flora or fauna exist in the reservoirs, ponds, or streams on the Western New York Nuclear Service Center or in its vicinity. The New York State Department of Environmental Conservation has delineated an Eastern sand darter area on Cattaraugus Creek near Perrysburg, New York. This area is protected to preserve the state-listed endangered species. The Eastern sand darter species is a state-listed threatened species (NYSDEC 2001).

In comments submitted on the draft version of this EIS, the U.S. Fish and Wildlife Service concurred in DOE's determination that no federally listed or proposed endangered or threatened species are known to exist in the project impact area and that no habitat in the project impact area is currently designated or proposed critical habitat in accordance with the provisions of the Endangered Species Act, 16 U.S.C. 1531 et seq.

3.4.2 Wetlands

The Western New York Nuclear Service Center has meadows, marshes, lakes, ponds, bogs, and other areas that are considered functional wetlands. Fifty-one such areas have been identified as "jurisdictional" wetlands, or wetlands that are constrained from dredging or filling actions by Section 404 of the Clean Water Act and by the state Freshwater Wetland Act (WVNS 1992a). These wetlands range in size from 100 square meters (1,100 square feet) to more than 37,000 square meters (398,000 square feet). The total wetlands area is approximately 0.14 square kilometers (0.05 square miles). Eighteen wetlands with a total area of approximately 37,000 square meters (398,000 square feet) were delineated within the Project Premises. The New York State Department of Environmental Conservation has determined that eight wetlands encompassing 81,000 square meters (872,000 square feet) on the south and east sides of the Project Premises and SDA are linked and meet the criteria for a single wetland.

3.4.3 Floodplains

The site's topographic setting renders major flooding unlikely; local run-off and flooding is adequately accommodated by natural and man-made drainage systems in and around the WVDP (WVNS 2000b). Flood levels for the 100-year and the 500-year storms show that no facilities on the Project Premises are in either floodplain (FEMA 1984).

Cattaraugus and Buttermilk creeks lie in deep, narrow valleys. Therefore, the effects on the WVDP of flooding by these creeks are negligible, as supported by historical data. Frank's Creek, Quarry Creek, and Erdman Brook are also located in deep valleys. Historical evidence and computer modeling indicate that flood conditions (including the probable maximum flood) will not result in stream flows overtopping their banks and flooding the plateau. However, indirect damage from the erosional effects of high stream flows and excessive slope saturation during flood conditions is a possibility. The facilities likely to be most affected by bank failure and gully head advancement due to extreme precipitation are lagoons 2 and 3, the NDA, and site access roads in several places (WVNS 2000b).

In the case of a hypothetical flood with peak discharge nearly eight times that of a 100-year flood, computer modeling suggests that floodwaters would overtop Rock Springs Road and some part of the floodwaters would flow across the plant area. Based on the topography in the plant area, it is likely that some portions of the site would experience shallow flows of moderate velocity. Flows would recede quickly, however, since the ditches that drain the site have gradients of up to 5 percent.

3.5 LAND USE AND VISUAL SETTING

The WVDP site consists of approximately 0.9 square kilometer (0.3 square mile) within the 14-square-kilometer (5-square-mile) Western New York Nuclear Service Center. It is located within the Cattaraugus highlands, which is a transitional zone between the Appalachian Plateau to the south and east and the Great Lakes Plain to the north and west. The Cattaraugus highlands range in elevation from 300 to 550 meters (1,000 to 1,800 feet). Deep valleys dissect rather flat-topped plateaus and support a climax plant community of northern hardwoods substantially reduced by agricultural activities (WVNS 2000b).

Slopes range from less than 5 percent to greater than 25 percent, with 5 to 15 percent slopes predominant. The Western New York Nuclear Service Center is drained by Buttermilk Creek, which flows into Cattaraugus Creek. Prior to 1961, much of the Center was cleared for agriculture. As a result, the Center now consists of a mixture of abandoned agricultural areas in various stages of ecological succession, forested tracts, and wetlands and transitional ecotones between these areas. The generally acidic and poorly drained soils influence the occurrence, distribution, and relative abundance of plant communities and their associated faunal species. The region's temperate climate is not prone to natural forest or grassland fires (WVNS 2000b).

The WVDP is on a plateau in the central portion of the Western New York Nuclear Service Center. The WVDP plateau elevation is approximately 430 meters (1,400 feet). The plateau margins are subject to erosion, especially along the banks of gully and stream drainage ways that cut into the plateau and feed to several named streams that, in turn, feed into Buttermilk Creek (WVNS 2000b).

The Western New York Nuclear Service Center is owned and controlled by NYSERDA. However, by cooperative agreement between NYSERDA and DOE, NYSERDA has agreed not to use or authorize use of the Center in a manner that would interfere with DOE's carrying out the waste solidification project under the West Valley Demonstration Project Act. DOE provides general surveillance and security services for the entire Center, including the WVDP site (WVNS 2000b).

Rock Springs Road, a county road, traverses the Western New York Nuclear Service Center immediately to the west of the WVDP site. If required by an emergency situation at the WVDP, access to this road can be controlled by Cattaraugus County authorities (WVNS 2000b).

The Western New York Nuclear Service Center (Figure 1-1) is fenced with barbed wire. The boundary is patrolled by security officers in vehicles at random several times a day. The WVDP site, also referred to as the Security Area, is surrounded by a high chain-link fence and can be entered only through one of three gates. Access is controlled through the use of magnetically coded picture badges, which also must be displayed at all times within the Security Area (WVNS 2000b).

All project-specific activities are performed within the WVDP site boundary. The New York State licensed LLW burial area (SDA), which is currently inactive, is located within the WVDP site boundary but is not part of the project. Figure 1-2 delineates the Project Premises area and the SDA (WVNS 2000b).

The WVDP is an industrial facility that is visible from several miles away, depending on location. It is well lit at night.

Site Vicinity Land Use

Land use within 8 kilometers (5 miles) of the site is predominantly agricultural (active and inactive) and forestry uses. The major exception is the Village of Springville, which comprises residential/commercial and industrial land uses (WVNS 2000b).

The industries near the site are light-industrial and commercial (either retail or service oriented). A field review of an 8-kilometer (5-mile) radius did not indicate the presence of any industrial facilities that would present a hazard in terms of safe operation of the site.

A similar land-use field review of the Village of Springville and the Town of Concord did not indicate the presence of any significant industrial facilities. Industrial facilities near the Western New York Nuclear Service Center include Winsmith-Peerless Winsmith, Inc., a gear reducer manufacturing facility; Robinson/Fiddlers Green Manufacturing Company, Inc., a plastic housewares and knives manufacturing facility; Ashford Concrete Co., Inc., a readi-mix concrete supplier and concrete equipment manufacturing facility; and Springville Manufacturing, a fabricating facility for air cylinders (WVNS 2000b). The industries within the Village of Springville and the Town of Concord, Erie County, are located in a valley approximately 6 kilometers (4 miles) to the north and east of the WVDP.

3.6 SOCIOECONOMICS

This section briefly describes the socioeconomic environment at the Project Premises and surrounding areas, focusing on the population distribution within 80 kilometers (50 miles) and the identification of minority and low-income populations within this area. Because employment levels are not anticipated to change under any of the alternatives evaluated in this EIS, there would be no potential to impact the economy of the local area or the region. Therefore, this section is limited to the characterization of population distribution necessary to support the assessment of human health impacts from the proposed actions.

3.6.1 Population

Data collected during the 2000 Census continue to indicate relatively stable overall population levels in the 12 counties surrounding the Western New York Nuclear Service Center. The area within 16 kilometers (10 miles) of the site lies within Cattaraugus and Erie counties. The total population in these counties has decreased by 3.3 percent since the 1990 census, with a loss of 1.9 percent in Erie County and 0.3 percent in Cattaraugus County. The population and median household income of the 12 New York and Pennsylvania counties that lie within 80 kilometers (50 miles) of the site are presented in Table 3-2. Average income in all counties in the region for 2000 was above the poverty level of $17,600 for a family of four (USCB 2001).

Table 3-2. Socioeconomic Conditions in the 12 Counties Surrounding West Valley, New York

County	Population (2000 Census)	Percent Change Since 1990	Persons per Square Mile	Median Household Income
Allegany County, NY	49,927	-1.10	48.5	31,291
Cattaraugus County, NY	83,955	-0.30	64.1	31,348
Chautauqua County, NY	139,750	-1.50	131.6	31,051
Erie County, NY	950,265	-1.90	910.2	36,711
Genessee County, NY	60,370	0.50	122.2	37,859
Livingston County, NY	64,328	3.10	101.8	39,354
Niagara County, NY	219,846	-0.40	420.4	36,218
Steuben County, NY	98,726	-0.40	70.9	33,732
Wyoming County, NY	43,424	2.20	73.2	35,915
McKean County, PA	45,936	-2.50	46.8	32,517
Potter County, PA	18,080	8.20	16.7	30,554
Warren County, PA	43,863	-2.60	49.7	33,863

Source: USCB 2001.

Figures 3-5 and 3-6 present population densities by the 15 points of the compass. Using the Project Premises plant as the center point, concentric, annular rings were drawn from the plant starting in 1-kilometer (0.6-mile) increments out to 5 kilometers (3 miles); a single 5-kilometer (3-mile) increment out to 10 kilometers (6 miles); and 10-kilometer increments out to 80 kilometers (50 miles). Figure 3-5 plots the data within 80 kilometers but, due to scale limitations, it cannot adequately portray data within 5 kilometers; therefore, Figure 3-6 provides data within 5 kilometers. The total calendar year 2000 U.S. population within 80 kilometers was 1,535,963 (USCB 2001). The population in Canada in 2001 within 80 kilometers of the WVDP site was 148,304 (Statistics Canada 2001a, 2001b).

3.6.2 Employment

DOE estimates that the waste management activities evaluated in this EIS would be accomplished by the existing work force with the technical capabilities now in use at the Western New York Nuclear Service Center. Based on the current employment of approximately 500 persons at the Center, no increases in employment would be anticipated to implement any of the alternatives proposed for this project. Evaluations in this EIS are based on continuation of current program funding and employment levels at

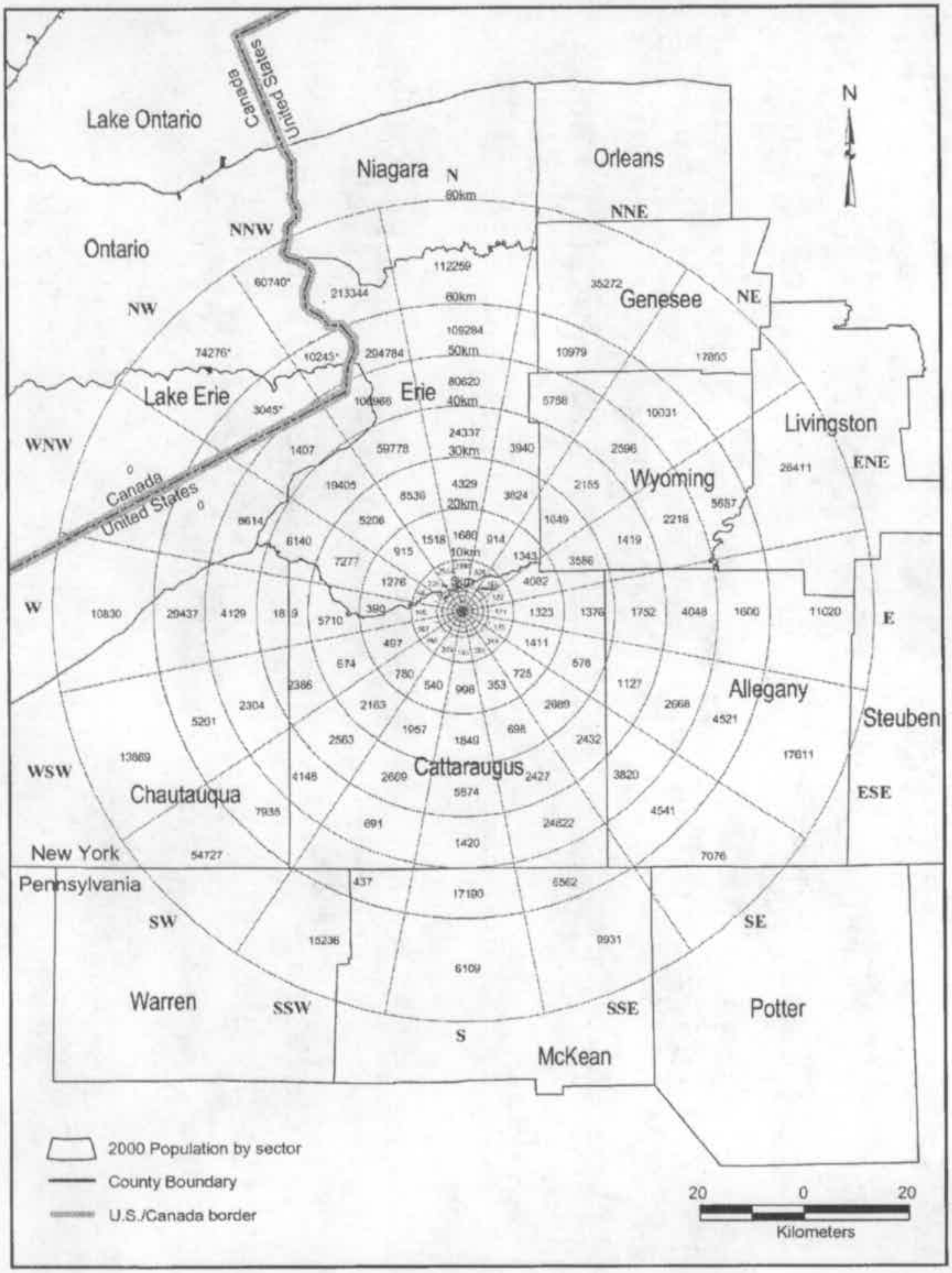

Figure 3-5. 2000 Population Density by Compass Direction (80-Kilometer Radius)
Note: The numbers with asterisks reflect the Canadian population within the corresponding sectors.

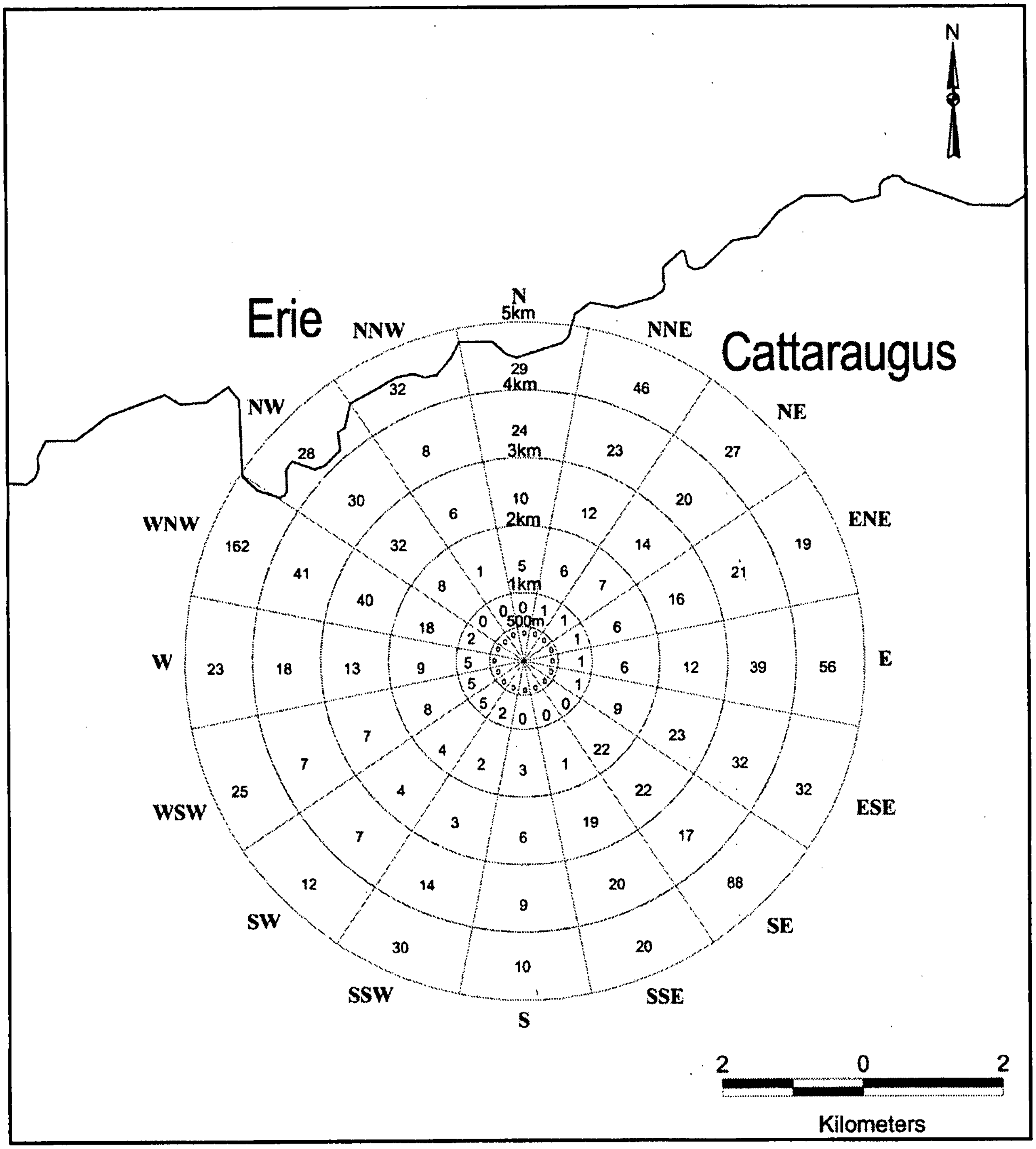

Figure 3-6. 2000 Population Density by Compass Direction (5-Kilometer Radius)

the Center for the duration of all three alternatives. Funding for the WVDP and the Center is subject to change on an annual basis, and decreases or increases in the levels of program funding and related increases or decreases in employment levels are always possible.

3.6.3 Public Services

This section describes the public services currently available to the Project Premises and surrounding areas.

3.6.3.1 Human Services

The Cattaraugus County Health Department provides health and emergency services for the entire county, with the closest locations to the Western New York Nuclear Service Center being in the towns of Machias and Little Valley. Other resources providing health care services to the West Valley include Service Medical, Springville Pediatrics, Concord Medical Group, and several private physician practices located in Springville. The closest hospital to the Center is the Bertrand Chaffee Hospital, located approximately 6 kilometers (4 miles) north on Route 39 in Springville. A written protocol for WVDP-related emergency medical needs provides the basis for support in the event of emergency from Bertrand Chaffee Hospital (WVNS 1992b) and the Erie County Medical Center.

3.6.3.2 Community Water Supplies

The Western New York Nuclear Service Center has its own reservoir and water treatment system to service the facility. The system provides potable and facility service water for operating systems and fire protection. A reservoir system created by damming tributaries of Buttermilk Creek south of the Project site is the raw water source for the non-community, non-transient water supply operated by the WVDP. Two outlying buildings outside the Project site have wells that supply sanitary facilities (WVNS 1992b).

The hamlet of the West Valley community water supply is supplied by a spring that is piped to a reservoir. The reservoir supplies water to the hamlet through water mains. The other hamlets in Ashford Township, Ashford Hollow and Riceville, do not have community water supply systems; each individual residence has its own private well. The Village of Springville community water system is supplied by three groundwater wells (WVNS 1992b).

3.6.3.3 Fire and Police Protection

The West Valley Volunteer Hose Company provides fire protection services to the Western New York Nuclear Service Center and the Township of Ashford. Responders are trained and briefed yearly by the Radiation and Safety Department at the Center, and they have some limited training and capability to assist in chemical or radioactive occurrences. The West Valley Volunteer Fire Department has an agreement with the bordering towns' fire departments for mutual assistance in situations needing emergency backup. These neighboring volunteer fire departments are the William C. Edmunds Fire Company (East Otto), Ellicottville Volunteer Fire Department, Machias Volunteer Fire Department, Chaffee-Sardinia Memorial Fire Department, Delevan Volunteer Fire Department, East Concord Volunteer Fire Department, and Springville Volunteer Fire Department (WVNS 1992b).

The New York State Police and the Cattaraugus County Sheriff Department have overlapping jurisdictions for the West Valley area. Any assistance needed may be obtained from the state or county police departments (WVNS 1992b).

3.6.4 Transportation

Transportation facilities near the WVDP include highways, rural roads, a rail line, and aviation facilities. The primary method of transportation in the site vicinity is motor vehicle traffic on the highway system (Figure 3-7).

All roads in Cattaraugus County, with the exception of those within the cities of Olean and Salamanca, are considered rural roads. Rural principal arterial highways are connectors of population and industrial centers. This category includes U.S. Route 219, located 4.2 kilometers (2.6 miles) west of the site; Interstate 86, the Southern Tier Expressway located approximately 35 kilometers (22 miles) south of the site; and the New York State Thruway (I-90), approximately 35 kilometers (22 miles) north of the site. Traffic volume along U.S. 219 between the intersection with NY Route 39 at Springville and the intersection with Cattaraugus County Route 12 (East Otto Road) ranges from a low average annual daily traffic volume of 6,100 to a high volume of 7,500. Seasonal holiday traffic is as much as 128 percent of the average annual daily volume. Approximately 18 percent of the traffic consists of trucks. This route operates at a level of service B, which indicates a stable traffic flow, an operating speed of 80 kilometers per hour (50 miles per hour), and reasonable driver freedom to maneuver (WVNS 2000b).

Rock Springs Road, adjacent to the site on the west, serves as the principal site access road. The portion of this road between Edies Road and U.S. 219 is known as Schwartz Road. Along this road, between the site and the intersection of U.S. 219, are fewer than 24 residences. State Route 240, also identified as County Route 32, is 2 kilometers (1.2 miles) northeast of the site. Average annual daily traffic on the portion of NY Route 240 that is proximate to the site (between County Route 16 - Rosick Hill Road and NY Route 39) ranges from a low of 440 to a high of 2,250 (WVNS 2000b).

The Buffalo and Pittsburgh Railroad line is located within 800 meters (2,600 feet) of the Project Premises. Running from Salamanca, New York, north to Buffalo, the Buffalo and Pittsburgh Railroad line carries a variety of freight and coal north and freight and newly manufactured vehicles south from Canada. As a result of the general decline of heavy industry on the Niagara Frontier and of rail traffic in the northeast, use of this route has also declined. In recent years, the tracks have also experienced several washouts and kindred problems, forcing traffic rerouting for extended periods. While railroad accidents are not uncommon in the United States, the relatively low utilization of the line in the vicinity of the WVDP, coupled with the demographic factors outlined above, tend to minimize the likelihood of an accident with consequences for site operations. This conclusion is reinforced by the presence of a deep ravine with perennial streams between the tracks and the Project Premises. These features reduce the threat of rail accident, which might result in a fire or a spill affecting the project. An airborne threat from a rail accident still exists but is also significantly mitigated by both distance and topography of the site from the rail line. In 1999, the Buffalo & Pittsburgh Railroad completed connection of track between Ashford Junction and Machias, New York. Service by Buffalo and Pittsburgh Railroad on the rail line from the WVDP to Ashford Junction and then to Machias now provides the WVDP rail access (WVNS 2000b).

There are no commercial airports in the site vicinity. The only major aviation facility in Cattaraugus County is the Olean Municipal Airport, located in the Town of Ischua, 34 kilometers (21 miles) southeast of the site. Regularly scheduled commercial air service was terminated at this airport in early 1972. The nearest major airport is Buffalo Niagara International Airport, 55 kilometers (34 miles) north of the site (WVNS 2000b).

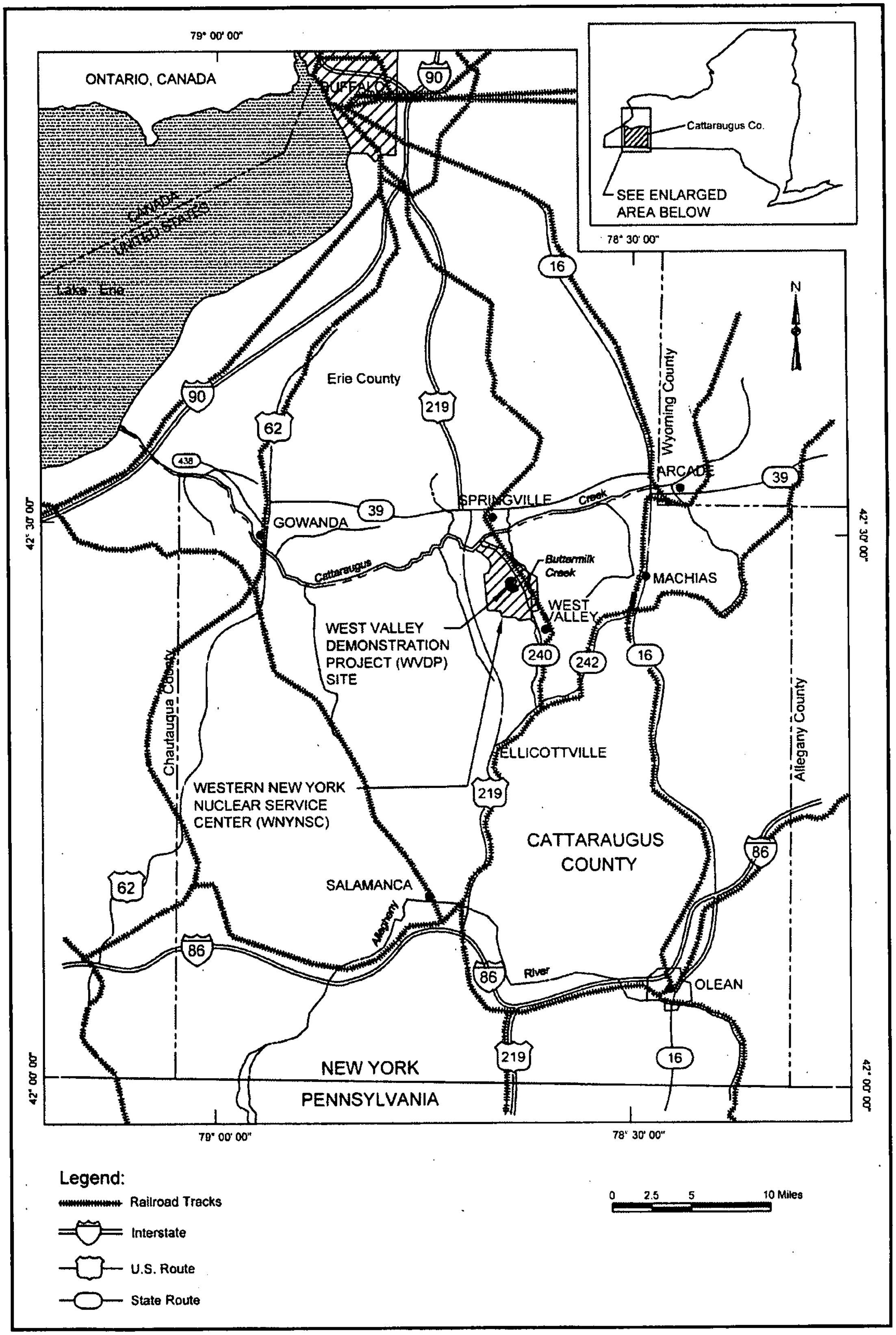

Figure 3-7. Transportation Routes in the Vicinity of the Center

3.7 CULTURAL RESOURCES

Cultural resources include but are not limited to:

- Archaeological materials (artifacts) and sites dating to the prehistoric, historic, and ethnohistoric periods currently located on the ground surface or buried beneath it;
- Standing structures that are over 50 years of age or are important because they represent a major historical theme or era;
- Cultural and natural places, select natural resources, and sacred objects that have importance for American Indians; and
- American folklife traditions and arts (WVNS 1994).

The cultural resource potential of the study area was initially considered to be moderate to high for locating unrecorded prehistoric and/or historic resources. Subsequent investigations indicated that these sensitivities were moderated by the extremely high degree of natural erosion and manmade impacts that have occurred in the study area. Cultural resource materials were found and 11 cultural resource sites were identified. The resources included eight historic archaeological sites, two standing structures, and one prehistoric lithic findspot (WVNS 1994).

The Project Premises, in which the proposed waste management actions described in Chapter 2 would take place, contain 114 buildings and structures. The New York State Office of Parks, Recreation, and Historic Preservation has determined that facilities on the Premises are not eligible for inclusion in the *National Register of Historic Places* (SHPO 1995).

3.8 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Fed. Reg. 7629), directs federal agencies to identify and address, as appropriate, disproportionately high and adverse health or environmental effects of their programs, policies, and activities on minority and low-income populations. Minorities are members of the following population groups: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander. A minority population has been defined as a group in which minorities represent over 50 percent of the population. Low-income populations are groups with an annual income below the poverty threshold.

Demographic information obtained from the U.S. Census Bureau was used to identify low-income and minority populations within 80 kilometers (50 miles) of the WVDP site. This radius is consistent with that used to evaluate collective dose for human health effects from the proposed waste management actions, continued operations, and accidents. Census data are compiled at a variety of levels corresponding to geographic areas. In order of decreasing size, the areas used are states, counties, census tracts, block groups, and blocks. A "block" is geographically the smallest census area; is usually bounded by visible features such as streets or streams or by invisible boundaries such as city limits, township lines or property boundaries; and offers the finest spatial resolution. Block data were used for characterization of minority distribution. Because block data are so specific to the individuals within a block (for example, sometimes only one family may live in a block), income data are only available at the block group and above. For this reason, block group data were used to identify low-income populations.

Demographic maps were prepared using 2000 data for minority populations and 1990 census data for low-income populations because income data from the 2000 Census were not available for the preparation of this DEIS. If available they will be incorporated into the FEIS. Figures 3-8 and 3-9 illustrate the distributions for minority and low-income populations, respectively. These figures include information for the affected Canadian population.

Using block data, Figure 3-8 shows census blocks with minority populations that are over 50 percent within 80 kilometers (50 miles). The nearest block occurs on the Cattaraugus Reservation of the Seneca Nation of Indians. As shown in Figure 3-8, there are also two other Native American Indian reservations within 80 kilometers: the Allegheny Reservation (10 to 25 percent minority) and the Tonawanda Reservation (25 to 49 percent minority). There are several other census blocks with minority populations that are over 50 percent in the Buffalo metropolitan area. The total minority U.S. population within the 80-kilometer radial distance from the WVDP site accounts for approximately 13 percent of the population in the area, or about 207,852 people. The racial and ethnic composition of this population is predominantly African-American and Hispanic (USCB 2001).

Using block group data from 1990 (income data were not yet available for 2000), Figure 3-9 (DOE 1996) identifies no block groups with an average income below the 1990 poverty level of $12,670 for a family of four. A further assessment of the census data determined that within the 80-kilometer (50-mile) area, approximately 13 percent of the U.S. population was low-income (DOE 1996). The poverty level established by the Census Bureau for 2000 is $17,600. Because this increase from 1990 is based on the annual increases in the consumer price index, it is likely that the regional percentages of low-income have not changed significantly.

3.9 DESCRIPTION OF OTHER SITES

In addition to activities at WVDP, implementation of the proposed action or alternatives would involve activities at one or more offsite locations. Sections 3.9.1 through 3.9.8 briefly discuss the affected environment at these offsite locations. Information regarding Envirocare was taken from its website (Envirocare 2002). Information regarding most of the potentially affected DOE sites was excerpted from the WM PEIS (DOE 1997a) and the WIPP Supplemental EIS II (DOE 1997b). Information regarding the Yucca Mountain site was excerpted from the *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 2002). Additional information regarding these sites is available from the documents noted (and which are incorporated here by reference) and in the other NEPA documents described in Section 1.7, Relationship with Other NEPA Documents.

3.9.1 Envirocare

Envirocare is a private facility licensed by the State of Utah (an NRC Agreement State) to accept Class A LLW. Envirocare is also a RCRA facility that is licensed by the State of Utah and the EPA to receive, possess, use, treat, and dispose of mixed waste. Waste material is disposed of in aboveground, engineered disposal cells that meet regulatory disposal requirements. The facility is located in Clive, Utah, approximately 80 kilometers (50 miles) west of Salt Lake City. Located in a remote area with an arid climate (annual precipitation is approximately 170 millimeters [7 inches] per year), Envirocare received its first DOE waste shipments in 1992 and has received waste shipments from 25 DOE sites. Envirocare is located adjacent to a major rail line and U.S. Interstate Highway 80.

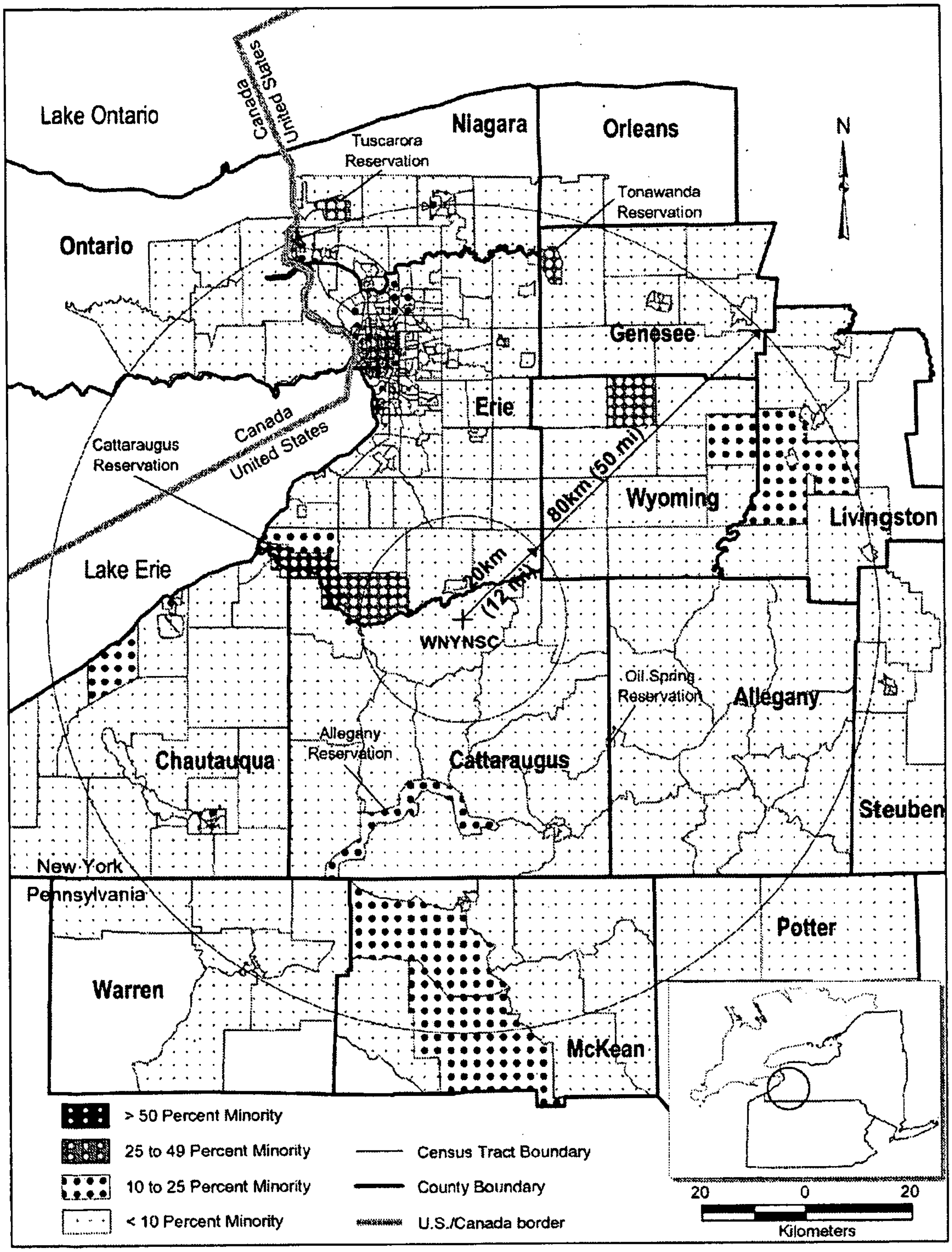

Figure 3-8. 2000 Minority Population Distribution

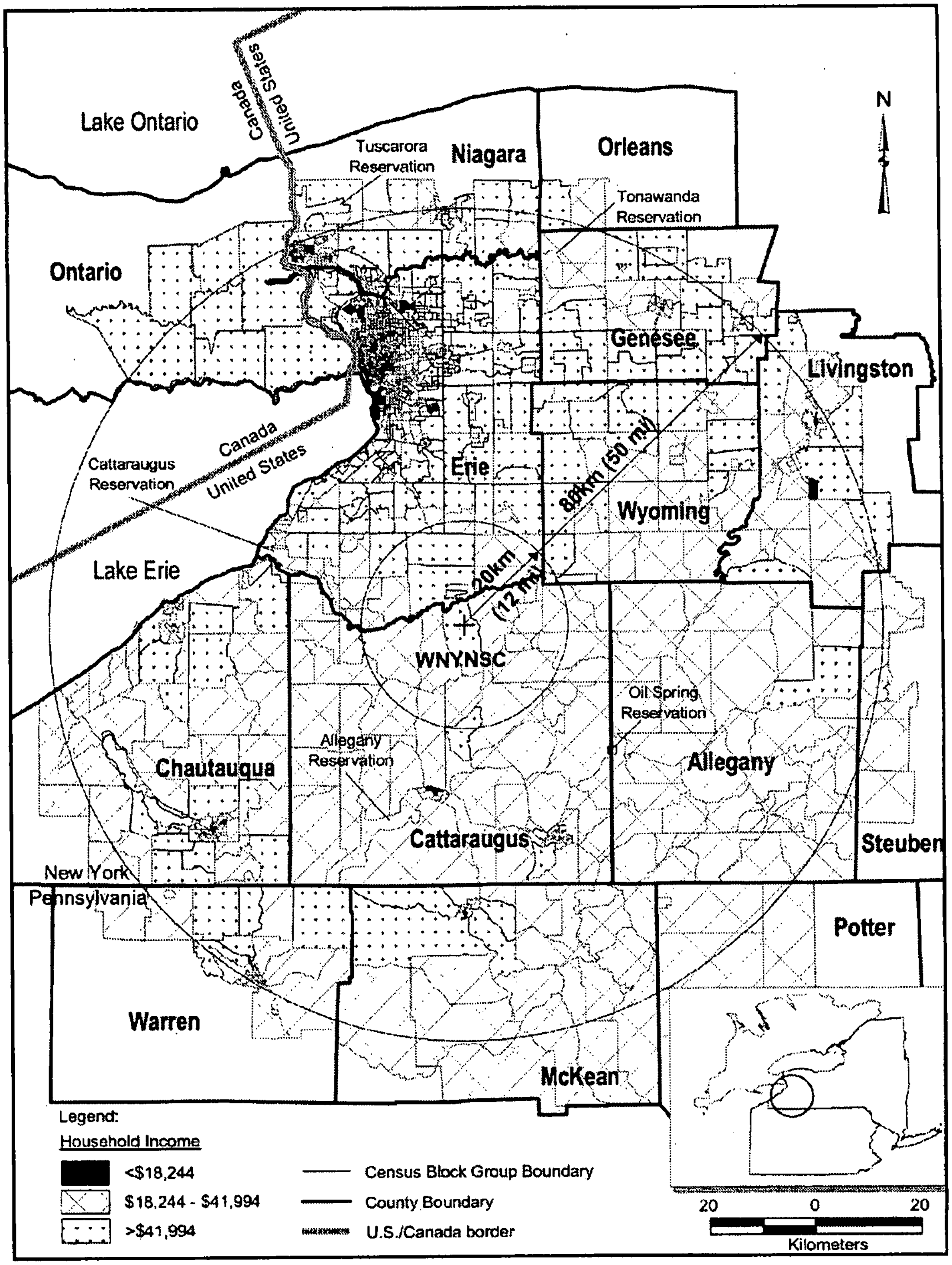

Figure 3-9. Low-income Population Distribution Within 80 Kilometers of the Center

3.9.2 Hanford Site

The Hanford Site has a number of facilities, including retired plutonium production reactors, waste management and spent nuclear fuel processing facilities, and nuclear research and development laboratories. The site occupies approximately 1,450 square kilometers (560 square miles) of semi-arid desert land in southeastern Washington State, approximately 192 kilometers (119 miles) southwest of Spokane and 240 kilometers (150 miles) southeast of Seattle. The nearest city, Richland, borders the site on its southeast corner. The site is bounded on the east by the Columbia River, on the west by the Rattlesnake Hill, and on the north by Saddle Mountain. U.S. Highways 12 and 395, Interstate-82, and State Route 240 run near the Hanford Site. Two railroads also connect the area with much of the rest of the nation.

3.9.3 Idaho National Engineering and Environmental Laboratory

Currently, the focus of INEEL is environmental restoration, waste management, research, and technology development. Included within the boundaries of the site are the Naval Reactors Facility and Argonne National Laboratory-West. INEEL occupies 2,300 square kilometers (890 square miles) of desert in the southeastern portion of Idaho, approximately 44 kilometers (27 miles) west of Idaho Falls on the Eastern Snake River Plain. The site is bordered by mountain ranges and volcanic buttes. Land at INEEL is used for DOE operations (about 2 percent of the site), recreation, grazing, and environmental research. About 144 kilometers (90 miles) of paved public highway run through INEEL; railroads also serve the area.

3.9.4 Nevada Test Site

NTS has been the primary location for testing the nation's nuclear explosive devices since 1951. The site occupies 3,500 square kilometers (1,350 square miles) of desert valley and Great Basin mountain terrain in southern Nevada, 105 kilometers (65 miles) northwest of Las Vegas, Nevada. The only permanent onsite water bodies are ponds associated with wastewater disposal and springs. No continuously flowing streams occur on the site. Vehicular access to NTS is provided by U.S. Route 95 from the south. Interstate-15 is the major transportation route in the region. The major railroad in the area is the Union Pacific, which runs through Las Vegas and is located approximately 80 kilometers (50 miles) east of the site.

3.9.5 Oak Ridge National Laboratory

ORNL is part of the ORR, which also contains the Y-12 Plant, the East Tennessee Technology Park (formerly known as K-25), and the Oak Ridge Institute of Science and Education. ORNL's mission is to conduct applied research and development in support of DOE programs in fusion, fission, conservation, and other energy technologies. The ORR occupies 140 square kilometers (34,545 acres) and is located in the City of Oak Ridge, Tennessee, and 32 kilometers (20 miles) west of Knoxville, Tennessee, in the rolling terrain between the Cumberland Mountains and Great Smoky Mountains. The Clinch River and its tributaries are the major surface water features of the area. Interstate-40, located 2.4 kilometers (1.5 miles) south of the ORR boundary, provides the main access to the cities of Nashville and Knoxville. Interstate-75, located 24 kilometers (15 miles) south of the site, serves as a major route to the north and south. Several state routes provide local access and form interchanges with Interstate-40. Railroad service is also available in the area.

3.9.6 Savannah River Site

DOE activities conducted at SRS have involved tritium recycling, support for the nation's space program missions, storage of plutonium on an interim basis, processing of backlog targets and spent nuclear fuel, waste management, and research and development. SRS is approximately 20 kilometers (12 miles) south of Aiken, South Carolina in southwest-central South Carolina. It is on approximately 800 square kilometers (198,000 acres) of land in a principally rural area, with most of the land serving as a forestry research center. The primary surface water feature is the Savannah River, which borders the site for approximately 32 kilometers (20 miles) to the southwest. Six major streams flow through SRS into the Savannah River, and approximately 190 Carolina bays are scattered throughout the site. Interstate-20 is located approximately 29 kilometers (18 miles) northeast of SRS, providing the nearest interstate access to the site. Railroad service is also available through SRS.

3.9.7 Waste Isolation Pilot Plant

WIPP is located in southeastern New Mexico, about 50 kilometers (30 miles) east of Carlsbad, New Mexico, in a relatively flat, sparsely inhabited plateau with little surface water. The constructed underground facilities include four shafts, an experimental area, an equipment and maintenance area, and connecting tunnels. These underground facilities were excavated 655 meters (2,150 feet) beneath the land surface. The site can be reached by rail or highway. DOE has constructed a rail spur to the site from the Burlington Northern and Santa Fe Railroad 10 kilometers (6 miles) west of the site. The site can also be reached from the north and south access roads constructed for the WIPP project. The south access road intersects New Mexico Highway 128 approximately 7 kilometers (4 miles) to the southwest of WIPP.

3.9.8 Yucca Mountain Repository

The Yucca Mountain Repository has been approved by the President and Congress for further development as the nation's first geologic repository for HLW and spent nuclear fuel. The site, located in the southwest corner of NTS, is in a remote area of the Mojave Desert in southern Nevada, about 160 kilometers (100 miles) northwest of Las Vegas, Nevada. The Yucca Mountain region is sparsely populated and receives only about 170 millimeters (7 inches) of precipitation each year. The area is characterized by a very dry climate, limited surface water, and generally deep aquifers. Shipments of HLW and spent nuclear fuel arriving in Nevada would travel to the Yucca Mountain site by truck or rail. At present, there is no rail access to the Yucca Mountain site. If material were shipped by rail, a branch line that connected an existing main line to the Yucca Mountain site would have to be built or the material would have to be transferred to heavy-haul trucks at an intermodal transfer station and transported over existing highways that might need upgrading.

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This chapter describes the impacts that would result from implementing the waste management alternatives described in Chapter 2. As an aid to the reader, this chapter begins with a guide to understanding the human health and transportation analyses (Section 4.1), followed by a summary of the impacts of the alternatives (Section 4.2).

The three alternatives and the sections in which they are fully discussed are:

- No Action Alternative – Continuation of Ongoing Waste Management Activities (Section 4.3);
- Alternative A – Offsite Shipment of HLW, LLW, Mixed LLW, and TRU Waste to Disposal – Preferred Alternative (Section 4.4); and
- Alternative B – Offsite Shipment of LLW and Mixed LLW to Disposal and Shipment of HLW and TRU Waste to Interim Storage (Section 4.5).

The potential for minority and low-income populations to bear a disproportionate share of high and adverse impacts from the proposed activities is discussed in Section 4.6.

The analyses in this chapter are limited to human health and transportation impacts. None of the proposed alternatives would require changes in the workforce or additional facilities at the WVDP premises; therefore, they would not affect the surrounding natural and cultural environments.

Additional information regarding the methodology used to conduct the analyses is contained in Appendices C and D.

As characterized in Chapter 2, the waste management activities assessed in this EIS would occur in the following facilities at the WVDP site: the Process Building; the Tank Farm; the LSB; LSAs 1, 3, and 4; the Chemical Process Cell Waste Storage Area; and the Radwaste Treatment System Drum Cell. This EIS evaluates proposed activities necessary to (1) store or prepare wastes for shipping, including loading containerized wastes onto transportation vehicles; (2) ship wastes to offsite disposal or interim storage; and (3) manage the emptied waste storage tanks until final decommissioning or long-term stewardship decisions can be made in the future.

The waste management actions proposed under all alternatives would be conducted in existing facilities (or in the case of waste transportation, on existing road and rail lines) by the existing work force and would not involve new construction or building demolition. Ongoing facility operations would continue, unaffected by the proposed actions assessed in this EIS. As a result, the scope of potential impacts that could result from the proposed actions is limited. Specifically, because there would be no mechanism for new land disturbance under any alternative, there would be no potential to directly or indirectly impact current land use; biotic communities;[1] cultural, historical, or archaeological resources; visual resources;

[1] In comments submitted on the draft version of this EIS, the U.S. Fish and Wildlife Service concurred in DOE's determination that no federally listed or proposed endangered or threatened species are known to exist in the project impact area and that no habitat in the project impact area is currently designated or proposed critical habitat in accordance with the provisions of the Endangered Species Act, 16 U.S.C. 1531 et seq. However, DOE would contact the U.S. Fish and Wildlife Service's New York Field Office for updated information on the presence of listed species or their habitat within 1 year prior to implementing the Record of Decision.

ambient noise levels; threatened or endangered species or their critical habitats; wetlands; or floodplains. Additionally, because the work force requirements would be the same under all alternatives (for example, there would be no increases or decreases from current employment levels), there would be no potential for socioeconomic impacts. Therefore, these elements of the affected environment would not be impacted by any actions proposed under the three alternatives and will not be discussed further in this chapter.

None of the onsite management activities under any of the alternatives would result in any new criteria air pollutant emissions (nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter). As shown in Section 3.3.2, the ambient air quality in the region of the Center complies with federal and state ambient air quality standards. Impacts of criteria air pollutant emissions resulting from transportation activities are incorporated in the transportation analysis. Radioactive emissions that could result from ongoing management are addressed under the human health analysis. Therefore, this chapter includes no further discussion of air quality impacts.

Consistent with DOE and Council on Environmental Quality NEPA guidance, the analysis of impacts in the following sections focuses on those limited areas in which impacts may occur from any action proposed by the three alternatives assessed in this EIS. Because of the limited scope of the proposed actions, there would be potential for impacts to only the workers and the public from the proposed onsite waste management actions, ongoing operations, and the offsite shipping of wastes.

4.1 UNDERSTANDING THE ANALYSIS

This section describes how impacts to worker and public human health from onsite waste management and offsite shipping were analyzed. This discussion is intended to help the reader understand the impacts described for each alternative in subsequent sections.

4.1.1 Human Health Impacts

4.1.1.1 Routine Operations

The waste management activities that would be undertaken under each of the three alternatives analyzed would result in the exposure of workers to radiation and exposure of the public to very small quantities of radioactive materials from controlled releases to the environment. Radiation can cause a variety of ill-health effects in people, including cancer.

To determine whether health effects could occur as a result of radiation exposure from a particular activity and the extent of such effects, the radiation dose must be calculated. An individual may be exposed to radiation externally, through a radiation source outside of the body, and/or internally from ingesting or inhaling radioactive material. The dose is a function of the exposure pathway (for example, external exposure, inhalation, or ingestion) and the type and quantity of radionuclides involved.

The unit of radiation dose for an individual is the rem. A millirem (mrem) is 1/1,000 of a rem. The unit of dose for a population is person-rem and is determined by summing the individual doses of an exposed population. Dividing the

Exposure Standards

The following radiation protection standards were established by the EPA and DOE.

- *EPA:* 10-mrem radiation dose per year to the maximally exposed individual member of the public from airborne releases (40 CFR Part 61, Subpart H, *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities*)
- *DOE:* 100-mrem dose per year to the maximally exposed individual member of the public through all exposure pathways (DOE Order 5400.5, *Radiation Protection of the Public and the Environment*)
- *DOE*: 5-rem dose per year for workers (10 CFR 835, *Occupational Radiation Protection*)

person-rem estimate by the number of people in the population indicates the average dose that a single individual could receive. The impacts from a small dose to a large number of people can be approximated by the use of population (collective) dose estimates.

After the dose is estimated, the health impact is calculated from current internationally recognized risk factors. The potential health impact is stated in terms of the probability of a latent cancer fatality (a fatality resulting from a cancer that was originally induced by radiation but which may occur years after the exposure) to an individual or the number of latent cancer fatalities expected in a population.

To estimate the human health impact from radiation dose, a dose-to-risk factor that indicates the potential for a latent cancer fatality is used. The dose-to-risk factor for low (less than 20 rem) annual doses is 6×10^{-4} of a latent cancer fatality per person-rem for the general public, which includes the very young and the very old, and 5×10^{-4} for the worker population. For example, a population dose of 1,700 person-rem is estimated to result in 1 additional cancer fatality ($0.0006 \times 1{,}700 = 1$) in the general public.

Calculations of the number of latent cancer fatalities associated with radiation doses often do not yield whole numbers, and the number may be less than 1. For example, if a population of 1,000,000 people each received a radiation dose of 1 mrem (1×10^{-3} rem) per person, the population dose would be 1,000 person-rem. The number of latent cancer fatalities would be 0.6 (1,000,000 persons × 0.001 rem × 0.0006 latent cancer fatalities per person-rem = 0.6 latent cancer fatalities). The value of 0.6 is the average number of latent cancer fatalities that would occur if the same radiation dose were applied to many different groups of 1,000,000 people. Some groups would experience 1 latent cancer fatality from the radiation dose, some groups would experience no latent cancer fatalities from the radiation dose, and the average would be 0.6. In this context, the value of 0.6 is often referred to as the probability of a latent cancer fatality in the exposed population of 1,000,000 people.

For perspective, it is estimated that the average individual in the United States receives a dose of about 300 mrem (0.3 rem) each year from natural sources of radiation. The probability of a latent cancer fatality corresponding to a single individual's exposure over an assumed 72-year lifetime to 300 mrem annually is about 0.013 or about 1 in 80 (1 person × 300 mrem per year × 1 rem per 1,000 mrem × 72 years × 0.0006 latent cancer fatalities per person-rem = 0.013 latent cancer fatality). If 1,000,000 people were exposed to 300 mrem per year over a 72-year lifetime, about 13,000 latent cancer fatalities would be estimated to occur (1,000,000 people × 300 mrem/year × 72 years × 6E-7 latent cancer fatalities/mrem = 13,000 latent cancer fatalities).

Under all alternatives, people near the WVDP site would be exposed to radionuclides (radioactive atoms) that are released to the atmosphere and to surface water during normal ongoing operations at the site. For this EIS, DOE estimated the radiation doses from those releases using the GENII computer model (Napier et al. 1988). People were assumed to inhale radioactive material and to be exposed to external radiation from the radioactive material released during normal ongoing operations. People were also assumed to ingest radioactive material through foodstuffs such as leafy vegetables, produce, meat, and milk and to be

Ongoing Operations

Under all alternatives, it is assumed that current levels of maintenance, surveillance, heating, ventilation, and other routine operations would continue to be required while the actions proposed under each alternative were performed. For this EIS, these actions are called *ongoing operations*. Although the impacts of these ongoing actions have been assessed in several previous NEPA documents and are characterized in the Annual Site Environmental Reports, the impacts on worker and public health of these ongoing operations have been included in this EIS using actual operational data from 1995 through 1999. Because ongoing operations would not vary among the proposed alternatives, the impacts from these actions would be the same across all alternatives.

exposed through activities such as swimming and boating; inadvertent soil ingestion; inhaling resuspended radioactive material; drinking water; and consuming fish from Lake Erie.

Human Health Impacts

DOE estimated radiation doses to:
- Involved workers
  - Worker population
  - Individual workers
- Noninvolved workers
  - Worker population
  - Individual workers
- Members of the public
  - Collective population
  - Maximally exposed individual

Using accepted dose-to-risk conversion factors, DOE calculated the probability that an individual would suffer a latent cancer fatality or that a latent cancer fatality would occur within the exposed population.

DOE analyzed the exposure of members of the public and workers to radiation or radioactive releases as a result of the alternatives. For workers, DOE analyzed the exposure of both involved and noninvolved workers at the site. Involved workers are those who would be undertaking the proposed waste management activities analyzed in this EIS. They would be exposed to radioactive releases from both the waste management activities and the ongoing operations of the site. Noninvolved workers are those workers who would be present on the site but who would not be conducting the proposed waste management activities. These workers would be conducting activities related to the ongoing operations of the WVDP site. Doses to the worker populations and to individual workers were estimated.

For the public, dose estimates were derived for both the maximally exposed individual (a member of the public located nearest to the site) and the collective U.S. population within 80 kilometers (50 miles) of the site. Dose estimates for the affected Canadian population were not included but would be very small because of the distance of this population from the WVDP site and the prevailing southwesterly wind direction.

For both the public and workers, DOE then calculated the probability that the maximally exposed individual would suffer a latent cancer fatality if exposed to that radiation dose and the probability that a latent cancer fatality would occur within the exposed U.S. population.

Additional information regarding the analysis of human health impacts under routine operations can be found in Appendix C.

4.1.1.2 Accident Conditions

For this EIS, DOE evaluated a wide range of potential facility accidents at the WVDP site that could result from handling mishaps, fires, or spills, or from external events such as high winds or earthquakes. Although a great many accidents could occur at WVDP facilities, only a few accidents could potentially result in an uncontrolled release of radioactive material to the environment.

Of the accidents that were evaluated, DOE selected 12 accidents for further evaluation using the GENII computer model (Napier et al. 1988). These accidents were selected because they could result from operations and activities that were determined to present the greatest risk, based on their accident consequence and probability.

The chance that an accident might occur during the conduct of an activity is called the probability of occurrence. An event that is certain to occur has a probability of 1 (as in 100 percent certainty). The probability of occurrence of an accident is less than 1 because accidents, by definition, are not certain to occur. However, in its accident analysis, when calculating the probability of a latent cancer fatality occurring as a result of exposure to radiation in particular accident situations, DOE did not take into account the probability of occurrence of the accident.

In an accident, radioactive material could be released from ground level or from a stack. Atmospheric conditions at the time of an accident would affect the dose received by workers, the maximally exposed individual, and the public. For that reason, DOE used two types of atmospheric conditions to estimate radiation doses: (1) atmospheric conditions that are not exceeded 50 percent of the time and provide a realistic estimate of the likely atmospheric conditions that would exist during an accident (50-percent atmospheric conditions), and (2) atmospheric conditions that are not exceeded 95 percent of the time and provide an upper bound on the atmospheric conditions that would exist during an accident (95-percent atmospheric conditions). Site-specific meteorological data from 1994 through 1998 (WVNS 2000a) were used to determine 50-percent and 95-percent atmospheric conditions.

After estimating the radiation that could be released as a result of specific postulated accidents at the WVDP site (the dose to workers or the public), DOE estimated the probability of latent cancer fatalities if those accidents were to occur. As with routine operations, DOE provides the probability of latent cancer fatalities under accident conditions for workers and members of the public (the maximally exposed individual and the collective population within 80 kilometers [50 miles] of the site). Estimates of latent cancer fatalities for Canadian populations were not included but would be very small because of the distance of this population from the WVDP site and the prevailing southwesterly wind direction.

Additional information regarding the analysis of human health impacts under accident conditions can be found in Appendix C.

4.1.2 Transportation Impacts

DOE analyzed the potential impacts of shipping radioactive waste from the WVDP site to a storage or disposal site under both incident-free and accident conditions. Representative highway and rail routes from the WVDP site to specific destinations were determined using the WebTRAGIS routing computer code (Johnson and Michelhaugh 2000). The routes conform to current routing practices and applicable routing regulations and guidelines. The populations that might be exposed along these routes were determined using data from the 2000 census.

The total impacts of transportation are the sums of the radiological and nonradiological incident-free and accident impacts (transportation impacts on Canadian populations would not be expected because the transportation routes would move generally in the opposite direction from the Canadian border). For incident-free transportation, the potential human health impacts were estimated for transportation workers and populations along the route, people sharing the route (in traffic), and people at stops along the route. The impacts from incident-free transportation are the radiological impacts from exposure to low levels of radiation from the radioactive waste containers and the nonradiological impacts from truck or train exhaust. The RADTRAN 5 computer code (Neuhauser et al. 2000) was used to estimate the impacts for transportation workers and populations. Impacts were also estimated for the maximally exposed individual, who may be a worker or a member of the public, using the RISKIND computer code (Yuan et al. 1995). The impacts for the maximally exposed individual are presented separately from the other incident-free transportation impacts.

Human health impacts could result from transportation accidents in which radioactive material could be released from a waste container and from traffic accidents in which no radioactive material would be released. For transportation accidents involving a release of radioactive material, DOE estimated radiological accident risks (probability of occurrence × consequence) expressed as the number of latent cancer fatalities summed over a complete spectrum of accidents. Impacts were evaluated for the population within 80 kilometers (50 miles) of the road or railway using the RADTRAN 5 computer code. DOE assumed that people would be exposed through inhalation, direct external dose from radioactive material that has deposited on the ground after being dispersed from the accident site (referred to as groundshine), and direct external dose from the passing cloud of dispersed radioactive material (referred to as cloudshine). In rural areas, DOE assumed that exposure could also occur through ingestion of agricultural products grown in contaminated soil. Consequences were also estimated for a severe transportation accident, known as the maximum reasonably foreseeable accident. These consequences were estimated using the RISKIND computer code and are presented separately from the other transportation accident impacts.

Additional information regarding the analysis of transportation impacts under both incident-free and accident conditions can be found in Appendix D.

4.2 SUMMARY OF IMPACTS

The actions proposed by the alternatives analyzed in this EIS would have an almost imperceptible impact on the health of the workers and the public, even when combined with the minimal impacts of ongoing operations. Health impacts for all alternatives under normal onsite operating conditions and offsite transportation would result in less than 1 cancer fatality among workers or the public.

4.2.1 Human Health Impacts

Waste management activities under each alternative would result in the exposure of workers to radiation and contaminated material and exposure of the public to very small quantities of radioactive materials. Because the proposed waste management actions would involve only the storage, packaging, loading, and shipping of wastes and management options for the waste storage tanks, the proposed activities would result in a statistically insignificant contribution to the historically low impacts of ongoing WVDP operations. As a result, the human health impacts to involved and noninvolved workers and the public are dominated by ongoing WVDP site operations that would continue under all alternatives; therefore, there would be little discernible difference in the impacts that could occur among the three alternatives. The potential human health impacts for onsite waste management actions are summarized below and demonstrate that the impacts of each alternative would result in less than 1 cancer fatality among workers or the public under normal operating conditions.

- Total Involved and Noninvolved Worker Population Dose (in person-rem)
  - No Action Alternative 150
  - Alternative A 210
  - Alternative B 210

- Latent Cancer Fatalities in Involved and Noninvolved Worker Population
  - No Action Alternative less than 1 (0.077)
  - Alternative A less than 1 (0.11)
  - Alternative B less than 1 (0.11)

- Total Public Population Dose (in person-rem)
  - No Action Alternative 2.5
  - Alternative A 2.5
  - Alternative B 2.5

- Latent Cancer Fatalities in Public Population
  - No Action Alternative — less than 1 (1.5×10^{-3})
  - Alternative A — less than 1 (1.5×10^{-3})
  - Alternative B — less than 1 (1.5×10^{-3})

- Total Maximally Exposed Individual Dose (in mrem)
  - No Action Alternative — 0.62
  - Alternative A — 0.62
  - Alternative B — 0.62

- Total Probability of Latent Cancer Fatality to Maximally Exposed Individual
  - No Action Alternative — 3.7×10^{-7}
  - Alternative A — 3.7×10^{-7}
  - Alternative B — 3.7×10^{-7}

Based on the detailed analyses provided later in this chapter and in Appendix C, under all alternatives, neither individual involved workers, the maximally exposed individual, nor the general public near the WVDP site would be expected to incur a latent cancer fatality under any atmospheric conditions if an accident were to occur during waste management activities. Among the accident scenarios evaluated, the projected latent cancer fatalities among the public ranged from a high of 0.084 to a low of 4.5×10^{-6}. The frequencies of these accidents ranged from 0.1 to 10^{-8} per year. Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), the sum of the fractions of the biota concentration guides for these accidents was less than 1. Therefore, the radioactive releases from these accidents would not be likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

4.2.2 Transportation Impacts

Projected impacts from offsite waste transportation were less than 1 latent cancer fatality among workers and the public for all three alternatives. Rail transportation was generally found to be slightly higher than, but similar to, the impacts from truck transportation. Impacts are also projected to be slightly higher for Alternative B due to the increased shipping required to move the TRU and HLW wastes to interim storage prior to ultimate disposal. Although the same number of shipments would be loaded at the WVDP site (2,250 truck or 847 rail), the total number of shipments required to reach disposal destinations would be higher under Alternative B due to the interim storage of TRU waste and HLW (see Table 2-3).

The transportation impacts that could result from transportation are summarized below.

- No Action Alternative
  - 169 truck or 85 rail shipments of Class A LLW
  - 0.034 – 0.041 fatalities expected from truck shipments
  - 0.042 – 0.049 fatalities expected from rail shipments

- Alternative A
  - 2,550 truck or 847 rail shipments of LLW, mixed LLW, TRU waste and HLW canisters
  - 0.79 – 0.82 fatalities expected for truck shipments
  - 0.60 – 0.68 fatalities expected for rail shipments

- Alternative B
  - 3,120 truck or 1,079 rail shipments of LLW, mixed LLW, TRU waste, and HLW canisters
  - 0.84 – 0.93 fatalities expected for truck shipments;
  - 0.66 – 0.79 fatalities expected for rail shipments

The consequences of the maximum reasonably foreseeable transportation accidents under each alternative would vary slightly among the alternatives and between truck and rail transport. Under the No Action Alternative, the maximum reasonably foreseeable transportation accident would involve Class A LLW. For truck transport, this accident could result in about 1 latent cancer fatality, and for rail about 2 latent cancer fatalities, among the exposed population. For Alternatives A and B, the maximum reasonably foreseeable truck or rail transportation accident with the highest consequences would involve CH-TRU waste. Because one TRUPACT-II shipping container was assumed to be involved in either the truck or rail accident, the consequences for the truck or rail accident would be the same. Among the exposed population, this accident could result in about 4 latent cancer fatalities. Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), the sum of the fractions of the biota concentration guides for the Class A LLW accidents and the CH-TRU accident was less than 1. Therefore, the radioactive releases from the Class A LLW accidents and the CH-TRU accident would not be likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

4.2.3 Offsite Impacts

Impacts of waste management activities at offsite locations (Envirocare, Hanford, INEEL, NTS, ORNL, SRS, WIPP, and Yucca Mountain) have been addressed in earlier NEPA documents (see Section 1.7.1). For all waste types, WVDP waste represents less than 2 percent of the total DOE waste inventory. Human health impacts at all sites as a result of the management (storage or disposal) of WVDP during the 10-year period of analysis would be very minor (substantially less than 1 latent cancer fatality).

4.3 IMPACTS OF THE NO ACTION ALTERNATIVE – CONTINUATION OF ONGOING WASTE MANAGEMENT ACTIVITIES

As described in Chapter 2, under the **No Action Alternative**, no additional waste management activities would be performed beyond those activities that have already been evaluated under prior NEPA analyses (Section 1.7.1) in accordance with the provisions of the Council on Environmental Quality Implementing Regulations for NEPA (40 CFR Parts 1500-1508). DOE would provide continued operational support and monitoring of the facilities to meet the requirements for safety and hazard management. Waste management activities currently in progress for onsite storage of existing wastes and offsite disposition of a limited quantity of Class A LLW to a facility such as Envirocare (a commercial radioactive waste disposal site in Clive, Utah) or NTS in Mercury, Nevada, would continue. For the purposes of analysis, however, offsite disposal of Class A LLW at Hanford was also considered. The emptied waste storage tanks would continue to be ventilated and maintained in either a wet or dry condition to mitigate corrosion until final decisions are reached in a ROD for the Decommissioning and/or Long-Term Stewardship EIS. Both wet and dry conditions were analyzed in this EIS. Under the No Action Alternative, active hazard management, operational support, surveillance, and oversight would continue at the current levels of activity. The waste management activities evaluated under this alternative would occur over the next 10 years.

4.3.1 Human Health Impacts (No Action Alternative)

This section characterizes the radiological impacts from the No Action Alternative activities that could result from exposure of workers to direct radiation and contaminated material and exposure of the public to small quantities of radioactive material from controlled releases to the environment. Nonradiological injuries and fatalities have also been estimated using Bureau of Labor Statistics on incident rates for construction, manufacturing, and services. The figures shown in the textbox provide the relative probabilities of cancer fatalities from more common sources of risk.

Comparative Risk

Cause of Death	**Approximate Probability**
Cancer	1 chance in 5
Lung cancer due to smoking	1 chance in 10
Cancer caused by background radiation	1 chance in 100
Second-hand smoke	1 chance in 700
Motor vehicle accident	1 chance in 5,000
Cancer due to CAT scan	1 chance in 20,000
Cancer due to chest x-ray	1 chance in 250,000

Worker Impacts. Under the No Action Alternative, waste management activities currently in progress would continue for onsite storage of existing wastes and offsite disposal of a limited quantity of Class A LLW. Management of the waste storage tanks would also continue as under current operations. Table 4-1 presents the radiological impacts to involved and noninvolved workers for the No Action Alternative. During the 10-year time period, the collective radiation dose to involved workers was estimated to be about 4.1 person-rem or about 0.41 person-rem per year from activities under the No Action Alternative. Over this same time period, the individual radiation dose to the average involved worker would be about 68 mrem per year.

Table 4-1. Radiation Doses for Involved and Noninvolved Workers Under the No Action Alternative

Worker Population	Activity	Time Period (years)	Collective Dose: Annual (person-rem/yr)	Collective Dose: Total (person-rem)	Latent Cancer Fatalities: Annual	Latent Cancer Fatalities: Total
Involved workers[a]	No Action Alternative activities	10	0.41	4.1	2.1×10^{-4}	2.1×10^{-3}
Noninvolved workers[b]	Ongoing operations of WVDP[b]	10	15	150	7.5×10^{-3}	0.075
All workers	Total	10	15	150	7.7×10^{-3}	0.077
Worker Population	**Activity**	**Time Period (years)**	**Individual Dose: Annual (mrem/yr)**	**Individual Dose: Total (mrem)**	**Latent Cancer Fatalities: Annual**	**Latent Cancer Fatalities: Total**
Involved workers[a]	No Action Alternative activities	10	68	680	3.4×10^{-5}	3.4×10^{-4}
Noninvolved workers[b]	Ongoing operations of WVDP[b]	10	59	590	3.0×10^{-5}	3.0×10^{-4}

a. Involved workers would be those individuals that actively participate in the No Action Alternative.

b. Noninvolved workers would be those individuals that would be onsite but would not actively participate in the No Action Alternative.

This radiation dose is well below the limit in 10 CFR 835 of 5 rem (5,000 mrem) per year and the WVDP administrative control level of 500 mrem per year (WVNS 2001), and would result in less than 1 (3.4×10^{-5}) latent cancer fatality or a chance of about 1 in 29,000 per year.

In addition to radiation doses from No Action Alternative activities, workers would be exposed to radiation doses from the ongoing operations of the WVDP site. When radiation doses are calculated for involved and noninvolved workers for both No Action Alternative activities and ongoing operations, the total collective radiation dose to the workers was estimated to be about 150 person-rem over the duration of the No Action Alternative or about 15 person-rem per year (Table 4-1). This dose is equivalent to less than 1 (0.077) latent cancer fatality within the worker population.

Nonradiological impacts to workers, based on Bureau of Labor Statistics and the required work effort estimated to complete the actions proposed under the No Action Alternative, are not expected to result in any non-lost workday injuries, lost workday injuries, or fatalities.

Public Impacts. Under the No Action Alternative, waste management activities currently in progress would continue for onsite storage of existing wastes and offsite disposal of a limited quantity of Class A LLW. Management of the waste storage tanks would also continue as under current operations. Radiation doses to the public would be similar to the radiation doses for ongoing operations at the WVDP (Table 4-2).

Table 4-2. Radiation Doses to the Public Under the No Action Alternative[a]

Activity	Maximally Exposed Individual				Population Around WVDP Site			
	Individual Radiation Dose[b]		Probability of Latent Cancer Fatality		Collective Radiation Dose[c]		Probability of Latent Cancer Fatality	
	Annual (mrem/yr)	Total (mrem)	Annual	Total	Annual (person-rem/yr)	Total (person-rem)	Annual	Total
Ongoing operations at WVDP								
Airborne releases	0.021	0.21	1.3×10^{-8}	1.3×10^{-7}	0.17	1.7	1.0×10^{-4}	1.0×10^{-3}
Percent of EPA standard (10 mrem per year)	<1	NA[d]	NA	NA	NA	NA	NA	NA
Waterborne releases	0.041	0.41	2.5×10^{-8}	2.5×10^{-7}	0.083	0.83	5.0×10^{-5}	5.0×10^{-4}
All pathways	0.062	0.62	3.7×10^{-8}	3.7×10^{-7}	0.25	2.5	1.5×10^{-4}	1.5×10^{-3}
Percent of DOE standard (100 mrem per year)	<1	NA	NA	NA	NA	NA	NA	NA
Percent of natural background	<1	NA	NA	NA	<1	NA	NA	NA

a. The time period for the No Action Alternative is 10 years.

b. Individual background radiation doses are about 300 mrem per year.

c. The collective radiation dose to the 1.5-million-person population that surrounds the WVDP site from natural background is about 380,000 person-rem per year.

d. NA = not applicable.

Annual Dose. The collective radiation dose through all exposure pathways (air and water) to people living within 80 kilometers (50 miles) of the site would be about 0.25 person-rem per year. This is equivalent to less than 1 (1.5×10^{-4}) latent cancer fatality in the exposed population each year. The radiation dose through all exposure pathways to the maximally exposed individual living around the WVDP site would be about 0.062 mrem per year. This radiation dose is 0.062 percent of the DOE standard of 100 mrem per year (DOE Order 5400.5, *Radiation Protection of the Public and the Environment*) and would result in less than 1 (3.7×10^{-8}) latent cancer fatality per year or a chance of about 1 in 27 million for the maximally exposed individual.

Total Dose. For the duration of the No Action Alternative (10 years), the total collective radiation dose through all exposure pathways to the population around the WVDP site would be about 2.5 person-rem. This is equivalent to less than 1 (1.5×10^{-3}) latent cancer fatality over the duration of the No Action Alternative.

4.3.2 Impacts from Facility Accidents (No Action Alternative)

DOE evaluated the potential impacts that could occur as a result of accidents at the WVDP site during the implementation of the No Action Alternative. Because only Class A LLW would be shipped under the No Action Alternative, these accidents were limited to those involving the handling of Class A LLW in preparation for shipping. In addition, accidents involving the ongoing management of Tanks 8D-1 and 8D-2 were evaluated. Accidents involving ongoing or continuing activities at the WVDP site that were not part of this EIS have been addressed in other documents such as the *Long-Term Management of Liquid High-Level Radioactive Wastes Stored at the Western New York Nuclear Service Center, West Valley Final Environmental Impact Statement* (DOE 1982) and several facility safety analysis reports and environmental assessments. For example, accidents involving the High-Level Waste Vitrification Facility are characterized in the *Safety Analysis Report for Vitrification System Operations and High-Level Waste Interim Storage* (WVNS 2000b).

One potential handling accident involved the puncture of a drum containing Class A LLW. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-3. For a worker located at the site, this accident could result in a radiation dose of 7.1×10^{-6} rem. This accident could result in a radiation dose of 2.4×10^{-6} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 0.0075 person-rem; this is equivalent to a probability of a latent cancer fatality of 4.5×10^{-6}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 7.2×10^{-5} for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-4).

A second potential accident involved a drop of a pallet containing six Class A LLW drums, all of which were assumed to rupture. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-3. For a worker located at the site, this accident could result in a radiation dose of 4.2×10^{-5} rem. This accident could result in a radiation dose of 1.4×10^{-5} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 0.044 person-rem; this is equivalent to a probability of a latent cancer fatality of 2.6×10^{-5}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 4.1×10^{-4} for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-4).

Table 4-3. Radiological Consequences of Accidents Using 50-Percent Atmospheric Conditions under the No Action Alternative

Accident	Frequency (per year)	Worker Radiation Dose (rem)	Worker Latent Cancer Fatality	Maximally Exposed Individual Radiation Dose (rem)	Maximally Exposed Individual Latent Cancer Fatality	Population[a] Radiation Dose (person-rem)	Population[a] Latent Cancer Fatality
Class A drum puncture[b]	0.1 – 0.01	7.1×10^{-6}	3.6×10^{-9}	2.4×10^{-6}	1.4×10^{-9}	7.5×10^{-3}	4.5×10^{-6}
Class A pallet drop[b]	0.1 – 0.01	4.2×10^{-5}	2.1×10^{-8}	1.4×10^{-5}	8.4×10^{-9}	0.044	2.6×10^{-5}
Class A box puncture[b]	0.1 – 0.01	8.5×10^{-5}	4.3×10^{-8}	2.9×10^{-5}	1.7×10^{-8}	0.090	5.4×10^{-5}
Collapse of Tank 8D-2 (wet)[b]	$10^{-4} – 10^{-6}$	2.4×10^{-3}	1.2×10^{-6}	8.1×10^{-4}	4.9×10^{-7}	2.5	1.5×10^{-3}
Collapse of Tank 8D-2 (dry)[b]	$10^{-4} – 10^{-6}$	2.8×10^{-3}	1.4×10^{-6}	9.5×10^{-4}	5.7×10^{-7}	3.0	1.8×10^{-3}

a. Collective dose to the 1.5 million people living within 80 kilometers (50 miles) of the WVDP site.
b. Ground-level release.

Table 4-4. Radiological Consequences of Accidents Using 95-Percent Atmospheric Conditions under the No Action Alternative

Accident	Frequency (per year)	Worker Radiation Dose (rem)	Worker Latent Cancer Fatality	Maximally Exposed Individual Radiation Dose (rem)	Maximally Exposed Individual Latent Cancer Fatality	Population[a] Radiation Dose (person-rem)	Population[a] Latent Cancer Fatality
Class A drum puncture[b]	0.1 – 0.01	7.0×10^{-5}	3.5×10^{-8}	2.6×10^{-5}	1.6×10^{-8}	0.12	7.2×10^{-5}
Class A pallet drop[b]	0.1 – 0.01	4.2×10^{-4}	2.1×10^{-7}	1.5×10^{-4}	9.0×10^{-8}	0.69	4.1×10^{-4}
Class A box puncture[b]	0.1 – 0.01	8.4×10^{-4}	4.2×10^{-7}	3.2×10^{-4}	1.9×10^{-7}	1.4	8.4×10^{-4}
Collapse of Tank 8D-2 (wet)[b]	$10^{-4} – 10^{-6}$	0.024	1.2×10^{-5}	8.9×10^{-3}	5.3×10^{-6}	39	0.023
Collapse of Tank 8D-2 (dry)[b]	$10^{-4} – 10^{-6}$	0.028	1.4×10^{-5}	0.010	6.0×10^{-6}	46	0.028

a. Collective dose to the 1.5 million people living within 80 kilometers (50 miles) of the WVDP site.
b. Ground-level release.

A third potential accident involved the puncture of a box containing Class A LLW. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-3. For a worker located at the site, this accident could result in a radiation dose of 8.5×10^{-5} rem. This accident could result in a radiation dose of 2.9×10^{-5} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 0.090 person-rem; this is equivalent to a probability of a latent cancer fatality of 5.4×10^{-5}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 8.4×10^{-4} for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-4).

DOE also analyzed accidents involving the ongoing management of Tanks 8D-1 and 8D-2. These accidents assumed that a severe earthquake occurred at the WVDP site, causing the roof of the vault and Tank 8D-2 to collapse into the tank. Two accidents were analyzed, one where the contents of the tank were kept wet and another where the contents of the tank were allowed to dry before the collapse. The frequencies of the accidents were estimated to be in the range of 10^{-4} to 10^{-6} per year.

The consequences of the accidents using 50-percent atmospheric conditions are presented in Table 4-3. If the contents of the tanks are kept wet, the accident could result in a radiation dose of 2.4×10^{-3} rem for the worker located at the site. This accident could result in a radiation dose of 8.1×10^{-4} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 2.5 person-rem; this is equivalent to a probability of a latent cancer fatality of 1.5×10^{-3}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 0.023 for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-4).

If the contents of the tanks are kept dry, this accident could result in a radiation dose of 2.8×10^{-3} rem for the worker located at the site (Table 4-3). This accident could result in a radiation dose of 9.5×10^{-4} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 3.0 person-rem; this is equivalent to a probability of a latent cancer fatality of 1.8×10^{-3}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 0.028 for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-4).

The highest consequence accident in Table 4-3 was the collapse of Tank 8D-2 while the contents of the tank were dry. Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), the sum of the fractions of the biota concentration guides for this accident was less than 1. Therefore, the radioactive releases for this accident would not be likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

4.3.3 Transportation (No Action Alternative)

Under the No Action Alternative analysis, about 4,100 cubic meters (145,000 cubic feet) of Class A LLW would be shipped for disposal either to NTS, Hanford, or a commercial disposal site such as Envirocare, under existing NEPA reviews. These shipments would take place over 10 years. All other newly generated and existing wastes would continue to be stored under this alternative. The waste transportation destinations proposed under the No Action Alternative are shown in Figure 4-1.

Transportation impacts were estimated assuming 100 percent of the Class A LLW would be shipped by truck and 100 percent of the Class A LLW would be shipped by rail. Table 4-5 lists the Class A LLW shipments proposed under the No Action Alternative.

4.3.3.1 Total Impacts from Transportation Activities

The transportation impacts of shipping radioactive waste would be from two sources: incident-free transportation and transportation accidents. Both radiological impacts and nonradiological impacts are included in the analysis. The total impacts from transportation would be the sum of the impacts from incident-free transportation and transportation accidents. Additional details on these analyses are provided in Appendix D.

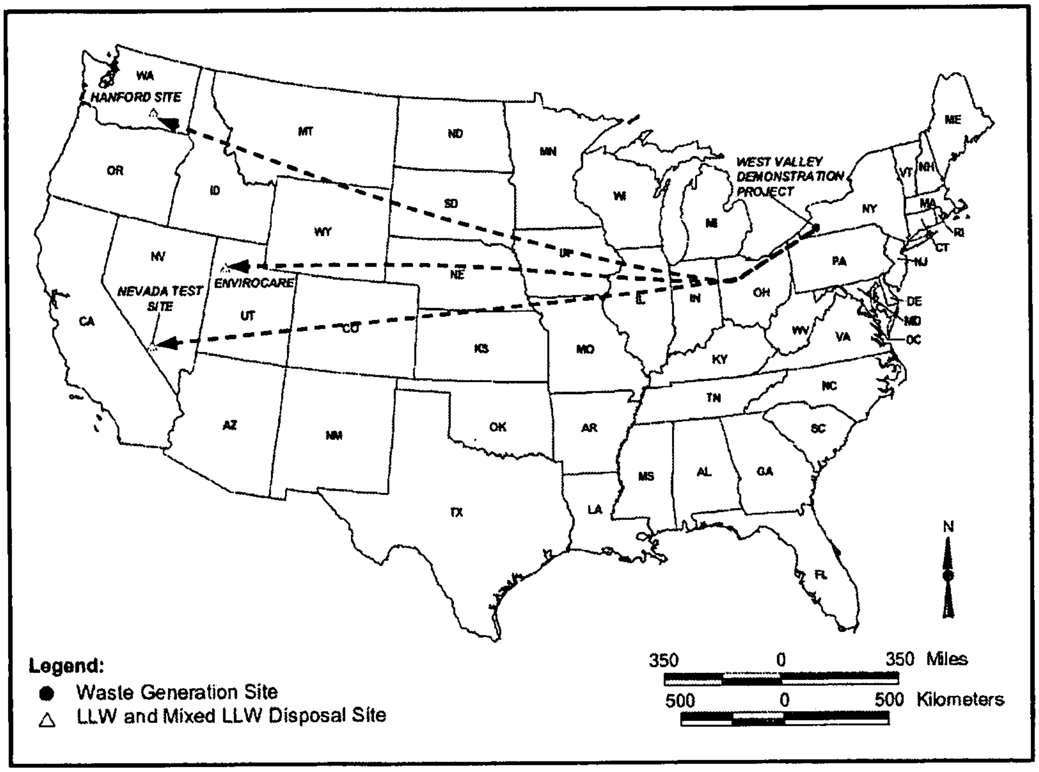

Figure 4-1. Waste Destinations Under the No Action Alternative

Table 4-5. LLW Shipped Under the No Action Alternative

Waste Type	Container Type	Waste Shipped (cubic feet)[a]	Number of Containers	Number of Shipments
Class A LLW	Boxes[b]	97,649	1,206	87 (truck) 44 (rail)
	Drums[b]	47,351	6,878	82 (truck) 41 (rail)
Total		145,000	8,084	169 (truck) 85 (rail)

a. To convert cubic feet to cubic meters, multiply by 0.028
b. Shipped in Type A shipping container

Table 4-6 lists the total transportation impacts by waste type and destination under the No Action Alternative. If either trucks or trains were used to ship the radioactive waste, less than 1 fatality would occur. For perspective, there would be about 400,000 traffic fatalities in the United States over the 10-year time period for the No Action Alternative (U.S. Bureau of the Census 1997).

4.3.3.2 Incident-Free Impacts for the Maximally Exposed Individual from Transportation Activities

Worker Impacts. If trucks were used to ship the waste, the maximally exposed worker would be a driver who would receive a radiation dose of about 250 mrem per year based on driving a truck containing radioactive waste for about 700 hours per year. This is equivalent to a probability of a latent cancer fatality of about 1.3×10^{-4}. If trains were used to ship the waste, the maximally exposed worker would be

Table 4-6. Transportation Impacts Under the No Action Alternative

Waste Type	Destination	Incident-Free Public (LCFs)	Incident-Free Worker (LCFs)	Radiological Accident Risk (LCFs)	Pollution Health Effects (Fatalities)	Traffic Fatalities	Total Fatalities
Truck							
Class A LLW	Envirocare	9.2×10^{-3}	0.011	6.9×10^{-5}	2.1×10^{-3}	0.011	0.034
	Hanford Site	0.011	0.014	7.4×10^{-5}	2.3×10^{-3}	0.014	0.041
	NTS	0.011	0.013	8.5×10^{-5}	2.8×10^{-3}	0.013	0.041
Total Truck Fatalities: 0.034 – 0.041							
Rail							
Class A LLW	Envirocare	0.016	0.012	2.7×10^{-4}	3.0×10^{-3}	9.8×10^{-3}	0.042
	Hanford Site	0.017	0.013	3.0×10^{-4}	3.1×10^{-3}	0.012	0.046
	NTS	0.017	0.016	2.7×10^{-4}	3.0×10^{-3}	0.012	0.049
Total Rail Fatalities: 0.042 – 0.049							

Acronyms: LCFs = latent cancer fatalities; NTS = Nevada Test Site. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type.

an inspector. This worker would receive a radiation dose of about 1.9 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 9.5×10^{-7}.

Public Impacts. For truck shipments, the maximally exposed member of the public would be a person working at a service station who would receive a radiation dose of about 0.10 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 6.0×10^{-8}.

If shipments were made by rail, the maximally exposed member of the public would be a railyard worker who was not directly involved with handling the railcars. This person would receive a radiation dose of about 0.35 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 2.1×10^{-7}.

4.3.3.3 Impacts from the Maximum Reasonably Foreseeable Transportation Accidents

The maximally exposed individual would receive a radiation dose of 4.6 rem from the maximum reasonably foreseeable transportation accident involving a truck shipment of Class A LLW. This is equivalent to a probability of a latent cancer fatality of about 2.8×10^{-3}. The probability of this accident is about 5×10^{-7} per year. The population would receive a collective radiation dose of about 1,300 person-rem from this truck accident involving Class A LLW. This could result in about 1 latent cancer fatality.

For the maximum reasonably foreseeable transportation rail accident involving Class A LLW, the maximally exposed individual would receive a radiation dose of about 9.2 rem. This is equivalent to a probability of a latent cancer fatality of about 5.5×10^{-3}. The probability of this accident is about 2×10^{-6} per year. The population would receive a collective radiation dose of about 2,600 person-rem from this rail accident involving Class A LLW. This could result in about 2 latent cancer fatalities.

Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), the sum of fractions of the biota concentration guides for the Class A LLW accidents was less than 1. Therefore, the radioactive releases from the Class A LLW accidents would not be likely to cause persistent, measurable deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

4.3.4 Offsite Impacts (No Action Alternative)

Under the No Action Alternative, 4,060 cubic meters (145,000 cubic feet) of Class A LLW would be disposed of at Hanford, NTS, or a commercial disposal site such as Envirocare. If the entire volume of WVDP Class A LLW were sent to one of these sites, the probability that a worker would incur a latent cancer fatality would range from 4.8×10^{-3} to 5.4×10^{-3}. The maximally exposed individual member of the public would have a probability of incurring a latent cancer fatality of between 6.9×10^{-6} and 3×10^{-16}. Table 2-6 provides offsite human health impacts in detail; Appendix C, Section C.10, explains how these impacts were derived.

4.4 IMPACTS OF ALTERNATIVE A – OFFSITE SHIPMENT OF HLW, LLW, MIXED LLW, AND TRU WASTE TO DISPOSAL

Under **Alternative A (Preferred Alternative),** DOE would ship Class A, B, and C LLW and mixed LLW to one of two DOE potential disposal sites (in Washington or Nevada) or to a commercial disposal site (such as the Envirocare facility in Utah); ship TRU waste to WIPP in New Mexico; and ship HLW to the proposed Yucca Mountain HLW Repository. LLW and mixed LLW would be shipped over the next 10 years. TRU waste shipments to WIPP could occur within the next 10 years if the TRU waste were determined to meet all the requirements for disposal in this repository. If some or all of WVDP's TRU waste did not meet these requirements, the Department would need to explore other alternatives for disposal of this waste.

Under DOE's current programmatic decisionmaking, offsite disposal of HLW would occur at the proposed Yucca Mountain HLW Repository sometime after 2025 assuming a license to operate is granted by NRC. Although this period would extend well beyond the 10 years required for all other proposed actions under this alternative, the impacts of transporting the HLW have been included in this EIS to fully inform the decisionmakers should an earlier opportunity to ship HLW present itself. The waste storage tanks would continue to be managed as described under the No Action Alternative.

4.4.1 Human Health Impacts (Alternative A)

This section characterizes the radiological impacts from Alternative A activities that could result from exposure of workers to direct radiation and contaminated material and exposure of the public to small quantities of radioactive material. Nonradiological injuries and fatalities have also been estimated using Bureau of Labor Statistics on incident rates for construction, manufacturing, and services.

Worker Impacts. Under Alternative A, waste management activities would involve offsite transportation and disposal of Class A, B, C, mixed LLW, RH-TRU, CH-TRU, and HLW. Management of the waste storage tanks would continue as under current operations. Table 4-7 presents the radiological impacts to involved and noninvolved workers for Alternative A. During the 10-year time period, the collective radiation dose to involved workers was estimated to be about 61 person-rem or about 6.1 person-rem per year from activities under Alternative A. Over this same time period, the individual radiation dose to the average involved worker would be about 260 mrem per year. This radiation dose is well below the limit in 10 CFR 835 of 5 rem (5,000 mrem) per year and the WVDP administrative control level of 500 mrem per year (WVNS 2001), and would result in less than 1 (1.3×10^{-4}) latent cancer fatality or a chance of about 1 in 7,700 per year.

In addition to radiation doses from Alternative A activities, workers would be exposed to radiation doses from the ongoing operations of the WVDP site. When radiation doses are calculated for involved and noninvolved workers for both Alternative A activities and ongoing operations, the total collective

4.3.4 Offsite Impacts (No Action Alternative)

Under the No Action Alternative, 4,060 cubic meters (145,000 cubic feet) of Class A LLW would be disposed of at Hanford, NTS, or a commercial disposal site such as Envirocare. If the entire volume of WVDP Class A LLW were sent to one of these sites, the probability that a worker would incur a latent cancer fatality would range from 4.8×10^{-3} to 5.4×10^{-3}. The maximally exposed individual member of the public would have a probability of incurring a latent cancer fatality of between 6.9×10^{-6} and 3×10^{-16}. Table 2-6 provides offsite human health impacts in detail; Appendix C, Section C.10, explains how these impacts were derived.

4.4 IMPACTS OF ALTERNATIVE A – OFFSITE SHIPMENT OF HLW, LLW, MIXED LLW, AND TRU WASTE TO DISPOSAL

Under **Alternative A (Preferred Alternative),** DOE would ship Class A, B, and C LLW and mixed LLW to one of two DOE potential disposal sites (in Washington or Nevada) or to a commercial disposal site (such as the Envirocare facility in Utah); ship TRU waste to WIPP in New Mexico; and ship HLW to the proposed Yucca Mountain HLW Repository. LLW and mixed LLW would be shipped over the next 10 years. TRU waste shipments to WIPP could occur within the next 10 years if the TRU waste were determined to meet all the requirements for disposal in this repository. If some or all of WVDP's TRU waste did not meet these requirements, the Department would need to explore other alternatives for disposal of this waste.

Under DOE's current programmatic decisionmaking, offsite disposal of HLW would occur at the proposed Yucca Mountain HLW Repository sometime after 2025 assuming a license to operate is granted by NRC. Although this period would extend well beyond the 10 years required for all other proposed actions under this alternative, the impacts of transporting the HLW have been included in this EIS to fully inform the decisionmakers should an earlier opportunity to ship HLW present itself. The waste storage tanks would continue to be managed as described under the No Action Alternative.

4.4.1 Human Health Impacts (Alternative A)

This section characterizes the radiological impacts from Alternative A activities that could result from exposure of workers to direct radiation and contaminated material and exposure of the public to small quantities of radioactive material. Nonradiological injuries and fatalities have also been estimated using Bureau of Labor Statistics on incident rates for construction, manufacturing, and services.

Worker Impacts. Under Alternative A, waste management activities would involve offsite transportation and disposal of Class A, B, C, mixed LLW, RH-TRU, CH-TRU, and HLW. Management of the waste storage tanks would continue as under current operations. Table 4-7 presents the radiological impacts to involved and noninvolved workers for Alternative A. During the 10-year time period, the collective radiation dose to involved workers was estimated to be about 61 person-rem or about 6.1 person-rem per year from activities under Alternative A. Over this same time period, the individual radiation dose to the average involved worker would be about 260 mrem per year. This radiation dose is well below the limit in 10 CFR 835 of 5 rem (5,000 mrem) per year and the WVDP administrative control level of 500 mrem per year (WVNS 2001), and would result in less than 1 (1.3×10^{-4}) latent cancer fatality or a chance of about 1 in 7,700 per year.

In addition to radiation doses from Alternative A activities, workers would be exposed to radiation doses from the ongoing operations of the WVDP site. When radiation doses are calculated for involved and noninvolved workers for both Alternative A activities and ongoing operations, the total collective

Table 4-7. Radiation Doses for Involved and Noninvolved Workers Under Alternative A

Worker Population	Activity	Time Period (years)	Collective Dose		Latent Cancer Fatalities	
			Annual (person-rem/yr)	Total (person-rem)	Annual	Total
Involved workers[a]	Alternative A activities	10	6.1	61	3.1×10^{-3}	0.031
Noninvolved workers[b]	Ongoing operations of WVDP[b]	10	15	150	7.5×10^{-3}	0.075
All workers	Total	10	21	210	0.011	0.11

Worker Population	Activity	Time Period (years)	Individual Dose		Latent Cancer Fatalities	
			Annual (mrem/yr)	Total (mrem)	Annual	Total
Involved workers[a]	Alternative A activities	10	260	2,600	1.3×10^{-4}	1.3×10^{-3}
Noninvolved workers[b]	Ongoing operations of WVDP[b]	10	59	590	3.0×10^{-5}	3.0×10^{-4}

a. Involved workers would be those individuals that actively participate in Alternative A.
b. Noninvolved workers would be those individuals that would be onsite but would not actively participate in Alternative A.

radiation dose to the workers was estimated to be about 210 person-rem over the duration of Alternative A or about 21 person-rem per year (Table 4-7). This dose is equivalent to less than 1 (0.11) latent cancer fatality within the worker population.

Nonradiological impacts to workers, based on Bureau of Labor Statistics and the required work effort estimated to complete the actions proposed under Alternative A, are not expected to result in any non-lost workday injuries, lost workday injuries, or fatalities.

Public Impacts. Under Alternative A, waste management activities would involve offsite transportation and disposal of Class A, B, C, mixed LLW, RH-TRU, CH-TRU, and HLW. Management of the waste storage tanks would also continue as under current operations. Radiation doses to the public would be similar to the radiation doses for ongoing operations at the WVDP and thus would be the same as under the No Action Alternative (Table 4-8).

Annual Dose. The collective radiation dose through all exposure pathways (air and water) to people living within 80 kilometers (50 miles) of the site would be about 0.25 person-rem per year. This is equivalent to less than 1 (1.5×10^{-4}) latent cancer fatality in the exposed population each year. The radiation dose through all exposure pathways to the maximally exposed individual living around the WVDP site would be about 0.062 mrem per year. This radiation dose is 0.062 percent of the DOE standard of 100 mrem per year (DOE Order 5400.5, *Radiation Protection of the Public and the Environment*) and would result in less than 1 (3.7×10^{-8}) latent cancer fatality per year or a chance of about 1 in 27 million for the maximally exposed individual.

Total Dose. For the duration of the Alternative A (10 years), the total collective radiation dose through all exposure pathways to the population around the WVDP site would be about 2.5 person-rem. This is equivalent to less than 1 (1.5×10^{-3}) latent cancer fatality for the duration of the alternative.

Table 4-8. Radiation Doses to the Public Under Alternative A[a]

Activity	Maximally Exposed Individual: Individual Radiation Dose[b] Annual (mrem/yr)	Maximally Exposed Individual: Individual Radiation Dose[b] Total (mrem)	Maximally Exposed Individual: Probability of Latent Cancer Fatality Annual	Maximally Exposed Individual: Probability of Latent Cancer Fatality Total	Population Around WVDP Site: Collective Radiation Dose[c] Annual (person-rem/yr)	Population Around WVDP Site: Collective Radiation Dose[c] Total (person-rem)	Population Around WVDP Site: Probability of Latent Cancer Fatality Annual	Population Around WVDP Site: Probability of Latent Cancer Fatality Total
Ongoing operations at WVDP								
Airborne releases	0.021	0.21	1.3×10^{-8}	1.3×10^{-7}	0.17	1.7	1.0×10^{-4}	1.0×10^{-3}
Percent of EPA standard (10 mrem per year)	<1	NA[d]	NA	NA	NA	NA	NA	NA
Waterborne releases	0.041	0.41	2.5×10^{-8}	2.5×10^{-7}	0.083	0.83	5.0×10^{-5}	5.0×10^{-4}
All pathways	0.062	0.62	3.7×10^{-8}	3.7×10^{-7}	0.25	2.5	1.5×10^{-4}	1.5×10^{-3}
Percent of DOE standard (100 mrem per year)	<1	NA	NA	NA	NA	NA	NA	NA
Percent of natural background	<1	NA	NA	NA	<1	NA	NA	NA

a. The time period for Alternative A is 10 years.
b. Individual background radiation doses are about 300 mrem per year.
c. The collective radiation dose to the 1.5-million-person population that surrounds the WVDP site from natural background is about 380,000 person-rem per year.
d. NA = not applicable.

4.4.2 Impacts from Facility Accidents (Alternative A)

DOE evaluated the potential impacts that could occur as result of accidents at the WVDP site during the implementation of Alternative A. Because all waste types (Class A, B, C, LLW, mixed LLW, RH-TRU, CH-TRU, and HLW) would be shipped under Alternative A, accidents involving the handling of all waste types were evaluated. As with the No Action Alternative, accidents involving the ongoing management of Tanks 8D-1 and 8D-2 were evaluated. Accidents involving ongoing or continuing activities at the WVDP site that were not part of this EIS have been addressed in other documents such as the *Long-Term Management of Liquid High-Level Radioactive Wastes Stored at the Western New York Nuclear Service Center, West Valley Final Environmental Impact Statement* (DOE 1982) and several facility safety analysis reports and environmental assessments. For example, accidents involving the High-Level Waste Vitrification Facility are characterized in the *Safety Analysis Report for Vitrification System Operations and High-Level Waste Interim Storage* (WVNS 2000b).

One potential accident involved dropping two drums containing solidified Class C LLW from the Drum Cell. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-9. For a worker located at the site, this accident could result in a radiation dose of 4.7×10^{-5} rem. This accident could result in a radiation dose of 1.6×10^{-5} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 0.050 person-rem; this is equivalent to a probability of a latent cancer fatality of 3.0×10^{-5}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 4.7×10^{-4} for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

Table 4-9. Radiological Consequences of Accidents Using 50-Percent Atmospheric Conditions under Alternative A

Accident	Frequency (per year)	Worker		Maximally Exposed Individual		Population[a]	
		Radiation Dose (rem)	Latent Cancer Fatality	Radiation Dose (rem)	Latent Cancer Fatality	Radiation Dose (person-rem)	Latent Cancer Fatality
Drum cell drop	0.1 – 0.01	4.7×10^{-5}	2.4×10^{-8}	1.6×10^{-5}	9.6×10^{-9}	0.050	3.0×10^{-5}
Class C drum puncture[b]	0.1 – 0.01	1.2×10^{-4}	6.0×10^{-8}	3.9×10^{-5}	2.3×10^{-8}	0.12	7.2×10^{-5}
Class C pallet drop[b]	0.1 – 0.01	6.9×10^{-4}	3.5×10^{-7}	2.4×10^{-4}	1.4×10^{-7}	0.74	4.4×10^{-4}
Class C box puncture[b]	0.1 – 0.01	1.2×10^{-3}	6.0×10^{-7}	3.9×10^{-4}	2.3×10^{-7}	1.2	7.2×10^{-4}
HIC[c] drop	0.1 – 0.01	1.5×10^{-3}	7.5×10^{-7}	5.2×10^{-4}	3.1×10^{-7}	1.6	9.6×10^{-4}
CH-TRU drum puncture	0.1 – 0.01	0.038	1.9×10^{-5}	0.013	7.8×10^{-6}	41	0.025
RHWF[d] fire	$10^{-4} – 10^{-6}$	0.13	6.5×10^{-5}	0.044	2.6×10^{-5}	140	0.084
Collapse of Tank 8D-2 (wet)[b]	$10^{-4} – 10^{-6}$	2.4×10^{-3}	1.2×10^{-6}	8.1×10^{-4}	4.9×10^{-7}	2.5	1.5×10^{-3}
Collapse of Tank 8D-2 (dry)[b]	$10^{-4} – 10^{-6}$	2.8×10^{-3}	1.4×10^{-6}	9.5×10^{-4}	5.7×10^{-7}	3.0	1.8×10^{-3}

a. Collective dose to the 1.5 million people living within 80 kilometers (50 miles) of the WVDP site.
b. Ground-level release.
c. HIC= High integrity container.
d. RHWF= Remote-Handled Waste Facility.

Table 4-10. Radiological Consequences of Accidents Using 95-Percent Atmospheric Conditions under Alternative A

Accident	Frequency (per year)	Worker		Maximally Exposed Individual		Population[a]	
		Radiation Dose (rem)	Latent Cancer Fatality	Radiation Dose (rem)	Latent Cancer Fatality	Radiation Dose (person-rem)	Latent Cancer Fatality
Drum cell drop	0.1 – 0.01	4.7×10^{-4}	2.4×10^{-7}	1.8×10^{-4}	1.1×10^{-7}	0.79	4.7×10^{-4}
Class C drum puncture[b]	0.1 – 0.01	1.2×10^{-3}	6.0×10^{-7}	4.3×10^{-4}	2.6×10^{-7}	1.9	1.1×10^{-3}
Class C pallet drop[b]	0.1 – 0.01	6.8×10^{-3}	3.4×10^{-6}	2.6×10^{-3}	1.6×10^{-6}	12	7.2×10^{-3}
Class C box puncture[b]	0.1 – 0.01	0.012	6.0×10^{-6}	4.3×10^{-3}	2.6×10^{-6}	19	0.011
HIC[c] drop	0.1 – 0.01	0.015	7.5×10^{-6}	5.6×10^{-3}	3.4×10^{-6}	25	0.015
CH-TRU drum puncture	0.1 – 0.01	0.38	1.9×10^{-4}	0.14	8.4×10^{-5}	630	0.38
RHWF[d] fire	$10^{-4} – 10^{-6}$	1.3	6.5×10^{-4}	0.47	2.8×10^{-4}	2,100	1.3
Collapse of Tank 8D-2 (wet)[b]	$10^{-4} – 10^{-6}$	0.024	1.2×10^{-5}	8.9×10^{-3}	5.3×10^{-6}	39	0.023
Collapse of Tank 8D-2 (dry)[b]	$10^{-4} – 10^{-6}$	0.028	1.4×10^{-5}	0.010	6.0×10^{-6}	46	0.028

a. Collective dose to the 1.5 million people living within 80 kilometers (50 miles) of the WVDP site.
b. Ground-level release.
c. HIC= High integrity container.
d. RHWF= Remote-Handled Waste Facility.

A second potential accident involved the puncture of a drum containing Class C LLW. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-9. For a worker located at the site, this accident could result in a radiation dose of 1.2×10^{-4} rem. This accident could result in a radiation dose of 3.9×10^{-5} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 0.12 person-rem; this is equivalent to a probability of a latent cancer fatality of 7.2×10^{-5}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 1.1×10^{-3} for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

A third potential accident involved a drop of a pallet containing six Class C LLW drums, all of which were assumed to rupture. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-9. For a worker located at the site, this accident could result in a radiation dose of 6.9×10^{-4} rem. This accident could result in a radiation dose of 2.4×10^{-4} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 0.74 person-rem; this is equivalent to a probability of a latent cancer fatality of 4.4×10^{-4}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 7.2×10^{-3} for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

A fourth potential accident involved the puncture of a box containing Class C LLW. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-9. For a worker located at the site, this accident could result in a radiation dose of 1.2×10^{-3} rem. This accident could result in a radiation dose of 3.9×10^{-4} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 1.2 person-rem; this is equivalent to a probability of a latent cancer fatality of 7.2×10^{-4}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 0.011 for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

A fifth potential accident involved dropping a high integrity container containing radioactive sludge and resin. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-9. For a worker located at the site, this accident could result in a radiation dose of 1.5×10^{-3} rem. This accident could result in a radiation dose of 5.2×10^{-4} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 1.6 person-rem; this is equivalent to a probability of a latent cancer fatality of 9.6×10^{-4}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 0.015 for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

A sixth potential accident involved the puncture of a drum containing CH-TRU waste. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-9. For a worker located at the site, this accident could result in a radiation dose of 0.038 rem. This accident could result in a radiation dose of 0.013 rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 41 person-rem; this is equivalent to a probability of a latent cancer fatality of 0.025. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 0.38 for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

A seventh potential accident involved a diesel fuel fire in the RHWF as a result of a leak in the fuel tank or fuel line of a truck. This fire would involve CH-TRU and RH-TRU waste. The frequency of this accident was estimated to be in the range of 10^{-4} to 10^{-6} per year. The consequences of this accident using 50-percent atmospheric conditions are presented in Table 4-9. For a worker located at the site, this accident could result in a radiation dose of 0.13 rem. This accident could result in a radiation dose of 0.044 rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 140 person-rem; this is equivalent to a probability of a latent cancer fatality of 0.084. Using 95-percent atmospheric conditions, this accident could result in about 1 latent cancer fatality for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

Although an accident involving dropping a HLW canister while loading a shipping cask could occur, the canisters are designed to resist breaching and tested to withstand a 7-meter (23-foot) drop onto an unyielding surface and it is unlikely that a canister would rupture if it were dropped during loading. Therefore, Tables 4-9 and 4-10 do not include analysis of this type of accident.

As in the No Action Alternative, DOE also analyzed accidents involving the ongoing management of Tanks 8D-1 and 8D-2, and determined that the consequences would be the same under both alternatives. These accidents assumed that a severe earthquake occurred at the WVDP site, causing the roof of the vault and Tank 8D-2 to collapse into the tank. Two accidents were analyzed, one where the contents of the tank were kept wet, and another were the contents of the tank were allowed to dry. The frequencies of the accidents were estimated to be in the range of 10^{-4} to 10^{-6} per year.

The consequences of the accidents using 50-percent atmospheric conditions are presented in Table 4-9. If the contents of the tanks are kept wet, the accident could result in a radiation dose of 2.4×10^{-3} rem for the worker located at the site. This accident could result in a radiation dose of 8.1×10^{-4} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 2.5 person-rem; this is equivalent to a probability of a latent cancer fatality of 1.5×10^{-3}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 0.023 for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

If the contents of the tanks are kept dry, this accident could result in a radiation dose of 2.8×10^{-3} rem for the worker located at the site (Table 4-9). This accident could result in a radiation dose of 9.5×10^{-4} rem to the maximally exposed individual living near the WVDP site. For the population living within 80 kilometers (50 miles) of the site, this accident could result in a radiation dose of 3.0 person-rem; this is equivalent to a probability of a latent cancer fatality of 1.8×10^{-3}. Using 95-percent atmospheric conditions, this accident could result in a probability of a latent cancer fatality of 0.028 for the population living within 80 kilometers (50 miles) of the WVDP site (Table 4-10).

The highest consequence accident in Table 4-9 was the fire at the RHWF. Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), the sum of the fractions of the biota concentration guides for this accident was less than 1. Therefore, the radioactive releases for this accident would not be likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

4.4.3 Transportation (Alternative A)

Under Alternative A, about 21,000 cubic meters (742,000 cubic feet) of radioactive waste would be shipped for disposal. These shipments would take place over 10 years. Although HLW would not be shipped to a geologic repository until sometime after 2025, HLW transportation impacts were included in Alternative A. Class A LLW would be shipped either to NTS, Hanford, or a commercial disposal site such as Envirocare. Class B and Class C LLW would be shipped either to the NTS or the Hanford Site. Mixed LLW, meeting disposal site waste acceptance criteria, would be shipped to Hanford, NTS, or a commercial disposal site such as Envirocare. TRU waste would be shipped to the WIPP site for disposal. HLW would be shipped to a geologic repository (assumed to be the proposed Yucca Mountain Repository for the purposes of evaluation in this EIS). The waste transportation destinations proposed under Alternative A are shown in Figure 4-2.

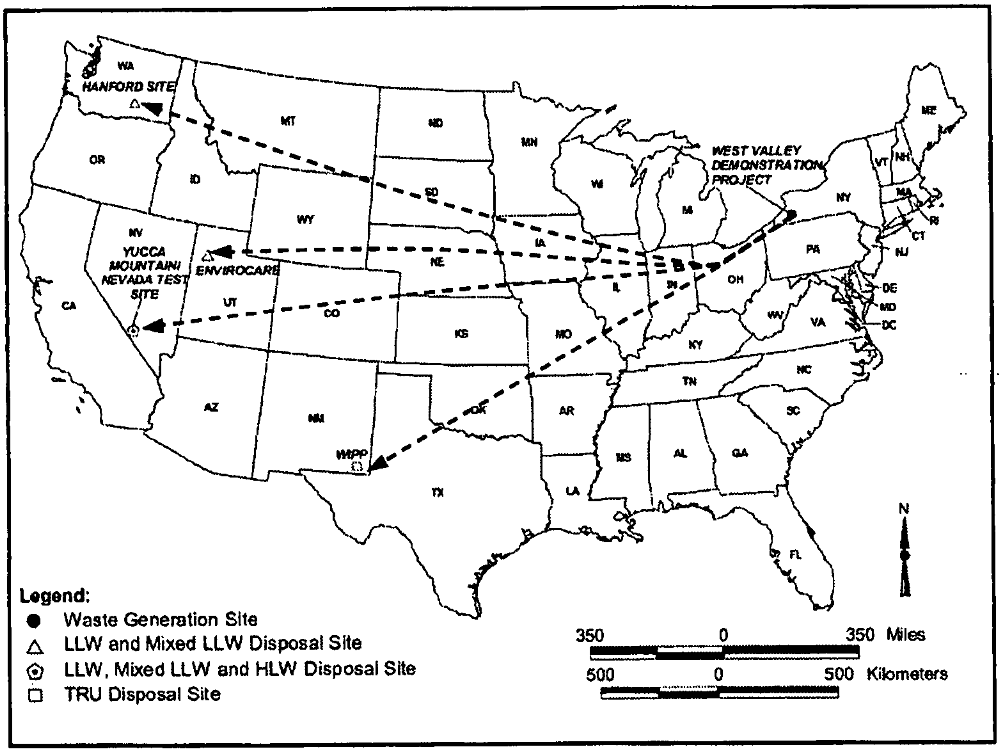

Figure 4-2. Waste Destinations Under Alternative A

Transportation impacts were estimated assuming 100 percent of the waste would be shipped by truck and 100 percent of the waste would be shipped by rail. Table 4-11 lists the waste shipments associated with Alternative A. These shipments would take place over 10 years.

4.4.3.1 Total Impacts from Transportation Activities

The transportation impacts of shipping radioactive waste would be from two sources: incident-free transportation and transportation accidents. Both radiological impacts and nonradiological impacts are included in the analysis. The total impacts from transportation would be the sum of the impacts from incident-free transportation and transportation accidents. Additional details on these analyses are provided in Appendix D.

Table 4-11. Waste Shipped Under Alternative A or B

Waste Type	Container Type	Waste Shipped (cubic feet)[a]	Number of Containers	Alternative A Shipments	Alternative B Shipments
Class A LLW	Boxes[b]	351,586	4,341	311 (truck) 156 (rail)	311 (truck) 156 (rail)
	Drums[b]	83,014	12,058	144 (truck) 72 (rail)	144 (truck) 72 (rail)
Class B LLW	HIC[c]	38,500	428	428 (truck) 107 (rail)	428 (truck) 107 (rail)
	Drums[b]	194	29	1 (truck) 1 (rail)	1 (truck) 1 (rail)
Class C LLW	HIC[c]	12,618	141	141 (truck) 36 (rail)	141 (truck) 36 (rail)
	55-gallon drums[c]	6,198	901	91 (truck) 23 (rail)	91 (truck) 23 (rail)
	71-gallon drums[b]	193,405	20,377	850 (truck) 213 (rail)	850 (truck) 213 (rail)
CH-TRU	Drums[c]	40,000	5,810	139 (truck) 139 (rail)	278 (truck)[d] 278 (rail)[d]
RH-TRU	Drums[c]	9,000	1,308	131 (truck) 33 (rail)	262 (truck)[e] 66 (rail)[f]
MLLW	Drums[b]	7,889	1,146	14 (truck) 7 (rail)	14 (truck) 7 (rail)
HLW	Canisters[c]		300[g]	300 (truck) 60 (rail)	600 (truck)[h] 120 (rail)[i]
Total		742,404	46,839	2,550 (truck) 847 (rail)	3,120 (truck)[j] 1,079 (rail)[k]

Acronyms: LLW = low-level radioactive waste; HIC = high-integrity container; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; MLLW = mixed low-level waste; HLW = high-level radioactive waste

a. To convert cubic feet to cubic meters, multiply by 0.028.
b. Shipped in Type A shipping container.
c. Shipped in Type B shipping container.
d. 139 CH-TRU shipments from WVDP to interim storage, 139 CH-TRU shipments from interim storage to disposal.
e. 131 RH-TRU shipments from WVDP to interim storage, 131 RH-TRU shipments from interim storage to disposal.
f. 33 RH-TRU shipments from WVDP to interim storage, 33 RH-TRU shipments from interim storage to disposal.
g. Assumed to be 300 for purposes of analysis; actual number of canisters is 275.
h. 300 HLW shipments from WVDP to interim storage, 300 HLW shipments from interim storage to disposal.
i. 60 HLW shipments from WVDP to interim storage, 60 HLW shipments from interim storage to disposal.
j. Includes 270 TRU waste, and 300 HLW, truck shipments from interim storage to disposal. Alternative B would load the same number of truck shipments (2,550) at WVDP for shipment offsite as Alternative A.
k. Includes 172 TRU waste, and 60 HLW, rail shipments from interim storage to disposal. Alternative B would load the same number of rail shipments (847) at WVDP for shipment offsite as Alternative A.

Table 4-12 lists the total transportation impacts by waste type and destination expected under Alternative A. If either trucks or trains were used to ship the radioactive waste, less than 1 fatality would occur. For perspective, there would be about 400,000 traffic fatalities in the United States over the 10-year time period under Alternative A (U.S. Bureau of the Census 1997).

4.4.3.2 Incident-Free Impacts for the Maximally Exposed Individual from Transportation Activities

Worker Impacts. If trucks were used to ship the waste, the maximally exposed worker would be the truck driver. This worker would receive a radiation dose of about 2,000 mrem per year based on driving

Table 4-12. Transportation Impacts Under Alternative A

Waste Type	Destination	Incident-Free Public (LCFs)	Incident-Free Worker (LCFs)	Radiological Accident Risk (LCFs)	Pollution Health Effects (Fatalities)	Traffic Fatalities	Total Fatalities
Truck							
Class A LLW	Envirocare	0.025	0.031	1.4×10^{-4}	5.7×10^{-3}	0.030	0.092
	Hanford Site	0.030	0.037	1.5×10^{-4}	6.3×10^{-3}	0.038	0.11
	NTS	0.031	0.036	1.7×10^{-4}	7.6×10^{-3}	0.036	0.11
Class B LLW	Hanford Site	1.4×10^{-3}	0.028	0.065	5.9×10^{-3}	0.035	0.13
	NTS	1.6×10^{-3}	0.029	0.062	7.1×10^{-3}	0.034	0.13
Class C LLW	Hanford Site	0.087	0.20	5.5×10^{-7}	0.018	0.11	0.41
	NTS	0.089	0.19	6.5×10^{-7}	0.022	0.10	0.41
CH-TRU	WIPP	8.3×10^{-3}	0.010	7.5×10^{-4}	2.3×10^{-3}	0.012	0.033
RH-TRU	WIPP	6.5×10^{-3}	0.013	7.5×10^{-9}	2.2×10^{-3}	0.011	0.033
MLLW	Envirocare	7.7×10^{-4}	9.5×10^{-4}	1.0×10^{-5}	1.8×10^{-4}	9.2×10^{-4}	2.8×10^{-3}
	Hanford Site	9.2×10^{-4}	1.1×10^{-3}	1.1×10^{-5}	1.9×10^{-4}	1.2×10^{-3}	3.4×10^{-3}
	NTS	9.5×10^{-4}	1.1×10^{-3}	1.3×10^{-5}	2.3×10^{-4}	1.1×10^{-3}	3.4×10^{-3}
HLW	Repository	0.020	0.044	9.8×10^{-7}	5.8×10^{-3}	0.024	0.094
							Total Truck Fatalities: 0.79 — 0.82
Rail							
Class A LLW	Envirocare	0.044	0.033	5.3×10^{-4}	8.0×10^{-3}	0.026	0.11
	Hanford Site	0.045	0.035	5.8×10^{-4}	8.2×10^{-3}	0.034	0.12
	NTS	0.046	0.044	5.3×10^{-4}	8.1×10^{-3}	0.033	0.13
Class B LLW	Hanford Site	0.042	0.033	3.4×10^{-6}	3.9×10^{-3}	0.016	0.095
	NTS	0.043	0.045	3.1×10^{-6}	3.8×10^{-3}	0.017	0.11
Class C LLW	Hanford Site	0.13	0.10	1.2×10^{-6}	0.012	0.049	0.29
	NTS	0.13	0.14	1.1×10^{-6}	0.012	0.053	0.34
CH-TRU	WIPP	8.3×10^{-3}	8.1×10^{-3}	2.0×10^{-4}	3.4×10^{-3}	0.018	0.038
RH-TRU	WIPP	6.6×10^{-3}	6.4×10^{-3}	2.4×10^{-8}	8.0×10^{-4}	4.2×10^{-3}	0.018
MLLW	Envirocare	1.3×10^{-3}	1.0×10^{-3}	4.1×10^{-5}	2.4×10^{-4}	8.1×10^{-4}	3.4×10^{-3}
	Hanford Site	1.4×10^{-3}	1.1×10^{-3}	4.5×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	3.8×10^{-3}
	NTS	1.4×10^{-3}	1.3×10^{-3}	4.1×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	4.0×10^{-3}
HLW	Repository	7.6×10^{-3}	0.014	3.0×10^{-7}	4.2×10^{-3}	0.019	0.045
							Total Rail Fatalities: 0.60 — 0.68

Acronyms: LCFs = latent cancer fatalities; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; MLLW = mixed low-level waste; HLW = high-level radioactive waste; NTS = Nevada Test Site; WIPP = Waste Isolation Pilot Plant. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type.

the truck containing radioactive waste for 1,000 hours per year. This is equivalent to a probability of a latent cancer fatality of about 1.0×10^{-3}.

If trains were used to ship the waste, the maximally exposed worker would be an inspector. This worker would receive a radiation dose of about 190 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 9.5×10^{-5}.

Public Impacts. If trucks were used to ship the waste, the maximally exposed member of the public would be a person working at a service station who would receive a radiation dose of about 19 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 1.1×10^{-5}.

If trains were used to ship the waste, the maximally exposed member of the public would be a railyard worker who was not directly involved with handling the railcars. This person would receive a radiation dose of about 35 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 2.1×10^{-5}.

4.4.3.3 Impacts from the Maximum Reasonably Foreseeable Transportation Accidents

For waste shipped under Alternative A, the maximum reasonably foreseeable truck or rail transportation accident with the highest consequences would involve CH-TRU waste. Since one TRUPACT-II shipping container was assumed to be involved in either the truck or rail accident, the consequences for the truck or rail accident are the same. The probabilities of the truck and rail accidents are slightly different. The probability of the truck accident was 6×10^{-7} per year. For rail, the probability of the accident was 1×10^{-7} per year. The maximally exposed individual would receive a radiation dose of about 25 rem from this accident, which is equivalent to a latent cancer fatality risk of 0.015. The population would receive a collective radiation dose of approximately 6,600 person-rem from this accident. This could result in about 4 latent cancer fatalities. Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), the sum of fractions of the biota concentration guides for the CH-TRU accident was less than 1. Therefore, the radioactive releases from the CH-TRU accident would not be likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

4.4.4 Offsite Impacts (Alternative A)

Under Alternative A, 19,200 cubic meters (685,515 cubic feet) of LLW and 221 cubic meters (7,889 cubic feet) of mixed LLW would be disposed of at Hanford, NTS, or a commercial disposal site such as Envirocare. If the entire volume of WVDP LLW and mixed LLW inventory were sent to one of these sites, the probability that a worker would incur a latent cancer fatality would range from 3.2×10^{-2} to 3.6×10^{-2}. The maximally exposed individual member of the public would have a probability of incurring a latent cancer fatality of between 5.1×10^{-5} and 2.1×10^{-15}.

In addition, approximately 1,372 cubic meters (49,000 cubic feet) of TRU waste would be disposed of at WIPP. Disposal of this waste volume at WIPP would result in a probability that a worker would incur a latent cancer fatality of 1.0×10^{-2}. The maximally exposed individual member of the public would have a probability of incurring a latent cancer fatality of 3.0×10^{-9}. The population within 80 kilometers (50 miles) of the site would have a probability of incurring a latent cancer fatality of 3.0×10^{-6}.

Disposal of 300 canisters of WVDP HLW[2] at a geologic repository at Yucca Mountain would result in a probability that a worker would incur a latent cancer fatality of 6.8×10^{-2}. The maximally exposed individual member of the public would have a probability of incurring a latent cancer fatality of 3.1×10^{-7}. The population within 80 kilometers (50 miles) of the site would have a probability of incurring a latent cancer fatality of 2.0×10^{-2}.

Table 2-6 provides offsite human health impacts in detail; Appendix C, Section C.10, explains how these impacts were derived.

[2] For purposes of analysis, DOE assumed that vitrification of HLW at WVDP would result in the production of 300 canisters. Vitrification is now complete and has resulted in the production of 275 canisters. Therefore, the impacts associated with the 275 canisters actually produced would be lower than the impacts analyzed.

4.5 IMPACTS OF ALTERNATIVE B – OFFSITE SHIPMENT OF LLW AND MIXED LLW TO DISPOSAL AND SHIPMENT OF HLW AND TRU WASTE TO INTERIM STORAGE

Under **Alternative B**, LLW and mixed LLW would be shipped offsite for disposal at the same locations as Alternative A. TRU wastes would be shipped for interim storage at one of five DOE sites: Hanford Site; INEEL; ORNL; SRS; or WIPP. TRU wastes would subsequently be shipped to WIPP (or would remain at WIPP) for disposal. HLW would be shipped to SRS or Hanford for interim storage, with subsequent shipment to Yucca Mountain for disposal.

It is assumed that the shipment of LLW and mixed LLW to disposal would occur within the next 10 years, and that TRU waste and HLW would be shipped to interim storage during that same 10 years. Ultimate disposal of TRU wastes and HLW wastes would be subject to the same constraints described under Alternative A; however, the impacts of transporting these wastes to their ultimate disposal sites have been included in the impact analyses for this alternative. The waste storage tanks and their surrounding vaults would be managed as under the No Action Alternative.

4.5.1 Human Health Impacts (Alternative B)

This section characterizes the radiological impacts from Alternative B activities that could result from exposure of workers to direct radiation and contaminated material and exposure of the public to small quantities of radioactive material from controlled releases to the environment. Nonradiological injuries and fatalities have also been estimated using Bureau of Labor Statistics on incident rates for construction, manufacturing, and services.

Worker Impacts. Under Alternative B, waste management activities would involve offsite transportation and disposal of Class A, B, C, mixed LLW, and offsite interim storage of RH-TRU, CH-TRU, and HLW prior to disposal. Management of the waste storage tanks would continue as under current operations. Table 4-13 presents the radiological impacts to involved and noninvolved workers for Alternative B. During the 10-year time period, the collective radiation dose to involved workers was estimated to be about 61 person-rem or about 6.1 person-rem per year from activities under Alternative B. Over this same time period, the individual radiation dose to the average involved worker would be about 260 mrem per year. This radiation dose is well below the limit in 10 CFR 835 of 5 rem (5,000 mrem) per year and the WVDP administrative control level of 500 mrem per year (WVNS 2001), and would result in less than 1 (1.3×10^{-4}) latent cancer fatality or a chance of about 1 in 7,700 per year.

In addition to radiation doses from Alternative B activities, workers would be exposed to radiation doses from the ongoing operations of the WVDP site. When radiation doses are calculated for involved and noninvolved workers for both Alternative B activities and ongoing operations, the total collective radiation dose to the workers was estimated to be about 210 person-rem over the duration of Alternative B or about 21 person-rem per year (Table 4-13). This dose is equivalent to less than 1 (0.11) latent cancer fatality within the worker population.

Nonradiological impacts to workers, based on Bureau of Labor Statistics and the required work effort estimated to complete the actions proposed under Alternative B, are not expected to result in any non-lost workday injuries, lost workday injuries, or fatalities.

Public Impacts. Under Alternative B, waste management activities would involve offsite transportation and disposal of Class A, B, C, mixed LLW, RH-TRU, CH-TRU, and HLW. Management of the waste storage tanks would continue as under current operations. Radiation doses to the public would be similar

Table 4-13. Radiation Doses for Involved and Noninvolved Workers Under Alternative B

Worker Population	Activity	Time Period (years)	Collective Dose		Latent Cancer Fatalities	
			Annual (person-rem/yr)	Total (person-rem)	Annual	Total
Involved workers[a]	Alternative B activities	10	6.1	61	3.1×10^{-3}	0.031
Noninvolved workers[b]	Ongoing operations of WVDP[b]	10	15	150	7.5×10^{-3}	0.075
All workers	Total	10	21	210	0.011	0.11

Worker Population	Activity	Time Period (years)	Individual Dose		Latent Cancer Fatalities	
			Annual (mrem/yr)	Total (mrem)	Annual	Total
Involved workers[a]	Alternative B activities	10	260	2,600	1.3×10^{-4}	1.3×10^{-3}
Noninvolved workers[b]	Ongoing operations of WVDP[b]	10	59	590	3.0×10^{-5}	3.0×10^{-4}

a. Involved workers would be those individuals that actively participate in Alternative B.
b. Noninvolved workers would be those individuals that would be onsite but would not actively participate in Alternative B.

to the radiation doses for ongoing operations at the WVDP and thus would be the same as under the No Action Alternative and Alternative A. Annual and total radiation doses to the public (maximally exposed individual and collective population) are listed in Table 4-14.

Annual Dose. The collective radiation dose through all exposure pathways (air and water) to people living within 80 kilometers (50 miles) of the site would be about 0.25 person-rem per year. This is equivalent to less than 1 (1.5×10^{-4}) latent cancer fatality in the exposed population each year. The radiation dose through all exposure pathways to the maximally exposed individual living around the WVDP site would be about 0.062 mrem per year. This radiation dose is 0.062 percent of the DOE standard of 100 mrem per year (DOE Order 5400.5, *Radiation Protection of the Public and the Environment*) and would result in less than 1 (3.7×10^{-8}) latent cancer fatality per year or a chance of about 1 in 27 million for the maximally exposed individual.

Total Dose. For the duration of the No Action Alternative (10 years), the total collective radiation dose through all exposure pathways to the population around the WVDP site would be about 2.5 person-rem. This is equivalent to less than 1 (1.5×10^{-3}) latent cancer fatality over the duration of Alternative B.

4.5.2 Impacts from Facility Accidents (Alternative B)

The onsite activities proposed under Alternative B would be the same as those proposed under Alternative A. The facility accidents characterized previously in Section 4.4.2 would be representative of Alternative B and would have the same consequences. Therefore, the potential facility accidents characterized in Section 4.4.2 and their consequences will not be repeated here. As with the No Action Alternative and Alternative A, accidents involving ongoing or continuing activities at the WVDP site that were not part of this EIS have been addressed in other documents such as the *Long-Term Management of Liquid High-Level Radioactive Wastes Stored at the Western New York Nuclear Service Center, West*

Table 4-14. Radiation Doses to the Public Under Alternative B[a]

Activity	Maximally Exposed Individual				Population Around WVDP Site			
	Individual Radiation Dose[b]		Probability of Latent Cancer Fatality		Collective Radiation Dose[c]		Probability of Latent Cancer Fatality	
	Annual (mrem/yr)	Total (mrem)	Annual	Total	Annual (person-rem/yr)	Total (person-rem)	Annual	Total
Ongoing operations at WVDP								
Airborne releases	0.021	0.21	1.3×10^{-8}	1.3×10^{-7}	0.17	1.7	1.0×10^{-4}	1.0×10^{-3}
Percent of EPA standard (10 mrem per year)	<1	NA[d]	NA	NA	NA	NA	NA	NA
Waterborne releases	0.041	0.41	2.5×10^{-8}	2.5×10^{-7}	0.083	0.83	5.0×10^{-5}	5.0×10^{-4}
All pathways	0.062	0.62	3.7×10^{-8}	3.7×10^{-7}	0.25	2.5	1.5×10^{-4}	1.5×10^{-3}
Percent of DOE standard (100 mrem per year)	<1	NA	NA	NA	NA	NA	NA	NA
Percent of natural background	<1	NA	NA	NA	<1	NA	NA	NA

a. The time period for Alternative B is 10 years.
b. Individual background radiation doses are about 300 mrem per year.
c. The collective radiation dose to the 1.5-million-person population that surrounds the WVDP site from natural background is about 380,000 person-rem per year.
d. NA = not applicable.

Valley Final Environmental Impact Statement (DOE 1982) and several facility safety analysis reports and environmental assessments. For example, accidents involving the High-Level Waste Vitrification Facility are characterized in the *Safety Analysis Report for Vitrification System Operations and High-Level Waste Interim Storage* (WVNS 2000b).

4.5.3 Transportation (Alternative B)

Under Alternative B, about 21,000 cubic meters (742,000 cubic feet) of radioactive waste would be shipped for disposal. These are the same volumes that would be shipped under Alternative A. These shipments would take place over 10 years. Although HLW would not be shipped to a geologic repository until sometime after 2025, HLW transportation impacts were included in Alternative B. As was the case for Alternative A, under Alternative B Class A LLW would be shipped either to NTS, Hanford, or a commercial disposal site such as Envirocare; Class B and Class C LLW would be shipped either to the NTS or the Hanford Site; and mixed LLW would be shipped to Hanford, NTS, or a commercial disposal site such as Envirocare. In contrast to Alternative A, TRU waste would be shipped first to Hanford, INEEL, ORNL, or SRS for storage, then to WIPP for disposal. TRU waste could also be shipped to WIPP for interim storage prior to disposal there. HLW would be shipped first to the SRS or Hanford for storage, then to a geologic repository for disposal (again, assumed to be the proposed Yucca Mountain Repository for the purposes of evaluation in this EIS). The waste transportation destinations proposed under Alternative B are shown in Figure 4-3.

Transportation impacts were estimated assuming that 100 percent of the waste would be shipped by truck and that 100 percent of the waste would be shipped by rail. Table 4-11 lists the waste shipments

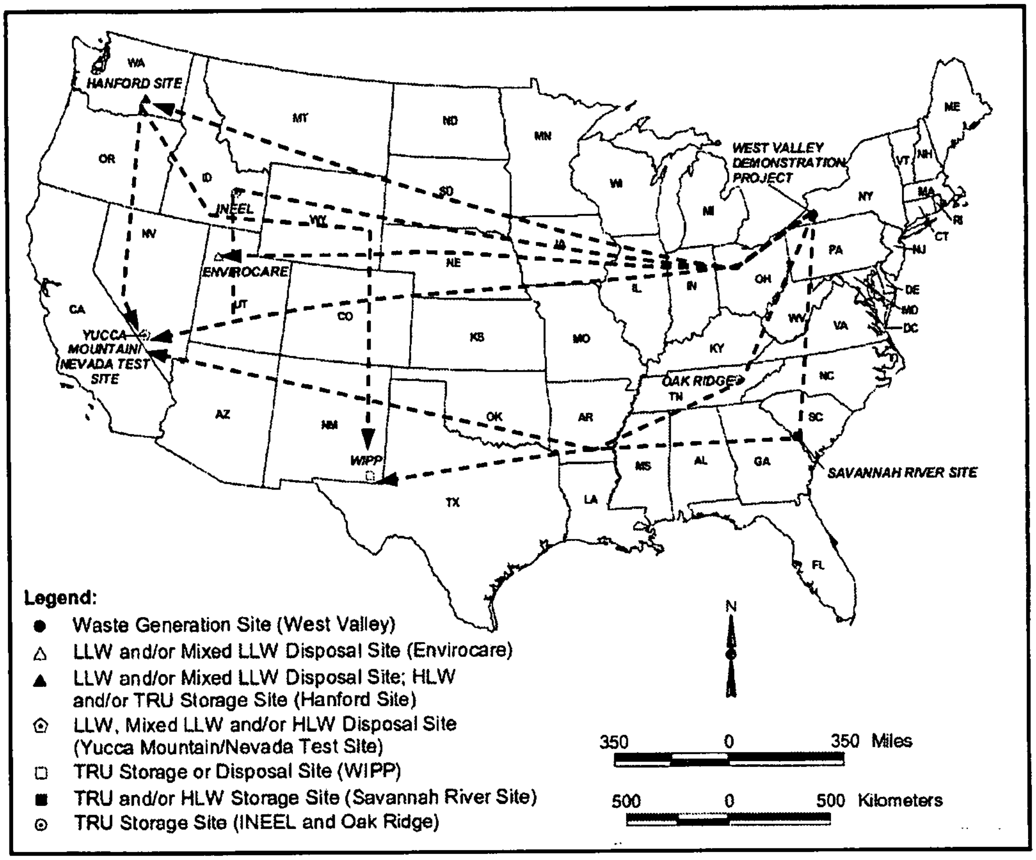

Figure 4-3. Waste Destinations Under Alternative B

associated with Alternative B. Because only the destinations for TRU waste and HLW vary between Alternatives A and B, the reader will see very little difference among the impacts to workers or the public for these alternatives.

4.5.3.1 Total Impacts from Transportation Activities

Table 4-15 lists the total transportation impacts by waste type and destination expected under Alternative B. If either trucks or trains were used to ship the radioactive waste, less than one fatality would occur. For perspective, there would be about 400,000 traffic fatalities in the United States during the 10-year time period under Alternative B (U.S. Bureau of the Census 1997).

4.5.3.2 Incident-Free Impacts for the Maximally Exposed Individual from Transportation Activities

Worker Impacts. If trucks were used to ship the waste, the maximally exposed worker would be the truck driver. This worker would receive a radiation dose of about 2,000 mrem per year based on driving the truck containing radioactive waste for 1,000 hours per year. This is equivalent to a probability of a latent cancer fatality of about 1.0×10^{-3}.

If trains were used to ship the waste, the maximally exposed worker would be an inspector. This worker would receive a radiation dose of about 190 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 9.5×10^{-5}.

Table 4-15. Transportation Impacts Under Alternative B

Waste Type	Destination	Incident-Free Public (LCFs)	Incident-Free Worker (LCFs)	Radiological Accident Risk (LCFs)	Pollution Health Effects	Traffic Fatalities	Total Fatalities
Truck							
Class A LLW	Envirocare	0.025	0.031	1.4×10^{-4}	5.7×10^{-3}	0.030	0.092
	Hanford Site	0.030	0.037	1.5×10^{-4}	6.3×10^{-3}	0.038	0.11
	NTS	0.031	0.036	1.7×10^{-4}	7.6×10^{-3}	0.036	0.11
Class B LLW	Hanford Site	0.028	0.065	8.2×10^{-7}	5.9×10^{-3}	0.035	0.13
	NTS	0.029	0.062	9.4×10^{-7}	7.1×10^{-3}	0.034	0.13
Class C LLW	Hanford Site	0.087	0.20	5.5×10^{-7}	0.018	0.11	0.41
	NTS	0.089	0.19	6.5×10^{-7}	0.022	0.10	0.41
CH-TRU	SRS → WIPP	8.8×10^{-3}	0.012	1.0×10^{-3}	2.7×10^{-3}	0.015	0.040
	INEEL → WIPP	0.011	0.016	6.7×10^{-4}	2.5×10^{-3}	0.016	0.046
	ORNL → WIPP	7.7×10^{-3}	0.012	6.4×10^{-4}	2.2×10^{-3}	0.012	0.034
	Hanford → WIPP	0.013	0.019	7.8×10^{-4}	3.0×10^{-3}	0.020	0.056
RH-TRU	SRS → WIPP	6.9×10^{-3}	0.015	1.0×10^{-8}	2.5×10^{-3}	0.014	0.039
	INEEL → WIPP	8.4×10^{-3}	0.021	7.3×10^{-9}	2.4×10^{-3}	0.015	0.046
	ORNL → WIPP	6.1×10^{-3}	0.014	6.4×10^{-9}	2.0×10^{-3}	0.011	0.034
	Hanford → WIPP	0.010	0.025	8.4×10^{-9}	2.8×10^{-3}	0.019	0.057
MLLW	Envirocare	7.7×10^{-4}	9.5×10^{-4}	1.0×10^{-5}	1.8×10^{-4}	9.2×10^{-4}	2.8×10^{-3}
	Hanford Site	9.2×10^{-4}	1.1×10^{-3}	1.1×10^{-5}	1.9×10^{-4}	1.2×10^{-3}	3.4×10^{-3}
	NTS	9.5×10^{-4}	1.1×10^{-3}	1.3×10^{-5}	2.3×10^{-4}	1.1×10^{-3}	3.4×10^{-3}
HLW	SRS → Repository	0.032	0.067	2.6×10^{-6}	9.6×10^{-3}	0.047	0.16
	Hanford Site → Repository	0.030	0.069	1.4×10^{-6}	8.0×10^{-3}	0.037	0.14
							Total Truck Fatalities: 0.84 – 0.93
Rail							
Class A LLW	Envirocare	0.044	0.033	5.3×10^{-4}	8.0×10^{-3}	0.026	0.11
	Hanford Site	0.045	0.035	5.8×10^{-4}	8.2×10^{-3}	0.034	0.12
	NTS	0.046	0.044	5.3×10^{-4}	8.1×10^{-3}	0.033	0.13
Class B LLW	Hanford Site	0.042	0.033	3.4×10^{-6}	3.9×10^{-3}	0.016	0.095
	NTS	0.043	0.045	3.1×10^{-6}	3.8×10^{-3}	0.017	0.11
Class C LLW	Hanford Site	0.13	0.10	1.2×10^{-6}	0.012	0.049	0.29
	NTS	0.13	0.14	1.1×10^{-6}	0.012	0.053	0.34
CH-TRU	SRS → WIPP	0.014	0.015	2.9×10^{-4}	5.8×10^{-3}	0.037	0.072
	INEEL → WIPP	0.014	0.016	3.4×10^{-4}	5.8×10^{-3}	0.023	0.059
	ORNL → WIPP	0.012	0.015	2.5×10^{-4}	5.1×10^{-3}	0.022	0.055
	Hanford → WIPP	0.016	0.017	4.3×10^{-4}	6.7×10^{-3}	0.032	0.073
RH-TRU	SRS → WIPP	0.011	0.012	3.1×10^{-8}	1.4×10^{-3}	8.8×10^{-3}	0.033
	INEEL → WIPP	0.011	0.013	4.0×10^{-8}	5.4×10^{-3}	0.021	0.050
	ORNL → WIPP	9.8×10^{-3}	0.011	2.9×10^{-8}	4.8×10^{-3}	0.021	0.047
	Hanford → WIPP	0.013	0.014	5.0×10^{-8}	6.3×10^{-3}	0.030	0.063
MLLW	Envirocare	1.3×10^{-3}	1.0×10^{-3}	4.1×10^{-5}	2.4×10^{-4}	8.1×10^{-4}	3.4×10^{-3}
	Hanford Site	1.4×10^{-3}	1.1×10^{-3}	4.5×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	3.8×10^{-3}
	NTS	1.4×10^{-3}	1.3×10^{-3}	4.1×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	4.0×10^{-3}
HLW	SRS → Repository	0.010	0.021	3.0×10^{-7}	6.1×10^{-3}	0.035	0.072
	Hanford Site → Repository	9.4×10^{-3}	0.021	3.9×10^{-7}	5.3×10^{-3}	0.030	0.066
							Total Rail Fatalities: 0.66 – 0.79

Acronyms: LCFs = latent cancer fatalities; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; MLLW = mixed low-level waste; HLW = high-level radioactive waste; SRS = Savannah River Site; NTS = Nevada Test Site; WIPP = Waste Isolation Pilot Plant; INEEL = Idaho National Engineering and Environmental Laboratory; ORNL = Oak Ridge National Laboratory. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type.

Public Impacts. If trucks were used to ship the waste, the maximally exposed member of the public would be a person working at a service station who would receive a radiation dose of about 19 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 1.1×10^{-5}.

If trains were used to ship the waste, the maximally exposed member of the public would be a rail yard worker who was not directly involved with handling the railcars. This person would receive a radiation dose of about 35 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 2.1×10^{-5}.

4.5.3.3 Impacts from the Maximum Reasonably Foreseeable Transportation Accidents

As is the case for Alternative A, for waste shipped under Alternative B, the maximum reasonably foreseeable truck or rail transportation accident with the highest consequences would involve CH-TRU waste. Because one TRUPACT-II shipping container was assumed to be involved in either the truck or rail accident, the consequences for the truck or rail accident are the same. However, the probability of the truck and rail accidents are slightly different. The probability of the truck accident was 8×10^{-7} per year. For rail, the probability of the accident was 3×10^{-7} per year. The maximally exposed individual would receive a radiation dose of about 25 rem from this accident, which is equivalent to a latent cancer fatality risk of 0.015. The population would receive a collective radiation dose of approximately 6,600 person-rem from this accident. This could result in about 4 latent cancer fatalities. Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002), the sum of fractions of the biota concentration guides for the CH-TRU accident was less than 1. Therefore, the radioactive releases from the CH-TRU accident would not be likely to cause persistent, measurable, deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

4.5.4 Offsite Impacts (Alternative B)

Under Alternative B, LLW and mixed LLW would be disposed of at Hanford, NTS, or a commercial disposal site such as Envirocare. If the entire volume of WVDP LLW and mixed LLW inventory were sent to one of these sites, the probability that a worker would incur a latent cancer fatality would range from 3.2×10^{-2} to 3.6×10^{-2}. The maximally exposed individual member of the public would have a probability of incurring a latent cancer fatality of between 5.1×10^{-5} and 2.1×10^{-15}.

In addition, approximately 1,372 cubic meters (49,000 cubic feet) of TRU waste would be stored at Hanford, INEEL, ORNL, SRS, or WIPP. Interim storage of this waste volume would result in a probability that a worker would incur a latent cancer fatality of between 2.5×10^{-3} and 1.6×10^{-4}. The maximally exposed individual member of the public would have a probability of incurring a latent cancer fatality of between 6.9×10^{-7} and 2.1×10^{-10}. The populations within 80 kilometers (50 miles) of the sites would have a probability of incurring a latent cancer fatality of between 2.6×10^{-3} and 2.3×10^{-5}.

HLW currently stored at WVDP would be stored at Hanford or SRS. Interim storage of 300 canisters of WVDP HLW at these sites would result in a probability that a worker would incur a latent cancer fatality of between 2.0×10^{-2} and 3.6×10^{-2}.

Table 2-6 provides offsite human health impacts in detail; Appendix C, Section C.10, explains how these impacts were derived.

4.6 ENVIRONMENTAL JUSTICE IMPACTS

In February 1994, the President issued Executive Order 12898, titled *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* [59 Fed. Reg. 7629-7633 (1994)]. This Order directs federal agencies to incorporate environmental justice as part of their missions. As such, federal agencies are specifically directed to identify and address as appropriate disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

The Council on Environmental Quality has issued guidance (CEQ 1997) to federal agencies to assist them with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. In this guidance, the Council encouraged federal agencies to supplement the guidance with their own specific procedures tailored to particular programs or activities of an agency. DOE has prepared the *Draft Guidance on Incorporating Environmental Justice Considerations into the Department of Energy's National Environmental Policy Act Process* (DOE 2000) based on Executive Order 12898 and the Council on Environmental Quality environmental justice guidance.

Among other things, the DOE draft guidance states that even for actions that are at the low end of the sliding scale with respect to the significance of environmental impacts, some consideration (which could be qualitative) is needed to show that DOE considered environmental justice concerns. DOE needs to demonstrate that it considered apparent pathways or uses of resources that are unique to a minority or low-income community before determining whether, even in light of these special pathways or practices, there are disproportionately high and adverse impacts on the minority or low-income population. The DOE draft guidance also defines "minority population" as a populace where either (1) the minority population of the affected area exceeds 50 percent or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population.

For this Waste Management EIS, DOE applied the environmental justice guidance to determine whether there could be any disproportionately high and adverse human health or environmental impacts on minority or low-income populations surrounding the WVDP site as a result of the implementation of any of the alternatives analyzed. Analysis of environmental justice concerns was based on an assessment of the impacts reported in Sections 4.3 through 4.5. Although no high and adverse impacts were identified to any receptor from either the proposed onsite waste management actions or the offsite shipments of wastes, DOE considered whether minority or low-income populations would be disproportionately affected by the ongoing management of the WVDP site, particularly taking into account subsistence fishing on the part of some residents of the Cattaraugus Reservation of the Seneca Nation of Indians.

Subsistence Consumption of Fish. Consumption of food and water is a major source of exposure to potentially hazardous substances for U.S. residents. These pathways are also expected to be the primary routes through which a resident of the Cattaraugus Reservation of the Seneca Nation could be exposed to releases from the WVDP site. Because a member of the Seneca Nation may consume more fish from local waters than other members of the population around the WVDP site, DOE performed an additional dose assessment for increased fish consumption.

Specifically, DOE evaluated the potential human health impacts that could occur from the consumption by one individual of up to 62 kilograms (137 pounds) of game fish per year, compared to 21 kilograms (46 pounds) of game fish assumed for the maximally exposed individual in the WVDP Annual Site Environmental Reports. The 62-kilogram consumption rate represents the 95th percentile fish consumption rate for Native Americans from the *Exposure Factors Handbook* (EPA 1997).

Over the period 1995 through 1999, the average radiation dose from fish consumption reported in the WVDP Annual Site Environmental Reports (WVNS 1996, 1997, 1998, 1999, 2000c) was 0.016 mrem per year, based on eating 21 kilograms (46 pounds) of fish per year. The radiation dose from eating 62 kilograms (137 pounds) of fish per year was 0.05 mrem per year. These radiation doses are less than 0.1 percent of the DOE standard of 100 mrem per year from DOE Order 5400.5 and would result in less than 1 (3.0×10^{-8}) latent cancer fatality. Based on this analysis, DOE concludes that implementation of any of the alternatives would not result in disproportionately high and adverse impacts on the minority or low-income population in the region, even in light of possible increased exposure through subsistence fishing. Additional information concerning the assessment of human health impacts is provided in Appendix C.

Transportation. The transportation of radioactive waste would use the nation's existing highways and railroads. As described in previous sections, the total impacts from transportation would be very low (less than 1 fatality over 10 years) and therefore would not present a large health or safety risk to the population as a whole, or to workers or individuals along transportation routes. Based on this analysis, DOE concludes that implementation of any of the alternatives would not result in disproportionately high and adverse impacts on the minority or low-income populations along transportation routes.

Only a severe accident that resulted in a considerable release of radioactive material could cause high and adverse impacts in the affected populations. Because the risk of these accidents applies to the entire population along transportation routes, it would not apply disproportionately to any minority or low-income populations along the routes.

Additional information concerning the assessment of transportation impacts is provided in Appendix D.

Offsite Activities. The potential that low-income or minority populations could experience disproportionately high and adverse environmental consequences at sites where waste management activities would occur was addressed in earlier NEPA documents (see Section 1.7.1). No such potential impacts were identified for any site. For LLW, mixed LLW, and HLW, the potential for adverse human health impacts as a result of waste management activities is low, and no disproportionately high and adverse health effects would be expected for any particular segment of the population, including low-income or minority populations.

With respect to TRU waste, the WM PEIS concluded that the potential for disproportionately high and adverse human health effects as a result of TRU waste treatment operations was low for all sites except INEEL and WIPP (WM PEIS, Section 8.10.1). At those sites, the maximally exposed individual member of the public would be located in a census tract that contained a low-income or minority population. WVDP TRU waste, however, would be stored on these sites on an interim basis and would not be treated. Therefore, DOE does not anticipate that the interim storage of WVDP TRU waste at either of these sites would pose disproportionately high and adverse impacts on low-income or minority populations.

4.7 REFERENCES

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CHAPTER 5

CUMULATIVE IMPACTS

This chapter addresses the potential for cumulative environmental impacts resulting from the implementation of Alternatives A or B and other past, present, and reasonably foreseeable future actions in the region around the West Valley Demonstration Project site.

Council on Environmental Quality regulations implementing the procedural provisions of NEPA require federal agencies to consider the cumulative impacts of a proposal (40 CFR 1508.25(c)). A cumulative impact on the environment is the impact that results from the incremental impact of an 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 (40 CFR 1508.7). This type of an assessment is important because significant cumulative impacts can result from several smaller actions that by themselves do not have significant impacts.

The Western New York Nuclear Service Center is located in a rural area with no other major industrial or commercial centers surrounding it. Land use within 8 kilometers (5 miles) of the site is predominantly agricultural (active and inactive) and forestry uses. The industries near the site are light industrial and commercial (either retail or service-oriented). A field review of an 8-kilometer (5-mile) radius did not indicate the presence of any industrial facilities that would present a hazard in terms of safe operation of the site or would have any potential to impact the environment around WVDP (see Section 3.5). Thus, there is no potential for cumulative impacts from other present or reasonably foreseeable future actions, other than from activities at the site.

The WVDP site and the surrounding area in Cattaraugus County are in attainment with the National Primary and Secondary Ambient Air Quality Standards and New York State air quality standards. WVDP's current emissions of criteria pollutants are well below the New York State Department of Environmental Conservation's annual emission. The estimate of future emissions of criteria pollutants under all alternatives demonstrates that the site will continue to operate within its permit limits, with emissions that, even when conservatively combine with Buffalo background levels, would all be below federal and New York State standards (see Section 3.3.2).

Past fuel processing and radioactive waste disposal operations at the Center have resulted in airborne and liquid releases, some soil and groundwater contamination, limited sediment contamination in the creeks, and some detectible contamination off the site. The net impact from these past operations to the regional population near the Center has been estimated to be approximately 13 person-rem. During reprocessing operations, the estimated cumulative exposure to the workforce was about 4,200 person-rem (JAI 1980). As demonstrated in Section 4.0, the potential radiation dose to workers and the public, within 80 kilometers (50 miles), from the implementation of the No Action Alternative, Alternatives A or B, would be far lower than that experienced in the past (2.5 person-rem), and the resulting cumulative impact would be very small (less than one projected latent cancer fatality). There are ongoing operations at the WVDP site. These activities are those included in the No Action Alternative and Alternatives A and B and involve active hazardous waste management, operational support, surveillance, and oversight and other routine operations. These activities result in exposure of workers and the public to very low doses of radiation above background levels each year (0.1 percent of natural background annual exposure for the maximally exposed member of the public). The dose from ongoing operations, when added to the expected dose from the implementation of Alternatives A or B, would remain very low.

All ongoing operations that would contribute to potential impacts have been incorporated into the impact analyses provided in this EIS that demonstrate very small impacts. There are no other ongoing or currently planned activities at the WVDP site that would contribute to site cumulative impacts. In the future, DOE or the New York State Energy Research and Development Authority may propose decommissioning and/or long-term stewardship activities that could impose environmental impacts at the site. However, at this time it is not known or reasonable to speculate what, if any, contributions future decontamination and/or long-term stewardship actions may make to cumulative impacts.

It is reasonably foreseeable that waste generated as part of decommissioning and/or long-term stewardship activities would also be shipped offsite. Although the specific volume cannot be known at this time and would vary depending on the alternative selected, it is expected that the volume to be shipped offsite would be analyzed in the Decommissioning and/or Long-Term Stewardship EIS.

The shipment of radioactive wastes from the WVDP site to the disposal sites has the potential to affect people nationwide located along the highway and rail corridors between the site and the offsite disposal facilities. These potential impacts include the direct effect of radiation exposure to people using, working, and residing along the selected corridors and traffic accidents. Transportation workers and the general public using, working, and residing along the selected transportation corridors could also be affected by shipments of radioactive waste or materials from other sites. This situation would be particularly true for individuals residing along the major interstate highways used as access routes to the waste disposal sites. However, the potential cumulative impacts would be small, less than one projected latent cancer fatality in the affected population for the 10-year duration of the proposed actions (see Section 4.0). Further, there would be relatively few shipments of radioactive waste, (average of 25 trucks and/or 8 railcars per year) from the WVDP site, in comparison to other radioactive waste and materials shipments and truck shipments. Additionally, the actions contemplated in this EIS are also addressed in other NEPA documents such as the WM PEIS (DOE 1997a) and WIPP Supplemental EIS II (DOE 1997b) as listed in Section 1.7. These documents include analyses of impacts associated with transportation of waste to the receiving sites identified in this EIS and potential cumulative impacts at those sites.

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CHAPTER 6

UNAVOIDABLE IMPACTS, SHORT-TERM USES AND LONG-TERM PRODUCTIVITY, AND IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

In addition to a discussion of the environmental impacts of the proposed action and a discussion of alternatives, NEPA requires that an EIS contain information on any adverse environmental effects that could not be avoided if the proposed action were implemented, the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources that would be involved in the proposed action should it be implemented (NEPA, Section 102(2)(C); 42 U.S.C. 4332(C)). This chapter provides this information for Alternatives A and B.

6.1 UNAVOIDABLE ADVERSE IMPACTS

Under Alternative A or B, there would be a very slight increase in radiation doses to the public and workers as a result of waste management activities, which could result in a very slight increase in excess cancer risk. The highest *total* risk of a latent cancer fatality for the maximally exposed member of the public would be very low at 3.1×10^{-7} (about 3 chances in 10 million) under all alternatives, including the No Action Alternative. Offsite transportation of waste under Alternatives A or B could result in slight worker and public radiation exposure and the potential for traffic accident fatalities. The total estimate of fatalities from waste shipments is less than one for all alternatives.

6.2 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

Implementation of Alternative A or B would not create a conflict between the local, short-term uses of the environment and long-term productivity. All activities would occur in existing or planned facilities or would use existing or planned infrastructure resources such as roads and railways. Environmental resources such as land use, plants and animals, and wetlands would not be affected by implementation of either of the action alternatives.

6.3 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Utilization of utilities such as electricity, natural gas, and water would continue at the same rates as current operations under all alternatives. The only additional irreversible or irretrievable commitment of resources that would occur if Alternative A or B were implemented is the use of fossil fuels in the shipment of waste off the site and the use of land for the disposal of radioactive wastes. Approximately 2,550 truck or 847 rail shipments would be required to ship all LLW, mixed LLW, TRU waste and HLW off the site under Alternative A or B. Both rail and truck shipments would require the consumption of diesel fuel and other fossil fuels such as gasoline and lubricants.

Implementation of Alternatives A or B would also involve the use of offsite land previously committed for radioactive waste disposal facilities. As described in Section 1.7, the land use requirements for the offsite disposal of LLW, mixed LLW, and TRU waste have been addressed in the WM PEIS (DOE 1997a) and the WIPP Supplemental EIS II (DOE 1997b). Land use requirements for the offsite disposal of HLW are addressed in the *Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 2002).

6.4 REFERENCES

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CHAPTER 7

LIST OF PREPARERS AND DISCLOSURE STATEMENT

This chapter identifies the individuals who were principal preparers of this document. Daniel Sullivan directed its preparation. Thomas L. Anderson managed the project and provided technical support. Lucinda Swartz served as technical reviewer for conformity to the National Environmental Policy Act, the Council on Environmental Quality, and U.S. Department of Energy regulations and guidance. Following the list of preparers is the "NEPA Disclosure Statement for Preparation of the West Valley Demonstration Project Waste Management Environmental Impact Statement."

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NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE WEST VALLEY DEMONSTRATION PROJECT WASTE MANAGEMENT ENVIRONMENTAL IMPACT STATEMENT

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require a contractor who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial or other interest in the outcome of the project" for purposes of this disclosure, is defined in the March 23, 1981, guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 18026-18038 at Questions 71a and b.

"Financial or other interest in the outcome of the project" includes "any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)" 46 FR 18026-18038 at 18031.

In accordance with these requirements, **Battelle Memorial Institute** hereby certifies as follows: check either (a) or (b).

(a) **X** **Battelle Memorial Institute** has no financial or other interest in the outcome of the referenced EIS projects.

(b) ____ ______________________ has the following financial or other interest in the outcome of the referenced EIS projects hereby agree to divest themselves of such interest prior to the start of the work.

Financial or Other Interest

1.
2.
3.

Certified by:

Signature

Ralph K. Henricks
Name

Contracting Officer
Title
25 October 2000
Date

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CHAPTER 8

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Janet Anderson
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Willis Bixby
Tom Blackburn
David Bradshaw
Melinda Brown
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Wesley Churchill
Cristin Clarke
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CHAPTER 9

GLOSSARY

50 percent atmospheric conditions — Atmospheric conditions that are not exceeded 50 percent of the time and provide a realistic estimate of the likely atmospheric conditions that would exist during an accident.

95 percent atmospheric conditions — Atmospheric conditions that are not exceeded 95 percent of the time and provide an upper bound on the atmospheric conditions that would exist during an accident.

air quality — The cleanliness of the air as measured by the levels of pollutants relative to standards or guideline levels established to protect human health and welfare. Air quality is often expressed in terms of the pollutant for which concentrations are the highest percentage of a standard (e.g., air quality may be unacceptable if the level of one pollutant is 150 percent of its standard, even if levels of other pollutants are well below their respective standards).

air-quality standards — The legally prescribed level of constituents in the outside air that cannot be exceeded during a specified time in a specified area.

background radiation — Radiation from (1) cosmic sources, (2) naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material), and (3) global fallout as it exists in the environment (e.g., from the testing of nuclear explosive devices).

Center — The Western New York Nuclear Service Center; the site abbreviation as used in this EIS.

characterization — The determination of waste composition and properties, whether by review of process knowledge, nondestructive examination or assay, or sampling and analysis, generally done for the purpose of determining appropriate storage, treatment, handling, transport, and disposal practices to meet regulatory requirements.

cloudshine — Direct external dose from the passing cloud of dispersed radioactive material.

collective dose — The sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation. Collective dose is expressed in units of person-rem or person-sievert.

concentration — The quantity of a substance in a unit quantity of a sample (for example, milligrams per liter or micrograms per kilogram).

contact-handled waste	Radioactive waste or waste packages whose external dose rate is low enough to permit handling by humans during normal waste management activities. Also defined as transuranic waste with a surface dose rate not greater than 200 millirem per hour.
contamination	Unwanted chemical elements, compounds, or radioactive material on structures, areas, environmental media, objects, or personnel.
criteria pollutant	An air pollutant that is regulated by National Ambient Air Quality Standards (NAAQS). The Environmental Protection Agency must describe the characteristics and potential health and welfare effects that form the basis for setting, or revising, the standard for each regulated pollutant. Criteria pollutants currently are: sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and two size classes of particulate matter (less than 10 micrometers [0.0004 inch] in diameter and less than 2.5 micrometers [0.0001 inch] in diameter. New pollutants may be added to, or removed from, the list of criteria pollutants as more information becomes available. *Note: Sometimes pollutants regulated by state laws are also called criteria pollutants.*
cumulative impacts	Impacts on the environment that result when the incremental impact of a proposed action is added to the impacts from other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes the other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
decommissioning	Removing facilities such as processing plants, waste tanks, and burial grounds from service and reducing or stabilizing radioactive contamination. Includes the following concepts: the decontamination, dismantling, and return of an area to its original condition without restrictions on use or occupancy; partial decontamination, isolation of remaining residues, and continued surveillance and restrictions on use or occupancy.
decontamination	The actions taken to reduce or remove substances that pose a substantial present or potential hazard to human health or the environment, such as radioactive contamination from facilities, soil, or equipment by washing, chemical action, mechanical cleaning, or other techniques.
dermal	Relating to the skin.
disposal	Emplacement of waste so as to ensure isolation from the biosphere without maintenance and with no intent of retrieval, and requiring deliberate action to gain access after emplacement.
disposal area	A place for burying unwanted (that is, radioactive) materials in which the earth acts as a receptacle to prevent the dispersion of wastes in the environment and the escape of radiation.

disposal facility	A man-made structure in which waste is disposed.
DOE orders	Requirements internal to the U.S. Department of Energy (DOE) that establish DOE policy and procedures, including those for compliance with applicable laws.
dose (radiological)	A generic term meaning absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or committed equivalent dose, as defined in the *Glossary of Terms Used in DOE NEPA Documents* (September 1998).
endangered species	Plants or animals that are in danger of extinction through all or a significant portion of their ranges and that have been listed as endangered by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service following procedures outlined in the Endangered Species Act and its implementing regulations (50 CFR 424). *Note: Some states also list species as endangered. Thus, in certain cases, a state definition would also be appropriate.*
environmental impact statement (EIS)	The detailed written statement that is required by section 102(2)(C) of the National Environmental Policy Act (NEPA) for a proposed major federal action significantly affecting the quality of the human environment. A DOE EIS is prepared in accordance with applicable regulations in 40 CFR 1500-1508, and the Department of Energy NEPA regulations in 10 CFR Part 1021. The statement includes, among other information, discussions of the environmental impacts of the proposed action and all reasonable alternatives, adverse environmental effects that can not be avoided should the proposal be implemented, the relationship between short-term uses of the human environment and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources.
environmental justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and Tribal programs and policies. Executive Order 12898 directs federal agencies to make achieving environmental justice part of their missions by identifying and addressing disproportionately high and adverse effects of agency programs, policies, and activities on minority and low-income populations.

exposure — The condition of being subject to the effects or acquiring a dose of a potential stressor such as a hazardous chemical agent or ionizing radiation; also, the process by which an organism acquires a dose of a chemical such as mercury or a physical agent such as ionizing radiation. Exposure can be quantified as the amount of the agent available at various boundaries of the organism (e.g., skin, lungs, gut) and available for absorption.

FONSI (Finding of no significant impact) — A public document issued by a federal agency briefly presenting the reasons why an action for which the agency has prepared an environmental assessment has no potential to have a significant effect on the human environment and, thus, will not require preparation of an environmental impact statement. [See environmental impact statement.]

geologic repository — A system that is intended to be used for, or may be used for, the disposal of radioactive waste or spent nuclear fuel in excavated geologic media. A geologic repository includes (a) the geologic repository operations area, and (b) the portion of the geologic setting that provides isolation. A near-surface disposal area is not a geologic repository.

groundwater — Water below the ground surface in a zone of saturation.

Subsurface water is all water that exists in the interstices of soil, rocks, and sediment below the land surface, including soil moisture, capillary fringe water, and groundwater. That part of subsurface water in interstices completely saturated with water is called groundwater.

groundshine — Direct external dose from radioactive material that has deposited on the ground after being dispersed from the accident site.

hazardous waste — A category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20 through 40 CFR 261.24 (i.e., ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the Environmental Protection Agency in 40 CFR 261.31 through 40 CFR 261.33.

Source, special nuclear, or by-product materials as defined by the Atomic Energy Act are not hazardous waste because they are not solid waste under RCRA. (See Resource Conservation and Recovery Act and waste characterization.)

high-efficiency particulate air filter (HEPA) — An air filter capable of removing at least 99.97 percent of particles 0.3 micrometers (about 0.00001 inch) in diameter. These filers include a pleated fibrous medium (typically fiberglass) capable of capturing very small particles.

high-level (radioactive) waste (HLW) Defined by statute (the Nuclear Waste Policy Act) to mean the highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products nuclides in sufficient concentrations; and other highly radioactive material that the U.S. Nuclear Regulatory Commission (NRC), consistent with existing law, determines by rule requires permanent isolation. The NRC has not defined "sufficient concentrations" of fission products or identified "other highly radioactive material that requires permanent isolation." The NRC defines high-level radioactive waste (HLW) to mean irradiated (spent) reactor fuel, as well as liquid waste resulting from the operation of the first cycle solvent extraction system, the concentrated wastes from subsequent extraction cycles in a facility for reprocessing irradiated reactor fuel, and solids into which such liquid wastes have been converted.

involved worker Worker who would participate in a proposed action.

lag storage In the context of this EIS, temporary onsite storage of waste at WVDP facilities.

latent cancer fatality (LCF) Deaths from cancer resulting from, and occurring some time after, exposure to ionizing radiation or other carcinogens.

Low-income population Low-income populations, defined in terms of Bureau of the Census annual statistical poverty levels (Current Population Reports, Series P-60 on Income and Poverty), may consist of groups or individuals who live in geographic proximity to one another or who are geographically dispersed or transient (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. (See environmental justice.)

low-level (radioactive) waste (LLW) Radioactive waste that is not high-level waste, transuranic waste, spent nuclear fuel, or by-product tailings from processing of uranium or thorium ore. (See radioactive waste.)

maximally exposed individual (MEI) A hypothetical individual whose location and habits result in the highest total radiological or chemical exposure (and thus dose) from a particular source for all exposure routes (e.g., inhalation, ingestion, direct exposure).

millirem One-thousandth of a rem (Also see *rem*).

mitigative measures Those actions that avoid impacts altogether, minimized impacts, rectify impacts, reduce or eliminate impacts, or compensate for the impact.

mixed waste — Waste that contains both hazardous waste, as defined under the Resource Conservation and Recovery Act, and source, special nuclear, or by-product material subject to the Atomic Energy Act.

NAAQS (National Ambient Air Quality Standards) — Standards defining the highest allowable levels of certain pollutants in the ambient air (i.e., the outdoor air to which the public has access). Because the Environmental Protection Agency must establish the criteria for setting these standards, the regulated pollutants are called *criteria* pollutants. Criteria pollutants include sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and two size classes of particulate matter, less than 10 micrometers (0.0004 inch) in diameter, and less than 2.5 micrometers (0.0001 inch) in diameter. Primary standards are established to protect public health; secondary standards are established to protect public welfare (e.g., visibility, crops, animals, buildings). (See criteria pollutant.)

NEPA (National Environmental Policy Act of 1969) — NEPA is the basic national charter for protection of the environment. It establishes policy, sets goals (in Section 101), and provides means (in Section 102) for carrying out the policy. Section 102(2) contains "action-enforcing" provisions to ensure that federal agencies follow the letter and spirit of the Act. For major federal actions significantly affecting the quality of the human environment, Section 102(2)(C) of NEPA requires federal agencies to prepare a detailed statement that includes the environmental impacts of the proposed action and other specified information.

NESHAPs (National Emissions Standards for Hazardous Air Pollutants) — Emissions standards set by the Environmental Protection Agency for air pollutants which are not covered by the Nation Ambient Air Quality Standards (NAAQS) and which may, at sufficiently high levels, cause increased fatalities, irreversible health effects, or incapacitating illness. These standards are given in 40 CFR Parts 61 and 63. NESHAPs are given for many specific categories of sources (e.g., equipment leaks, industrial process cooling towers, dry cleaning facilities, petroleum refineries).

noninvolved worker — A worker who would be on the site of an action but would not participate in the action. (See involved worker.)

occupational dose — Whole-body radiation dose received by workers participating in a given task.

person-rem — The unit of collective radiation dose applied to populations or groups of individuals (see collective dose); that is, a unit for expressing the dose when summed across all persons in a specified population or group. One person-rem equals 0.01 person-sieverts.

probability of occurrence — The chance that an accident might occur during the conduct of an activity.

radioactive waste	In general, waste that is managed for its radioactive content. Waste material that contains source, special nuclear, or by-product material is subject to regulation as radioactive waste under the Atomic Energy Act. Also, waste material that contains accelerator-produced radioactive material or a high concentration of naturally occurring radioactive material may be considered radioactive waste.
radionuclide	An unstable isotope that undergoes spontaneous transformation, emitting radiation.
Record of Decision (ROD)	A concise public document that records a federal agency's decision(s) concerning a proposed action for which the agency has prepared an environmental impact statement (EIS). The ROD is prepared in accordance with the requirements of the Council on Environmental Quality NEPA regulations (40 CFR 1505.2). A ROD identifies the alternatives considered in reaching the decision, the environmentally preferable alternatives(s), factors balanced by the agency in making the decision, whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why they were not. [See environmental impact statement (EIS).]
release fraction	The fraction of the radioactivity that could be released to the atmosphere in a given accident.
rem	A unit of dose equivalent. The dose equivalent in rem equals the absorbed dose in rads in tissue multiplied by the appropriate quality factor and possibly other modifying factors. Derived from "roentgen equivalent man," referring to the dosage of ionizing radiation that will cause the same biological effect as one roentgen of X-ray or gamma-ray exposure. One rem equals 0.01 sievert.
remote-handled waste	Packaged waste whose external surface dose rate exceeds 200 millirem per hour.
repository	A permanent deep geologic disposal facility for high-level or transuranic wastes and spent nuclear fuel.
Resource Conservation and Recovery Act (RCRA)	A law that gives the Environmental Protection Agency the authority to control hazardous waste from "cradle to grave" (i.e., from the point of generation to the point of ultimate disposal), including its minimization, generation, transportation, treatment, storage, and disposal. RCRA also sets forth a framework for the management of non-hazardous solid wastes. (See hazardous waste.)
risk	The probability of a detrimental effect from exposure to a hazard. Risk is often expressed quantitatively as the probability of an adverse event occurring multiplied by the consequence of that event (i.e., the product of these two factors). However, separate presentation of probability and consequence is often more informative.

scientific notation

A notation adopted by the scientific community to deal with very large and very small numbers by moving the decimal point to the right or left so that only one number above zero is to the left of the decimal point. Scientific notation uses a number times 10 and either a positive or negative exponent to show how many places to the left or right the decimal places has been moved. For example, in scientific notation, 120,000 would be written as 1.2×10^5, and 0.000012 would be written as 1.2×10^{-5}.

scoping

An early and open process for determining the scope of issues to be addressed in an environmental impact statement (EIS) and for identifying the significant issues related to a proposed action.

The scoping period begins after publication in the Federal Register of a Notice of Intent (NOI) to prepare an EIS. The public scoping process is that portion of the process where the public is invited to participate. DOE also conducts an early internal scoping process for environmental assessments or EISs. For EISs, this internal scoping process precedes the public scoping process. DOE's scoping procedures are found in 10 CFR 1021.311.

source term

The amount of a specific pollutant (e.g., chemical, radonuclide) emitted or discharged to a particular environmental medium (e.g., air, water) from a source or group of sources. It is usually expressed as a rate (i.e., amount per unit time).

storage (waste)

The collection and containment of waste in a retrievable manner, requiring surveillance and institutional control, as not to constitute disposal.

surface water

All bodies of water on the surface of the earth and open to the atmosphere, such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

thalweg

The line joining the deepest points of a stream channel, often used as a synonym for valley profile.

threatened species

Any plants or animals that are likely to become endangered species within the forseeable future throughout all or a significant portion of their ranges and which have been listed as threatened by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service following the procedures set out in the Endangered Species Act and its implementing regulations (50 CFR 424). (See endangered species.)

transuranic (TRU) waste

Radioactive waste that is not classified as high-level radioactive waste and that contains more than 100 nanocuries (3700 becquerels) per gram of alpha-emitting transuranic isotopes with half-lives greater than 20 years.

TRUPACT-II

TRUPACT-II is the package designed to transport contact-handled transuranic waste to the Waste Isolation Pilot Plant site. It is a cylinder with a flat bottom and a domed top that is transported in the upright position. The major components of the TRUPACT-II are an inner, sealed, stainless steel containment vessel within an outer, sealed, stainless steel containment vessel. Each containment vessel is nonvented and capable of withstanding 345 kilopascals (50 pounds per square inch) of pressure. The inner containment vessel cavity is 1.8 meters (6 feet) in diameter and 2 meters (6.75 feet) tall, with a capability of transporting fourteen 0.21-cubic-meter (55-gallon) drums, two standard waste boxes, or one 10-drum overpack.

waste characterization

The identification of waste composition and properties by reviewing process knowledge, nondestructive examination, nondestructive assay, or sampling and analysis. Characterization provides the basis for determining appropriate storage, treatment, handling, transportation, and disposal methods to meet regulatory requirements.

worker

Any worker whose day-to-day activities are controlled by process safety management programs and a common emergency response plan associated with a facility or facility area. This definition includes any individual within a facility/facility area who would participate or support activities required for implementation of the alternatives.

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CHAPTER 10

INDEX

A

B

No entries.

C

D

E

O

P

Q

No entries.

R

S

QA: NA

APPENDIX A

SPECIFIC LEGAL REQUIREMENTS THAT APPLY TO WEST VALLEY WASTE MANAGEMENT ACTIVITIES

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APPENDIX A

SPECIFIC LEGAL REQUIREMENTS THAT APPLY TO WEST VALLEY WASTE MANAGEMENT ACTIVITIES

This appendix includes copies of the original West Valley Demonstration Project Act and the original Stipulation of Compromise settlement, as filed with the U.S. District Court for the Western District of New York.

WEST VALLEY PROJECT DEMONSTRATION ACT

PUBLIC LAW 96-368 [S. 2443]; October 1, 1980

WEST VALLEY DEMONSTRATION PROJECT ACT

For Legislative History of this and other Laws, see Table 1, Public Laws and Legislative History, at end of final volume

An Act to authorize the Department of Energy to carry out a high-level liquid nuclear waste management demonstration project at the Western New York Service Center In West Valley, New York.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

West Valley Demonstration Project Act.
42 USC 2021a note.

SECTION 1. This Act may be cited as the "West Valley Demonstration Project Act".

42 USC 2021a note.

SEC. 2. (a) The Secretary shall carry out, in accordance with this Act, a high level radioactive waste management demonstration project at the Western New York Service Center in West Valley, New York, for the purpose of demonstrating solidification techniques which can be used for preparing high level radioactive waste for disposal. Under the project the Secretary shall carry out the following activities:

Activities.

(1) The Secretary shall solidify, in a form suitable for transportation and disposal, the high level radioactive waste at the Center by vitrification or by such other technology which the Secretary determines to be the most effective for solidification.

(2) The Secretary shall develop containers suitable for the permanent disposal of the high level radioactive waste solidified at the Center.

(3) The Secretary shall, as soon as feasible, transport, in accordance with applicable provisions of law, the waste solidified at the Center to an appropriate Federal repository for permanent disposal.

(4)The Secretary shall, in accordance with applicable licensing requirements, dispose of low level radioactive waste and transuranic waste produced by the solidification of the high level radioactive waste under the project.

(5) The Secretary shall decontaminate and decommission—

(A) the tanks and other facilities of the Center in which the high level radioactive waste solidified under the project was stored,

(B) the facilities used in the solidification of the waste, and

(C) any material and hardware used in connection with the project,

in accordance with such requirements as the Commission may prescribe.

(b) Before undertaking the project and during the fiscal year ending September 30, 1981, the Secretary shall carry out the following:

Hearings.

(1) The Secretary shall hold in the vicinity of the Center public hearings to inform the residents of the area in which the Center is located of the activities proposed to be undertaken under the project and to receive their comments on the project.

(2) The Secretary shall consider the various technologies available for the solidification and handling of high level radioactive waste taking into account the unique characteristics of such waste at the Center.

94 STAT. 1347

(3) The Secretary shall—

(A) undertake detailed engineering and cost estimates for the project,

(B) prepare a plan for the safe removal of the high level radioactive waste at the Center for the purposes of solidification and include in the plan provisions respecting the safe breaching of the tanks in which the waste is stored, operating equipment to accomplish the removal, and sluicing techniques,

(C) conduct appropriate safety analyses of the project, and

(D) prepare required environmental impact analyses of the project.

(4) The Secretary shall enter into a cooperative agreement with the State in accordance with the Federal Grant and Cooperative Agreement Act of 1977 under which the State will carry out the following:

41 USC 501 note.

(A) The State will make available to the Secretary the facilities of the Center and the high level radioactive waste at the Center which are necessary for the completion of the project. The facilities and the waste shall be made available without the transfer of title and for such period as may be required for completion of the project.

(B) The Secretary shall provide technical assistance in securing required license amendments.

State costs, percentage.

(C) The State shall pay 10 per centum of the costs of the project, as determined by the Secretary. In determining the costs of the project, the Secretary shall consider the value of the use of the Center for the project. The State may not use Federal funds to pay its share of the cost of the project, but may use the perpetual care fund to pay such share.

Licensing amendment application.

(D) Submission jointly by the Department of Energy and the State of New York of an application for a licensing amendment as soon as possible with the Nuclear Regulatory Commission providing for the demonstration.

(c) Within one year from the date of the enactment of this Act, the Secretary shall enter into an agreement with the Commission to establish arrangements for review and consultation by the Commission with respect to the project: *Provided*, That review and consultation by the Commission pursuant to this subsection shall be conducted informally by the Commission and shall not include nor require formal procedures or actions by the Commission pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, or any other law. The agreement shall provide for the following:

42 USC 2011 note.
42 USC 5801 note.

(1) The Secretary shall submit to the Commission, for its review and comment, a plan for the solidification of the high level radioactive waste at the Center, the removal of the waste for purposes of its solidification, the preparation of the waste for disposal, and the decontamination of the facilities to be used in solidifying the waste. In preparing its comments on the plan, the Commission shall specify with precision its objections to any provision of the plan. Upon submission of a plan to the Commission, the Secretary shall publish a notice in the Federal Register of the submission of the plan and of its availability for public inspection, and, upon receipt of the comments of the Commission respecting a plan, the Secretary shall publish a notice in the Federal Register of the receipt of the comments and of the availability of the comments for public inspection. If the Secre-

Publications in Federal Register.

tary does not revise the plan to meet objections specified in the comments of the Commission, the Secretary shall publish in the Federal Register a detailed statement for not so revising the plan.

(2) The Secretary shall consult with the Commission with respect to the form in which the high level radioactive waste at the Center shall be solidified and the containers to be used in the permanent disposal of such waste.

(3) The Secretary shall submit to the Commission safety analysis reports and such other information as the Commission may require to identify any danger to the public health and safety which may be presented by the project. Reports and other information to Commission.

(4) The Secretary shall afford the Commission access to the Center to enable the Commission to monitor the activities under the project for the purpose of assuring the public health and safety.

(d) In carrying out the project, the Secretary shall consult with the Administrator of the Environmental Protection Agency, the Secretary of Transportation, the Director of the Geological Survey, and the commercial operator of the Center. Consultation with EPA and others.

SEC. 3. (a) There are authorized to be appropriated to the Secretary for the project not more than $5,000,000 for the fiscal year ending September 30, 1981. Appropriation authorization. 42 USC 2021a note.

(b) The total amount obligated for the project by the Secretary shall be 90 per centum of the costs of the project.

(c) The authority of the Secretary to enter into contracts under this Act shall be effective for any fiscal year only to such extent or in such amounts as are provided in advance by appropriation Acts.

SEC. 4. Not later than February 1, 1981, and on February 1 of each calendar year thereafter during the term of the project, the Secretary shall transmit to the Speaker of the House of Representatives and the President pro tempore of the Senate an up-to-date report containing a detailed description of the activities of the Secretary in carrying out the project, including agreements entered into and the costs incurred during the period reported on and the activities to be undertaken in the next fiscal year and the estimated costs thereof. Report to Speaker of the House and President pro tempore of the Senate. 42 USC 2021a note.

Sec. 5. (a) Other than the costs and responsibilities established by this Act for the project, nothing in this Act shall be construed as affecting any rights, obligations, or liabilities of the commercial operator of the Center, the State, or any person, as is appropriate, arising under the Atomic Energy Act of 1954 or under any other law, contract, or agreement for the operation, maintenance, or decontamination of any facility or property at the Center or for any wastes at the Center. Nothing in this Act shall be construed as affecting any applicable licensing requirement of the Atomic Energy Act of 1954 or the Energy Reorganization Act of 1974. This Act shall not apply or be extended any facility or property at the Center which is not used in conducting the project. This Act may not be construed to expand or diminish the rights of the Federal Government. 42 USC 2021a note. 42 USC 2011 note. 42 USC 5801 note.

(b) This Act does not authorize the Federal Government to acquire title to any high level radioactive waste at the Center or to the Center or any portion thereof.

SEC. 6. For purposes of this Act Definitions. 42 USC 2021a note.

(1) The term "Secretary" means the Secretary of Energy.

(2) The term "Commission" means the Nuclear Regulatory Commission.

(3) The term "State" means the State of New York.

P.L. 95-368 LAWS OF 96th CONG—2nd SESS. Oct. 1

(4) The term "high level radioactive waste" means the high level radioactive waste which was produced by the reprocessing at the Center of spent nuclear fuel. Such term includes both liquid wastes which are produced directly in reprocessing, dry solid material derived from such liquid waste, and such other material as the Commission designates as high level radioactive waste for purposes of protecting the public health and safety.

(5) The term "transuranic waste" means material contaminated with elements which have an atomic number greater than 92, including neptunium, plutonium, americium, and curium, and which are in concentrations greater than 10 nanocuries per gram, or in such other concentrations as the Commission may prescribe to protect the public health and safety.

(6) The term "low level radioactive waste" means radioactive waste not classified as high level radioactive waste, transuranic waste, or byproduct material as defined in section 11 e. (2) of the Atomic Energy Act of 1954.

42 USC 2014.

(7) The term "project" means the project prescribed by section 2(a).

(8) The term "Center" means the Western New York Service Center in West Valley, New York.

Approved October 1, 1980.

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF NEW YORK

COALITION ON WEST VALLEY NUCLEAR WASTES & RADIOACTIVE WASTE CAMPAIGN, Plaintiffs, -V- DEPARTMENT OF ENERGY, UNITED STATES OF' AMERICA, Defendant	CIVIL NO. 86-1052-C STIPULATION OF COMPROMISE SETTLEMENT

WHEREAS plaintiffs have filed this action challenging certain proposed actions of the United States Department of Energy relating to the disposal of low-level radioactive wastes generated from the solidification of high-level radioactive waste, and

WHEREAS plaintiffs and the defendant have met during the course of this litigation in an attempt to resolve through compromise the issues raised in the litigation, and

WHEREAS plaintiffs maintain that the defendants "Finding of No Significant Impact" dated August 6, 1986, which supported approval of disposal of certain radioactive wastes in two facilities situated at the Western New York Nuclear Service Center in West Valley, New York, should be annulled as contrary to the National Environmental Policy Act in that an Environmental Impact Statement (EIS) should have been prepared beforehand, and that

- 2 -

certain radioactive wastes which the defendant intends to dispose of are not "low-level wastes" but are instead "transuranic wastes" and that an EIS should be prepared by a date certain and that judicial review is necessary for other reasons as well, and

WHEREAS the defendant maintains that the Environmental Assessment undertaken which ultimately resulted in a Finding Of No Significant Impact proceeded in a manner within all statutory mandates of the National Environmental Policy Act and the guidelines promulgated thereunder, including those promulgated by the Council on Environmental Quality,

WHEREAS the defendant during discussions with plaintiffs, has made representations to the plaintiffs based on preliminary evaluations done by the defendant in good faith, which the plaintiffs utilized in arriving at this settlement. Those representations are as follows:

a. should the Class B/C wastes have to be moved from the existing emplacement as a result of the Environmental Impact Statement, it is estimated that there would be minimal occupational radiation doses associated with such potential future movement of the stored Class B/C wastes which would be further evaluated during the Environmental Impact Statement process; and

b. the defendant estimates that the costs of construction at the tumulus location for emplacement purposes is approximately $2,000,000 and the costs of converting the storage facility into a tumulus as approved by defendant is approximately $18,000,000.

- 3 -

WHEREAS, each of the parties is desirous of resolving this lawsuit so that one of the foremost objectives of the West Valley Demonstration Project Act can be met, that is, the immobilization of the liquid high-level radioactive waste located at the Western New York Nuclear Service Center (hereinafter referred to as "Center"), and

WHEREAS, the parties desire to avoid extended litigation and concomitant delay to the West Valley Demonstration Project and the parties further desire to advance the best interests of the public health and safety in light of the high-level nuclear wastes located at the Center, now

IT IS HEREBY STIPULATED AND AGREED by and between the the plaintiffs, Coalition on West Valley Nuclear Wastes & Radioactive Waste Campaign, and the defendant, United States of America and the United States Department of Energy, by and through their respective attorneys as follows:

1. As used herein, the term "defendant" shall mean the United States of America and the United States Department of Energy and the term "plaintiffs" shall mean the Coalition on West Valley Nuclear Wastes and the Radioactive Waste Campaign.

2. The parties acknowledge that this agreement shall not constitute an admission of liability or fault on the part of the plaintiffs or the defendant or on the part of their agents,

- 4 -

contractors or employees: this agreement is being entered into so that the best interests of the public and their health and safety can be served by the expeditious solidification of the high-level radioactive wastes located at the Western New York Nuclear Service Center and by the transport of said waste' to an appropriate federal repository for permanent disposal-in accordance with provisions of he West Valley Demonstration Project Act, Public Law 96-368. The procedures and actions set forth in the provisions of this agreement shall in force and in effect supersede the "Finding of No Significant Impact [FONSI] for Disposal of Project Low Level Wastes", dated August 6, 1986.

3. The Department of Energy had planned to prepare an Environmental Impact Statement concerning closure for the post-solidification phase of the project. The defendant hereby agrees that the scope of that Environmental Impact Statement shall include the following:

a. Disposal of those Class A wastes generated as a result of the activities of the Department of Energy at the West Valley Demonstration Project as mandated by the United States Congress under the West Valley Demonstration Project Act. However, in lieu of undertaking such an EIS, the defendant reserves the right to:

i. dispose of the Class A wastes in accordance with applicable law at a site other than the Center; or

ii. evaluate disposal of those Class A wastes in a separate EIS; or

iii. seek and obtain Nuclear Regulatory Commission (NRC) review and approval of any proposed disposal methodology for such Class A wastes at the Center.

b. The disposal of those Class B/C wastes generated as a result of the activities of the Department of Energy at the West Valley Demonstration Project as mandated by the United States Congress under the West Valley Demonstration Project Act.

4. The parties hereby agree that the closure Environmental Impact Statement process -- including the scoping process -- shall begin no later than 1988 and that this process shall continue without undue delay and in an orderly fashion consistent with applicable law, the objectives of the West Valley Demonstration Project, available resources and mindful of the procedural processes (including public input) needed to complete the aforesaid Environmental Impact Statement. The defendant agrees to provide a six (6) month public comment period for the draft EIS.

5. Pending such Environmental Impact Statement, the plaintiffs withdraw and waive any objection or claim concerning immobilization of the Class B/C wastes in a cement form consistent with the applicable Nuclear Regulatory Commission "Technical Position on Waste Form, May 1983, Rev. 0".

6. The plaintiffs withdraw and waive any objection or claim concerning the placement of the solidified Class B/C wastes in the "RTS Drum Cell" already under construction at the West Valley Demonstration Project pending a determination of the disposal of these solidified Class B/C wastes as a result of the Environmental Impact Statement. The Class A and Class B/C wastes shall be retrievably and temporarily stored pending the EIS or in the case of Class A wastes until fulfillment of the alternative disposal provisions under paragraph 3(a), supra.

7. The parties agree that for consideration of any on-site disposal, the defendant in the EIS shall evaluate erosion impacts and erosion control impacts and the need for erosion control measures.

8. While this agreement will not in and of itself subject the Department of Energy to formal NRC procedures, nor to actions required by law for licensed activities, it is hereby agreed that every good-faith effort shall be made to evaluate the site and the design(s) relative to the provisions of 10 C.F.R. S61.50 and s61.51. Similarly, if the Class B/C waste form does not satisfy or meet otherwise applicable NRC regulations and guidelines at the time of the draft Environmental Impact Statement, the defendant agrees that the scope of the Environmental Impact Statement shall

evaluate reasonable additional site suitability and disposal facility design safeguards to provide reasonable assurance that exposures to humans are within regulatory limits and guidelines established by the NRC.

9. The defendant agrees to hold and undertake meetings on a quarterly basis at a location at or near the West Valley Demonstration Project site to which members of the local geographical, educational, scientific and political communities -- including plaintiffs -- shall be invited, so that the defendant can advise such participants of the status of the Environmental Impact Statement process including current results and in order to receive public comment. The meetings shall commence during or prior to the EIS scoping process.

10. The defendant agrees to make available to the plaintiffs at the West Valley Demonstration Project Public Reading Room for public inspection upon reasonable notice, at reasonable hours and without a search charge, those documents requested with reasonable specificity which are reasonably related to the preparation of the EIS for the West Valley Demonstration Project including background information which would be available under a Freedom of Information Act request to the Department of Energy in accordance with the provisions of that Act. Should any person wish to have

copies, they may have such at nominal charges provided for under the Freedom of Information Act.

11. The defendant agrees to expeditiously seek and abide by a determination or prescription provided for under the West Valley Demonstration Project Act from the Nuclear Regulatory Commission (NRC) as to whether waste material (other than high-level waste) intended for disposal by the Department of Energy in conjunction with the West Valley Demonstration Project which waste material contains elements having an atomic number greater than 92 in concentrations greater than ten (10) nanocuries per gram but less than or equal to 100 nanocuries per gram, are transuranic wastes or low level wastes within the meaning of the West Valley Demonstration Project Act, Public Law 96-368 for disposal at the Center. For disposal at locations other than the Center, such disposal will be in accordance with applicable law. This determination or prescription shall be binding upon all parties except that plaintiffs reserve their right to seek judicial review of such determination or prescription of the Nuclear Regulatory Commission to the extent that such determination or prescription is arbitrary and capricious, an abuse of discretion or otherwise reviewable as not in accordance with the law.

12. The parties agree that this agreement shall fully and finally settle all the claims set forth in the Complaint and shall

be binding upon the plaintiffs for themselves, their successors or assigns and shall release the defendant of liability for all those claims set forth in the Complaint. However, such release is conditioned upon compliance with the terms of this agreement. Additionally, it is expressly acknowledged that this agreement is designed to ensure that an EIS process is undertaken in accordance with the terms of this agreement and consistent with applicable law. However, the plaintiffs reserve all their rights to challenge the contents of any EIS under applicable law once the EIS process is completed.

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Manager, Idaho Operations Office

RAYMOND C. VAUGHAN,
ACTING CHAIRMAN
On behalf of the Coalition on West Valley Nuclear Wastes

CAROL MONGERSON
Vice Chairperson, On Behalf of the Radioactive Waste Campaign

SO ORDERED:

HONORABLE JOHN T. CURTIN
UNITED STATES DISTRICT JUDGE

Dated: May 27, 1987.

APPENDIX B
RESPONSES TO SCOPING COMMENTS

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APPENDIX B
RESPONSES TO SCOPING COMMENTS

B.1 INTRODUCTION

In March 2001, the U.S. Department of Energy (DOE) issued a strategy for completing the 1996 West Valley Demonstration Project (WVDP) Completion and Closure Draft Environmental Impact Statement (EIS) (DOE 1996) and a Notice of Intent (NOI) to prepare a Decontamination and Waste Management EIS (66 Fed. Reg. 16447 (2001)). The Decontamination and Waste Management EIS was originally intended to be a revision of the 1996 Completion and Closure Draft EIS (see Section 1.2 for details). In the NOI, DOE published for comment its position that its decisionmaking process would be facilitated by preparing and issuing for public comment a Revised Draft EIS that focused on DOE's actions to decontaminate the project facilities and manage WVDP wastes controlled by DOE under the West Valley Demonstration Project Act. In the NOI, DOE also announced that it would conduct a public scoping meeting on April 10, 2001.

DOE received nine written and oral comments regarding the proposed scope of the Decontamination and Waste Management EIS from individuals, organizations, and government agencies. These comments were provided in letters and electronic mail messages and at the public scoping meeting. The commenters were:

- George J. Wilberg
- James L. Pickering
- Carol Mongerson
- State of New York Office of the Attorney General
- Coalition on West Valley Nuclear Wastes
- Concerned Citizens of Cattaraugus County, Inc.
- West Valley Citizens Task Force
- Nuclear Information and Resource Service, and Public Citizen/Critical Mass Energy and Environment Program (joint submittal)
- League of Women Voters of Buffalo/Niagara

B.2 SUMMARY OF COMMENTS

The commenters expressed concern regarding or opposition to DOE's rescoping of the *Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center* (1996 Completion and Closure Draft EIS). Taken together, the comments suggest that preparing one EIS for near-term decontamination and waste management activities and another EIS to support long-term decommissioning and/or long-term stewardship of the site violates the National Environmental Policy Act (NEPA) and the Stipulation of Compromise (*Coalition on West Valley Nuclear Wastes & Radioactive Waste Campaign*, Civil Action No. 86-1052-C, entered into on May 27, 1987).

B.3 DOE RESPONSE

As stated in the NOI to rescope the 1996 Completion and Closure Draft EIS, this EIS was originally focused on DOE actions to decontaminate West Valley Demonstration Project (WVDP or the Project) facilities and manage WVDP wastes that are controlled by DOE under the West Valley Demonstration Project Act. DOE has modified the scope of this EIS as a result of public comments received during scoping and has decided to eliminate the consideration of decontamination activities at the WVDP in the scope of this EIS. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI. The need for and potential environmental impacts of future decontamination activities will be addressed in the continuation of the 1996 Completion and Closure EIS, now referred to as the Decommissioning and/or Long-Term Stewardship EIS. An Advance NOI for this EIS was issued on November 6, 2001 (66 Fed. Reg. 56090 (2001)).

The proposed waste management activities addressed in this EIS would need to be taken by DOE regardless of the decisions regarding the long-term management of the Western New York Nuclear Service Center (the Center) that would be made at a later date. DOE's proposed waste management activities are independent of eventual site decommissioning and closure decisions.

DOE believes that the proposed waste management activities are not "connected" to future decommissioning and/or long-term stewardship decisions for WVDP or the Center, as that term is defined in the Council on Environmental Quality regulations implementing NEPA (*see* 40 Code of Federal Regulations [CFR] 1508.25(a)). The proposed activities would not automatically trigger other actions that would require the preparation of an EIS, can proceed independently of other actions at the site, and are not dependent upon future decisions regarding long-term plans for the site. Moreover, undertaking these activities in the near term would not limit or prejudge the range of alternatives or the decisions that would be made for eventual decommissioning of WVDP facilities and/or long-term stewardship of the Center. Finally, DOE believes that preparing an EIS for waste management activities would allow the Department to make progress in removing wastes from the site, rather than waiting until site decommissioning and/or long-term stewardship decisions are made some time in the future.

The specific issues that were raised by the commenters and DOE's responses are provided below.

GEORGE J. WILBERG

Wilberg Comment 1. *After reading the recent article about the continuing radioactive cleanup at the West Valley Nuclear Facilities I can only think that this cleanup has taken what seems to me "forever." In weighing the alternatives of a one part or two part plan I can only wonder how much longer the two part plan will take? Although I do not have the exact details of each plan it would appear to the uninformed reader that the two part plan obviously would take longer. Therefore, as a local resident and taxpayer I opt for the one part plan to achieve closure of this facility.*

DOE Response: DOE believes that rescoping the 1996 Completion and Closure Draft EIS into a Waste Management EIS and continuing the evaluations begun in the 1996 Completion and Closure Draft EIS in a future Decommissioning and/or Long-Term Stewardship EIS will allow the Department to begin site cleanup at an earlier time, rather than waiting until all future site closure decisions have been made. This approach will allow DOE to make decisions regarding transportation of waste for offsite disposal and to implement those decisions while undertaking the process of making long-term closure or stewardship decisions with the New York State Energy Research and Development Authority (NYSERDA) and federal and state regulators.

Wilberg Comment 2. *The four day trip* [in reference to spent fuel shipments to Idaho] *seems to be the safest and most secure by using our railways. Truck transportation has too many variables and possibilities of failure – that is unacceptable. The half life of U-235 and 238 is high was well as strontium. Many thousands of years will pass before that radioactivity can decrease to an acceptable level (most sources says 10,000 years!). The best place for storage is in a relatively uninhabited area* *with low earthquake activity. An area that can be relatively easily protected from terrorism is also a needed requirement – Idaho would seem ideal for such a venture.*

DOE Response: The Waste Management EIS analyzes the transportation of low-level radioactive waste (LLW), mixed LLW, transuranic (TRU) waste, and high-level radioactive waste (HLW) by both rail and truck to appropriate storage or disposal facilities. The storage and disposal sites being considered are Envirocare in Utah (disposal of LLW and mixed LLW), the Nevada Test Site in Nevada (disposal of LLW), the Hanford Site in Washington (disposal of LLW and storage of HLW and TRU waste), the Waste Isolation Pilot Plant in New Mexico (storage and disposal of TRU waste), the Savannah River Site in South Carolina (storage of TRU and HLW), Oak Ridge National Laboratory in Tennessee (storage of TRU waste), Idaho National Engineering and Environmental Laboratory (storage of TRU waste), and the proposed Yucca Mountain High-Level Waste Repository (disposal of HLW). All of these sites have waste management facilities that are safe and secure and that provide the appropriate isolation from the human environment for each type of WVDP waste.

JAMES L. PICKERING

Pickering Comment 1 (summarized from comment letter). *The West Valley Demonstration Project Act (Public Law No. 96-368) provides for the removal, preparation for disposal, solidification, and decontamination of facilities at the West Valley Demonstration Project site. The Stipulation of Compromise in Civil Action No. 86-1052-C (U.S. District Court, Western District of New York) calls for one EIS process and one environmental impact statement. Both the Stipulation and the one process/one EIS under Public Law No. 96-368 are binding upon the Department of Energy. The Notice of Intent to rescope the 1966 Draft Completion and Closure EIS is void and unlawful and unconstitutional.*

DOE Response: In DOE's view, neither the West Valley Demonstration Project Act nor the Stipulation of Compromise requires the preparation of only one EIS. DOE has met or will meet all of the commitments included in the Stipulation of Compromise by completing both the Waste Management EIS and the future Decommissioning and/or Long-Term Stewardship EIS. DOE has met or will meet all of the vitrification, waste management, and closure requirements set forth in the West Valley Demonstration Project Act. The Decommissioning and/or Long-Term Stewardship EIS will evaluate alternatives for completing DOE's obligations under the Act.

Pickering Comment 2 (from public meeting). *Our scientists have identified certain black holes in outer space. They have computed that it takes millions and billions of light years before the rays got here to identify those black holes. What those black holes are is a space where all of the rest of its environment is zero. We have developed the technology to get vehicles in outer space. I see no reason why we should not take a test and ship something even if it was not radioactive and see if it would head towards that black hole once we got beyond the gravitational pull of the earth and have a vehicle headed into a black hole, then we give nature the whole of creation back her radioactive waste.*

DOE Response: DOE has studied the environmental impacts that could occur if DOE developed and implemented various technologies for the management and disposal of radioactive waste. It examined several alternatives, including mined geologic disposal, very deep hole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, and space disposal in a Final Environmental Impact Statement on *Management of Commercially Generated Radioactive Waste* (DOE/EIS-0046F). Space disposal in particular was thought to pose unacceptable health and safety risks. The Record of Decision for that EIS announced the DOE decision to pursue the mined geologic disposal alternative for disposition of radioactive waste (46 Federal Register [FR] 26677 (1981)).

CAROL MONGERSON COMMENTS (FROM PUBLIC MEETING)

Mongerson Comment 1. *If this hearing were legal, which I am not conceding by making these remarks, I would want to say some of the following. I do not really have comments to make on the first EIS proposal. What you are planning to cover sounds reasonable to me. You've done a pretty good job our here so far and I trust you to do the decontamination work pretty well.*

DOE Response: The NOI to revise the strategy for completing the 1996 Completion and Closure Draft EIS, published in the *Federal Register* on March 26, 2001 (66 FR 16447) gave appropriate notice of the public meeting held on April 10, 2001. Notice of the meeting was also provided in local media. For this reason, DOE believes that the public meeting held to discuss the revised strategy and the scope of the Waste Management EIS was in compliance with all applicable laws.

DOE and the WVDP appreciate the confidence in our ability to safely and effectively decontaminate the Project facilities.

Mongerson Comment 2. *So my concerns are about the second one... It appears to me that some decisions – that the two EISs are not really inseparable because some decisions have already been made about which waste to ship. Until this time only Class A waste has been agreed that we would ship Class A waste offsite. Now we are talking about doing higher classes of waste and the transuranic waste. So that decision has already been made and it makes those EISs inseparable and we will already be committed to that.*

DOE Response: As a result of the *Final Waste Management Programmatic Environmental Impact Statement for Managing, Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (WM PEIS) (DOE/EIS-0200-F, May 1997), DOE made programmatic decisions regarding the management (treatment, storage, or disposal) of LLW, mixed LLW, TRU waste, HLW, and non-wastewater hazardous waste. The proposed actions and alternatives assessed in this EIS are consistent with the terms of the Stipulation of Compromise reached with the Coalition on West Valley Nuclear Wastes and Radioactive Waste Campaign. Implementation of theses actions would allow DOE to make progress in meeting its obligations under the Act that pertain to waste management (see Appendix A), and they are consistent with programmatic decisions DOE has made (see Sections 1.6.1.2 and 1.6.1.4) regarding the waste types addressed in this EIS. Those decisions and their respective EISs, as they apply to the WVDP, provide for shipping wastes from the West Valley site to other regional or centralized DOE sites for treatment, storage, and disposal, as appropriate. In particular, DOE is considering a variety of options in this EIS for offsite transportation and disposal of LLW and mixed LLW and offsite storage or disposal of TRU waste and HLW.

Pursuant to the Stipulation of Compromise, DOE is permitted to ship Class A LLW and some mixed LLW. DOE will defer shipment of other types of waste until completion of the Waste Management EIS and the issuance of a Record of Decision (ROD). The shipment of wastes offsite for disposal or storage is an activity that will have to occur regardless of the ultimate decision that is made regarding the disposition of the WVDP and the Center.

Mongerson Comment 3. *The first thing I want to say about the second EIS is ... the idea of doing a draft environmental impact statement without knowing what NRC criteria you are going to have to meet has always struck me as being insane and it still has. We must wait for that NRC criteria before we write these drafts.*

DOE Response: This comment refers to criteria that the U.S. Nuclear Regulatory Commission (NRC) has prescribed for the cleanup of the WVDP site. DOE will address these criteria in the future Decommissioning and/or Long-Term Stewardship EIS.

Mongerson Comment 4. *The second thing that disturbs me is what appears to me to be an appearance of a new term. That term in the title – long term management of the facilities. That may mean nothing but is sounds ominous to me and it disturbs me because to me what we were promised was not long-term management. What we were promised was closure and decommission. Long-term management to me implies indefinite institutional control and indefinite institutional control is something that is not realistic. I don't believe that we can count on it. I just don't think it is going to happen.*

DOE Response: Long-term stewardship (or management) does include provisions for institutional control such as continuous monitoring and maintenance of protective barriers to protect the public.

Long-term stewardship was an option in the 1996 Completion and Closure Draft EIS under Alternatives III and IV, although the term "long-term stewardship" was not used in that document. Long-term stewardship (long-term monitoring and maintenance) is a reasonable alternative for site closure, and it will be analyzed in the future Decommissioning and/or Long-Term Stewardship EIS along with other alternatives. An Advance NOI was issued on November 6, 2001 (66 FR 56090) formalizing DOE's commitment to begin work on the Decommissioning and/or Long-Term Stewardship EIS.

Mongerson Comment 5. *Any waste which we ship away from here has to go some place else and that some place else is not going to want it either. This is a fundamental problem that we are simply going to have to deal with. Our society is going to have to deal with this problem and the irony is that we keep on making more waste. All the time we are trying to deal with this problem but nobody wants it. We must stop making more nuclear waste. Yes, we have to deal with what is at West Valley already. We must stop making more. Now, you will say that's neither here nor there with this EIS and in a sense that is true, but the problem is not inseparable. You cannot make the one decision without making the other as a society.*

DOE Response: As the commenter recognizes, whether the nation continues to produce nuclear waste is a decision to be made by the American people and Congress, not by DOE. As a federal agency, DOE is required to follow the dictates of Congress, which has enacted laws directing DOE to engage in activities (such as research and development and national security) that generate nuclear waste. Because a decision to discontinue the production of nuclear waste is not within DOE's purview, that issue will not be analyzed in either the Waste Management EIS or the future Decommissioning and/or Long-Term Stewardship EIS.

STATE OF NEW YORK OFFICE OF THE ATTORNEY GENERAL

Office of the Attorney General Comment 1. *There is no basis for the proposed action other than the conclusory statement in the Notice that "the regulatory and physical nature of the two categories of actions are different." This is no more true now than it was when the NEPA process was initiated in 1988.*

DOE Response: Although DOE attempted to address all issues in the 1996 Completion and Closure Draft EIS, it became apparent, during DOE and NYSERDA discussions on the preferred alternative, that separating waste management from decommissioning would allow DOE to move forward with activities for which it is responsible under the West Valley Demonstration Project Act and for which it would not need NYSERDA's concurrence. For that reason, DOE decided to rescope the 1996 Draft EIS and proceed with the Waste Management EIS that focuses exclusively on activities conducted by DOE.

Office of the Attorney General Comment 2. *The Notice is somewhat misleading in that it announces DOE's and NYSERDA's "intent to revise their strategy for completing the [1996 Completion and Closure Draft EIS] issued for public comment in March 1996." In fact, however, a review of the entire Notice reveals that the agencies seek not to complete the 1996 Completion and Closure Draft EIS but instead to separate the EIS process into two parts.*

DOE Response: DOE apologizes if some readers found the Notice misleading. As described in the Notice, the revised strategy for completing the 1996 Completion and Closure Draft EIS was to separate the original proposed action into two distinct activities: the first being waste management and decontamination; and the second focusing on decommissioning. DOE has modified the scope of this EIS as a result of public comments received during scoping. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI. DOE will prepare an EIS in the future for decisions regarding decommissioning and/or long-term stewardship. An Advance NOI was issued on November 6, 2001 (66 FR 56090), formalizing DOE's commitment to begin work on the Decommissioning and/or Long-Term Stewardship EIS. Upon completion of both of these EISs, the proposed action and alternatives described in the 1996 Completion and Closure Draft EIS will have been fully analyzed and the subject of public review and comment, thus "completing" the 1996 Completion and Closure Draft EIS.

Office of the Attorney General Comment 3. *Pursuant to 40 CFR Section 1508.25(a)(3), actions involving common geography and cumulative environmental impacts such as are present at the WNYNSC and the WVDP should be evaluated in a single EIS.*

DOE Response: The Council on Environmental Quality regulations implementing the procedural provisions of NEPA do encourage federal agencies to consider the extent to which proposed actions that are connected, cumulative, or similar should be addressed in the same EIS (*see* 40 CFR 1508.25(a)). DOE has determined that, while the waste management and decommissioning proposals would both affect the WVDP site and the Center, other considerations (such as timing) favor the separation of the two proposals into two EISs. This is consistent with the Council on Environmental Quality NEPA regulations.

Office of the Attorney General Comment 4. *The first three alternatives for closure of the WNYNSC including the WVDP in the 1996 Draft Completion and Closure EIS are based on varying degrees of waste removal. Given the acknowledged unsuitability of the WNYNSC for the long-term storage or disposal of radioactive waste, waste removal must necessarily be part of future actions regarding decommissioning and/or long-term stewardship. Pursuant to 40 CFR Section 1502.23 an EIS must include a cost-benefit analysis. Separating the same issues now addressed in the 1996 Completion and Closure Draft EIS into two separate Environmental Impact Statements, particularly waste removal, will have a significant impact on the cost-benefit analysis used to evaluate closure options, including monetary costs and qualitative considerations. Economies of scale and the significance of cumulative environmental, social, and economic impacts are unavoidably affected by separating the EIS into two parts.*

DOE Response: The Council on Environmental Quality NEPA regulations state that "[i]f a cost-benefit analysis relevant to the choice among environmentally different alternatives is being considered for the proposed action, it shall be incorporated by reference or appended to the statement as an aid in evaluating the environmental consequences." (40 CFR 1502.23). Neither NEPA nor the Council on Environmental Quality regulations require that a cost-benefit analysis be prepared as part of an EIS.

There could be cumulative environmental impacts associated with the proposed waste management activities and the conduct of future decommissioning and/or long-term stewardship activities. DOE describes the potential for these cumulative impacts in the Waste Management EIS and will take these potential impacts into account in its decisionmaking process.

COALITION ON WEST VALLEY NUCLEAR WASTES (COALITION)

Coalition Comment 1. *The Stipulation of Compromise Settlement (hereinafter "Stipulation") requires that "the closure Environmental Impact Statement process - including the scoping process - shall begin no later than 1988 . . ." This requirement is binding. DOE cannot unilaterally create a new scoping process that supersedes or substantially modifies the scoping process carried out in 1988.*

DOE Response: The Notice of Intent to prepare the Completion and Closure EIS was issued in 1988, beginning the scoping process for that document. DOE has fulfilled this aspect of the Stipulation. Moreover, the Stipulation does not preclude DOE from preparing other EISs or environmental review documentation to analyze proposed activities at the WVDP that must occur regardless of any future decisions regarding site decommissioning, closure, or long-term stewardship.

Coalition Comment 2. *The scoping process begun in 1988 led to issuance of the 1996 Completion and Closure Draft EIS. A Final EIS or Record of Decision has not yet been issued. Thus, the EIS process specified in the Stipulation has not yet been completed. It is not clear from the Notice of Intent published in the Federal Register on March 26, 2001 whether the EIS process specified in the Stipulation has already been, or soon will be, partially discontinued or suspended. It would be violative of the Stipulation of Compromise Settlement for the DOE to unilaterally abandon the current EIS process and begin a new segmented process.*

DOE Response: The EIS process specified in the Stipulation is not being and will not be discontinued or suspended. Rather, DOE will complete its obligations under the Stipulation by a slightly different route than was envisioned in 1988. An Advance NOI was issued on November 6, 2001 (66 FR 56090), formalizing DOE's commitment to begin work on the Decommissioning and/or Long-Term Stewardship EIS. The conditions of the Stipulation of Compromise will be met by the Waste Management EIS and the future Decommissioning and/or Long-Term Stewardship EIS, in combination. Upon completion of both of these EISs, all conditions of the Stipulation will have been met.

Coalition Comment 3. *The provisions of the Stipulation apply to any and all Environmental Impact Statements into which the closure EIS that began in 1988 may be split. Paragraph 3 of the Stipulation defines the scope of the closure EIS very broadly, such that it covers disposal of all "[Class A] [Class B/C] wastes generated as a result of the activities of the West Valley Demonstration Project as mandated by the United States Congress under the West Valley Demonstration Project Act."*

DOE Response: The provisions of the Stipulation apply to an EIS, begun in 1988, to analyze the potential impacts associated with site closure, including onsite waste disposal. This EIS, as rescoped, assesses only the offsite shipment of stored wastes and wastes that will be generated during the next 10 years of operations while decommissioning and/or long-term closure decisions are still ongoing. Pursuant to the Stipulation, DOE retains the ability to dispose of Class A LLW in accordance with applicable law at a site other than the Center. In addition, for waste material containing elements having an atomic number greater than 92 in concentrations greater than 10 nanocuries per gram but less than or equal to 100 nanocuries per gram, the Stipulation provides that "[f]or disposal at locations other than the Center, such disposal will be in accordance with applicable law." The Stipulation does not address transportation and subsequent offsite disposal of TRU (waste material containing elements having an atomic number greater than 92 in concentrations greater than 100 nanocuries per gram) or HLW. Thus, the preparation of an EIS to examine waste management activities, none of which relate to onsite disposal of waste, is consistent with the Stipulation.

Coalition Comment 4. *According to the Notice of Intent published in the Federal Register on March 26, 2001, "DOE intends to issue soon a Notice of Intent for a second EIS, with NYSERDA as a joint lead agency, on decommissioning and/or long-term stewardship of the WVDP and the Western New York Nuclear Service Center . . ." This will violate provisions of the Stipulation. The Stipulation requires that "the closure Environmental Impact Statement process - including the scoping process - shall begin no later than 1988 . ." DOE cannot unilaterally create a new EIS with a new scoping process that supersedes or substantially modifies the scoping process carried out in 1988. As specified in the Stipulation, the EIS is a closure EIS. DOE cannot unilaterally change the purpose of the project and thus the scope of the EIS.*

DOE Response: As noted above, the NOI to prepare the Completion and Closure EIS was issued in 1988, beginning the scoping process for that document. DOE has fulfilled this aspect of the Stipulation. However, the Stipulation does not preclude DOE from completing its obligations under the Stipulation by a slightly different route than was envisioned in 1988, separating the original scope of the Completion and Closure EIS into two EISs, one that analyzes proposed waste management activities and one that addresses future decisions regarding site decommissioning, closure, and/or long-term stewardship. As stated above, DOE believes that this approach is consistent with the Council on Environmental Quality NEPA implementing regulations regarding connected actions (40 CFR 1506.1) and that this approach, upon completion of the future Decommissioning and/or Long-Term Stewardship EIS, will meet all of the conditions of the Stipulation of Compromise. An Advance NOI was issued on November 6, 2001 (66 FR 56090), formalizing DOE's commitment to continue work on the Closure EIS process by beginning work on the Decommissioning and/or Long-Term Stewardship EIS. DOE is anticipating that NYSERDA will participate in the preparation of the Decommissioning and/or Long-Term Stewardship EIS as a joint lead agency, that the Nuclear Regulatory Commission (NRC) will participate as a cooperating agency, and that the New York State Department of Environmental Conservation will participate as an involved agency under the New York State Environmental Quality Review Act (SEQRA).

Coalition Comment 5. *According to the Notice of Intent published in the Federal Register on March 26, 2001, DOE intends to dispose of certain low-level and mixed wastes in either Nevada or Washington prior to completion of the West Valley closure EIS. The Stipulation allows off-site disposal of Class A wastes in accordance with applicable law but does not allow any disposal (offsite or otherwise) of Class B/C wastes until the closure EIS is completed.*

DOE Response: Pursuant to the Stipulation, DOE retains the ability to dispose of Class A LLW in accordance with applicable law at a site other than the Center. In addition, for waste material containing elements having an atomic number greater than 92 in concentrations greater than 10 nanocuries per gram but less than or equal to 100 nanocuries per gram, the Stipulation provides that "[f]or disposal at locations other than the Center, such disposal will be in accordance with applicable law." The Stipulation does not address transportation and subsequent offsite disposal of TRU (waste material containing elements having an atomic number greater than 92 in concentrations greater than 100 nanocuries per gram) or HLW. Further, the Stipulation does not preclude the offsite disposal of any type of radioactive waste in accordance with applicable law prior to the completion of a closure EIS. This Waste Management EIS does not address onsite disposal; however, DOE will not initiate any of the waste shipping proposed under the action alternatives until this EIS is completed and a ROD is issued.

Coalition Comment 6. *According to the Notice of Intent published in the Federal Register on March 26, 2001, DOE intends to provide a 45-day public comment period following the issuance of the draft*

Decontamination and Waste Management EIS. The Stipulation requires a six month public comment period.

DOE Response: DOE provided a 6-month comment period for the 1996 Completion and Closure Draft EIS in compliance with the Stipulation and intends to provide a 6-month comment period for the future Decommissioning and/or Long-Term Stewardship EIS, which will be the continuation of the 1996 Completion and Closure Draft EIS. Thus, DOE has complied with, and will continue to comply with, this provision of the Stipulation. The 6-month comment period noted in the Stipulation does not apply to the Waste Management EIS.

Coalition Comment 7. *DOE asserts in the Notice of Intent published in the Federal Register on March 26, 2001, that the "decontamination and waste management actions will not be connected within the meaning of the regulations to decommissioning and/or long-term stewardship actions because decontamination and waste disposal actions can be implemented without previous or simultaneous actions being taken, are not an interdependent part of a larger action, and do not depend on a larger action for their justification . . ." This assertion is false. The actions of decontamination, decommissioning and/or long term stewardship are clearly interconnected in the context of the West Valley Demonstration Project.*

DOE Response: As originally scoped, DOE agrees that the proposed decontaminations actions could have been linked to decommissioning and/or long-term stewardship decisions and has accordingly eliminated them from the scope of this EIS. However, DOE believes that the waste management actions it proposes would need to occur regardless of any future decisions regarding site decommissioning, closure, and/or long-term stewardship. For this reason, DOE believes that these proposed waste management actions are independent from future site decommissioning and/or long-term stewardship decisions and do not depend on those future actions for their justification.

Coalition Comment 8. *DOE asserts in the Notice of Intent published in the Federal Register on March 26, 2001, that DOE and NYSERDA "may decide to proceed independently." This segmentation of the overall cleanup and closure is inappropriate under federal and state environmental review law.*

DOE Response: DOE noted that DOE and NYSERDA intended to prepare the future Decommissioning and/or Long-Term Stewardship EIS jointly under both NEPA and SEQRA, although either agency could decide to proceed independently in support of its separate mission. Applicable NEPA regulations encourage federal and state agencies to become joint lead agencies where appropriate; there is no requirement to do so, particularly when the agencies have responsibilities under different laws and regulations. It is not unlawful for DOE to prepare an EIS pursuant to NEPA to support its decisionmaking process and for NYSERDA to prepare separate documentation pursuant to SEQRA.

CONCERNED CITIZENS OF CATTARAUGUS COUNTY, INC. (CCCC)

CCCC Comment 1. *The substantive mandate of New York's State Environmental Quality Review Act (SEQRA) is much broader than that of the National Environmental Policy Act (NEPA). In particular, SEQRA disfavors dividing an action for environmental review in such a way that the various segments are addressed as though they were independent and unrelated activities where the earlier part of the action may practically determine a subsequent part of the action. Such an approach impermissibly avoids considering the combined environmental effects of all parts of the action. This mandate does not preclude action in stages; it only requires that cumulative impacts of likely subsequent actions be considered in the initial EIS. Unless DOE/NYSERDA's proposed new decontamination and waste management EIS also considers what standards for protection of health and the environment will be met* *at closure and decommissioning of the site, DOE/NYSERDA's proposal will violate SEQRA's mandate. Isn't the proposal dependent on decisions regarding closure of the West Valley site? Won't decisions regarding closure of the West Valley site depend on decontamination and waste management decisions?*

DOE Response: The proposed action and alternatives to be addressed in the Waste Management EIS are activities that are solely DOE's responsibility under the West Valley Demonstration Project Act. These proposed activities include management of waste for which DOE is responsible. For this reason, the applicable environmental review statute is NEPA, not SEQRA. DOE is not required to comply with SEQRA.

However, NEPA, like the SEQRA, requires that an agency consider connected actions together in the same EIS to avoid segmenting a large project into smaller projects with fewer impacts (*see* Council on Environmental Quality, NEPA Implementing Regulations, 40 CFR 1508.25(a)). NEPA also requires that agencies consider the cumulative impacts of past, present, and reasonably foreseeable future actions, along with the impacts of the proposed action (*see* 40 CFR 1508.7)). Thus, although SEQRA does not apply to DOE actions, NEPA imposes similar segmentation and cumulative impact requirements on federal agencies.

DOE does not believe that the proposed waste management activities in this EIS are connected to future decommissioning and/or long-term stewardship decisions for WVDP or the Center. These proposed waste management activities would not trigger other actions that would require the preparation of an EIS, can proceed independently of other actions at the site, and are not dependent upon future decisions regarding long-term plans for the site.

Rather, the proposed waste management activities are those that DOE would need to take regardless of eventual decisions regarding the long-term management of the Center. Undertaking these activities in the near term would not limit or prejudge the range of alternatives or the decisions to be made for eventual decommissioning of Project facilities and/or long-term stewardship of the Center. Further, DOE believes that preparing an EIS for waste management activities will allow the Department to make progress in removing wastes from the site, rather than waiting until site decommissioning and/or long-term stewardship decisions are made in the future.

CCCC Comment 2. *The West Valley Demonstration Project Act's Section 2(a)(5) requires DOE to "decontaminate and decommission" in accordance with NRC requirements. Under what authority does DOE now propose to decontaminate without considering requirements for decommissioning?*

DOE Response: DOE has modified the scope of this EIS as a result of public comments received during scoping. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI.

CCCC Comment 3. *Current federal regulations require monitoring for radionuclides be performed at entry points to community water distribution systems and impose drinking water limits for radionuclides on such water systems. 65 FR 76707 (Dec. 7, 2000). Will the scope include the impact of DOE/NYSERDA's proposed new approach on the ability of community water systems to comply with current MCLs for radionuclides? If such impacts are considered, will they extend to community water systems that rely on the Cattaraugus Creek Sole Source Aquifer that underlies the WVDP site? See 52 FR 36100 (September 25, 1987).*

DOE Response: Because the proposed activities analyzed in the Waste Management EIS are limited to the shipping of wastes offsite and continued management of the HLW tanks prior to decisions from the Decommissioning and/or Long-Term Stewardship EIS, there would be no change in any site releases that could affect the ability of community water systems to comply with maximum contaminant levels for radionuclides. The EIS that will be prepared to address decommissioning and/or long-term stewardship of the site will address any potential impacts to water quality in general and to the Cattaraugus Creek Sole Source Aquifer in particular.

CCCC Comment 4. *Will the proposed EIS consider the effect of contaminated materials left onsite after decontamination on the collective dose for the population that uses the Cattaraugus Creek Sole Source Aquifer? If so, will this be the population at the time of the final status survey is performed?*

DOE Response: DOE will address the potential environmental impacts of contamination remaining after implementation of a decontamination and decommissioning alternative and disposition of the remaining wastes at the Center in the EIS for site decommissioning and/or long-term stewardship. To that end, DOE will use the most current population data available.

CCCC Comment 5. *Will the scope of the proposed decontamination and waste management EIS include the cumulative impact of releases of radioactive and non-radioactive hazardous or toxic substances into surface waters and groundwater from the West Valley site on the Cattaraugus Creek Sole Source Aquifer and the communities and private well water users who rely on the aquifer?*

DOE Response: The Waste Management EIS evaluates potential releases from the proposed waste management actions to the environment (Chapter 4) and the cumulative impacts (Chapter 5) of such releases for each alternative considered. As shown by the analyses, the proposed waste management actions would not result in adverse impacts to groundwater or surface water. Such impacts will be addressed in the Decommissioning and/or Long-Term Stewardship EIS.

CCCC Comment 6. *Together with the Nuclear Regulatory Commission (NRC), DOE and NYSERDA "have long favored addressing environmental impacts on a site-wide basis. Therefore, the EIS, the [NRC's] decommissioning criteria, and long-term control alternatives discussed in [SECY-98-251] cover both DOE's completion of the project and NYSERDA's closure of the site." NRC, SECY-98-251, note 1 (October 30, 1998). Isn't the proposed new decontamination and waste management EIS part of a long-term plan that includes closure of the West Valley site under NEPA? The EIS should consider impacts of decontamination and waste management activities on future site closure options.*

DOE Response: The proposed waste management activities analyzed in this EIS are those that DOE would need to take regardless of eventual decisions regarding the long-term closure and/or management of the Center. Undertaking these activities in the near term would not limit or prejudge the range of alternatives or the decisions to be made for eventual decommissioning of WVDP facilities and/or long-term stewardship of the Center. The proposed waste management activities addressed in this EIS would not have any impact on future site closure options. The potential environmental impacts of contamination remaining after implementation of a decontamination alternative and disposition of remaining wastes from the Center will be evaluated as part of the future EIS for site decommissioning and/or long-term stewardship.

CCCC Comment 7. *Low level radioactive waste and transuranic waste produced by the solidification of high level radioactive waste under the WVDP may be left in place or be left on the West Valley site following completion of the proposed decontamination and waste management activities. Will the scope of the proposed decontamination and waste management EIS measure, calculate, estimate or otherwise determine the amounts of these low level radioactive wastes and transuranic wastes or the exposure levels to be expected from these wastes?*

DOE Response: DOE has limited this EIS to those waste management actions that would ship wastes that are currently stored and that would be generated over the next 10 years to offsite disposal or interim storage. Information regarding the volume and exposure rates of other wastes left onsite after completion of proposed waste management activities (and the proposed disposition of that waste) will be provided in the future Decommissioning and/or Long-Term Stewardship EIS.

CCCC Comment 8. *Will the scope of the proposed decontamination and waste management EIS include the question whether long-term or perpetual institutional controls are necessary to ensure adequate protectiveness results from any decontamination and waste management activities? If this question of institutional controls is considered within the scope, will impacts of decontamination and waste management activities on resources and staff necessary to support long-term institutional controls also be included within the scope?*

DOE Response: This Waste Management EIS examines the potential environmental impacts of performing certain near-term waste management activities for which DOE is responsible under the West Valley Demonstration Project Act. The need for long-term or perpetual institutional controls will be examined in the future Decommissioning and/or Long-Term Stewardship EIS.

CCCC Comment 9. *Will dose-based criteria that include all pathways and that take into account exposures from the entire site, including the State Disposal Area and NYSERDA's 3300 acres around the WVDP, be used to evaluate potential impacts from decontamination and waste management activities?*

DOE Response: This Waste Management EIS examines the potential environmental impacts of performing certain near-term waste management activities for which DOE is responsible under the West Valley Demonstration Project Act. This EIS analyzes the potential worker and public dose from all pathways that could result from these activities. Cumulative impacts from past, present, and reasonably foreseeable future actions also are also analyzed. The future EIS that will be prepared to address decommissioning and/or long-term stewardship of the site will address potential exposures from the 13-square-kilometer (3,300-acre) Center as a whole, including the State-licensed Disposal Area.

CCCC Comment 10. *Will NYSDEC's technical and administrative guidance memorandum 4003, "Cleanup Guidelines for Soils Contaminated with Radioactive Materials," be adopted by DOE as a currently applicable, relevant and appropriate regulation for purposes of decontaminating areas of soil contamination?*

DOE Response: DOE has modified the scope of this EIS as a result of public comments received during scoping. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI; therefore, the guidance memorandum is not applicable to the proposed actions of this EIS. The future Decommissioning and/or Long-Term Stewardship EIS will consider all relevant regulations and standards in its assessments of impacts.

CCCC Comment 11. *Will the scope of the proposed decontamination and waste management EIS include the question whether new waste disposal cells on the site will be needed to manage hazardous or mixed wastes generated as a result of decontamination activities?*

DOE Response: The activities analyzed in the Waste Management EIS do not include onsite disposal of any waste. For that reason, this EIS does address the need for new onsite waste disposal cells.

CCCC Comment 12. *NRC's decommissioning criteria for the West Valley site, including areas outside the Demonstration Project's 200 acres, NRC "rel[ies] on the DOE/NYSERDA's EIS for [NEPA]* *purpose[s]." 64 FR 67952, at p. 67954 (Dec. 3, 1999) (NRC Draft Policy Statement on West Valley). Will the proposed decontamination and waste management EIS stand in for or otherwise consider impacts on NRC's NEPA responsibilities?*

DOE Response: This Waste Management EIS examines the potential impacts of activities at WVDP for which DOE is responsible, and does not affect the NRC's NEPA responsibilities.

WEST VALLEY CITIZEN TASK FORCE (CTF)

CTF Comment 1. *Concerns about Splitting the EIS: The CTF agrees that we must stay within the requirements of the National Environmental Policy Act (NEPA) and the West Valley Demonstration Project (WVDP) Act, both of which seem to call for one process. We are concerned that some important matters might get lost in the changeover; that segmentation could be an issue, and that the second phase could get bogged down if the DOE/NYSERDA disagreement continues. We are eager to see the wording of the proposal for the second phase to be assured that the emphasis will be on closure rather than long-term stewardship and that the possibility of further decontamination is addressed adequately. We believe arriving at a cost/benefit analysis for waste removal and closure could be substantially more difficult once the EIS is split. We note that the recent DOE budget cut could be an omen of future funding shortages, a disturbing possibility.*

DOE Response: Neither NEPA nor the West Valley Demonstration Project Act requires only one NEPA document for all of the activities that must be undertaken at the site in compliance with the Act. The two-EIS strategy allows DOE to progress while longer term discussions with NYSERDA continue.

The Waste Management EIS will address activities that DOE would need to take regardless of eventual decisions regarding the long-term management of the Center, such as transporting nuclear waste for which DOE is responsible to offsite locations for storage or disposal. Decontamination, decommissioning, and site closure will be addressed in the future Decommissioning and/or Long-Term Stewardship EIS. DOE recognizes the CTF's stated preference for a focus on closure in the upcoming EIS and will consider that in the scoping process for that document. An Advance NOI was issued on November 6, 2001 (66 FR 56090), formalizing DOE's commitment to begin work on the Decommissioning and/or Long-Term Stewardship EIS.

DOE disagrees that the generation of two EISs would have a negative effect on its ability to assess the costs of the various decommissioning and/or closure alternatives available to DOE and NYSERDA. DOE annually reassesses its estimated operating costs and uses this information in its budget submittals. DOE is committed to seeking the funding necessary to meet its obligations under the West Valley Demonstration Project Act in its annual budget submittal to Congress; however, it cannot control Congressional decisionmaking.

CTF Comment 2. *Concerns about Phase One: We support only option two, as it is defined in the Federal Register notice (option three as presented at the scoping meeting), which includes decontaminating the high and low-level waste areas, the main plant, Vitrification facility, 01/14 Building and the waste tank farm. In regard to all cleanup, we would like to see all of EPA's concerns addressed, as expressed in their comment to NRC January 2000, including assurance that both radioactive and hazardous waste will be included in the cleanup, and that groundwater and air emissions standards likewise will be upheld. The CTF also has concerns about the brevity of the 45-day comment period.*

DOE Response: DOE has modified the scope of this EIS as a result of public comments received during scoping. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI. DOE's ability to continue to comply with groundwater and air emission standards during the proposed waste management activities is addressed in the Waste Management EIS (Chapter 4).

With respect to the 45-day comment period, DOE believes that the standard 45-day comment period called for in NEPA implementing regulations will be sufficient given the limited nature of the proposed waste management activities analyzed in this Waste Management EIS. DOE provided a 6-month comment period for the 1996 Completion and Closure Draft EIS in compliance with the Stipulation of Compromise and intends to provide a 6-month comment period for the future Decommissioning and/or Long-Term Stewardship EIS.

CTF Comment 3. *Concerns about Phase Two: Our primary concern about splitting the EIS relates to the impact on phase two. Our concerns include:*

- *DOE's definition of the term "closure or long-term management";*
- *Whether the waste left in the tanks could be reclassified as incidental, as at other sites, yet could still be HLW by other definitions;*
- *Whether and how EPA and NRC criteria will be reconciled;*
- *The impact of the NRC Decontamination and Decommissioning guidelines when they are finally made public; and*
- *Most imminent, the ultimate division of responsibility between DOE and NYSERDA.*

DOE Response: These issues relate to the scope of the future Decommissioning and/or Long-Term Stewardship EIS and the basis for ultimate decisions to be made regarding site closure or future use, and are not addressed in the Waste Management EIS due to its limited scope. However, the issues raised in the comment will be within the scope of the second EIS.

NUCLEAR INFORMATION AND RESOURCE SERVICE AND PUBLIC CITIZEN/CRITICAL MASS ENERGY AND ENVIRONMENT PROGRAM (JOINT SUBMITTAL)

NIRS/PC Comment 1. *[Our organizations] request direct notification of all future comment periods, proposed actions and meetings regarding the long-term management and clean-up at the West Valley site. We believe that the 30-day comment period for this Notice of Intent is inadequate and that a 45-day comment period for the proposed segmented Draft Environmental Impact Statement to be published later this year is inadequate.*

DOE Response: DOE has included both organizations on its mailing list for future notices and copies of the Draft Waste Management EIS when it is issued. While DOE allowed for the usual 30-day public comment period on the scope of this EIS, the Department also stated in the Notice of Intent published in the Federal Register on March 26, 2001, that late comments would be considered to the extent practicable (the last comment letter DOE received was dated May 10, 2001). DOE has received no indication that any party seeking to submit scoping comments was unable to do so because of the length of the formal scoping period. Given the limited nature of the proposed activities to be analyzed in the Waste Management EIS, DOE believes that the standard 45-day comment period called for in NEPA implementing regulations will be sufficient for this EIS.

NIRS/PC Comment 2. *[Our organizations] oppose the splitting or segmenting of the Environmental Impact Statement for the West Valley Demonstration Project and Nuclear Service Center site. Some of us are already on record calling for the inclusion of the entire site in long-term planning so that the entire legacy at the site is evaluated in total, all areas, including the DOE Demonstration Project and the NYS* *areas. Segmenting the property into smaller sub-groups for purposes of long-term management and closure opens the door to leaving greater amounts of contamination and risk. We believe that the decontamination and waste management activities are inextricably linked to the decommissioning and long-term management of the site and should not be severed into two distinct Environmental Impact Statements. The Federal Register Notice of Intent does not fully explain or make the case for revising the strategy for completing the demonstration project and closure/long-term site management.*

DOE Response: DOE is not proposing to split the consideration of decommissioning and/or long-term stewardship of the WVDP facilities from the decommissioning and/or long-term stewardship of the Center. Rather, DOE is proposing to analyze the potential impacts associated with waste management activities such as offsite transportation of waste. DOE has modified the scope of this EIS as a result of public comments received during scoping. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI. The proposed waste management activities are those that DOE would need to take regardless of eventual decisions regarding the long-term management of the Center. The future Decommissioning and/or Long-Term Stewardship EIS will analyze the potential impacts of closure and/or long-term management of the Center as a whole, including the Project facilities. An Advance NOI was issued on November 6, 2001(66 FR 56090), formalizing DOE's commitment to begin work on the Decommissioning and/or Long-Term Stewardship EIS.

NIRS/PC Comment 3. *[Our organizations] support efforts by DOE and NYSERDA to comply with the Agreement (Stipulation of Compromise Settlement) with the local community organization, the Coalition on West Valley Nuclear Wastes, in 1987, which resulted from legal action on the long-term management of the site. We do not support efforts to circumvent or violate the Agreement or NEPA. We support the Coalition in its efforts toward isolation of radioactivity from all of the West Valley nuclear activities.*

DOE Response: DOE is not proposing to take any action that would violate either the Stipulation of Compromise or NEPA. DOE supports the efforts to isolate radioactivity from WVDP nuclear activities and believes that preparing an EIS for waste management activities will allow the Department to make progress in onsite waste management and offsite waste transportation activities, rather than waiting until site decommissioning and/or long-term stewardship decisions are made some time in the future.

NIRS/PC Comment 4. *[Our organizations] consider this notice inadequate as an announcement of Scoping for a new segmented EIS, since we contest the simultaneous announcement splitting the existing process.*

DOE Response: In its NOI, published in the *Federal Register* on March 26, 2001, DOE stated that it welcomed comments on the plan for revising the strategy for completion of the 1996 Completion and Closure Draft EIS as well as on the scope of the anticipated Waste Management EIS. DOE has considered all of the comments it received regarding its plan to rescope the 1996 Draft EIS, and continues to believe that this course of action is appropriate and consistent with NEPA and the Stipulation of Compromise.

NIRS/PC Comment 5. *[Our organizations] support the goal of complete isolation of all of the West Valley wastes, support both short and long term remedial actions and planning that prevent leakage, exposure and loss of control of the radioactivity from all of the West Valley activities.*

DOE Response: DOE also supports the efforts to isolate WVDP wastes and believes that preparing an EIS for waste management activities will allow the Department to make progress in onsite waste management and offsite waste transportation activities, rather than waiting until site decommissioning and/or long-term stewardship decisions are made some time in the future.

THE LEAGUE OF WOMEN VOTERS OF BUFFALO/NIAGARA

LWV Comment 1. *The official time period on this revised strategy was inadequate.*

DOE Response: DOE provided the required 30-day comment period for the proposed rescoping of the 1996 Completion and Closure Draft EIS. In addition, DOE stated that late comments would be considered to the extent practicable. For example, DOE received the League of Women Voters comments on May 11, 2001, and has considered those comments along with comments received by the April 25, 2001 due date.

LWV Comment 2. *We concur with all the comments made by the [Citizens Task Force] in this matter, especially questioning the legality of the proposed change, emphasizing the need for staying within the laws of NEPA and the West Valley Demonstration Project Act, and reiterating the necessity that the Nuclear Regulatory Commission guidelines be available soon, before completion of the draft EIS, and honored therein.*

DOE Response: Please see the DOE responses to the CTF comments above. With respect to NRC guidelines, the West Valley Demonstration Project Act requires DOE to decontaminate and decommission material and hardware used in connection with the project "in accordance with such requirements as the Commission may prescribe." West Valley Demonstration Project Act, Section 2((a)(5)(C). The level to which the Center should be cleaned up will be addressed in the future Decommissioning and/or Long-Term Stewardship EIS.

DOE has modified the scope of the EIS as a result of public comments received during scoping. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI.

LWV Comment 3. *The 1996 Draft Environmental Impact Statement for Completion and Closure called for one project while the strategy change requires two separate NEPA documents. When a coordinated plan is split into two or more phases, the overall plan remains in effect. When the plan itself is split, many unforeseen problems can emerge:*

- *Parts of the original plan could be changed, ignored, or forgotten*
- *Cumulative effects may go unchecked because of the segmentation of various portions*
- *Arriving at a cost benefit analysis for a split project will be difficult, and completion will be more expensive*
- *Considering the uncertainty of Congressional budget allotments (recent cuts in the DOE budget presents a prime example), budget constraints could disallow continuance of the project, thus endangering its completion*
- *Splitting the EIS into two could allow for serious delay in drafting and implementing the final EIS and completion and closure for the entire site.*

DOE Response: The West Valley Demonstration Project Act established a single program with multiple components. DOE has already prepared numerous NEPA documents to carry out its numerous responsibilities under the Act, including the *Final Environmental Impact Statement, Long Term Management of Liquid High-Level Radioactive Wastes Stored at the Western New York Nuclear Service Center* (DOE/EIS-0081, June 1982). Rather than address the waste management activities and decommissioning components in one EIS, as originally planned for the Completion and Closure EIS, DOE decided that addressing the two components separately would facilitate its decisionmaking process. Regardless of the number of NEPA documents prepared, the overall plan required by the West Valley Demonstration Project Act remains in place.

DOE believes that all of the activities that were addressed in the 1996 Completion and Closure Draft EIS will be addressed in either the Waste Management EIS or in the future Decommissioning and/or Long-Term Stewardship EIS. Cumulative impacts will be addressed in both documents.

Because DOE proposes to implement actions that will need to occur regardless of any future decommissioning and/or long-term stewardship scenario, DOE does not expect that significant additional costs would be incurred. Although DOE does not anticipate discontinuance of federal funds for the WVDP, possible future budget constraints are a reason to analyze and implement initial cleanup decisions in the short term.

DOE does not expect that the decision to prepare the Waste Management EIS will delay the final decision on the future of the site. DOE issued an Advance NOI on November 6, 2001, to prepare the Decommissioning and/or Long-Term Stewardship EIS in the near future with NYSERDA, demonstrating its commitment to making final decisions regarding the site. Moreover, the waste management activities addressed in the Waste Management EIS would take several years to implement, allowing sufficient time for DOE and the NYSERDA to resolve their differences and make the necessary decommissioning and/or long-term stewardship decisions.

LWV Comment 4. *The second phase could get bogged down, in light of the fact that the Department of Energy withdrew in January from negotiations with the New York State Energy Research and Development Authority regarding their individual responsibilities. We find it very disturbing that the future of the entire project and the surrounding community is being held hostage to intra-governmental squabbles.*

DOE Response: One of the reasons DOE decided to rescope the 1996 Completion and Closure Draft EIS was to be able to make decisions more quickly regarding its responsibilities for the cleanup of the WVDP site. DOE believes that preparing an EIS for waste management activities will allow the Department to make progress in removing waste from the site, rather than waiting until site decommissioning and/or long-term stewardship decisions are made some time in the future.

LWV Comment 5. *Under the proposed change, the first EIS refers to Decontamination and Waste Management. The proposed second EIS does not mention further decontamination and waste management, including removal, which we assume will be necessary. We all need assurance that waste removal and closure will remain the goal and become the reality at the completion of the entire cleanup process at the West Valley site.*

DOE Response: DOE has modified the scope of this EIS as a result of public comments received during scoping. The scope is now limited to onsite waste management and offsite waste transportation activities, and no longer includes decontamination activities as proposed in the NOI. The proposed actions evaluated in this EIS would remove all stored and newly generated wastes from the site. Further decontamination, and decommissioning actions will be the subject of the Decommissioning and/or Long-Term Stewardship EIS.

B.4 REFERENCES

DOE (U.S. Department of Energy), 1996. *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center - Volumes 1 and 2*, DOE/EIS-0226-D, January.

DOE (U.S. Department of Energy), 1997. *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (Volumes 1 through 5)*, DOE/EIS-0200, Washington, DC, May.

APPENDIX C
HUMAN HEALTH IMPACTS

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APPENDIX C
HUMAN HEALTH IMPACTS

This appendix contains information in addition to that presented in Chapter 4 on the human health analyses conducted for this environmental impact statement (EIS).

C.1 RADIATION AND HUMAN HEALTH

Radiation is the emission and propagation of energy through space or through a material in the form of waves or bundles of energy called photons, or in the form of high-energy subatomic particles. Radiation generally results from atomic or subatomic processes that occur naturally. The most common kind of radiation is electromagnetic radiation, which is transmitted as photons. Electromagnetic radiation is emitted over a range of wavelengths and energies. We are most commonly aware of visible light, which is part of the spectrum of electromagnetic radiation. Radiation of longer wavelengths and lower energy includes infrared radiation, which heats material when the material and the radiation interact, and radio waves. Electromagnetic radiation of shorter wavelengths and higher energy (which are more penetrating) includes ultraviolet radiation, which causes sunburn, X-rays, and gamma radiation.

Ionizing radiation is radiation that has sufficient energy to displace electrons from atoms or molecules to create ions. It can be electromagnetic (for example, X-rays or gamma radiation) or subatomic particles (for example, alpha and beta radiation). The ions have the ability to interact with other atoms or molecules; in biological systems, this interaction can cause damage in the tissue or organism.

Radioactivity is the property or characteristic of an unstable atom to undergo spontaneous transformation (to disintegrate or decay) with the emission of energy as radiation. Usually the emitted radiation is ionizing radiation. The result of the process, called radioactive decay, is the transformation of an unstable atom (a radionuclide) into a different atom, accompanied by the release of energy (as radiation) as the atom reaches a more stable, lower energy configuration. Radioactive decay produces three main types of ionizing radiation—alpha particles, beta particles, and gamma or X-rays—but our senses cannot detect them. These types of ionizing radiation can have different characteristics and levels of energy and, thus, varying abilities to penetrate and interact with atoms in the human body. Because each type has different characteristics, each requires different amounts of material to stop (shield) the radiation. Alpha particles are the least penetrating and can be stopped by a thin layer of material such as a single sheet of paper. However, if radioactive atoms (called radionuclides) emit alpha particles in the body when they decay, there is a concentrated deposition of energy near the point where the radioactive decay occurs. Shielding for beta particles requires thicker layers of material such as several reams of paper or several inches of wood or water. Shielding from gamma rays, which are highly penetrating, requires very thick material such as several inches to several feet of heavy material (for example, concrete or lead). Deposition of the energy by gamma rays is dispersed across the body in contrast to the local energy deposition by an alpha particle. In fact, some gamma radiation will pass through the body without interacting with it.

Radiation that originates outside of an individual's body is called external or direct radiation. Such radiation can come from an X-ray machine or from radioactive materials (materials or substances that contain radionuclides), such as radioactive waste or radionuclides in soil. Internal radiation originates inside a person's body following intake of radioactive material or radionuclides through ingestion or inhalation. Once in the body, the fate of a radioactive material is determined by its chemical behavior and how it is metabolized. If the material is soluble, it might be dissolved in bodily fluids and transported to and deposited in various body organs; if it is insoluble, it might move rapidly through the gastrointestinal tract or be deposited in the lungs.

Exposure to ionizing radiation is expressed in terms of absorbed dose, which is the amount of energy imparted to matter per unit mass. Often simply called dose, it is a fundamental concept in measuring and quantifying the effects of exposure to radiation. The unit of absorbed dose is the rad. The different types of radiation mentioned above have different effects in damaging the cells of biological systems. Dose equivalent is a concept that considers the absorbed dose and the relative effectiveness of the type of ionizing radiation in damaging biological systems, using a radiation-specific quality factor. The unit of dose equivalent is the rem. In quantifying the effects of radiation on humans, other types of concepts are also used. The concept of effective dose equivalent is used to quantify effects of radionuclides in the body. It involves estimating the susceptibility of the different tissue in the body to radiation to produce a tissue-specific weighting factor. The weighting factor is based on the susceptibility of that tissue to cancer. The sum of the products of each affected tissue's estimated dose equivalent multiplied by its specific weighting factor is the effective dose equivalent. The potential effects from a one-time ingestion or inhalation of radioactive material are calculated over a period of 50 years to account for radionuclides that have long half-lives and long residence time in the body. The result is called the committed effective dose equivalent. The unit of effective dose equivalent is also the rem. Total effective dose equivalent is the sum of the committed effective dose equivalent from radionuclides in the body plus the dose equivalent from radiation sources external to the body (also in rem). All estimates of dose presented in this EIS, unless specifically noted as something else, are total effective dose equivalents, which are quantified in terms of rem or millirem (mrem), which is one one-thousandth of a rem.

More detailed information on the concepts of radiation dose and dose equivalent are presented in publications of the National Council on Radiation Protection and Measurements (NCRP 1993) and the International Commission on Radiological Protection (ICRP 1991).

The factors used to convert estimates of radionuclide intake (by inhalation or ingestion) to dose are called dose conversion factors. The International Commission on Radiological Protection and federal agencies such as the U.S. Environmental Protection Agency (EPA) publish these factors (Eckerman and Ryman 1993; Eckerman et al. 1988). They are based on original recommendations of the International Commission on Radiological Protection (ICRP 1977).

The radiation dose to an individual or to a group of people can be expressed as the total dose received or as a dose rate, which is dose per unit time (usually an hour or a year). Collective dose is the total dose to an exposed population. Person-rem is the unit of collective dose. Collective dose is calculated by summing the individual dose to each member of a population. For example, if 100 workers each received 0.1 rem, the collective dose would be 10 person-rem (100 × 0.1 rem).

Exposures to radiation or radionuclides are often characterized as being acute or chronic. Acute exposures occur over a short period of time, typically 24 hours or less. Chronic exposures occur over longer periods of time (months to years); they are usually assumed to be continuous over a period, even though the dose rate might vary. For a given dose of radiation, chronic radiation exposure is usually less harmful than acute exposure because the dose rate (dose per unit time, such as rem per hour) is lower, providing more opportunity for the body to repair damaged cells.

On average, members of the public nationwide are exposed to approximately 300 mrem per year from natural sources (NCRP 1987). The largest natural sources are radon-222 and its radioactive decay products in homes and buildings, which contribute about 200 mrem per year. Additional natural sources include radioactive material in the earth (primarily the uranium and thorium decay series, and potassium-40) and cosmic rays from space filtered through the atmosphere. With respect to exposures resulting from human activities, the combined doses from weapons testing fallout, consumer and industrial products, and air travel (cosmic radiation) account for the remaining approximate 3 percent of the total annual dose. Nuclear fuel cycle facilities contribute less than 0.1 percent (0.05 mrem per year) of the total dose.

Cancer is the principal potential risk to human health from exposure to low or chronic levels of radiation. This EIS expresses radiological health impacts as the incremental changes in the number of expected fatal cancers (latent cancer fatalities) for populations and as the incremental increases in lifetime probabilities of contracting a fatal cancer for an individual. The estimates are based on the dose received and on dose-to-health effect conversion factors recommended by the Interagency Steering Committee on Radiation Standards (DOE 2002a). The Committee estimated that, for the general population, a collective dose of 1 person-rem would yield 6×10^{-4} excess latent cancer fatality. For radiation workers, a collective dose of 1 person-rem would yield an estimated 5×10^{-4} excess latent cancer fatality. The higher risk factor for the general population is primarily due to the inclusion of children in the population group, while the radiation worker population includes only people older than 18.

Other health effects such as nonfatal cancers and genetic effects can occur as a result of chronic exposure to radiation. Inclusion of the incidence of nonfatal cancers and severe genetic effects from radiation exposure increases the total detriment by 40 to 50 percent (Table C-1), compared to the change for latent cancer fatalities (ICRP 1991). As is the general practice for any U.S. Department of Energy (DOE) EIS, estimates of the total change have not been included in this EIS.

Table C-1. Risk of Latent Cancer Fatalities and Other Health Effects from Exposure to Radiation

Population	Latent Cancer Fatality (per rem)	Nonfatal Cancer (per rem)	Genetic Effects (per rem)	Total Detriment (per rem)
Workers	4.0×10^{-4}	8.0×10^{-5}	8.0×10^{-5}	5.6×10^{-4}
General Population	5.0×10^{-4}	1.0×10^{-4}	1.3×10^{-4}	7.3×10^{-4}

Source: ICRP 1991.

Exposures to high levels of radiation at high dose rates over a short period (less than 24 hours) can result in acute radiation effects. Minor changes in blood characteristics might be noted at doses in the range of 25 to 50 rad. The external symptoms of radiation sickness begin to appear following acute exposures of about 50 to 100 rad and can include anorexia, nausea, and vomiting. More severe symptoms occur at higher doses and can include death at doses higher than 200 to 300 rad of total body irradiation, depending on the level of medical treatment received. Information on the effects of acute exposures on humans was obtained from studies of the survivors of the Hiroshima and Nagasaki bombings and from studies following a multitude of acute accidental exposures. Factors to relate the level of acute exposure to health effects exist but are not applied in this EIS because expected exposures during normal operations and accidents would be well below 50 rem.

C.2 RADIOLOGICAL ASSESSMENT

When radioactivity is released into the environment, it has the potential to affect persons who come in contact with it. Mechanisms for transporting radiation include air, water, soil and food. The many ways an individual or population can come into contact with radiation are known as pathways. Pathway analysis is useful in quantifying the effective dose equivalent to an individual or population that is affected by the release. If radiation is released into the environment, an individual can come directly into contact with it via the external and inhalation pathways, or indirectly via the ingestion pathway. Submersion in an air or water plume can be directly quantified by dose conversion factors based on the concentration in the medium of interest.

Gaseous effluents released to the atmosphere were modeled with a straight line gaussian plume. The receptors were assumed to be downwind at a location that maximized their dose. The total dose to the individual at that location is the sum of all pathways (external, inhalation, and ingestion). At the location of the receptor, the external dose was calculated by multiplying the time-integrated concentration in air by the length of exposure and then multiplying that product by the appropriate external dose conversion factor for air, for each radionuclide, and then those doses were summed across all radionuclides. Radionuclides deposited on the ground also provide an external dose component and are assessed in a similar manner using the appropriate external ground dose conversion factors.

Internal exposure via inhalation for each radionuclide was quantified at the receptor location by multiplying the estimated concentration of the radionuclide by the intake of air (breathing rate times length of exposure) multiplied by the appropriate inhalation dose conversion factor for all nuclides.

The ingestion pathway is significant for some radionuclides that are released into the air or into water used for irrigation. For those radionuclides in the air, as the plume carrying the radionuclides travels away from the source, the radionuclides are deposited on the ground. Some radionuclides move from the soil into vegetation with water. The outside of plants will also intercept radionuclides from air and water. These plants can be either consumed directly by humans, or ingested by an animal (beef or poultry) that will then be consumed by humans or that will produce milk or eggs. The rates at which radionuclides accumulate in plant and animal product food stuffs are described by radionuclide transfer factors.

The following are pathways for liquid effluents released into surface water. The receptor can come into contact with liquid effluents that are released into surface water through direct external submersion in the contaminated water, boating over contaminated water and by spending time on shorelines where contaminated water is present. These are all external pathways. Internal pathways are primarily from drinking contaminated water, eating fish and wildlife that use the water, and by eating produce and animal products that were irrigated using the contaminated surface water.

C.2.1 Normal Operations

The GENII computer code (Napier et al. 1988) was used to estimate the radiation doses from releases during normal operations. For releases of radioactive material to the atmosphere, two receptors were evaluated: the maximally exposed individual, who was considered to be a nearby resident, and the population within 80 kilometers (50 miles) of the WVDP site. People were assumed to inhale radioactive material and be exposed to external radiation from the radioactive material released during normal operations. People were also assumed to ingest radioactive material through foodstuffs such as leafy vegetables, produce, meat, and milk.

Releases to the atmosphere could be from ground level or from a stack. Annual average atmospheric conditions were used to estimate radiation doses. Site-specific meteorological data from 1994 through 1998 (WVNS 2000a) were used to determine these atmospheric conditions.

The values of parameters used in GENII are listed in Table C-2.

C.2.2 Facility Accidents

The GENII computer code (Napier et al. 1988) was also used to estimate radiation doses from accidents. For accidents where radioactive material would be released to the atmosphere, three receptors were evaluated: (1) a worker at the onsite evaluation point located 640 meters (3,000 feet) from the accident, (2) the maximally exposed individual located at the WVDP site boundary, and (3) the population within

Table C-2. Parameters Used in GENII Radiological Assessments

Parameter	Individual Value	Population Value
Leafy Vegetable Consumption Rate	64 kg/yr	23 kg/yr
Other Produce Consumption Rate	217 kg/yr	80 kg/yr
Fruit Consumption Rate	114 kg/yr	42 kg/yr
Cereal Consumption Rate	125 kg/yr	46 kg/yr
Leafy Vegetable Growing Time	90 d	60 d
Other Produce Growing Time	90 d	60 d
Fruit Growing Time	90 d	60 d
Cereal Growing Time	90 d	60 d
Leafy Vegetable Holdup Time	1 d	14 d
Other Produce Holdup Time	60 d	14 d
Fruit Holdup Time	60 d	14 d
Cereal Holdup Time	90 d	14 d
Leafy Vegetable Yield	2 kg/m^2	2 kg/m^2
Other Produce Yield	2 kg/m^2	2 kg/m^2
Fruit Yield	2 kg/m^2	2 kg/m^2
Cereal Yield	2 kg/m^2	2 kg/m^2
Beef Consumption Rate	73 kg/yr	63 kg/yr
Poultry Consumption Rate	37 kg/yr	31 kg/yr
Milk Consumption Rate	310 L/yr	110 L/yr
Egg Consumption Rate	100 kg/yr	20 kg/yr
Beef Holdup Time	20 d	20 d
Poultry Holdup Time	1 d	1 d
Milk Holdup Time	0 d	4 d
Egg Holdup Time	0 d	3 d
Stored Feed Diet Fraction (beef)	0.25	0.25
Stored Feed Diet Fraction (poultry)	0.25	0.25
Stored Feed Diet Fraction (milk cow)	0.25	0.25
Stored Feed Diet Fraction (laying hen)	0.25	0.25
Stored Feed Grow Time (beef)	90 d	90 d
Stored Feed Grow Time (poultry)	90 d	90 d
Stored Feed Grow Time (milk cow)	45 d	45 d
Stored Feed Grow Time (laying hen)	90 d	90 d
Stored Feed Yield (beef)	2 kg/m^2	1 kg/m^2
Stored Feed Yield (poultry)	2 kg/m^2	2 kg/m^2
Stored Feed Yield (milk cow)	2 kg/m^2	2 kg/m^2
Stored Feed Yield (laying hen)	2 kg/m^2	2 kg/m^2
Stored Feed Storage Time (beef)	90 d	90 d
Stored Feed Storage Time (poultry)	90 d	90 d
Stored Feed Storage Time (milk cow)	90 d	90 d
Stored Feed Storage Time (laying hen)	90 d	90 d
Fresh Forage Diet Fraction (beef)	0.25	0.25
Fresh Forage Diet Fraction (milk cow)	0.75	0.75
Fresh Forage Grow Time (beef)	45 d	45 d
Fresh Forage Grow Time (milk cow)	30 d	30 d
Fresh Forage Yield (beef)	0.70 kg/m^2	2 kg/m^2
Fresh Forage Yield (milk cow)	1 kg/m^2	0.7 kg/m^2
Fresh Forage Storage Time (beef)	90 d	90 d
Fresh Forage Storage Time (milk cow)	0	0
Immersion Exposure Time (Chronic)	8,760 hr/yr	8,760 hr/yr

Table C-2. Parameters Used in GENII Radiological Assessments (cont)

Parameter	Individual Value	Population Value
Inhalation Exposure Time (Chronic)	2,000 hr/yr	2,000 hr/yr
Ground Surface Exposure Time (Chronic)	2,000 hr/yr	2,000 hr/yr
Immersion Exposure Time (Acute)	Duration of plume passage	Duration of plume passage
Inhalation Exposure Time (Acute)	Duration of plume passage	Duration of plume passage
Ground Surface Exposure Time (Acute)	2 hr	2 hr
Mass Loading	1×10^{-4} g/m^3	1×10^{-4} g/m^3
Swimming Time	12 hr/yr	8.3 hr/yr
Boating Time	12 hr/yr	8.3 hr/yr
Other Shoreline Activities Time	12 hr/yr	8.3 hr/yr
Transit Time for aquatic recreation	2.3 hr	0 hr
Irrigation Rate	43 in/yr	36 in/yr
Irrigation Duration	6 mo/yr	6 mo/yr
Fish Consumption Rate	21 kg/yr	0.1 kg/yr
Fish Holdup Time	1 d	10 d
Fish Transit Time	2.3 hr	160 hr
Mixing Ratio	0.125	4×10^{-3}
Average River Flow Rate	13.6 m^3/s	23.1 m^3/s
Transit Time to Irrigation Withdrawal	3.8 hr	0
Drink Water Consumption Rate	0	370 L/yr
Drinking Water Holdup Time	0	1 d
Breathing Rate (Chronic)	270 cm^3/s	270 cm^3/s
Breathing Rate (Acute)	330 cm^3/s	330 cm^3/s

Source: WVNS 2000a.
Acronyms: kg/yr = kilograms per year; d = day; kg/m^2 = kilograms per square meter; L/yr = liters per year; hr/yr = hours per year; g/m^3 = grams per cubic meter; in/yr = inches per year; mo/yr = months per year; m^3/s = cubic meters per second; cm^3/s = cubic centimeters per second

80 kilometers (50 miles) of the WVDP site. The maximally exposed individual was assumed to be at the WVDP site boundary because radiation doses were higher at the boundary than at the actual locations of nearby residents.

People were assumed to inhale radioactive material and be exposed to external radiation from radioactive material released during the accident. This radioactive material could be released from ground level or from a stack, depending on the accident. Two types of atmospheric conditions were used to estimate radiation doses, 50 percent atmospheric conditions and 95 percent atmospheric conditions. Fifty percent atmospheric conditions are conditions that are not exceeded 50 percent of the time and provide a realistic estimate of the likely atmospheric conditions that would exist during an accident. Ninety-five percent atmospheric conditions are conditions that are not exceeded 95 percent of the time and provide an upper bound on the atmospheric conditions that would exist during an accident. Site-specific meteorological data from 1994 through 1998 (WVNS 2000a) were used to determine 50 percent and 95 percent atmospheric conditions.

C.3 RADIONUCLIDE RELEASES FOR NORMAL OPERATIONS

Under all alternatives, it is assumed that current levels of maintenance, surveillance, heating, ventilation, and other routine operations would continue to be required while the actions proposed under each alternative were performed. For this EIS, these actions are called ongoing operations. Because ongoing operations would not vary among the proposed alternatives, the releases from these actions would be the same across all alternatives. These releases are listed in the WVDP Annual Site Environmental Reports for 1995 through 1999 (WVNS 1996, 1997, 1998, 1999a, 2000b). Stack parameters for these releases are listed in Table C-3.

Table C-3. Stack Parameters for Normal Operations Releases

Stack	Height (meters)[a]	Diameter (meters)	Discharge Rate (cubic meters per second)[b]	Exit Velocity (meters per second)
Process Building (ANSTACK)	63.4	1.35	23.6	16.49
Vitrification Facility (ANVITSK)	22.86	0.91	11.8	17.98
Waste Tank Farm (ANSTSK)	10.06	0.47	2.12	12.24
01/14 Building (ANCSSTK)	22.25	0.6	4.58	16.19

Source: WVNS 1999b.
a. To convert meters to feet, multiply by 3.2808.
b. To convert cubic meters to cubic feet, multiply by 0.028317.

C.4 RADIONUCLIDE RELEASES FOR ACCIDENTS

The amount of radioactive material released during an accident is known as the source term. The units of the source term are usually curies. It is the product of several factors, including:

$$\text{Source Term} = \text{MAR} \times \text{DR} \times \text{ARF} \times \text{RF} \times \text{LPF}$$

where:

MAR = Material at risk
DR = Damage ratio
ARF = Airborne release fraction
RF = Respirable fraction
LPF = Leakpath factor

The material at risk is the amount of radioactive material (in grams or curies of radioactivity for each radionuclide) available to be acted on by a given physical stress.

The damage ratio is the fraction of the material at risk impacted by the actual accident-generated conditions under evaluation.

The airborne release fraction is the coefficient used to estimate the amount of a radioactive material that can be suspended in air and made available for airborne transport under a specific set of induced physical stresses. It is applicable to events and situations that are completed during the course of the event.

The respirable fraction is the fraction of airborne radionuclides as particles that can be transported through air and inhaled into the human respiratory system and is commonly assumed to include particulate matter less than or equal to 10 micrometers in diameter.

The leakpath factor is the fraction of airborne materials transported from containment or confinement deposition or filtration mechanism (for example, fraction of airborne material in a glovebox leaving the glovebox under static conditions, fraction of material passing through a high efficiency particulate air [HEPA] filter).

C.4.1 Class A LLW Drum Puncture

This accident assumed that a drum containing Class A low-level waste (LLW) was punctured during handling by a fork of the forktruck. The accident could take place under the No Action Alternative, Alternative A, or Alternative B.

The material at risk for this accident is based on a Class A LLW drum filled with the intermediate radionuclide mix from Marschke (2001). The values for the damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (1993a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-4 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-4. Source Term for Class A LLW Drum Puncture

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Strontium-90	6.7×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	6.7×10^{-8}
Cesium-137	8.6×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	8.6×10^{-8}
Plutonium-238	2.7×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	2.7×10^{-8}
Plutonium-239	3.8×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	3.8×10^{-8}
Plutonium-240	2.7×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	2.7×10^{-8}
Plutonium-241	1.1×10^{-2}	0.10	1.0×10^{-3}	1.0	1.0	1.1×10^{-6}
Americium-241	2.8×10^{-5}	0.10	1.0×10^{-3}	1.0	1.0	2.8×10^{-9}
Americium-243	8.3×10^{-7}	0.10	1.0×10^{-3}	1.0	1.0	8.3×10^{-11}
Curium-244	4.0×10^{-7}	0.10	1.0×10^{-3}	1.0	1.0	4.0×10^{-11}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.2 Class A LLW Pallet Drop

This accident assumed that a pallet containing six Class A LLW drums was dropped during handling and the 6 drums were punctured. The accident could take place under the No Action Alternative, Alternative A, or Alternative B.

The material at risk for this accident is based on a Class A LLW drum filled with the intermediate radionuclide mix from Marschke (2001). The values for the damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (1993a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-5 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-5. Source Term for Class A LLW Pallet Drop

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Strontium-90	4.0×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	4.0×10^{-7}
Cesium-137	5.2×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	5.2×10^{-7}
Plutonium-238	1.6×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	1.6×10^{-7}
Plutonium-239	2.3×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	2.3×10^{-7}
Plutonium-240	1.6×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	1.6×10^{-7}
Plutonium-241	0.063	0.10	1.0×10^{-3}	1.0	1.0	6.3×10^{-6}
Americium-241	1.7×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	1.7×10^{-8}
Americium-243	5.0×10^{-6}	0.10	1.0×10^{-3}	1.0	1.0	5.0×10^{-10}
Curium-244	2.4×10^{-6}	0.10	1.0×10^{-3}	1.0	1.0	2.4×10^{-10}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.3 Class A LLW Box Puncture

This accident assumed that a B-25 box containing 90 cubic feet of Class A LLW was punctured during handling by a fork of the forktruck. The accident could take place under the No Action Alternative, Alternative A, or Alternative B.

The material at risk for this accident is based on a Class A LLW box filled with the intermediate radionuclide mix from Marschke (2001). The values for the damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (1993a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-6 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-6. Source Term for Class A LLW Box Puncture

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Strontium-90	8.3×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	8.3×10^{-7}
Cesium-137	0.011	0.10	1.0×10^{-3}	1.0	1.0	1.1×10^{-6}
Plutonium-238	3.3×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	3.3×10^{-7}
Plutonium-239	4.6×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	4.6×10^{-7}
Plutonium-240	3.3×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	3.3×10^{-7}
Plutonium-241	0.13	0.10	1.0×10^{-3}	1.0	1.0	1.3×10^{-5}
Americium-241	3.4×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	3.4×10^{-8}
Americium-243	1.0×10^{-5}	0.10	1.0×10^{-3}	1.0	1.0	1.0×10^{-9}
Curium-244	4.9×10^{-6}	0.10	1.0×10^{-3}	1.0	1.0	4.9×10^{-10}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.4 Collapse of Tank 8D-2 Vault (Wet)

For this accident, it is assumed that the occurrence of a severe earthquake greater than six times the design basis (0.1 g) causes the roof of Tank 8D-2 and its vault to collapse, exposing the tank contents to the atmosphere. In this accident, the contents of the tank were assumed to be wet. The material at risk for

Tank 8D-2 was a heel made up of two components, the mobile inventory and the fixed inventory (WVNS 2001a). The mobile inventory consisted of the liquid at the bottom of the tank. This liquid was assumed to have an airborne release fraction of 1×10^{-8}. The fixed inventory was assumed to be scoured from the sides of the tank by debris falling into the tank during the collapse and have an airborne release fraction of 1×10^{-7}. Because of its physical form (particles as opposed to liquid), the zeolite inventory was assumed to not be released during the accident.

This accident could take place under any of the alternatives. The frequency of this accident was estimated to be in the range of 10^{-4} to 10^{-6} per year (WVNS 2002a). Table C-7 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-7. Source Term for Tank 8D-2 Collapse (Wet)

Nuclide	Mobile MAR (curies)	Fixed MAR (curies)	DR	Mobile ARF	Fixed ARF	RF	LPF	ST (curies)
Carbon-14	1.0×10^{-3}	4.0×10^{-3}	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	4.1×10^{-10}
Cobalt-60	0.50	1.2	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	1.3×10^{-7}
Nickel-63	4.1	9.7	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	1.0×10^{-6}
Strontium-90	820	39,000	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	3.9×10^{-3}
Technetium-99	0.12	0.68	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	6.9×10^{-8}
Cesium-137	21,000	4,600	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	6.7×10^{-4}
Plutonium-241	6.3	1,000	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	1.0×10^{-4}
Curium-242	0.060	1.4	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	1.4×10^{-7}
Neptunium-237	7.0×10^{-3}	0.32	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	3.2×10^{-8}
Plutonium-238	0.70	120	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	1.2×10^{-5}
Plutonium-239	0.30	48	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	4.8×10^{-6}
Americium-241	5.4	170	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	1.7×10^{-5}
Americium-243	0.090	2.1	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	2.1×10^{-7}
Curium-244	1.1	25	1.0	1.0×10^{-8}	1.0×10^{-7}	1.0	1.0	2.5×10^{-6}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.5 Collapse of Tank 8D-2 Vault (Dry)

For this accident, it is assumed that the occurrence of a severe earthquake greater than six times the design basis (0.1 g) causes the roof of Tank 8D-2 and its vault to collapse, exposing the tank contents to the atmosphere. In this accident, the contents of the tank were assumed to be dry. The material at risk for Tank 8D-2 was a heel made up of two components, the mobile and zeolite inventory, and the fixed inventory (WVNS 2001a). The mobile and zeolite inventory was assumed to have dried out at the bottom of the tank. This dry material was assumed to have an airborne release factor of 4×10^{-7}. The fixed inventory was assumed to be scoured from the sides of the tank by debris falling into the tank during the collapse and have an airborne release factor of 1×10^{-7}.

Two phenomena were assumed to control the release of radioactive material following a tank collapse. The impact stresses imposed by the falling debris entrain some of the radioactive material in the air during the collapse. For the material on the walls of the tank, the fraction airborne was estimated using Equation 5-1 in DOE (1994). Using a fall height of 8 meters (27 feet) and a particle density of 2 grams per cubic meter, an airborne release fraction of 3×10^{-5} was estimated.

For the solid debris on the bottom of the tank, Section 4.4.3.3.2 of DOE (1994) summarizes experiments that have been run to estimate the release fractions when debris falls into various powders. According to Volume 2 of DOE (1994), there is only one experiment in which objects were actually dropped on powders; Table A-42 of that document summarizes those results. Based on the values listed in the "< 10 :m Inhal. PMS Probe" column, the average airborne release fraction is 1.4×10^{-4}.

The two airborne release fractions derived above were multiplied by 3×10^{-3} to obtain the final release fractions of 1.0×10^{-7} and 4×10^{-7}. The factor of 3×10^{-3} accounts for the effectiveness of the falling debris to remove entrained respirable particulates. The basis for this removal fraction is a series of experiments performed to determine the release fraction of respirable material following an explosion in a cell used to assemble nuclear weapons. These cells have roofs consisting of several feet of overburden that falls into the cell following an explosion. These experiments show that the falling debris removes 99.7 percent of the respirable particles.

This accident could take place under any of the alternatives. The frequency of this accident was estimated to be in the range of 10^{-4} to 10^{-6} per year (WVNS 2002a). Table C-8 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-8. Source Term for Tank 8D-2 Collapse (Dry)

Nuclide	Dry MAR (curies)	Fixed MAR (curies)	DR	Dry ARF	Fixed ARF	RF	LPF	ST (curies)
Carbon-14	1.0×10^{-3}	4.0×10^{-3}	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	8.0×10^{-10}
Cobalt-60	0.50	1.2	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	3.2×10^{-7}
Nickel-63	4.1	9.7	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	2.6×10^{-6}
Strontium-90	990	39,000	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	4.3×10^{-3}
Technetium-99	0.12	0.68	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	1.2×10^{-7}
Cesium-137	130,000	4,600	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	0.054
Plutonium-241	8.3	1,000	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	1.0×10^{-4}
Curium-242	0.060	1.4	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	1.6×10^{-7}
Neptunium-237	7.0×10^{-3}	0.32	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	3.5×10^{-8}
Plutonium-238	0.93	120	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	1.2×10^{-5}
Plutonium-239	0.40	48	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	5.0×10^{-6}
Americium-241	5.4	170	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	1.9×10^{-5}
Americium-243	0.090	2.1	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	2.4×10^{-7}
Curium-244	1.1	25	1.0	4.0×10^{-7}	1.0×10^{-7}	1.0	1.0	2.9×10^{-6}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.6 Drum Cell Drop

This accident assumed that two drums containing solidified LLW from the Drum Cell were dropped. The accident could take place under Alternative A or Alternative B.

The material at risk for this accident is based on a 71-gallon drum filled with solidified LLW (WVNS 1993b). The airborne release fraction (DOE 1994) assumed that the cement in the drum was solid with a density of 1.8 grams per cubic centimeter (0.065 pound per cubic inch). The fall height for the drums was assumed to be 200 centimeters (79 inches), which yields an airborne release fraction of 7.1×10^{-6}. The damage ratio, respirable fraction, and leakpath factor were assumed to equal one for this accident. The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-9 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-9. Source Term for Drum Cell Drop

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Strontium-90	0.30	1.0	7.1×10^{-6}	1.0	1.0	2.1×10^{-6}
Cesium-137	2.0	1.0	7.1×10^{-6}	1.0	1.0	1.4×10^{-5}
Plutonium-238	0.076	1.0	7.1×10^{-6}	1.0	1.0	5.4×10^{-7}
Plutonium-239	0.015	1.0	7.1×10^{-6}	1.0	1.0	1.0×10^{-7}
Plutonium-240	0.011	1.0	7.1×10^{-6}	1.0	1.0	7.8×10^{-8}
Plutonium-241	0.74	1.0	7.1×10^{-6}	1.0	1.0	5.2×10^{-6}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.7 Class C LLW Drum Puncture

This accident assumed that a drum containing Class C LLW was punctured during handling by a fork of the forktruck. The accident could take place under Alternative A or Alternative B.

The material at risk, damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (1993a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-10 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-10. Source Term for Class C LLW Drum Puncture

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Strontium-90	0.14	0.10	1.0×10^{-3}	1.0	1.0	1.4×10^{-5}
Cesium-137	0.15	0.10	1.0×10^{-3}	1.0	1.0	1.5×10^{-5}
Plutonium-238	7.5×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	7.5×10^{-7}
Plutonium-239	2.1×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	2.1×10^{-7}
Plutonium-240	1.5×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	1.5×10^{-7}
Plutonium-241	0.099	0.10	1.0×10^{-3}	1.0	1.0	9.9×10^{-6}
Americium-241	5.7×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	5.7×10^{-7}
Americium-243	5.0×10^{-5}	0.10	1.0×10^{-3}	1.0	1.0	5.0×10^{-9}
Curium-244	6.0×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	6.0×10^{-8}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.8 Class C LLW Pallet Drop

This accident assumed that a pallet containing six Class C LLW drums was dropped during handling and the 6 drums were punctured. The accident could take place under Alternative A or Alternative B.

The material at risk, damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (1993a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-11 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-11. Source Term for Class C LLW Pallet Drop

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Strontium-90	0.84	0.10	1.0×10^{-3}	1.0	1.0	8.4×10^{-5}
Cesium-137	0.90	0.10	1.0×10^{-3}	1.0	1.0	9.0×10^{-5}
Plutonium-238	0.045	0.10	1.0×10^{-3}	1.0	1.0	4.5×10^{-6}
Plutonium-239	0.013	0.10	1.0×10^{-3}	1.0	1.0	1.3×10^{-6}
Plutonium-240	9.0×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	9.0×10^{-7}
Plutonium-241	0.59	0.10	1.0×10^{-3}	1.0	1.0	5.9×10^{-5}
Americium-241	0.034	0.10	1.0×10^{-3}	1.0	1.0	3.4×10^{-6}
Americium-243	3.0×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	3.0×10^{-8}
Curium-244	3.6×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	3.6×10^{-7}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.9 Class C LLW Box Puncture

This accident assumed that a B-25 box containing 90 cubic feet of Class C LLW was punctured during handling by a fork of the forktruck. The accident could take place under Alternative A or Alternative B.

The material at risk, damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (1993a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-12 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-12. Source Term for Class C LLW Box Puncture

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Strontium-90	1.4	0.10	1.0×10^{-3}	1.0	1.0	1.4×10^{-4}
Cesium-137	1.5	0.10	1.0×10^{-3}	1.0	1.0	1.5×10^{-4}
Plutonium-238	0.075	0.10	1.0×10^{-3}	1.0	1.0	7.5×10^{-6}
Plutonium-239	0.021	0.10	1.0×10^{-3}	1.0	1.0	2.1×10^{-6}
Plutonium-240	0.015	0.10	1.0×10^{-3}	1.0	1.0	1.5×10^{-6}
Plutonium-241	0.99	0.10	1.0×10^{-3}	1.0	1.0	9.9×10^{-5}
Americium-241	0.057	0.10	1.0×10^{-3}	1.0	1.0	5.7×10^{-6}
Americium-243	5.0×10^{-4}	0.10	1.0×10^{-3}	1.0	1.0	5.0×10^{-8}
Curium-244	6.0×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	6.0×10^{-7}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.10 High-Integrity Container Drop

This accident assumed that a high-integrity container holding radioactive sludge and resin was dropped during handling, spilling its contents. The accident could take place under Alternative A or Alternative B.

The material at risk, damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (2002a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-13 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-13. Source Term for High-Integrity Container Drop

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Americium-241	0.18	1.0	4.0×10^{-5}	1.0	1.0	7.2×10^{-6}
Plutonium-239	0.15	1.0	4.0×10^{-5}	1.0	1.0	6.1×10^{-6}
Plutonium-240	0.12	1.0	4.0×10^{-5}	1.0	1.0	4.6×10^{-6}
Plutonium-241	5.7	1.0	4.0×10^{-5}	1.0	1.0	2.3×10^{-4}
Plutonium-238	0.043	1.0	4.0×10^{-5}	1.0	1.0	1.7×10^{-6}
Cesium-137	210	1.0	4.0×10^{-5}	1.0	1.0	8.4×10^{-3}
Cobalt-60	5.2	1.0	4.0×10^{-5}	1.0	1.0	2.1×10^{-4}
Strontium-90	2.2	1.0	4.0×10^{-5}	1.0	1.0	8.7×10^{-5}
Cesium-134	4.5	1.0	4.0×10^{-5}	1.0	1.0	1.8×10^{-4}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.11 CH-TRU Drum Puncture

This accident assumed that a drum containing contact-handled transuranic (CH-TRU) waste was punctured during handling by a fork of the forktruck. The accident could take place under Alternative A or Alternative B.

The material at risk for this accident is from WVNS (2002a). The damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (1993a). The frequency of this accident was estimated to be in the range of 0.1 to 0.01 per year (WVNS 2002a). Table C-14 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-14. Source Term for CH-TRU Drum Puncture

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Plutonium-238	3.3	0.10	1.0×10^{-3}	1.0	1.0	3.3×10^{-4}
Strontium-90	520	0.10	1.0×10^{-3}	1.0	1.0	0.052
Plutonium-239	0.85	0.10	1.0×10^{-3}	1.0	1.0	8.5×10^{-5}
Plutonium-240	0.64	0.10	1.0×10^{-3}	1.0	1.0	6.4×10^{-5}
Americium-241	0.62	0.10	1.0×10^{-3}	1.0	1.0	6.2×10^{-5}
Plutonium-241	32	0.10	1.0×10^{-3}	1.0	1.0	3.2×10^{-3}
Curium-244	0.14	0.10	1.0×10^{-3}	1.0	1.0	1.4×10^{-5}
Americium-243	0.045	0.10	1.0×10^{-3}	1.0	1.0	4.5×10^{-6}
Cesium-137	570	0.10	1.0×10^{-3}	1.0	1.0	0.057
Uranium-232	0.015	0.10	1.0×10^{-3}	1.0	1.0	1.5×10^{-6}
Americium-242m	7.6×10^{-3}	0.10	1.0×10^{-3}	1.0	1.0	7.6×10^{-7}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.4.12 Fire in Loadout Bay

This accident involved a diesel fuel fire in the Remote-Handled Waste Facility as a result of a leak in the fuel tank or fuel line of a truck. This fire would involve CH-TRU and remote-handled transuranic (RH-TRU) waste. The frequency of this accident was estimated to be in the range of 10^{-4} to 10^{-6} per year WVNS (2000c). This accident could take place under Alternative A or Alternative B.

The material at risk, damage ratio, airborne release fraction, respirable fraction, and leakpath factor are from WVNS (2000c). Table C-15 lists the material at risk, damage ratio, airborne release fraction, respirable fraction, leakpath factor, and source term for this accident.

Table C-15. Source Term for Fire in Loadout Bay

Nuclide	MAR (curies)	DR	ARF	RF	LPF	ST (curies)
Plutonium-238	11	1.0	6.0×10^{-3}	0.010	1.0	6.8×10^{-4}
Americium-241	3.9	1.0	6.0×10^{-3}	0.010	1.0	2.3×10^{-4}
Plutonium-239	3.2	1.0	6.0×10^{-3}	0.010	1.0	1.9×10^{-4}
Plutonium-240	2.4	1.0	6.0×10^{-3}	0.010	1.0	1.5×10^{-4}
Plutonium-241	71	1.0	6.0×10^{-3}	0.010	1.0	4.2×10^{-3}
Cesium-137	180	1.0	6.0×10^{-3}	1.0	1.0	11
Strontium-90	170	1.0	6.0×10^{-3}	0.010	1.0	9.9×10^{-3}
Curium-244	0.35	1.0	6.0×10^{-3}	0.010	1.0	2.1×10^{-5}
Americium-243	0.17	1.0	6.0×10^{-3}	0.010	1.0	1.0×10^{-5}
Uranium-232	0.051	1.0	6.0×10^{-3}	0.010	1.0	3.0×10^{-6}
Americium-242	0.027	1.0	6.0×10^{-3}	0.010	1.0	1.6×10^{-6}
Thorium-228	0.051	1.0	6.0×10^{-3}	0.010	1.0	3.1×10^{-6}
Americium-242m	0.027	1.0	6.0×10^{-3}	0.010	1.0	1.6×10^{-6}

Acronyms: MAR = material at risk; DR = damage ratio; ARF = airborne release fraction; RF = respirable fraction; LPF = leakpath factor; ST = Source Term

C.5 ATMOSPHERIC DATA

Hourly meteorological data collected at West Valley are shown in Tables C-16 and C-17 for 10-meter (33-foot) and 60-meter (197-foot) heights. These data were collected over a 5-year period from 1994 through 1998 (WVNS 2000a). They are arranged according to direction, atmospheric stability class, and wind speed. When the wind was calm (wind speed = 0 meters per second), the data were assigned to stability classes weighted by the frequency of each stability class. The "greater than 12 meters per second" data were included with the "9.0-12.0 meters per second" data.

C.6 LOCATIONS OF RECEPTORS

Locations of receptors near the WVDP site are listed in Table C-18. To provide a realistic estimate of maximally exposed individual radiation doses from airborne releases during normal operations, radiation doses were evaluated at the locations of nearby residences. For releases from the Process Building, the location that yielded the largest radiation dose was at 1,800 meters (5,900 feet) northwest of the WVDP site. For airborne releases from the Vitrification Facility, the Waste Tank Farm, and the 01/14 Building, the location that yielded the largest radiation dose was at 1,900 meters (6,200 feet) north-northwest of the WVDP site. Population radiation doses from airborne releases during normal operations included contributions from all directions for distances from 0 to 80 kilometers (0 to 50 miles) of the WVDP site.

Table C-16. Hours for Combinations of Direction, Stability Class, and Wind Speed Range at 10-meter (33-foot) Height for 1994-1998 at the WVDP Site[a]

Direction From	Direction To	Stability Class	Wind Speed Range (in meters per second) 0.0-1.5	1.5-3.0	3.0-6.0	6.0-9.0	9.0-12.0	> 12.0
S	N	A	4	9	21	1	0	0
SSW	NNE	A	2	11	16	0	0	0
SW	NE	A	1	16	14	0	0	0
WSW	ENE	A	2	10	3	0	0	0
W	E	A	1	11	3	0	0	0
WNW	ESE	A	0	22	40	0	0	0
NW	SE	A	1	46	242	2	0	0
NNW	SSE	A	0	19	67	6	0	0
N	S	A	0	21	20	0	0	0
NNE	SSW	A	0	18	12	0	0	0
NE	SW	A	0	13	10	0	0	0
ENE	WSW	A	0	11	12	0	0	0
E	W	A	0	16	9	0	0	0
ESE	WNW	A	0	7	6	0	0	0
SE	NW	A	0	9	10	0	0	0
SSE	NNW	A	2	6	10	0	0	0
	Calms	A	0					
S	N	B	0	23	42	3	0	0
SSW	NNE	B	2	34	26	0	0	0
SW	NE	B	1	50	27	0	0	0
WSW	ENE	B	0	26	10	0	0	0
W	E	B	1	34	14	0	0	0
WNW	ESE	B	1	67	61	1	0	0
NW	SE	B	0	119	241	1	0	0
NNW	SSE	B	0	34	95	2	0	0
N	S	B	0	24	18	0	0	0
NNE	SSW	B	2	28	15	0	0	0
NE	SW	B	3	22	10	0	0	0
ENE	WSW	B	2	13	4	0	0	0
E	W	B	0	15	7	0	0	0
ESE	WNW	B	0	10	4	0	0	0
SE	NW	B	1	15	16	2	0	0
SSE	NNW	B	2	19	40	0	0	0
	Calms	B	1					
S	N	C	5	68	74	0	0	0
SSW	NNE	C	3	74	29	0	0	0
SW	NE	C	3	102	30	0	0	0
WSW	ENE	C	3	48	19	0	0	0
W	E	C	2	71	21	0	0	0
WNW	ESE	C	8	143	72	2	0	0

Table C-16. Hours for Combinations of Direction, Stability Class, and Wind Speed Range at 10-meter (33-foot) Height for 1994-1998 at the WVDP Site[a] (cont)

Direction		Stability Class	Wind Speed Range (in meters per second)					
From	To		0.0-1.5	1.5-3.0	3.0-6.0	6.0-9.0	9.0-12.0	> 12.0
NW	SE	C	7	203	341	4	0	0
NNW	SSE	C	4	95	118	5	0	0
N	S	C	1	71	30	0	0	0
NNE	SSW	C	9	39	11	0	0	0
NE	SW	C	5	33	11	0	0	0
ENE	WSW	C	3	18	6	0	0	0
E	W	C	2	17	20	4	0	0
ESE	WNW	C	3	22	14	0	0	0
SE	NW	C	5	39	44	2	0	0
SSE	NNW	C	2	39	42	9	0	0
	Calms	C	0					
S	N	D	284	929	615	25	0	0
SSW	NNE	D	294	938	283	1	0	0
SW	NE	D	257	729	181	1	0	0
WSW	ENE	D	251	501	96	0	0	0
W	E	D	340	827	214	0	0	0
WNW	ESE	D	429	1,441	739	1	0	0
NW	SE	D	370	2,575	1,816	8	0	0
NNW	SSE	D	147	630	492	4	0	0
N	S	D	131	421	126	0	0	0
NNE	SSW	D	139	261	46	0	0	0
NE	SW	D	91	170	29	0	0	0
ENE	WSW	D	90	142	117	8	0	0
E	W	D	103	161	128	1	0	0
ESE	WNW	D	140	314	202	2	0	0
SE	NW	D	191	660	698	114	4	0
SSE	NNW	D	180	534	797	270	29	3
	Calms	D	46					
S	N	E	810	895	315	10	0	0
SSW	NNE	E	446	288	39	0	0	0
SW	NE	E	280	59	3	0	0	0
WSW	ENE	E	267	41	3	0	0	0
W	E	E	290	66	3	0	0	0
WNW	ESE	E	317	183	2	0	0	0
NW	SE	E	175	267	28	0	0	0
NNW	SSE	E	60	34	3	0	0	0
N	S	E	38	8	1	0	0	0
NNE	SSW	E	38	8	0	0	0	0
NE	SW	E	32	9	0	0	0	0
ENE	WSW	E	54	8	0	0	0	0

Table C-16. Hours for Combinations of Direction, Stability Class, and Wind Speed Range at 10-meter (33-foot) Height for 1994-1998 at the WVDP Site[a] (cont)

Direction		Stability Class	Wind Speed Range (in meters per second)					
From	To		0.0-1.5	1.5-3.0	3.0-6.0	6.0-9.0	9.0-12.0	> 12.0
E	W	E	95	15	4	0	0	0
ESE	WNW	E	114	73	7	0	0	0
SE	NW	E	275	433	199	3	0	0
SSE	NNW	E	575	692	476	94	11	0
	Calms	E	219					
S	N	F	632	98	0	0	0	0
SSW	NNE	F	276	9	0	0	0	0
SW	NE	F	166	1	0	0	0	0
WSW	ENE	F	111	4	0	0	0	0
W	E	F	68	7	0	0	0	0
WNW	ESE	F	28	2	0	0	0	0
NW	SE	F	20	6	0	0	0	0
NNW	SSE	F	23	4	0	0	0	0
N	S	F	16	0	0	0	0	0
NNE	SSW	F	10	1	0	0	0	0
NE	SW	F	20	0	0	0	0	0
ENE	WSW	F	17	0	0	0	0	0
E	W	F	42	1	0	0	0	0
ESE	WNW	F	96	14	1	0	0	0
SE	NW	F	223	72	3	0	0	0
SSE	NNW	F	711	136	10	0	0	0
	Calms	F	537					
S	N	G	696	22	0	0	0	0
SSW	NNE	G	168	0	0	0	0	0
SW	NE	G	89	0	0	0	0	0
WSW	ENE	G	51	1	0	0	0	0
W	E	G	16	1	0	0	0	0
WNW	ESE	G	4	0	0	0	0	0
NW	SE	G	8	0	0	0	0	0
NNW	SSE	G	9	0	0	0	0	0
N	S	G	5	0	0	0	0	0
NNE	SSW	G	4	0	0	0	0	0
NE	SW	G	6	0	0	0	0	0
ENE	WSW	G	12	0	0	0	0	0
E	W	G	16	0	0	0	0	0
ESE	WNW	G	53	3	0	0	0	0
SE	NW	G	260	27	0	0	0	0
SSE	NNW	G	1,197	85	0	0	0	0
	Calms	G	611					

Source: WVNS 2000a.

a. Total hours recorded (1994-1998) for wind blowing from the direction and at the speed range indicated.

Table C-17. Hours for Combinations of Direction, Stability Class, and Wind Speed Range at 60-meter (197-foot) Height for 1994-1998 at the WVDP Site[a]

Direction		Stability Class	Wind Speed Range (in meters per second)					
From	To		0.0-1.5	1.5-3.0	3.0-6.0	6.0-9.0	9.0-12.0	> 12.0
S	N	A	0	2	15	7	1	0
SSW	NNE	A	0	2	22	5	0	0
SW	NE	A	0	5	21	12	0	0
WSW	ENE	A	0	5	11	5	0	0
W	E	A	1	4	16	4	1	0
WNW	ESE	A	1	7	87	70	2	0
NW	SE	A	0	8	122	59	3	0
NNW	SSE	A	0	9	41	21	1	0
N	S	A	0	7	34	2	0	0
NNE	SSW	A	0	3	26	0	0	0
NE	SW	A	0	3	19	0	0	0
ENE	WSW	A	0	6	17	0	0	0
E	W	A	1	9	19	0	0	0
ESE	WNW	A	0	4	6	0	0	0
SE	NW	A	1	2	13	1	0	0
SSE	NNW	A	1	3	8	1	0	0
	Calms	A	1					
S	N	B	0	8	34	7	2	0
SSW	NNE	B	1	3	45	15	1	0
SW	NE	B	1	5	72	12	0	0
WSW	ENE	B	0	9	42	10	1	0
W	E	B	0	16	38	19	0	0
WNW	ESE	B	0	31	159	55	6	0
NW	SE	B	0	31	168	51	1	0
NNW	SSE	B	0	23	72	7	0	0
N	S	B	3	14	22	0	0	0
NNE	SSW	B	0	21	21	0	0	0
NE	SW	B	1	19	16	0	0	0
ENE	WSW	B	0	8	10	0	0	0
E	W	B	0	7	14	0	0	0
ESE	WNW	B	2	9	4	1	0	0
SE	NW	B	0	7	15	5	0	0
SSE	NNW	B	2	6	29	12	0	0
	Calms	B	0					
S	N	C	4	15	61	11	0	0
SSW	NNE	C	2	28	107	9	0	0
SW	NE	C	2	30	121	17	0	0
WSW	ENE	C	1	29	71	13	0	0
W	E	C	0	35	115	14	2	0
WNW	ESE	C	1	48	266	79	12	0

Table C-17. Hours for Combinations of Direction, Stability Class, and Wind Speed Range at 60-meter (197-foot) Height for 1994-1998 at the WVDP Site[a] (cont)

Direction		Stability Class	Wind Speed Range (in meters per second)					
From	To		0.0-1.5	1.5-3.0	3.0-6.0	6.0-9.0	9.0-12.0	> 12.0
NW	SE	C	3	53	260	41	1	0
NNW	SSE	C	4	53	98	15	0	0
N	S	C	2	52	45	0	0	0
NNE	SSW	C	1	36	22	0	0	0
NE	SW	C	4	28	17	0	0	0
ENE	WSW	C	1	14	14	1	0	0
E	W	C	1	14	21	7	3	0
ESE	WNW	C	3	14	15	4	0	0
SE	NW	C	1	27	40	4	1	1
SSE	NNW	C	0	16	38	14	6	
	Calms	C	0					
S	N	D	42	162	475	278	54	5
SSW	NNE	D	24	242	908	204	6	0
SW	NE	D	29	408	1,334	296	2	0
WSW	ENE	D	46	438	1,066	181	2	0
W	E	D	49	528	1,737	506	24	0
WNW	ESE	D	49	585	2,320	748	32	0
NW	SE	D	70	524	1,425	322	8	0
NNW	SSE	D	67	311	469	46	0	0
N	S	D	82	312	262	14	0	0
NNE	SSW	D	84	234	167	1	0	0
NE	SW	D	74	193	99	6	0	0
ENE	WSW	D	76	105	195	10	3	0
E	W	D	62	126	214	12	1	0
ESE	WNW	D	85	219	281	33	0	0
SE	NW	D	86	371	671	226	53	6
SSE	NNW	D	38	227	685	323	204	45
	Calms	D	24					
S	N	E	65	178	523	226	28	1
SSW	NNE	E	39	174	728	136	0	0
SW	NE	E	38	153	589	69	0	0
WSW	ENE	E	30	200	249	6	0	0
W	E	E	32	184	299	7	0	0
WNW	ESE	E	42	165	286	10	1	0
NW	SE	E	47	134	201	6	0	0
NNW	SSE	E	56	65	62	0	0	0
N	S	E	55	72	10	0	0	0
NNE	SSW	E	43	34	4	0	0	0
NE	SW	E	36	32	7	0	0	0
ENE	WSW	E	40	35	14	0	0	0

Table C-17. Hours for Combinations of Direction, Stability Class, and Wind Speed Range at 60-meter (197-foot) Height for 1994-1998 at the WVDP Site[a] (cont)

Direction		Stability Class	Wind Speed Range (in meters per second)					
From	To		0.0-1.5	1.5-3.0	3.0-6.0	6.0-9.0	9.0-12.0	> 12.0
E	W	E	55	59	14	6	0	0
ESE	WNW	E	111	121	42	1	0	0
SE	NW	E	224	507	455	50	0	0
SSE	NNW	E	166	337	536	207	76	14
	Calms	E	59					
S	N	F	72	100	140	1	0	0
SSW	NNE	F	19	87	115	0	0	0
SW	NE	F	26	46	66	0	0	0
WSW	ENE	F	27	56	30	1	0	0
W	E	F	18	50	22	0	0	0
WNW	ESE	F	26	55	25	0	0	0
NW	SE	F	43	52	35	0	0	0
NNW	SSE	F	44	34	13	0	0	0
N	S	F	42	8	0	0	0	0
NNE	SSW	F	20	4	0	0	0	0
NE	SW	F	28	3	0	0	0	0
ENE	WSW	F	28	3	0	0	0	0
E	W	F	39	7	0	0	0	0
ESE	WNW	F	72	35	6	0	0	0
SE	NW	F	374	390	162	3	0	0
SSE	NNW	F	457	286	134	8	0	0
	Calms	F	77					
S	N	G	99	172	122	1	0	0
SSW	NNE	G	36	114	166	1	0	0
SW	NE	G	25	87	49	0	0	0
WSW	ENE	G	32	68	7	0	0	0
W	E	G	20	37	8	0	0	0
WNW	ESE	G	21	25	6	0	0	0
NW	SE	G	31	44	6	0	0	0
NNW	SSE	G	24	16	1	0	0	0
N	S	G	15	2	0	0	0	0
NNE	SSW	G	19	1	0	0	0	0
NE	SW	G	28	0	0	0	0	0
ENE	WSW	G	17	2	0	0	0	0
E	W	G	27	1	0	0	0	0
ESE	WNW	G	63	12	2	0	0	0
SE	NW	G	317	369	89	0	0	0
SSE	NNW	G	554	511	110	0	0	0
	Calms	G	44					

Source: WVNS 2000a.

a. Total hours recorded (1994-1998) for wind blowing from the direction and at the speed range indicated.

Table C-18. Locations of Receptors at WVDP Site (in meters)[a]

Direction	Site Boundary Distance	Nearest Residence Distance
S	1,958	2,300
SSW	1,806	2,800
SW	1,538	2,100
WSW	1,405	2,200
W	1,051	1,800
WNW	1,051	1,200
NW	1,153	1,300
NNW	1,223	1,900
N	1,598	2,500
NNE	1,604	2,600
NE	1,604	1,900
ENE	1,615	2,000
E	1,856	2,500
ESE	2,430	2,600
SE	2,406	2,900
SSE	2,223	3,100

Sources: WVNS 2000a (site boundary); WVNS 2002b (nearest residence).
a. To convert meters to feet, multiply by 3.2808.

To provide a conservative estimate of maximally exposed individual radiation doses from airborne releases during accidents, radiation doses were evaluated at the WVDP site boundary because radiation doses at the site boundary were slightly larger than at nearby residences. For ground-level releases, the location that yielded the largest radiation dose was at 1,051 meters (3,448 feet) west-northwest of the WVDP site for 95-percent meteorology and at 1,223 meters (4,012 feet) north-northwest for 50-percent meteorology. For elevated releases, the location that yielded the largest radiation dose was at 1,806 meters (5,925 feet) south-southwest of the WVDP site for 95-percent meteorology and 50-percent meteorology.

For accidents, radiation doses for workers were also evaluated at an onsite evaluation point located 640 meters (2,100 feet) from the accident. For ground-level releases, the north-northwest direction yielded the largest radiation dose for 95-percent meteorology and 50-percent meteorology. For elevated releases, the southwest direction yielded the largest radiation dose for 95-percent meteorology and 50-percent meteorology.

Population radiation doses from airborne releases during accidents were evaluated for the direction that yielded the largest population radiation dose. For ground-level and elevated releases, the north-northwest direction yielded the largest population radiation dose for 95-percent meteorology and 50-percent meteorology. For distances from 0 to 80 kilometers (0 to 50 miles) of the WVDP site, this direction had a population of about 680,000 people.

C.7 POPULATION DATA

The 2000 population within 80 kilometers (50 miles) of the WVDP site was 1,535,963 (Table C-19). This was an increase of about 15 percent since 1990, with most of the growth being in the southern suburbs of Buffalo, north and north-northwest of the WVDP site. The 2000 population within 10 kilometer (6.2 miles) of the WVDP site was 8,978; this was a decrease of about 2 percent since 1990.

Table C-19. 2000 Population Distribution Around the WVDP Site

Direction	Distance (in kilometers)[a]										
	0 to 2	2 to 3	3 to 5	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 80	Total (0 to 80)
S	3	6	19	140	998	1,849	5,874	1,420	1,7190	6,109	33,608
SSW	4	3	44	205	540	1,957	2,669	691	437	15,236	21,786
SW	9	4	19	166	780	2,163	2,563	4,148	7,935	54,727	72,514
WSW	13	7	32	167	497	674	2,386	2,304	5,201	13,869	25,150
W	14	13	41	105	390	5,710	1,819	4,129	29,437	10,830	52,488
WNW	20	40	203	68	1,276	7,277	6,140	8,614	0	0	23,638
NW	8	32	58	236	915	5,206	19,405	1,407	0	0	27,267
NNW	1	6	40	2,554	1,518	8,536	59,778	106,966	294,784	213,344	687,527
N	5	10	53	2380	1,680	4,329	24,337	80,620	109,284	112,259	334,957
NNE	7	12	69	306	914	3,824	3,940	5,758	10,979	35,272	61,081
NE	8	14	47	160	1,343	1,649	2,155	2,596	10,031	17,803	35,806
ENE	7	16	40	122	4,082	3,586	1,419	2,218	5,687	26,411	43,588
E	7	12	95	171	1,323	1,376	1,752	4,048	1,600	11,020	21,404
ESE	10	23	64	175	1,411	578	1,127	2,668	4,521	17,611	28,188
SE	22	22	105	318	725	2,689	2,432	3,820	4,541	7,076	21,750
SSE	1	19	40	358	353	698	2,427	24,822	6,562	9,931	45,211
Total	139	239	969	7,631	18,745	52,101	140,223	256,229	508,189	551,498	1,535,963

a. To convert kilometers to miles, multiply by 0.62137.

C.8 RADIATION DOSES FROM CONTINUED MANAGEMENT FOR WVDP WORKERS AND THE PUBLIC

Using data from DOE Radiation Exposure Monitoring System (DOE 2001) for 1995 through 1999, the average collective radiation dose to workers at the WVDP site was about 15 person-rem per year (Table C-20). Over this same time period, the average individual radiation dose to workers at the WVDP site was about 59 millirem (mrem) per year. This radiation dose is well below the WVDP site administrative control level of 500 mrem per year (WVNS 2001b).

Table C-20. Radiation Doses to WVDP Workers from Continued Management Activities

Year	Number of People Monitored	Number of People with Measurable Doses	Collective Dose (person-rem/yr)	Individual Dose (mrem/yr)
1999	1,064	243	12.5	52
1998	1,115	260	18.2	70
1997	1,206	174	6.9	40
1996	1,365	231	11.2	48
1995	1,518	311	26.9	87
Average	1,254	244	15	59

Source: DOE 2001.

Using data from the West Valley Annual Site Environmental Reports (WVNS 1996, 1997, 1998, 1999a, 2000b) for 1995 through 1999, the collective radiation dose to people living around the WVDP site from airborne releases was about 0.17 person-rem per year (Table C-21). The individual radiation dose from airborne releases was about 0.021 mrem per year.

Table C-21. Radiation Doses to WVDP Members of the Public from Continued Management Activities

Pathway	Individual Dose (mrem/yr)	Collective Dose (person-rem/yr)
Airborne		
1999	0.011	0.11
1998	0.034	0.26
1997	0.049	0.39
1996	8.7×10^{-3}	0.070
1995	4.3×10^{-4}	8.6×10^{-3}
Annual Average	0.021	0.17
Waterborne[a]		
1999	0.056	0.13
1998	0.031	0.067
1997	0.024	0.038
1996	0.067	0.084
1995	0.028	0.094
Annual Average	0.041	0.083
All-Pathways		
1999	0.068	0.24
1998	0.065	0.33
1997	0.073	0.43
1996	0.076	0.15
1995	0.028	0.10
Annual Average	0.062	0.25
Background		
1999	300	380,000
1998	300	380,000
1997	300	380,000
1996	300	390,000
1995	300	390,000
Annual Average	300	380,000

a. Includes effluents and North Plateau drainage.
Sources: WVNS 1996, 1997, 1998, 1999a, and 2000b

Over this same time period, radiation doses from waterborne releases, including effluents and North Plateau drainage, were estimated to be 0.041 mrem per year for individuals and 0.083 person-rem per year for the population within 80 kilometers (50 miles) of the WVDP site.

The collective radiation dose through all exposure pathways (air and water) to people living around the WVDP site was about 0.25 person-rem per year. The individual radiation dose through all exposure pathways to people living within 80 kilometers (50 miles) of the WVDP site was about 0.062 mrem per year. For perspective, the population radiation dose from background radiation to people living within 80 kilometers (50 miles) of the WVDP site was 380,000 person-rem per year, and the individual radiation dose from background radiation to people living within 80 kilometers of West Valley was about 300 mrem per year.

C.9 AIR QUALITY

New York State is divided into nine regions for assessing state ambient air quality. The WVDP site is located in Region 9, which is comprised of Niagara, Erie, Wyoming, Chautauqua, Cattaraugus, and Allegany counties. The WVDP site and the surrounding area in Cattaraugus County are in attainment with the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and

New York State air quality standards contained in 6 NYCRR 257. The city of Buffalo, located about 48 km (30 mi) from the WVDP site, is a marginal nonattainment area for ozone (EPA 2002).

Under all of the proposed alternatives, the primary impacts to air quality would be through the continued emission of four criteria pollutants—nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter—from the two Cleaver Brooks boilers at the WVDP site. These boilers are used to generate steam for heating and other processes at the site, and each have a capacity of 20.2 million British thermal units per hour. Together, these boilers use about 2 million cubic meters (70 million cubic feet) of natural gas and about 24,000 liters (6,300 gallons) of No. 2 fuel oil per year. The other two criteria pollutants, lead and ozone, are produced in insufficient quantities by the boilers for consideration in this analysis.

Emissions from the boilers are presented in Table C-22. These emissions were calculated using the emission factors from *Compilation of Air Pollutant Emission Factors* (EPA 1998) (Chapter 1.3 for fuel oil combustion and Chapter 1.4 for natural gas combustion and are for boilers with a capacity of less than 100 million British thermal units per hour). The particulate matter emissions include both filterable particulate matter and condensable particulate matter, and all particulate matter was assumed to have an aerodynamic diameter of less than 10 micrometers. Back-up generators at the WVDP site do not contribute significantly to these emissions. Other data used in the analysis are listed in Table C-23.

The SCREEN3 computer code (EPA 1995) was used to model the potential impacts to air quality from these emissions. Three analyses were performed: (1) a simple terrain analysis for flat terrain, (2) a simple elevated terrain analysis for terrain lower than the physical stack height, and (3) a complex terrain analysis for terrain higher than the physical stack height. The simple elevated terrain analysis and the complex terrain analysis were performed because of the many hills and valleys around the WVDP site. Many offsite locations were examined in these analyses. The nearest location was at 1,051 meters (3,450 feet) from the boiler stacks, which corresponds to the nearest the WVDP site boundary location. The furthest location was at 50,000 meters (30 miles) from the site. The simple elevated terrain analysis yielded the highest estimates of criteria pollutant concentrations (Table C-24). The highest concentrations occurred at 1,379 meters (4,524 feet) from the WVDP site. As shown in Table C-24, the concentrations of criteria pollutants from the WVDP site emissions are well below the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and the New York State air quality standards contained in 6 NYCRR 257. It should be noted that the background concentrations used in Table C-24 were from near Buffalo, New York; actual background concentrations near the WVDP site would be lower. WVDP emissions of nitrogen dioxide and sulfur dioxide are also well below the New York State Department of Environmental Conservation's annual emission cap of 90,700 kilograms (100 tons).

Table C-22. Annual Criteria Pollutant Emissions from WVDP Boilers (in tons)[a]

Criteria Pollutant	Emissions from Natural Gas	Emissions from No. 2 Fuel Oil
Nitrogen Dioxide	3.5	0.063
Sulfur Dioxide	0.021	0.22
Carbon Monoxide	2.9	0.016
Particulate Matter	0.27	0.010

Source: EPA 1998.

a. To convert tons to kilograms, multiply by 907.18.

Note: Emissions are based on using 70 million cubic feet of natural gas and 6,300 gallons of No. 2 fuel oil per year. The boilers were assumed to operate 180 days per year. Emissions were calculated using the emission factors from AP-42, Chapter 1.3 for fuel oil combustion and AP-42, Chapter 1.4 for natural gas combustion, and are for boilers with a capacity of less than 100 million British thermal units per hour.

Table C-23. Data Used to Model Criteria Pollutant Emissions

Parameter	Value
Stack Height	7.62 meters (25 feet)
Stack Diameter	0.6096 meter (24 inches)
Stack Velocity	8 meters per second (26 feet per second)
Stack Temperature	154°C (427°K)
Ambient Temperature	20°C (293°K)
Boiler Capacity	20.2 million British thermal units per hour
Boiler Operating Time	180 days per year
Minimum site boundary distance	1,051 meters (3,450 feet)
Maximum distance	50,000 meters (30 miles)
Maximum sulfur content of No. 2 fuel oil	0.5 percent
Excess oxygen	3 percent
Fuel factor (natural gas)	8,710 dry standard cubic feet per million British thermal units
1-hour averaging time to 3-hour averaging time multiplying factor	0.9 (a)
1-hour averaging time to 8-hour averaging time multiplying factor	0.7 (a)
1-hour averaging time to 24-hour averaging time multiplying factor	0.4 (a)
1-hour averaging time to annual averaging time multiplying factor	0.08 (a)

Source: EPA 1992.

Table C-24 also shows the regional background concentrations of the criteria pollutants as measured near Buffalo, New York (EPA 2001). When combined with concentrations from WVDP emissions, the resulting total concentrations are also below the National Primary and Secondary Ambient Air Quality Standards contained in 40 CFR 50 and the New York State air quality standards contained in 6 NYCRR 257.

Air emissions of radionuclides from WVDP, are regulated by the EPA under the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations, 40 CFR Part 61, Subpart H, National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities. Annual reporting of the radionuclide emissions for calendar year 2000 was less than 0.1 percent of EPA's standards (WVNS, 2001).

C.10 OFFSITE IMPACTS

This section describes how the data in Table 2-6 were derived from the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE 1997a) (WM PEIS), the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (DOE 1997b) (WIPP SEIS-II), and the *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 2002) (Yucca Mountain Repository EIS).

LLW and Mixed LLW Disposal at Hanford, NTS, or a Commercial Disposal Site such as Envirocare. In the WM PEIS, DOE analyzed the potential environmental impacts of managing (treating, storing, or disposing of) LLW, mixed LLW, TRU waste, high-level waste (HLW), and hazardous waste. For each waste type, DOE considered a Decentralized Alternative (DOE sites where waste was currently

Table C-24. Criteria Pollutant Concentrations from WVDP Boiler Emissions and Regional Background

Criteria Pollutant	Averaging Time	Standard[a,b]	Concentration From WVDP Emissions[b,c]	Background Concentration[b,d]	Total Concentration[b]	Percent of Standard
Nitrogen dioxide	Annual	100[g,h,i] (0.053 ppm)	1.5	41	42	42
Carbon monoxide	1 hour	40,000[g,i] (35 ppm)	15	5,800	5,800	14
Carbon monoxide	8 hours	10,000[g,i] (9 ppm)	11	3,200	3,200	32
Sulfur dioxide	Annual	80[g,i] (0.03 ppm)	0.10	17	17	22
Sulfur dioxide	24 hours	365[g,i] (0.14 ppm)	0.50	63	64	17
Sulfur dioxide	3 hours	1,300[h,i] (0.5 ppm)	1.1	160	160	12
Particulate matter[e]	Annual	50[g,h]	0.11	21	21	42
Particulate matter[f]	24 hours	150[g,h]	0.56	61	61	41
Ozone	1 hour	235[g,h] (0.12 ppm)	(--)	210	210	89
Lead	Quarterly	1.5[g,h]	(--)	0.03	0.03	2

a. Standards from 40 CFR 50, National Primary and Secondary Ambient Air Quality Standards and 6 NYCRR 257, Air Quality Standards. Comparisons to the standards for particulate matter with an aerodynamic diameter less than 2.5 micrometers and the 8-hour ozone standard were not made because these standards have been remanded to the U.S. Environmental Protection Agency by the U.S. Court of Appeals.
b. Units in micrograms per cubic meter. Parts per million not calculated for substances that do not exist as a gas or vapor at normal room temperature and pressure.
c. The maximum criteria pollutant concentrations from WVDP boiler emissions were located 1,379 meters (4,524 feet) from the WVDP site.
d. Source: EPA 2001. Background concentrations were measured near Buffalo, New York.
e. Annual state standard is 45 to 75 micrograms per cubic meter according to level designation.
f. 24-hour state standard is 250 micrograms per cubic meter.
g. National primary ambient air quality standard.
h. National secondary ambient air quality standard.
i. New York State air quality standard.

generated or stored), one or more Regionalized Alternatives (a few DOE sites at various locations across the nation), and one or more Centralized Alternatives (one DOE site). Of particular relevance to this WVDP Waste Management EIS, the WM PEIS described human health impacts of disposing of 1.5 million cubic meters (53.5 million cubic feet) of LLW at Hanford (Centralized Alternative 3) or NTS (Centralized Alternative 4) and disposing of 219,000 cubic meters (7.8 million cubic feet) of mixed LLW at Hanford (Centralized Alternative) or NTS (Regionalized Alternative 3) (WM PEIS, Section 1.5 and Table 1-6.2).

For these two waste types, the WVDP waste represents less than 2 percent of the total waste volume from all DOE sites analyzed in the WM PEIS (for Class A waste, the WVDP represents 0.3 percent of the total LLW volume; for LLW, the WVDP waste represents 1.3 percent of the total LLW volume; and for mixed LLW, the WVDP waste represents 0.1 percent of the total mixed LLW volume). Because impacts, particularly human health impacts, are directly related to waste volume, the impacts of managing WVDP LLW and mixed LLW at either Hanford or NTS would be no more than 2 percent of the total impacts at those sites, as described in the WM PEIS. Table 2-6 shows the potential human health impacts of disposing of WVDP LLW and mixed LLW at Hanford or NTS. These impacts are 2 percent of the impacts described in the site data tables for those sites in Volume II of the WM PEIS. The impacts of the disposal of these waste types at Envirocare are assumed to be similar to impacts at Hanford.

TRU Waste Interim Storage at Hanford, INEEL, ORNL, or SRS. The WM PEIS also analyzed the treatment and interim storage of differing volumes of TRU waste from several DOE sites (including WVDP) at Hanford, INEEL, ORNL, or SRS (Regionalized Alternative 3). Table 2-6 shows the potential human health impacts of all TRU waste treatment and interim storage at those sites as stated in the WM PEIS. Because the WVDP TRU waste to be stored at those sites would not be treated and would be a smaller volume than that analyzed in the WM PEIS (and included in Table 2-6), the data in Table 2-6 substantially overstate the potential impacts of storing WVDP TRU waste at those sites.

TRU Waste Interim Storage at WIPP. The WM PEIS analyzed the treatment of TRU waste generated at most DOE sites at WIPP (Centralized Alternative). Table 2-6 shows the potential human health impacts of WVDP TRU waste interim storage at WIPP. These impacts are the impacts described in the WIPP SEIS-II for TRU waste treatment at WIPP. Because the volume of WVDP TRU waste is less than the volume analyzed in the WM PEIS, and because the impacts of interim storage at WIPP would be less than the impacts of TRU waste treatment at that site, the data in Table 2-6 substantially overstate the potential impacts of WVDP TRU waste interim storage at WIPP.

HLW Interim Storage at Hanford or SRS. With respect to HLW storage, the WM PEIS analyzed the interim storage of 340 canisters of WVDP HLW at Hanford (Regionalized Alternative 2) and SRS (Regionalized Alternative 1). Table 2-6 shows the potential human health impacts of WVDP HLW interim storage at these sites as originally reported in the site data tables for Hanford and SRS (Volume II of the WM PEIS). The impacts of interim storage of WVDP HLW would be slightly less because the volume of WVDP HLW (300 canisters) is slightly less than the volume of WVDP HLW analyzed in the WM PEIS (340 canisters).

TRU Waste Disposal at WIPP. The WIPP SEIS-II analyzed the potential environmental impacts of the shipment of all TRU waste to WIPP for treatment prior to disposal. TRU waste generated and stored at WVDP represents less than 1 percent of the total inventory to be disposed of at WIPP (175,580 cubic meters [6.2 million cubic feet]). Table 2-6 shows the expected human health impacts of disposing of WVDP TRU waste at WIPP. These impacts are 1 percent of the impacts reported in the WIPP SEIS-II (WIPP SEIS-II, Section 3.4, Table 3-18).

HLW Disposal at Yucca Mountain. The Yucca Mountain Repository EIS analyzed the potential environmental impacts of the disposal of 70,000 metric tons of heavy metal of HLW and spent nuclear fuel at the Yucca Mountain Repository. The 300 canisters of HLW (approximately 690 metric tons of heavy metal)[1] at WVDP represent approximately 1 percent of the total inventory of HLW and spent nuclear fuel to be disposed of at Yucca Mountain. Table 2-6 shows the expected human health impacts of disposing of WVDP HLW waste at the Yucca Mountain Repository. These impacts are 1 percent of the impacts reported in the Yucca Mountain Repository EIS (Yucca Mountain Repository EIS, Section 2.4.1, Table 2-7).

C.11 BIOTA SCREENING PROCEDURE

DOE's graded approach for evaluating radiation doses to aquatic and terrestrial biota consists of a three-step process designed to guide a user from an initial, conservative general screening to, if needed, a

[1] DOE estimates that each WVDP HLW canister contains 2.3 metric tons of heavy metal. Thus, 300 canisters would contain 690 metric tons of heavy metal. This volume is 1 percent of the 70,000 metric tons of heavy metal analyzed in the Yucca Mountain Repository EIS.

more rigorous analysis using site-specific information (DOE 2002c). The three-step process includes: (1) assembling radionuclide concentration data and knowledge of sources, receptors, and routes of exposure for the area to be evaluated, (2) applying a general screening methodology that provides limiting radionuclide concentration values (i.e., biota concentration guides in soil, sediment, and water), and (3) if needed, conducting an analysis through site-specific screening, site-specific analysis, or an actual site-specific biota dose assessment.

Internal and external sources of dose (and their contributing exposure pathways) are incorporated in the derivation of the graded approach methodology. Sufficient prudence has been exercised in developing each assumption and default parameter value to ensure that the resulting biota concentration guides are appropriately conservative. In the event that an individual default parameter value is subsequently found to be an upper-end value but not the "most limiting" value for a unique site-specific exposure scenario, the other prudent assumptions and default parameter values will ensure that the biota concentration guides (and resultant doses to biota) should continue to carry the appropriate degree of conservatism for screening purposes.

Biota concentration guides were derived for aquatic animal, riparian animal, terrestrial plant, and terrestrial animal reference organisms. The dose rate limits used to derive the biota concentration guides for each organism type are 1 rad per day, 0.1 rad per day, 1 rad per day, and 0.1 rad per day, respectively. While existing effects data support the application of these dose limits to representative individuals within populations of plants and animals, the assumptions and parameters applied in deriving the biota concentration guides are based on a maximally exposed individual, representing a conservative approach for screening purposes.

The contribution to dose from external radioactive material was estimated assuming that all of the ionizing radiation was deposited in the organism (i.e., no pass-through and no self-shielding). This is conservative and is tantamount to assuming that the radiosensitive tissues of concern (the reproductive tissues) lie on the surface of a very small organism. For external exposure to contaminated soil, the source was presumed to be infinite in extent. In the case of external exposure to contaminated sediment and water, the source was presumed to be semi-infinite in extent. The source medium to which the organisms are continuously exposed is assumed to contain uniform concentrations of radionuclides. These assumptions provide for appropriately conservative estimates of energy deposition in the organism from external sources of radiation exposure.

The contribution to dose from internal radioactive material was conservatively estimated assuming that all of the decay energy is retained in the tissue of the organism, (i.e., 100 percent absorption). Progeny of radionuclides and their decay chains are also included. This overestimates internal exposure, as the lifetimes of many of the biota of interest are generally short compared to the time for the build-up of progeny for certain radionuclides. The radionuclides are presumed to be homogeneously distributed in the tissues of the receptor organism. This is unlikely to underestimate the actual dose to the tissues of concern (i.e., reproductive organs). A radiation weighing factor of 20 for alpha particles is used to calculate the biota concentration guides for all organism types. This is conservative, especially if nonstochastic effects are most important in determining harm to biota.

The limiting concentration in an environmental medium was calculated by first setting a target total dose (e.g., 1 rad per day for aquatic organisms and terrestrial plants, or 0.1 rad per day for riparian and terrestrial animals) and then back-calculating to the medium concentration (i.e., the biota concentration guide) necessary to produce the applicable dose from radionuclides in the organism (internal dose), plus the external dose components from radionuclides in the environment (external dose).

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APPENDIX D
TRANSPORTATION

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APPENDIX D
TRANSPORTATION

D.1 INTRODUCTION

This appendix summarizes the methods and results of analysis for determining the environmental impacts of radioactive materials transportation on public highways and rail systems. The impacts are presented by alternative and include doses and health effects.

D.2 TRANSPORTATION REGULATIONS

The regulatory standards for packaging and transporting radioactive materials are designed to achieve four primary objectives:

- Protect persons and property from radiation emitted from packages during transportation, by specific limitations on the allowable radiation levels;
- Provide proper containment of the radioactive material in the package (achieved by packaging design requirements based on performance-oriented packaging integrity tests and environmental criteria);
- Prevent nuclear criticality (an unplanned nuclear chain reaction that may occur as a result of concentrating too much fissile material in one place); and
- Provide physical protection against theft and sabotage during transit.

The U.S. Department of Transportation regulates the transportation of hazardous materials in interstate commerce by land, by air, and on navigable water. As outlined in a 1979 Memorandum of Understanding (MOU) with the U.S. Nuclear Regulatory Commission (NRC), the Department of Transportation specifically regulates the carriers of radioactive materials and the conditions of transport such as routing, handling and storage, and vehicle and driver requirements. The Department of Transportation also regulates the labeling, classification, and marking of radioactive material packages.

The NRC regulates the packaging and transport of radioactive material for its licensees, which includes commercial shippers of radioactive materials. Under an agreement with the U.S. Department of Transportation, the NRC sets the standards for packages containing fissile materials and Type B packages. The NRC also establishes safeguards and security regulations to minimize the theft, diversion, or attack on certain shipments.

The U.S. Department of Energy (DOE), through its management directives, orders, and contractual agreements, ensures the protection of public health and safety by imposing standards on its transportation activities that are equivalent to those of the NRC and Department of Transportation. DOE has the authority, granted by a 1973 MOU between the Department of Transportation and the Atomic Energy Commission, to certify DOE-owned packages. DOE may design, procure, and certify its own packages, for use by DOE and its contractors, if the packages provide for a level of safety that is equivalent to that provided in Title 10 of the Code of Federal Regulations (CFR) Part 71.

The U.S. Department of Transportation also has requirements that help reduce transportation impacts. For example, there are requirements for drivers, packaging, labeling, marking, and placarding. There are also requirements that specify the maximum dose rate associated with radioactive material shipments, which help reduce incident-free transportation doses.

The Federal Emergency Management Agency is responsible for establishing policies for, and coordinating civil emergency management, planning, and interaction with, federal executive agencies that have emergency response functions in the event of a transportation incident. The Federal Emergency Management Agency coordinates federal and state participation in developing emergency response plans and is responsible for the development of the interim Federal Radiological Emergency Response Plan. This plan is designed to coordinate federal support to state and local governments, upon request, during the event of a transportation incident.

Other agencies regulating the handling and transport of radioactive materials include the U.S. Postal Service, the Occupational Safety and Health Administration, and the U.S. Environmental Protection Agency.

Radioactive materials are transported in Excepted packages, Industrial packages, Type A packages, or Type B packages. The amount of radioactive material determines which package must be used. Excepted packages are used to transport materials with extremely low levels of radioactivity and must meet only general design requirements. Industrial packages are used to transport materials which present a limited hazard to the public and environment, such as contaminated equipment and radioactive waste solidified in materials such as concrete.

Type A packages are used to transport radioactive materials with higher concentrations of radioactivity such as low-level radioactive waste (LLW). Type A packages are designed to retain their radioactive contents in normal transport. Under normal conditions, a Type A package must withstand:

- Hot (158 degrees Celsius [70 degrees Fahrenheit]) and cold (-40 degrees Celsius [-40 degrees Fahrenheit]) temperatures
- Pressure changes of 3.6 pounds per square inch
- Normal vibration experienced during transportation
- Simulated rainfall of 5 centimeters (2 inches) per hour for 1 hour
- Free drop from 0.3 to 1 meter (1 to 4 feet), depending on the package weight
- Corner drop test
- Compression test
- Impact of a 6-kilogram (13.2-pound) steel cylinder with rounded ends dropped from 1 meter (3 feet) onto the most vulnerable surface of the cask.

Type B packages are used to transport materials with radioactivity levels higher than those allowed for Type A packages. Type B packages are designed to retain their radioactive contents in both normal and accident conditions. In addition to the normal conditions outlined above, under accident conditions a Type B package must withstand:

- Free drop for 9 meters (30 feet) onto an unyielding surface in a way most likely to cause damage to the cask
- For some low-density, light-weight packages, a dynamic crush test consisting of dropping a 500-kilogram (1,100-pound) mass from 9 meters (30 feet) onto the package resting on an unyielding surface
- Free drop from 1 meter (40 inches) onto the end of a 15-centimeter (6-inch) diameter vertical steel bar
- Exposure for not less than 30 minutes to temperatures of 800 degrees Celsius (1,475 degrees Fahrenheit)
- For all packages, immersion in at least 15 meters (50 feet) of water for 8 hours
- For some packages, immersion in at least 0.9 meter (3 feet) of water for 8 hours in an orientation most likely to result in leakage
- For some packages, immersion in at least 200 meters (660 feet) of water for 1 hour.

Compliance with these requirements is demonstrated by using a combination of simple calculational methods, computer modeling techniques, or full-scale or scale-model testing of casks.

D.3 TRANSPORTATION ROUTES

To assess incident-free and transportation accident impacts, route characteristics were determined for shipments from the West Valley Demonstration Project (WVDP) Site to Envirocare in Clive, Utah; the Hanford Site in Richland, Washington; the Idaho National Engineering and Environmental Laboratory (INEEL); the Nevada Test Site (NTS) in Mercury, Nevada; the Oak Ridge National Laboratory (ORNL) in Tennessee; the Savannah River Site (SRS) in Aiken, South Carolina; and the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico. Representative highway and rail routes were analyzed using the routing computer code WebTRAGIS (Johnson and Michelhaugh 2000).[1] The routes were calculated using current routing practices and applicable routing regulations and guidelines. Route characteristics include total shipment distance between each origin and destination and the fractions of travel in rural, suburban, and urban population density zones. Population densities were determined using data from the 2000 census. Table D-1 shows the truck and rail route distances and the population densities along the proposed routes.

The WebTRAGIS computer code predicts highway routes for transporting radioactive materials within the United States. The WebTRAGIS database is a computerized road atlas that currently describes approximately 386,000 kilometers (240,000 miles) of roads. Complete descriptions of the interstate highway system, U.S. highways, most of the principal state highways, and a number of local and community highways are identified in the database. The WebTRAGIS computer code calculates routes that maximize the use of interstate highways. This feature allows the user to determine routes for shipment of radioactive materials that conform to U.S. Department of Transportation regulations (as specified in 49 CFR Part 397). The calculated routes conform to applicable guidelines and regulations and therefore represent routes that could be used. However, they may not be the actual routes used in the

[1] There is direct rail access to Envirocare, the Hanford Site, INEEL, ORNL, SRS, and WIPP. There is no direct rail access to NTS, including Yucca Mountain.

Table D-1. Truck and Rail Route Distances and Population Densities

Origin	Destination	Distances (in kilometers)[a]			Population Densities (in person per square kilometer)[b]		
		Rural	Suburban	Urban	Rural	Suburban	Urban
Truck Routes							
WVDP	Envirocare	2,505.2	659.5	81.5	11.6	303.3	2,352.1
	SRS	856.3	583.1	35.4	17.7	309.0	2,197.5
	Hanford	3,222.1	792.0	82.2	11.2	294.5	2,309.8
	WIPP	2,482.8	1,225.0	77.1	15.3	292.1	2,115.7
	NTS/Yucca Mountain	3,055.0	756.7	115.9	11.0	308.9	2,468.1
	INEEL	2,642.9	702.3	70.3	11.8	295.2	2,325.3
	ORNL	716.4	517.1	25.2	19.3	291.5	2,110.5
SRS	WIPP	1,729.6	650.8	64.4	13.2	315.6	2,172.5
	NTS/Yucca Mountain	3,253.7	893.2	137.2	11.0	333.7	2,393.5
INEEL	WIPP	1,952.1	266.0	42.8	6.9	356.2	2,293.6
ORNL	WIPP	1,647.1	538.6	67.8	12.7	328.2	2,263.6
Hanford	WIPP	2,531.3	355.7	54.7	7.2	339.3	2,277.2
	NTS/Yucca Mountain	1,507.7	299.1	75.3	8.6	345.4	2,537.9
Rail Routes[c]							
WVDP	Envirocare	2,778.9	502.5	176.1	8.2	423.4	2,482.9
	SRS	1,284.6	430.1	96.9	15.3	391.4	2,486.0
	Hanford	3,471.5	559.6	176.9	6.3	413.2	2,477.1
	WIPP	2,491.5	372.9	117.3	7.4	437.9	2,448.8
	NTS/Yucca Mountain (rail portion of route)	3,172.5	507.8	176.3	7.4	421.8	2,482.8
	NTS/Yucca Mountain (truck portion of route)	517.71	4.18	0.16	1.08	577.00	1,764.67
	INEEL	2,839.1	490.0	159.9	8.2	414.3	2,487.0
	ORNL	827.6	329.6	97.6	15.2	435.1	2,490.6

Table D-1. Truck and Rail Route Distances and Population Densities (cont)

Origin	Destination	Distances (in kilometers)[a]			Population Densities (in person per square kilometer)[b]		
		Rural	Suburban	Urban	Rural	Suburban	Urban
Rail Routes (cont)[c]							
SRS	WIPP	2,512.2	421.6	78.7	9.9	415.7	2,188.4
	NTS/Yucca Mountain (rail portion of route)	3,479.1	550.9	125.5	7.4	418.6	2,280.7
	NTS/Yucca Mountain (truck portion of route)	517.71	4.18	0.16	1.08	577.00	1,764.67
INEEL	WIPP	2,169.7	162.2	42.5	3.6	421.8	2,292.5
ORNL	WIPP	2,458.6	360.4	63.8	8.0	388.7	2,241.2
Hanford	WIPP	2,986.1	214.0	57.2	3.7	428.8	2,262.3
	NTS/Yucca Mountain (rail portion of route)	1,597.5	124.3	38.0	4.7	400.2	2,370.1
	NTS/Yucca Mountain (truck portion of route)	517.71	4.18	0.16	1.08	577.00	1,764.67

Acronyms: WVDP = West Valley Demonstration Project; SRS= Savannah River Site; WIPP= Waste Isolation Pilot Plant; NTS = Nevada Test Site; INEEL = Idaho National Engineering and Environmental Laboratory; ORNL = Oak Ridge National Laboratory.

a. To convert kilometers to miles, multiply by 0.62137.

b. To convert people per square kilometer to people per square mile, multiply by 2.59.

c. Envirocare, SRS, Hanford, WIPP, INEEL, and ORNL have direct rail access. NTS does not have direct rail access.

future. The code is updated periodically to reflect current road conditions, and it has been benchmarked against reported mileages and observations of commercial truck firms.

The WebTRAGIS computer code also is designed to simulate the routing of the U.S. rail system. The WebTRAGIS database consists of 94 separate subnetworks and represents various competing rail companies in the United States. The database used by WebTRAGIS was originally based on Federal Railroad Administration data and reflected the U.S. railroad system in 1974. The database has since been expanded and modified over the past two decades. Standard assumptions in the WebTRAGIS computer code were applied to the routes analyzed for this EIS and simulate the selection process railroads used to direct shipments of radioactive material. Currently, there are no specific routing regulations for transporting radioactive material by rail. WebTRAGIS is updated periodically to reflect current track conditions, and it has been benchmarked against reported mileages and observations of commercial rail firms.

Because there is no rail access to the NTS, it was assumed that radioactive waste would be shipped to Nevada by rail to an intermodal transfer facility in Nevada and then shipped from the intermodal transfer facility to NTS by truck.

D.4 SHIPMENTS

Radioactive material shipments associated with the proposed alternatives are assumed to be transported by either truck or rail. At this time, insufficient data exist to determine what fraction of shipments would be shipped by either transport mode. Therefore, the transportation analysis assumed that radioactive materials would be shipped 100 percent by truck and 100 percent by rail to bound potential impacts.

Several types of containers were assumed to be used to transport the radioactive waste evaluated in this environmental impact statement (EIS). The types of containers, their volumes, and the numbers of containers in a shipment are listed in Table D-2. Table D-3 lists the waste volumes, numbers of containers, and numbers of shipments for each alternative evaluated in the EIS. In Tables D-2 and D-3, a shipment is defined as the amount of waste transported on a single truck or a single railcar. There may be multiple railcars per train, but the data used in the transportation analysis and the resulting transportation impacts are based on the number of railcars that are transported. For example, rail accident rates are based on the number of accidents per railcar-mile, not on the number of accidents per train-mile.

The waste volumes used in this EIS were based on current waste volumes and future projections. These volumes were then escalated by about 10 percent to account for the uncertainties in future waste projections, packaging efficiency, and the choice of shipping container. Using this process, contact-handled transuranic (CH-TRU) waste was escalated from 1,019 cubic meters (36,000 cubic feet) to 1,133 cubic meters (40,000 cubic feet); remote-handled transuranic (RH-TRU) waste was escalated from 227 cubic meters (8,000 cubic feet) to 255 cubic meters (9,000 cubic feet); and LLW was escalated from 12,743 cubic meters (450,000 cubic feet) to 14,158 cubic meters (500,000 cubic feet). Drum Cell waste was not escalated because actual container counts are known. The volume of Drum Cell waste was based on 19,877 71-gallon drums and an additional 500 71-gallon drums containing sodium-bearing waste. All Drum Cell waste and sodium-bearing waste was assumed to be Class C LLW. This yields a volume of 5,477 cubic meters (193,405 cubic feet), so the total volume of LLW analyzed was 19,635 cubic meters (693,405 cubic feet). The escalated volume includes 223 cubic meters (7,889 cubic feet) of mixed LLW.

Table D-2. Waste Types and Containers

Waste Type	Container	Container Volume (ft³)[a]	Effective Volume (ft³)	Number of Containers per Shipment
Class A LLW	B-25 box	90	81	14 (truck) 28 (rail)
Class A LLW	55-gallon drum	7.65	6.885	84 (truck) 168 (rail)
Class B LLW	HIC[b]	100	90	1 (truck) 4 (rail)
Class B LLW	55-gallon drum	7.65	6.885	84 (truck) 168 (rail)
Class C LLW	HIC[b]	100	90	1 (truck) 4 (rail)
Class C LLW	71-gallon drum[c]	9.5	9.5	24 (truck) 96 (rail)
Class C LLW	55-gallon drum[d]	7.65	6.885	10 (truck) 40 (rail)
CH-TRU	55-gallon drum[e]	7.65	6.885	42 (truck) 42 (rail)
RH-TRU	55-gallon drum[f]	7.65	6.885	10 (truck) 40 (rail)
MLLW	55-gallon drum	7.65	6.885	84 (truck) 168 (rail)
HLW	Canister	NA[g]	NA	1 (truck) 5 (rail)

Acronyms: LLW = low-level radioactive waste; HIC = high-integrity container; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; MLLW = mixed low-level waste; HLW = high-level radioactive waste.

a. To convert cubic feet to cubic meters, multiply by 0.028317.
b. High-integrity containers were assumed to be shipped in a Type B shipping container.
c. Solidified waste from the Drum Cell.
d. Class C drums were assumed to be shipped in a Type B shipping container holding 10 drums.
e. CH-TRU waste drums were assumed to be shipped in a Type B TRUPACT-II shipping container, which holds 14 drums. A truck or rail shipment was assumed to hold three TRUPACT-II shipping containers.
f. RH-TRU waste drums were assumed to be shipped in a Type B shipping container holding 10 drums.
g. NA = not applicable.

D.5 INCIDENT-FREE TRANSPORTATION

Radiological dose during normal, incident-free transportation of radioactive materials results from exposure to the external radiation field that surrounds the shipping containers. The dose is a function of the number of people exposed, their proximity to the containers, their length of time of exposure, and the intensity of the radiation field surrounding the containers.

Radiological impacts were determined for crew workers and the general population during normal, incident-free transportation. For truck shipments, the crew were drivers of the shipment vehicles. For rail shipments, the crew were workers in close proximity to the shipping containers during inspection or classification of railcars. The general population was the individuals within 800 meters (2,625 feet) of the road or railway (off-link), sharing the road or railway (on-link), and at stops. Collective doses for the crew and general population were calculated using the RADTRAN 5 computer code (Neuhauser et al. 2000).

Table D-3. Waste Volumes, Containers, and Shipments By Alternative

Waste Type	No Action Alternative			Alternative A			Alternative B		
	Volume (ft^3)[a]	Number of Containers	Number of Shipments	Volume (ft^3)	Number of Containers	Number of Shipments	Volume (ft^3)	Number of Containers	Number of Shipments
Class A LLW (boxes)	97,649	1,206	87 (truck) 44 (rail)	351,586	4,341	311 (truck) 156 (rail)	351,586	4,341	311 (truck) 156 (rail)
Class A LLW (drums)	47,351	6,878	82 (truck) 41 (rail)	83,014	12,508	144 (truck) 72 (rail)	83,014	12,508	144 (truck) 72 (rail)
Class B LLW (HIC)	0	0	0	38,500	428	428 (truck) 107 (rail)	38,500	428	428 (truck) 107 (rail)
Class B LLW (drums)	0	0	0	194	29	1 (truck) 1 (rail)	194	29	1 (truck) 1 (rail)
Class C LLW (HIC)	0	0	0	12,618	141	141 (truck) 36 (rail)	12,618	141	141 (truck) 36 (rail)
Class C LLW (55-gallon drums)	0	0	0	6,198	901	91 (truck) 23 (rail)	6,198	901	91 (truck) 23 (rail)
Class C LLW (71-gallon drums)	0	0	0	193,405	20,377	850 (truck) 213 (rail)	193,405	20,377	850 (truck) 213 (rail)
CH-TRU	0	0	0	40,000	5,810	139 (truck) 139 (rail)	40,000	5,810	278 (truck)[b] 278 (rail)[b]
RH-TRU	0	0	0	9,000	1,308	131 (truck) 33 (rail)	9,000	1,308	262 (truck)[c] 66 (rail)[d]
MLLW	0	0	0	7,889	1,146	14 (truck) 7 (rail)	7,889	1,146	14 (truck) 7 (rail)
HLW		0	0		300	300 (truck) 60 (rail)		300	600 (truck)[e] 120 (rail)[f]
Total	145,000	8,084	169 (truck) 85 (rail)	742,404	46,839	2550 (truck) 847 (rail)	742,404	46,839	3,120 (truck)[g] 1,079 (rail)[h]

Acronyms: LLW = low-level radioactive waste; HIC = high-integrity container; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; MLLW = mixed low-level waste; HLW = high-level radioactive waste.

a. To convert cubic feet to cubic meters, multiply by 0.028317.
b. 139 CH-TRU shipments from WVDP to interim storage, 139 CH-TRU shipments from interim storage to disposal.
c. 131 RH-TRU shipments from WVDP to interim storage, 131 RH-TRU shipments from interim storage to disposal.
d. 33 RH-TRU shipments from WVDP to interim storage, 33 RH-TRU shipments from interim storage to disposal.
e. 300 HLW shipments from WVDP to interim storage, 300 HLW shipments from interim storage to disposal.
f. 60 HLW shipments from WVDP to interim storage, 60 HLW shipments from interim storage to disposal.
g. Includes 270 TRU waste, and 300 HLW, truck shipments from interim storage to disposal. Alternative B would load the same number of truck shipments (2,550) at WVDP for shipment offsite as Alternative A.
h. Includes 172 TRU waste, and 60 HLW, rail shipments from interim storage to disposal. Alternative B would load the same number of rail shipments (847) at WVDP for shipment offsite as Alternative A.

Collective Dose Scenarios

Calculating the collective doses is based on developing unit risk factors. Unit risk factors provide an estimate of the impact from transporting one shipment of radioactive material over a unit distance of travel in a given population density zone. The unit risk factors may be combined with routing information such as the shipment distances in various population density zones to determine the risk for a single shipment (a shipment risk factor) between a given origin and destination. Cashwell et al. (1986) contains a detailed explanation of the use of unit risk factors. Table D-4 contains the unit risk factors for truck and rail shipments.

Table D-4. Unit Risk Factors for Incident-Free Transportation

Receptor	Type of Zone	Rail	Truck
Public			
Off-link (rem per [persons per square kilometer] per kilometer)	Rural	3.90×10^{-8}	2.89×10^{-8}
	Suburban	6.24×10^{-8}	3.18×10^{-8}
	Urban	1.04×10^{-7}	3.18×10^{-8}
On-link (person-rem per kilometer per vehicle per hour)	Rural	1.21×10^{-7}	9.53×10^{-6}
	Suburban	1.55×10^{-6}	2.75×10^{-5}
	Urban	4.29×10^{-6}	9.88×10^{-5}
Residents near rest/refueling and walk-around stops (person-rem per [persons per square kilometer] per kilometer)	Rural	1.24×10^{-7}	5.50×10^{-9}
	Suburban	1.24×10^{-7}	5.50×10^{-9}
	Urban	1.24×10^{-7}	5.50×10^{-9}
Residents near rail classification stops (person-rem per [persons per square kilometer] per square kilometer)	Suburban	1.59×10^{-5}	NA[a]
Public including workers at rest/refueling stops (person-rem per kilometer)	Rural	NA	7.86×10^{-6}
	Suburban	NA	7.86×10^{-6}
	Urban	NA	7.86×10^{-6}
Workers			
Dose in moving vehicle (person-rem per kilometer)	Rural	NA	4.52×10^{-5}
	Suburban	NA	4.76×10^{-5}
	Urban	NA	4.76×10^{-5}
Classification stops at origin and destination (person-rem)	Suburban	0.0464	0.018
In-transit rail stops (person-rem per kilometer)	Rural	1.45×10^{-5}	NA
	Suburban	1.45×10^{-5}	NA
	Urban	1.45×10^{-5}	NA
Walk-around inspection (person-rem per kilometer)	Rural	NA	1.93×10^{-5}
	Suburban	NA	1.93×10^{-5}
	Urban	NA	1.93×10^{-5}

a. NA = not applicable.

Each waste type was assigned an external radiation dose rate representative of its constituents and shipping container. High-level waste (HLW), Class B LLW, and Class C LLW were assigned a dose rate of 14 millirem (mrem) per hour at 1 meter (3 feet) from their respective vehicles. Using the RADTRAN 5 computer code, this yields the regulatory maximum dose rate at 2 meters (7 feet) from the vehicle, which is 10 mrem per hour. RH-TRU waste was assigned a dose rate of 10 mrem per hour at 1 meter, and CH-TRU waste was assigned a dose rate of 4 mrem per hour at 1 meter (DOE 1997a). Class A LLW and mixed LLW were assigned a dose rate of 1 mrem per hour at 1 meter (DOE 1997b).

Incident-free nonradiological fatalities were also evaluated using unit risk factors. These fatalities would result from exhaust and fugitive dust emissions from highway and rail traffic and are associated with 10-micrometer particles. The nonradiological unit risk factor for truck transport used in this analysis was 1.5×10^{-11} fatalities per kilometer per persons per square kilometer; for train transport, the nonradiological unit risk factor was 2.6×10^{-11} fatalities per kilometer per persons per square kilometer. Escorts for HLW shipments were assumed to be in automobiles, with a unit risk factor of 9.4×10^{-12} fatalities per kilometer per persons per square kilometer. These unit risk factors were estimated from the data in Biwer and Butler (1999) and have been adjusted to account for more current diesel exhaust emission factors, a fleet average fugitive dust emission factor for roads, an age-adjusted mortality rate, and an average 10-micrometer particle risk factor. The distances used in the nonradiological analyses were doubled to reflect the round-trip distances, because these impacts could occur whether or not the shipments contain radioactive material.

Maximally Exposed Individual Exposure Scenarios

Maximum individual doses were calculated using the RISKIND computer code (Yuan et al. 1995). The maximum individual doses for the routine transport offsite were estimated for transportation workers and for members of the public. For rail shipments, the three scenarios for members of the public were:

- A railyard worker working at a distance of 10 meters (33 feet) from the shipping container for 2 hours,
- A resident living 30 meters (98 feet) from the rail line where the shipping container was being transported, and
- A resident living 200 meters (656 feet) from a rail stop where the shipping container was sitting for 20 hours.

For train shipments, the maximum exposed transportation worker was an inspector working 1 meter (3 feet) from the shipping container for 1 hour.

For truck shipments, the three scenarios for members of the public were:

- A person caught in traffic and located 1 meter (3 feet) away from the surface of the shipping container for 30 minutes,
- A resident living 30 meters (98 feet) from the highway used to transport the shipping container, and
- A service station worker working at a distance of 20 meters (66 feet) from the shipping container for 1 hour.

The hypothetical maximum exposed individual doses were accumulated for all shipments over 1 year. For workers, it was assumed that they would be exposed to 23 percent of the shipments, based on working 2,000 hours per year. However, for the scenario involving an individual caught in traffic next to a truck, the radiological exposures were calculated for only one event because it was considered unlikely that the same individual would be caught in traffic next to all containers for all shipments. For truck shipments, the maximum exposed transportation worker is the driver who was assumed to drive shipments for up to 1,000 hours per year. In the maximum exposed individual scenarios, the exposure rate for the shipments depended on the type of waste being transported. Also, the maximum exposure rate for the truck driver was 2 mrem per hour (10 CFR 71.47(b)(4)).

D.6 TRANSPORTATION ACCIDENTS

The offsite transportation accident analysis considers the impacts of accidents during the transportation of waste by truck or rail. Under accident conditions, impacts to human health and the environment may result from the release and dispersal of radioactive material. Transportation accident impacts have been assessed using accident analysis methodologies developed by the NRC. This section provides an overview of the methodologies, and the reader can obtain a detailed description from the referenced reports (NRC 1977; Fischer et al. 1987; Sprung et al. 2000). Accidents that could potentially breach the shipping container are represented by a spectrum of accident severities and radioactive release conditions. Historically, most transportation accidents involving radioactive materials have resulted in little or no release of radioactive material from the shipping container. Consequently, the analysis of accident risks takes into account a spectrum of accidents ranging from high-probability accidents of low severity to hypothetical high-severity accidents that have a correspondingly low probability of occurrence. This accident analysis calculates the probabilities and consequences from this spectrum of accidents.

To provide DOE and the public with a reasonable assessment of radioactive waste transportation accident impacts, two types of analyses were performed. First, an accident risk assessment was performed that takes into account the probabilities and consequences of a spectrum of potential accident severities using a methodology developed by the NRC (NRC 1977; Fischer et al. 1987; Sprung et al. 2000). For the spectrum of accidents considered in the analysis, accident consequences in terms of collective dose to the population within 80 kilometers (50 miles) were multiplied by the accident probabilities to yield collective dose risk using the RADTRAN 5 computer code (Neuhauser et al. 2000). Second, to represent the maximum reasonably foreseeable impacts to individuals and populations should an accident occur, radiological consequences were calculated for an accident of maximum credible severity in each population zone. An accident is considered credible if its probability of occurrence is greater than 1×10^{-7} per year (1 in 10 million per year). The accident consequence assessment for maximally exposed individuals and population groups was performed using the RISKIND computer code (Yuan et al. 1995).

The impacts for specific alternatives were calculated in units of dose (rem or person-rem). Impacts are further expressed as health risks in terms of estimated latent cancer fatalities in exposed populations. The health risk conversion factors used were derived from International Commission on Radiological Protection Publication 60 (ICRP 1991). The nonradiological impacts from transportation accidents (traffic fatalities) were also estimated.

D.6.1 Transportation Accident Rates

For calculating accident risks and consequences, state-specific accident rates were taken from data provided in Saricks and Tompkins (1999) for rail and heavy combination trucks. For calculating the nonradiological impacts from transportation accidents, state-specific fatality rates were taken from data provided in Saricks and Tompkins (1999) for rail and heavy combination trucks.

D.6.2 Conditional Probabilities and Release Fractions

Accident severity categories for potential radioactive waste transportation accidents are described in three NRC reports: NUREG-0170 (NRC 1977) for radioactive waste in general; a report commonly referred to as the Modal Study (Fischer et al. 1987); and a reassessment of NUREG-0170 (Sprung et al. 2000). The latter two reports address only spent nuclear fuel. The Modal Study represents a refinement of the NUREG-0170 methodology, and the recent reassessment analysis, which compares more recent results to NUREG-0170, represents a further refinement of both studies. Even though none of the radioactive waste assumed to be shipped in this EIS is classified as spent nuclear fuel, many of the modeling techniques developed in Fischer et al. (1987) and Sprung et al. (2000) can be applied to the types of waste that would be shipped from the WVDP site. Thus, this section presents the results of analyses that extend the results presented in the reexamination of the transport risk to fuel types other than spent nuclear fuel.

Each of the risk analyses considers a spectrum of accidents of varying severity. Each first determines the conditional probability that the accident will be of a specified severity. Then, based on the accident environment associated with each severe accident, each models the behavior of the material being shipped and the response of the packaging. The models estimate the fraction of each species of radioactive material that might be released for each of the severe accidents being considered. Each of the NRC risk assessments has considered a different breakdown of the severe accident environment. The analyses presented in NUREG-0170 divides the accident environment into eight accident severity categories. Fischer et al. (1987) represented the severe accident environment as a matrix, with one dimension being midline temperature of the lead in the cask and the other dimension being cask deformation. The matrix contained a total of 20 cases. The most recent analysis (Sprung et al. 2000) also represented the severe accident environment as a matrix, with one dimension being the temperature of the radioactive material and the other being the velocity of impact onto an unyielding surface. The matrix contained 19 cases for the truck accidents and 21 cases for rail accidents. The unique feature of the most recent analysis is the specification of a fire-only case. The NUREG-0170 analyses did not specify the accident environment associated with each of the eight accident severity categories, whereas the later analyses both based their cases on a matrix of fire durations and mechanical impacts on the cask. The result is ultimately reduced to a conditional probability of occurrence for each accident case or category, and a set of radionuclide release fractions for each accident case or category.

Both the Modal Study and Sprung et al. (2000) distinguished among material types that are present in the waste form. In addition to release fractions for particulates, separate release fractions are specified for noble gases, cesium, ruthenium, and any crud that might be present on the external surfaces of the spent nuclear fuel cladding. Rather than carry between 19 and 21 accident severity cases through the analysis, a simple mathematical technique has been used to reduce the accident categories to 6 when estimating the transport accident risk.

The probability for the severity category was estimated using the following formula:

$$P_{Sci} = \sum_{j} P_{Cj}$$

where:

- j represents the cases included in severity category i
- P_{Cj} is the case j probability
- P_{Sci} is the accident severity i probability

The probability weighting of the release fractions is calculated using the following formula:

$$RF_{Sci,m} = \frac{\sum_{j,m} RF_{Cj} * P_{Cj}}{P_{Sci}}$$

The use of the "i" and "j" subscripts in the above equation are the same as those used for the probability calculation. The additional "m" subscript has been added to represent the various material classes. The term "RF" is the fraction of the material in the cask released for a given material type. The two equations above are general and have been used to reduce the accident severity categories in NUREG-0170 from

8 to 6 and, in the case of the HLW and Class B and Class C shipping container analyses, from the 21 rail and 19 truck accident severity cases described by Sprung et al. (2000) to the 6 accident severity categories carried through this assessment. Use of these two equations reduces the level of detail carried into subsequent calculations without changing the overall risk estimate. Tables D-5 through D-10 show the six accident severity categories used to model the transportation accident risk for all the waste materials that may be shipped from the WVDP site.

Table D-5. Conditional Probabilities and Release Fractions for CH-TRU Waste Shipments

Severity Category	Truck		Rail	
	Conditional Probability	Release Fraction	Conditional Probability	Release Fraction
1	0.91	0	0.80	0
2	0.070	8.0×10^{-9}	0.18	2.0×10^{-8}
3	0.016	2.0×10^{-7}	0.018	7.0×10^{-7}
4	2.8×10^{-3}	8.0×10^{-5}	1.8×10^{-3}	8.0×10^{-5}
5	1.1×10^{-3}	2.0×10^{-4}	1.3×10^{-4}	2.0×10^{-4}
6	1.0×10^{-4}	2.0×10^{-4}	7.0×10^{-5}	2.0×10^{-4}

Source: DOE 1990.

Table D-6. Conditional Probabilities and Release Fractions for RH-TRU Waste Shipments

Severity Category	Truck		Rail	
	Conditional Probability	Release Fraction	Conditional Probability	Release Fraction
1	0.99993	0	0.99991	0
2	6.2×10^{-5}	2.6×10^{-5}	3.9×10^{-5}	2.5×10^{-5}
3	5.6×10^{-6}	2.4×10^{-5}	4.9×10^{-5}	8.8×10^{-5}
4	5.2×10^{-7}	2.6×10^{-5}	5.8×10^{-7}	5.3×10^{-4}
5	7.0×10^{-8}	6.2×10^{-5}	1.1×10^{-7}	1.3×10^{-4}
6	2.2×10^{-10}	6.7×10^{-5}	8.5×10^{-10}	2.9×10^{-4}

Source: DOE 1990.

Table D-7. Conditional Probabilities and Release Fractions for HLW Shipments

Severity Category	Truck		Rail	
	Conditional Probability	Release Fraction	Conditional Probability	Release Fraction
1	0.99993	0	0.99991	0
2	6.2×10^{-5}	3.4×10^{-8}	3.9×10^{-5}	6.2×10^{-8}
3	5.6×10^{-6}	0	4.9×10^{-5}	0
4	5.2×10^{-7}	2.4×10^{-7}	5.8×10^{-7}	7.9×10^{-6}
5	7.0×10^{-8}	9.3×10^{-8}	1.1×10^{-7}	9.3×10^{-8}
6	2.2×10^{-10}	3.0×10^{-7}	8.5×10^{-10}	2.7×10^{-6}

Table D-8. Conditional Probabilities and Release Fractions for Class C LLW Drum Cell Waste Shipments

Severity Category	Truck		Rail	
	Conditional Probability	Release Fraction	Conditional Probability	Release Fraction
1	0.93	0	0.93	0
2	0.071	1.2×10^{-5}	0.069	1.2×10^{-5}
3	2.2×10^{-3}	3.1×10^{-5}	1.0×10^{-3}	3.1×10^{-5}
4	7.5×10^{-5}	8.8×10^{-6}	3.7×10^{-3}	3.3×10^{-5}
5	6.9×10^{-4}	5.0×10^{-5}	3.8×10^{-4}	5.9×10^{-5}
6	6.1×10^{-5}	5.7×10^{-5}	1.3×10^{-4}	7.5×10^{-5}

Table D-9. Conditional Probabilities and Release Fractions for Class A Drum and Box and Class B LLW Drum Waste Shipments

Severity Category	Truck		Rail	
	Conditional Probability	Release Fraction	Conditional Probability	Release Fraction
1	0.81	0	0.82	0
2	0.14	1.2×10^{-5}	0.14	1.2×10^{-5}
3	0.028	9.2×10^{-4}	0.019	9.1×10^{-4}
4	1.9×10^{-4}	5.0×10^{-4}	2.5×10^{-5}	5.0×10^{-4}
5	0.019	7.9×10^{-3}	0.015	7.7×10^{-3}
6	1.2×10^{-4}	0.38	9.7×10^{-4}	0.38

Table D-10. Conditional Probabilities and Release Fractions for Class B LLW High-Integrity Containers and Class C LLW Drum and High-Integrity Container Shipments

Severity Category	Truck		Rail	
	Conditional Probability	Release Fraction	Conditional Probability	Release Fraction
1	0.99993	0	0.99991	0
2	6.2×10^{-5}	2.6×10^{-5}	3.9×10^{-5}	2.5×10^{-5}
3	5.6×10^{-6}	2.4×10^{-5}	4.9×10^{-5}	8.8×10^{-5}
4	5.2×10^{-7}	2.6×10^{-5}	5.8×10^{-7}	5.3×10^{-4}
5	7.0×10^{-8}	6.2×10^{-5}	1.1×10^{-7}	1.3×10^{-4}
6	2.2×10^{-10}	6.7×10^{-5}	8.5×10^{-10}	2.9×10^{-4}

In developing the release fractions for the various waste types, the models developed in Sprung et al. (2000) combined separate responses of the waste form, its cladding, the response of the gases internal to the waste form and shipping container, and the shipping container. Waste form release fractions were estimated for the 21 rail and 19 truck cases. For shipping containers used for HLW and Class B and Class C waste, the response for the various accident environments represented by the 19 and 21 cases was assumed to be the same. To estimate the behavior of materials released from the clad to the internals of the packaging, Sprung et al. (2000) developed a deposition and gas expansion model to estimate the fraction of the material in the gas that might be released to the environment. To demonstrate how these models were adapted to one of the WVDP waste types, the modeling of the HLW canister behavior in the accident environment represented by the 21 rail and 19 truck severe accident cases will be described.

The first step was to make the assumption that because glass and ceramics are both brittle solids, both will have similar particulate release fractions when struck during a severe transportation accident. Because a melt temperature of 1,150 degrees Celsius (2,102 degrees Fahrenheit) is used to pour the HLW into the canister, no noble gases would be present in the waste form. Furthermore, any cesium or ruthenium present would be tightly bound to the boron and silicon in the HLW so they would behave as particulates instead of volatile species. Lastly, there would be no crud.

The second step was to replace the clad failure rate used in Sprung et al. (2000) for spent nuclear fuel with a canister failure model. Based on impact tests on simulated HLW canisters, it was estimated that 20 percent of the canisters would fail if they impacted a surface at between 48 and 97 kilometers (30 and 60 miles) per hour, 70 percent would fail if they impacted the surface at between 97 and 145 kilometers (60 and 90 miles) per hour, and all would fail if they impacted the surface at speeds in excess of 145 kilometers (90 miles) per hour. Furthermore, assuming the canister was sealed at room temperature, a stress analysis performed on the canister showed that it would not fail from pressure buildup when exposed to fires as high as 1,000 degrees Celsius (1,832 degrees Fahrenheit). This was the highest temperature considered in any of the cases modeled by Sprung et al. (2000).

The final two parts of the Sprung et al. (2000) analysis were deposition and gas displacement models. The deposition model estimated the fraction of the material released from the spent nuclear fuel clad that is deposited on the inside surfaces of the cask and clad and therefore not available for immediate release. The gas displacement model considers the pressure buildup inside the cask and the fraction of the gas that must be released to reduce the pressure inside the cask to atmospheric pressure. The model assumes the fraction of the radioactive material released from the cask is the same as the fraction of the internal gases that must be released from the cask to reduce the internal pressure in the cask to atmospheric pressure. In the modeling of the HLW releases, no changes were made to the gas displacement model. The source of the displacement was assumed to be the 1.9 atmosphere pressure internal to the canister during shipment. This pressure is based on the assumption that the canister was sealed at room temperature and operates at 300 degrees Celsius (572 degrees Fahrenheit) during shipment.

Once the 19 truck cases and the 21 rail cases have been modeled for the waste forms, the resultant conditional probabilities and release fractions were reduced to the 6 accident severity categories shown in Tables D-5 to D-10. While different assumptions were made, a similar process was performed to estimate the conditional probabilities and release fractions for the other waste forms. For the Class C drum cell waste shipments, the waste is contained in a grout matrix that is assumed to be have impact properties that are similar to those for the HLW and ceramic fuel. For the thermal behavior, the grout will basically turn back to powder, losing all its bound water, at 600° Celsius (1,112° Fahrenheit). A thermal model of a waste drum was used to estimate the fraction of the grout decomposed as a function of the fire duration. The conditional fire probabilities were the same as those used for the HLW, and the thermal release fraction for the decomposed grout used the release fraction for aggregate taken from DOE (1994). The results for this waste form are shown in Table D-8. For the waste in Type B containers, the HLW canister model was modified in two ways. First, the effect of the canister was removed, placing all of the release limits on the performance of the Type B packaging in the accident environment. This packaging was assumed to perform as the lead cask performed in Sprung et al. (2000). The other change was to use release fractions that are consistent with the type of waste being shipped, a surface-contaminated solid. These release fractions and conditional probabilities are shown in Tables D-6 and D-10. For the Class A waste shipped in drums and boxes, a crush model was used to estimate the fraction of the drums failed at various impact velocities, and the release fractions for combustible solids presented in DOE (1994) were thought to be most representative of these wastes. The release fractions and conditional probabilities for these waste forms are presented in Table D-9.

The RADTRAN 5 computer code was used to estimate accident unit risk factors (units of person-rem per kilometer per person per square kilometer) for each radionuclide in the various waste forms. An Access database was used to combine the unit risk factors with data on conditional probabilities, release fractions, accident rates, population densities, route distances, and radionuclide inventories to calculate the total accident dose risk for each alternative examined in the EIS. For a given alternative, the accident unit risk factors were first multiplied by the number of shipment kilometers through each population zone being traversed by the waste shipments and then by the population density associated with that population zone. By summing over all population zones traversed by the waste form and then over all waste forms being considered, the total accident dose risk for each of the alternatives has been obtained.

D.6.3 Shipment Inventories

The radionuclide inventories in Classes A, B, and C LLW were estimated from the five radionuclide mixes in Table 3-6 of Marschke (2001). The five radionuclide mixes were converted to radionuclide concentrations and scaled to arrive at the maximum radionuclide concentrations that were Class A, B, or C waste. To determine which of the five mixes for each waste class had the greatest radiological hazard, the radionuclide concentration was divided by the A_2 value for each radionuclide from 10 CFR 71 and summed for each mix. The mix with the largest sum represents the mix with the largest radiological hazard; this mix was then used in the transportation risk assessment. The radionuclide concentrations were then converted to container inventories, which are presented in Table D-11. Radionuclide inventories for Drum Cell waste are presented in Table D-12.

The radionuclide inventories for CH-TRU waste was taken from DOE (1997a) and are listed in Table D-13. The radionuclide inventory for RH-TRU waste was based on the radionuclide distribution for spent nuclear fuel, scaled to 2 curies of plutonium per 55-gallon drum, or 20 curies of plutonium per 10 drums, which is the limit for the shipping container. The radionuclide inventory is listed in Table D-13. The radionuclide inventory for HLW was taken from DOE (2002a) and is listed in Table D-14.

D.6.4 Atmospheric Conditions

Because it is impossible to predict the specific location of an offsite transportation accident, generic atmospheric conditions were selected for the risk and consequence assessments. For accident risk assessment, neutral weather conditions (Pasquill Stability Class D) were assumed. Neutral weather conditions are typified by moderate windspeeds, vertical mixing within the atmosphere, and good dispersion of atmospheric contaminants. Because neutral meteorological conditions compose the most frequently occurring atmospheric stability condition in the United States, these conditions are most likely to be present in the event of an accident involving a radioactive waste shipment. On the basis of observations from National Weather Service surface meteorological stations at 177 locations in the United States, on an annual average, neutral conditions (Pasquill Class C and D) occur 59 percent of the time, while stable (Pasquill Class E and F) and unstable (Pasquill Class A and B) conditions occur 33 percent and 8 percent of the time, respectively (CRWMS M&O 1999).

For the accident consequence assessment, doses were assessed under stable (Class F with 0.89 meter [2.92 feet] per second windspeed) atmospheric conditions. Stable weather conditions are typified by low windspeeds, very little vertical mixing within the atmosphere, and poor dispersion of atmospheric contaminants. Class F meteorology in combination with windspeeds of 0.89 meter per second generally occur no more than 12 percent of the time. Results calculated for stable conditions represent a worst-case weather situation.

Table D-11. Class A, B, and C Container Inventories[a]

Nuclide	Class A LLW		Class B LLW		Class C LLW	
	Drum[b] Inventory	Box Inventory	Drum Inventory	HIC[c] Inventory	Drum Inventory	HIC[c] Inventory
Hydrogen-3	1.56×10^{-6}	5.50×10^{-8}	6.76×10^{-8}	8.83×10^{-7}	6.76×10^{-7}	8.83×10^{-6}
Carbon-14	6.49×10^{-6}	7.23×10^{-8}	8.88×10^{-8}	1.16×10^{-6}	8.88×10^{-7}	1.16×10^{-5}
Iron-55	0	5.57×10^{-7}	6.84×10^{-7}	8.95×10^{-6}	6.84×10^{-6}	8.95×10^{-5}
Nickel-59	0	1.24×10^{-6}	1.52×10^{-6}	1.99×10^{-5}	1.52×10^{-5}	1.99×10^{-4}
Nickel-63	0	1.66×10^{-4}	2.04×10^{-4}	2.66×10^{-3}	2.04×10^{-3}	0.0266
Cobalt-60	0	1.16×10^{-8}	1.43×10^{-8}	1.87×10^{-7}	1.43×10^{-7}	1.87×10^{-6}
Strontium-90	7.02×10^{-4}	0.070	0.086	1.12	0.86	11.2
Technetium-99	2.49×10^{-7}	6.26×10^{-6}	7.68×10^{-6}	1.00×10^{-4}	7.68×10^{-5}	1.00×10^{-3}
Iodine-129	5.21×10^{-10}	0	0	0	0	0
Cesium-137	8.96×10^{-4}	0.798	0.98	12.8	9.80	128
Europium-154	5.48×10^{-6}	7.32×10^{-4}	8.99×10^{-4}	0.0118	8.99×10^{-3}	0.118
Actinium-227	5.85×10^{-10}	9.44×10^{-12}	1.16×10^{-11}	1.52×10^{-10}	1.16×10^{-10}	1.52×10^{-9}
Radium-228	3.43×10^{-11}	1.57×10^{-17}	1.93×10^{-17}	2.52×10^{-16}	1.93×10^{-16}	2.52×10^{-15}
Protactinium-231	2.21×10^{-9}	4.55×10^{-12}	5.58×10^{-12}	7.30×10^{-11}	5.58×10^{-11}	7.30×10^{-10}
Thorium-232	2.37×10^{-10}	9.25×10^{-17}	1.14×10^{-16}	1.49×10^{-15}	1.14×10^{-15}	1.49×10^{-14}
Uranium-232	4.09×10^{-6}	6.09×10^{-8}	7.48×10^{-8}	9.78×10^{-7}	7.48×10^{-7}	9.78×10^{-6}
Uranium-233	8.75×10^{-6}	1.08×10^{-7}	1.33×10^{-7}	1.74×10^{-6}	1.33×10^{-6}	1.74×10^{-5}
Uranium-234	4.34×10^{-7}	6.27×10^{-8}	7.70×10^{-8}	1.01×10^{-6}	7.70×10^{-7}	1.01×10^{-5}
Uranium-235	8.43×10^{-8}	1.40×10^{-9}	1.71×10^{-9}	2.24×10^{-8}	1.71×10^{-8}	2.24×10^{-7}
Uranium-238	9.49×10^{-7}	1.24×10^{-8}	1.52×10^{-8}	1.99×10^{-7}	1.52×10^{-7}	1.99×10^{-6}
Neptunium-237	3.71×10^{-9}	4.70×10^{-7}	5.77×10^{-7}	7.55×10^{-6}	5.77×10^{-6}	7.55×10^{-5}
Plutonium-238	2.79×10^{-4}	8.80×10^{-5}	1.08×10^{-4}	1.41×10^{-3}	1.08×10^{-3}	0.0141
Plutonium-239	3.92×10^{-4}	2.10×10^{-5}	2.58×10^{-5}	3.38×10^{-4}	2.58×10^{-4}	3.38×10^{-3}
Plutonium-240	2.78×10^{-4}	2.10×10^{-5}	2.58×10^{-5}	3.38×10^{-4}	2.58×10^{-4}	3.38×10^{-3}
Plutonium-241	0.011	7.62×10^{-4}	9.36×10^{-4}	0.0122	9.36×10^{-3}	0.122
Plutonium-242	2.27×10^{-7}	1.08×10^{-7}	1.33×10^{-7}	1.74×10^{-6}	1.33×10^{-6}	1.74×10^{-5}
Americium-241	2.87×10^{-5}	7.33×10^{-4}	9.00×10^{-4}	0.0118	9.00×10^{-3}	0.118
Americium-243	8.70×10^{-7}	8.61×10^{-6}	1.06×10^{-5}	1.38×10^{-4}	1.06×10^{-4}	1.38×10^{-3}
Curium-242	1.05×10^{-16}	5.10×10^{-6}	6.26×10^{-6}	8.19×10^{-5}	6.26×10^{-5}	8.19×10^{-4}
Curium-243	1.54×10^{-8}	7.97×10^{-5}	9.78×10^{-5}	1.28×10^{-3}	9.78×10^{-4}	0.0128
Curium-244	4.21×10^{-7}	7.97×10^{-5}	9.78×10^{-5}	1.28×10^{-3}	9.78×10^{-4}	0.0128

a. All inventories presented in curies.
b. Also used for mixed LLW shipment inventory.
c. HIC = high-integrity container

D.6.5 Population Density Zones

Three population density zones (rural, suburban, and urban) were used for the offsite population risk assessment. These zones respectively correspond to three mean population densities of 6, 719, and 3,861 persons per square kilometer. The actual population densities in the three zones were based on an aggregation of the twelve population density zones provided in the WebTRAGIS output and on data from the 2000 census.

Table D-12. Drum Cell Waste Container Inventory

Nuclide	Drum Inventory (in curies)
Hydrogen-3	1.3×10^{-4}
Carbon-14	3.6×10^{-4}
Cobalt-60	6.0×10^{-8}
Nickel-63	3.5×10^{-5}
Strontium-90	0.027
Technetium-99	0.11
Antimony-125	1.0×10^{-4}
Iodine-129	1.8×10^{-5}
Cesium-137	0.021
Neptunium-237	4.3×10^{-5}
Plutonium-238	5.9×10^{-3}
Plutonium-239	1.2×10^{-3}
Plutonium-240	9.4×10^{-4}
Plutonium-241	0.067
Americium-241	1.4×10^{-3}
Plutonium-242	1.2×10^{-6}
Curium-242	8.6×10^{-12}

Table D-13. TRU Waste Container Inventories[a]

Nuclide	CH-TRU Waste Drum Inventory	RH-TRU Waste Drum Inventory
Cobalt-60	4.6×10^{-5}	0
Strontium-90	7.1×10^{-4}	3.8
Cesium-137	7.1×10^{-4}	4.1
Thorium-228	0	1.2×10^{-3}
Uranium-232	0	1.2×10^{-3}
Uranium-233	0	0
Uranium-235	0	0
Uranium-238	0	0
Plutonium-238	71	0.26
Plutonium-239	1.1	0.073
Plutonium-240	0.30	0.055
Plutonium-241	14	1.6
Plutonium-242	4.9×10^{-5}	0
Americium-241	0.26	0.089
Americium-242	0	6.2×10^{-4}
Americium-242m	0	6.2×10^{-4}
Americium-243	0	3.9×10^{-3}
Curium-244	0	8.1×10^{-3}

a. All inventories presented in curies.

Table D-14. HLW Canister Inventory

Nuclide	Canister Inventory[a]
Actinium-227	0.046
Americium-241	200
Americium-242m	1.0
Americium-243	1.3
Carbon-14	0.53
Curium-242	0.84
Curium-243	0.28
Curium-244	11
Curium-245	3.4×10^{-3}
Curium-246	3.9×10^{-4}
Cesium-134	4.4×10^{-3}
Cesium-135	0.62
Cesium-137	16,000
Hydrogen-3	0.078
Iodine-129	8.1×10^{-4}
Niobium-93m	0.95
Neptunium-237	0.092
Protactinium-231	0.059
Palladium-107	0.042
Plutonium-238	27
Plutonium-239	6.4
Plutonium-240	4.7
Plutonium-241	95
Plutonium-242	6.4×10^{-3}
Radium-228	6.3×10^{-3}
Ruthenium-106	1.9×10^{-9}
Selenium-79	0.23
Samarium-151	270
Tin-126	0.4
Strontium-90	14,000
Technetium-99	6.5
Thorium-229	8.9×10^{-4}
Thorium-230	2.3×10^{-4}
Thorium-232	6.3×10^{-3}
Uranium-232	0.023
Uranium-233	0.037
Uranium-234	0.019
Uranium-235	3.9×10^{-4}
Uranium-236	1.1×10^{-3}
Uranium-238	3.3×10^{-3}
Zirconium-93	1.1
Nickel-59	0.41
Nickel-63	27

Source: DOE 2002a.
a. All inventories presented in curies.

D.6.6 Exposure Pathways

Radiological doses were calculated for an individual located near the scene of the accident and for populations within 80 kilometers (50 miles) of the accident. Rural, suburban, and urban population densities were assessed. Dose calculations considered a variety of exposure pathways, including inhalation and direct exposure (cloudshine) from the passing cloud, ingestion of contaminated crops, direct exposure (groundshine) from radioactivity deposited on the ground, and inhalation of resuspended radioactive particles from the ground.

D.6.7 Health Risk Conversion Factors

The following health risk conversion factors used to estimate latent cancer fatalities from radiological exposures were from the Interagency Steering Committee on Radiation Standards (DOE 2002b): 6×10^{-4} and 5×10^{-4} latent cancer fatalities per person-rem for members of the public and workers, respectively. Although latent cancer fatalities are the predominant health risk associated with low-level radiation doses (that is, doses below the thresholds for acute effects), they are not the only potential detrimental health effect. Risks of other delayed health effects such as non-fatal cancers and hereditary effects should also be acknowledged. International Commission on Radiological Protection Publication 60 (ICRP 1991) has estimated that the total risk of detrimental health effects are 7.3×10^{-4} and 5.6×10^{-4} total detrimental health effects per person-rem for members of the public and workers, respectively.

D.7 RESULTS

D.7.1 Transportation Impacts

No Action Alternative. Table D-15 lists the transportation impacts under the No Action Alternative. If trucks were used to ship the radioactive waste, an estimated 0.034 to 0.041 fatality would occur. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type. Of that, about 60 percent would be from nonradiological traffic accidents and about 10 percent would be from nonradiological pollutants (diesel exhaust and fugitive dust).

Table D-15. Transportation Impacts Under the No Action Alternative

Waste Type	Destination	Incident-Free Public (person-rem)	Incident-Free Worker (person-rem)	Radiological Accident Dose Risk (person-rem)	Incident-Free Public (LCFs)	Incident-Free Worker (LCFs)	Radiological Accident Risk (LCFs)	Pollution Health Effects	Traffic Fatalities	Total Fatalities
Truck										
Class A	Envirocare	15	23	0.11	9.2×10^{-3}	0.011	6.9×10^{-5}	2.1×10^{-3}	0.011	0.034
Class A	Hanford	19	27	0.12	0.011	0.014	7.4×10^{-5}	2.3×10^{-3}	0.014	0.041
Class A	NTS	19	27	0.14	0.011	0.013	8.5×10^{-5}	2.8×10^{-3}	0.013	0.041
Total Truck Fatalities: 0.034 – 0.041										
Rail										
Class A	Envirocare	27	24	0.45	0.016	0.012	2.7×10^{-4}	3.0×10^{-3}	9.8×10^{-3}	0.042
Class A	Hanford	28	26	0.49	0.017	0.013	3.0×10^{-4}	3.1×10^{-3}	0.012	0.046
Class A	NTS	28	32	0.45	0.017	0.016	2.7×10^{-4}	3.0×10^{-3}	0.012	0.049
Total Rail Fatalities: 0.042 – 0.049										

Acronyms: LCFs = latent cancer fatalities; NTS = Nevada Test Site. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type.

If trains were used, an estimated 0.042 to 0.049 fatality would occur. About 70 percent would be from nonradiological traffic accidents and about 20 percent would be from nonradiological pollutants (diesel exhaust and fugitive dust).

Alternative A. Table D-16 lists the transportation impacts under Alternative A. If trucks were used to ship the radioactive waste, an estimated 0.79 to 0.82 fatality would occur. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type. Of that, about 30 percent would be from nonradiological traffic accidents and about 15 percent would be from nonradiological air pollutants.

If trains were used, an estimated 0.60 to 0.68 fatality would occur. Of that, about 30 percent would be from nonradiological traffic accidents and about 20 percent would be from nonradiological air pollutants.

Alternative B. Table D-17 lists the transportation impacts under Alternative B. If trucks were used to ship the radioactive waste, an estimated 0.84 to 0.93 fatality would occur. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type. Of that, about 35 percent would be from nonradiological traffic accidents and about 15 percent would be from nonradiological air pollutants.

If trains were used, an estimated 0.66 to 0.79 fatality would occur. Of that, about 30 percent would be from nonradiological traffic accidents and about 15 percent would be from nonradiological air pollutants.

D.7.2 Incident-Free Radiation Doses to Maximally Exposed Individuals

No Action Alternative. Table D-18 lists the incident-free radiation doses for the maximally exposed individual scenarios under the No Action Alternative. If trucks were used to ship the waste, the maximally exposed worker would be a driver who would receive a radiation dose of about 250 mrem per year based on driving a truck carrying Class A LLW for about 700 hours per year. This is equivalent to a probability of a latent cancer fatality of about 1.3×10^{-4}.

Under the No Action Alternative, the maximally exposed member of the public would be a person working at a service station who would receive a radiation dose of about 0.10 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 6.0×10^{-8}.

If trains were used to ship the waste, the maximally exposed worker would be an inspector. This worker would receive a radiation dose of about 1.9 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 9.5×10^{-7}. The maximally exposed member of the public was a railyard worker who was not directly involved with handling the railcars. This person would receive a radiation dose of about 0.35 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 2.1×10^{-7}.

Alternative A. Table D-18 lists the incident-free radiation doses for the maximally exposed individual scenarios under Alternative A. If trucks were used to ship the waste, the maximally exposed worker would be a driver who would receive a radiation dose of about 2,000 mrem per year based on driving a truck for 1,000 hours per year. This is equivalent to a probability of a latent cancer fatality of about 1.0×10^{-3}.

Table D-16. Transportation Impacts Under Alternative A

Waste Type	Destination	Incident-Free Public (person-rem)	Incident-Free Worker (person-rem)	Radiological Accident Dose Risk (person-rem)	Incident-Free Public (LCFs)	Incident-Free Worker (LCFs)	Radiological Accident Risk (LCFs)	Pollution Health Effects	Traffic Fatalities	Total Fatalities
Truck										
Class A	Envirocare	41	62	0.23	0.025	0.031	1.4×10^{-4}	5.7×10^{-3}	0.030	0.092
	Hanford Site	50	74	0.24	0.030	0.037	1.5×10^{-4}	6.3×10^{-3}	0.038	0.11
	NTS	51	71	0.28	0.031	0.036	1.7×10^{-4}	7.6×10^{-3}	0.036	0.11
Class B	Hanford Site	47	130	1.4×10^{-3}	1.4×10^{-3}	0.028	0.065	5.9×10^{-3}	0.035	0.13
	NTS	48	120	1.6×10^{-3}	1.6×10^{-3}	0.029	0.062	7.1×10^{-3}	0.034	0.13
Class C	Hanford Site	140	400	9.1×10^{-4}	0.087	0.20	5.5×10^{-7}	0.018	0.11	0.41
	NTS	150	380	1.1×10^{-3}	0.089	0.19	6.5×10^{-7}	0.022	0.10	0.41
CH-TRU	WIPP	14	20	1.2	8.3×10^{-3}	0.010	7.5×10^{-4}	2.3×10^{-3}	0.012	0.033
RH-TRU	WIPP	11	27	1.2×10^{-5}	6.5×10^{-3}	0.013	7.5×10^{-9}	2.2×10^{-3}	0.011	0.033
MLLW	Envirocare	1.3	1.9	0.017	7.7×10^{-4}	9.5×10^{-4}	1.0×10^{-5}	1.8×10^{-4}	9.2×10^{-4}	2.8×10^{-3}
	Hanford	1.5	2.3	0.019	9.2×10^{-4}	1.1×10^{-3}	1.1×10^{-5}	1.9×10^{-4}	1.2×10^{-3}	3.4×10^{-3}
	NTS	1.6	2.2	0.022	9.5×10^{-4}	1.1×10^{-3}	1.3×10^{-5}	2.3×10^{-4}	1.1×10^{-3}	3.4×10^{-3}
HLW	Repository	34	88	1.6×10^{-3}	0.020	0.044	9.7×10^{-7}	5.8×10^{-3}	0.024	0.094
										Total Truck Fatalities: 0.79 – 0.82
Rail										
Class A	Envirocare	73	65	0.88	0.044	0.033	5.3×10^{-4}	8.0×10^{-3}	0.026	0.11
	Hanford Site	74	70	0.97	0.045	0.035	5.8×10^{-4}	8.2×10^{-3}	0.034	0.12
	NTS	76	87	0.88	0.046	0.044	5.3×10^{-4}	8.1×10^{-3}	0.033	0.13
Class B	Hanford Site	70	66	5.6×10^{-3}	0.042	0.033	3.4×10^{-6}	3.9×10^{-3}	0.016	0.095
	NTS	71	90	5.1×10^{-3}	0.043	0.045	3.1×10^{-6}	3.8×10^{-3}	0.017	0.11
Class C	Hanford Site	220	200	2.0×10^{-3}	0.13	0.10	1.2×10^{-6}	0.012	0.049	0.29
	NTS	220	280	1.8×10^{-3}	0.13	0.14	1.1×10^{-6}	0.012	0.053	0.34
CH-TRU	WIPP	14	16	0.33	8.3×10^{-3}	8.1×10^{-3}	2.0×10^{-4}	3.4×10^{-3}	0.018	0.038
RH-TRU	WIPP	11	13	4.0×10^{-5}	6.6×10^{-3}	6.4×10^{-3}	2.4×10^{-8}	8.0×10^{-4}	4.2×10^{-3}	0.018
MLLW	Envirocare	2.2	2.0	0.068	1.3×10^{-3}	1.0×10^{-3}	4.1×10^{-5}	2.4×10^{-4}	8.1×10^{-4}	3.4×10^{-3}
	Hanford	2.3	2.2	0.075	1.4×10^{-3}	1.1×10^{-3}	4.5×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	3.8×10^{-3}
	NTS	2.3	2.7	0.068	1.4×10^{-3}	1.3×10^{-3}	4.1×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	4.0×10^{-3}
HLW	Repository	13	28	4.9×10^{-4}	7.6×10^{-3}	0.014	3.0×10^{-7}	4.2×10^{-3}	0.019	0.045
										Total Rail Fatalities: 0.60 – 0.68

Acronyms: LCFs = latent cancer fatalities; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; MLLW = mixed low-level waste; HLW = high-level radioactive waste; NTS = Nevada Test Site; WIPP = Waste Isolation Pilot Plant. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type.

Table D-17. Transportation Impacts Under Alternative B

Waste Type	Destination	Incident-Free		Radiological Accident Dose Risk (person-rem)	Incident-Free		Radiological Accident Risk (LCFs)	Pollution Health Effects	Traffic Fatalities	Total Fatalities
		Public (person-rem)	Worker (person-rem)		Public (LCFs)	Worker (LCFs)				
Truck										
Class A	Envirocare	41	62	0.23	0.025	0.031	1.4×10^{-4}	5.7×10^{-3}	0.030	0.092
	Hanford Site	50	74	0.24	0.030	0.037	1.5×10^{-4}	6.3×10^{-3}	0.038	0.11
	NTS	51	71	0.28	0.031	0.036	1.7×10^{-4}	7.6×10^{-3}	0.036	0.11
Class B	Hanford Site	47	130	1.4×10^{-3}	0.028	0.065	8.2×10^{-7}	5.9×10^{-3}	0.035	0.13
	NTS	48	120	1.6×10^{-3}	0.029	0.062	9.4×10^{-7}	7.1×10^{-3}	0.034	0.13
Class C	Hanford Site	140	400	9.1×10^{-4}	0.087	0.20	5.5×10^{-7}	0.018	0.11	0.41
	NTS	150	380	1.1×10^{-3}	0.089	0.19	6.5×10^{-7}	0.022	0.10	0.41
CH-TRU	SRS → WIPP	15	25	1.7	8.8×10^{-3}	0.012	1.0×10^{-3}	2.7×10^{-3}	0.015	0.040
	INEEL → WIPP	18	32	1.1	0.011	0.016	6.7×10^{-4}	2.5×10^{-3}	0.016	0.046
	ORNL → WIPP	13	23	1.1	7.7×10^{-3}	0.012	6.4×10^{-4}	2.2×10^{-3}	0.012	0.034
	Hanford → WIPP	22	38	1.3	0.013	0.019	7.8×10^{-4}	3.0×10^{-3}	0.020	0.056
RH-TRU	SRS → WIPP	12	31	1.7×10^{-5}	6.9×10^{-3}	0.015	1.0×10^{-8}	2.5×10^{-3}	0.014	0.039
	INEEL → WIPP	14	41	1.2×10^{-5}	8.4×10^{-3}	0.021	7.3×10^{-9}	2.4×10^{-3}	0.015	0.046
	ORNL → WIPP	10	29	1.1×10^{-5}	6.1×10^{-3}	0.014	6.4×10^{-9}	2.0×10^{-3}	0.011	0.034
	Hanford → WIPP	17	50	1.4×10^{-5}	0.010	0.025	8.4×10^{-9}	2.8×10^{-3}	0.019	0.057
MLLW	Envirocare	1.3	1.9	0.017	7.7×10^{-4}	9.5×10^{-4}	1.0×10^{-5}	1.8×10^{-4}	9.2×10^{-4}	2.8×10^{-3}
	Hanford Site	1.5	2.3	0.019	9.2×10^{-4}	1.1×10^{-3}	1.1×10^{-5}	1.9×10^{-4}	1.2×10^{-3}	3.4×10^{-3}
	NTS	1.6	2.2	0.022	9.5×10^{-4}	1.1×10^{-3}	1.3×10^{-5}	2.3×10^{-4}	1.1×10^{-3}	3.4×10^{-3}
HLW	SRS → Repository	53	130	4.3×10^{-3}	0.032	0.067	2.6×10^{-6}	9.6×10^{-3}	0.047	0.16
	Hanford → Repository	50	140	2.3×10^{-3}	0.030	0.069	1.4×10^{-6}	8.0×10^{-3}	0.037	0.14
									Total Truck Fatalities:	0.84 – 0.93

Table D-17. Transportation Impacts Under Alternative B (cont)

Waste Type	Destination	Incident-Free		Radiological Accident Dose Risk (person-rem)	Incident-Free		Radiological Accident Risk (LCFs)	Pollution Health Effects	Traffic Fatalities	Total Fatalities
Rail										
Class A	Envirocare	73	65	0.88	0.044	0.033	5.3×10^{-4}	8.0×10^{-3}	0.026	0.11
	Hanford Site	74	70	0.97	0.045	0.035	5.8×10^{-4}	8.2×10^{-3}	0.034	0.12
	NTS	76	87	0.88	0.046	0.044	5.34×10^{-4}	8.1×10^{-3}	0.033	0.13
Class B	Hanford Site	70	66	5.6×10^{-3}	0.042	0.033	3.4×10^{-6}	3.9×10^{-3}	0.016	0.095
	NTS	71	90	5.1×10^{-3}	0.043	0.045	3.1×10^{-6}	3.8×10^{-3}	0.017	0.11
Class C	Hanford Site	220	200	2.0×10^{-3}	0.13	0.10	1.2×10^{-6}	0.012	0.049	0.29
	NTS	220	280	1.8×10^{-3}	0.13	0.14	1.1×10^{-6}	0.012	0.053	0.34
CH-TRU	SRS → WIPP	23	30	0.48	0.014	0.015	2.9×10^{-4}	5.8×10^{-3}	0.037	0.072
	INEEL → WIPP	23	32	0.57	0.014	0.016	3.4×10^{-4}	5.8×10^{-3}	0.023	0.059
	ORNL → WIPP	21	29	0.42	0.012	0.015	2.5×10^{-4}	5.1×10^{-3}	0.022	0.055
	Hanford → WIPP	27	35	0.72	0.016	0.017	4.3×10^{-4}	6.7×10^{-3}	0.032	0.073
RH-TRU	SRS → WIPP	18	24	5.1×10^{-5}	0.011	0.012	3.1×10^{-8}	1.4×10^{-3}	8.8×10^{-3}	0.033
	INEEL → WIPP	18	25	6.7×10^{-5}	0.011	0.013	4.0×10^{-8}	5.4×10^{-3}	0.021	0.050
	ORNL → WIPP	16	23	4.9×10^{-5}	9.8×10^{-3}	0.011	2.9×10^{-8}	4.8×10^{-3}	0.021	0.047
	Hanford → WIPP	21	27	8.3×10^{-5}	0.013	0.014	5.0×10^{-8}	6.3×10^{-3}	0.030	0.063
MLLW	Envirocare	2.2	2.0	0.068	1.3×10^{-3}	1.0×10^{-3}	4.1×10^{-5}	2.4×10^{-4}	8.1×10^{-4}	3.4×10^{-3}
	Hanford Site	2.3	2.2	0.075	1.4×10^{-3}	1.1×10^{-3}	4.5×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	3.8×10^{-3}
	NTS	2.3	2.7	0.068	1.4×10^{-3}	1.3×10^{-3}	4.1×10^{-5}	2.5×10^{-4}	1.0×10^{-3}	4.0×10^{-3}
HLW	SRS → Repository	17	42	5.1×10^{-4}	0.010	0.021	3.0×10^{-7}	6.1×10^{-3}	0.035	0.072
	Hanford → Repository	16	42	6.5×10^{-4}	9.4×10^{-3}	0.021	3.9×10^{-7}	5.3×10^{-3}	0.030	0.066
										Total Rail Fatalities: 0.66 – 0.79

Acronyms: LCFs = latent cancer fatalities; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; MLLW = mixed low-level waste; HLW = high-level radioactive waste; SRS = Savannah River Site; HF = Hanford Site; WIPP = Waste Isolation Pilot Plant; NTS = Nevada Test Site; INEEL = Idaho National Engineering and Environmental Laboratory; ORNL = Oak Ridge National Laboratory. The range of total fatalities is based on the minimum and maximum total fatalities for each waste type.

Table D-18. Incident-Free Radiation Doses for the Maximally Exposed Individual Scenarios

Scenario	No Action Alternative	Alternative A	Alternative B
Truck			
Service station worker (member of the public)	0.10 mrem/yr (6.0×10^{-8} LCFs)	19 mrem/yr (1.1×10^{-5} LCFs)	19 mrem/yr (1.1×10^{-5} LCFs)
Individual in traffic jam (member of the public)	0.50 mrem (3.0×10^{-7} LCFs)	8.2 mrem (4.9×10^{-6} LCFs)	8.2 mrem (4.9×10^{-6} LCFs)
Nearby resident (member of the public)	1.1×10^{-4} mrem/yr (6.6×10^{-11} LCFs)	0.022 mrem/yr (1.3×10^{-8} LCFs)	0.022 mrem/yr (1.3×10^{-8} LCFs)
Driver (occupational)	250 mrem/yr (1.3×10^{-4} LCFs)	2,000 mrem/yr (1.0×10^{-3} LCFs)	2,000 mrem/yr (1.0×10^{-3} LCFs)
Rail			
Railyard worker (member of the public)	0.35 mrem/yr (2.1×10^{-7} LCFs)	35 mrem/yr (2.1×10^{-5} LCFs)	35 mrem/yr (2.1×10^{-5} LCFs)
Nearby resident (member of the public)	2.9×10^{-4} mrem/yr (1.7×10^{-10} LCFs)	0.055 mrem/yr (3.3×10^{-8} LCFs)	0.055 mrem/yr (3.3×10^{-8} LCFs)
Resident near rail stop (member of the public)	0.042 mrem/yr (2.5×10^{-8} LCFs)	8.0 mrem/yr (4.8×10^{-6} LCFs)	8.0 mrem/yr (4.8×10^{-6} LCFs)
Inspector (occupational)	1.9 mrem/yr (9.5×10^{-7} LCFs)	190 mrem/yr (9.5×10^{-5} LCFs)	190 mrem/yr (9.5×10^{-5} LCFs)

The maximally exposed member of the public would be a person working at a service station who would receive a radiation dose of about 19 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 1.1×10^{-5}.

If trains were used to ship the waste, the maximally exposed worker would be an inspector. This worker would receive a radiation dose of about 190 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 9.5×10^{-5}. The maximally exposed member of the public was a railyard worker who was not directly involved with handling the railcars. This person would receive a radiation dose of about 35 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 2.1×10^{-5}.

Alternative B. Table D-18 lists the incident-free radiation doses for the maximally exposed individual scenarios under Alternative B. If trucks were used to ship the waste, the maximally exposed worker would be a driver who would receive a radiation dose of about 2,000 mrem per year based on driving a truck for 1,000 hours per year. This is equivalent to a probability of a latent cancer fatality of about 1.0×10^{-3}.

The maximally exposed member of the public would be a person working at a service station who would receive a radiation dose of about 19 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 1.1×10^{-5}.

If trains were used to ship the waste, the maximally exposed worker would be an inspector. This worker would receive a radiation dose of about 190 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 9.5×10^{-5}. The maximally exposed member of the public was a railyard worker who was not directly involved with handling the railcars. This person would receive a radiation dose of about 35 mrem per year. This is equivalent to a probability of a latent cancer fatality of about 2.1×10^{-5}.

D.7.3 Impacts from Severe Transportation Accidents

In addition to analyzing the radiological and nonradiological risks of transporting radioactive waste from West Valley, DOE assessed the consequences of severe transportation accidents, known as maximum reasonably foreseeable transportation accidents. These severe accidents have a probability of about 1×10^{-7} per year. The consequences of these accidents were determined through the inhalation, groundshine, and immersion pathways.

The following assumptions were used to estimate the consequences of maximum reasonably foreseeable accidents:

- The release height of the plume is 10 meters (33 feet) for both fire- and impact-related accidents. Modeling the heat release rate of accident scenarios involving fire would result in lower consequences than modeling all events with a 10-meter release height.
- Breathing rate for individuals is assumed to be 10,400 cubic meters (13,600 cubic yards) per year (Neuhauser and Kanipe 2000).
- Short-term exposure to airborne contaminants is assumed to be 2 hours.
- Long-term exposure to contamination deposited on the ground is assumed to be 24 hours for the maximally exposed individual and 7 days for the population, with no interdiction or cleanup.
- The accident was assumed to occur in an urban area. The consequences for the maximum reasonably foreseeable accidents were estimated using 2000 census population density data from 0 to 80 kilometers (50 miles) for the 20 most populous urbanized areas in the country.
- Impacts were determined using low wind speeds and stable atmospheric conditions (a wind speed of 0.89 meters per second [2.9 feet per second] and Class F stability). The atmospheric concentrations estimated from these conditions would be exceeded only 5 percent of the time.
- The release fractions used in the analysis were for severity category 6 accidents (see Tables D-5 through D-10).
- The container inventories used in the analysis are listed in Tables D-11 through D-14. The number of containers that were assumed to be involved in the maximum reasonably foreseeable accident are listed in Table D-19. In several cases, multiple Type B shipping containers could be transported in a single shipment (see Table D-2). Because it is unlikely that a severe accident would breach multiple Type B shipping containers, a single Type B shipping container was assumed to be breached in the maximum reasonably foreseeable accident.

No Action Alternative. The maximally exposed individual would receive a radiation dose of 4.6 rem from the maximum reasonably foreseeable transportation accident involving a truck shipment of Class A LLW (Table D-20). This is equivalent to a risk of a latent cancer fatality of about 2.8×10^{-3}. The probability of this accident is about 5×10^{-7} per year. The population would receive a collective radiation dose of about 1,300 person-rem from this truck accident involving Class A LLW. This could result in about 1 latent cancer fatality.

Table D-19. Number of Containers Involved in the Maximum Reasonably Foreseeable Transportation Accident

Case	Mode	Container Type	Number of Containers Involved
Class A LLW drums	Rail	55-gallon drum	168 55-gallon drums
Class A LLW boxes	Rail	B-25 box	28 B-25 boxes
Class A LLW drums	Truck	55-gallon drum	84 55-gallon drums
Class A LLW boxes	Truck	B-25 box	14 B-25 boxes
Class B LLW drums	Rail	55-gallon drum	168 55-gallon drums
Class B LLW HIC	Rail	High-integrity container	1 high-integrity container in one Type B shipping container
Class B LLW drums	Truck	55-gallon drum	84 55-gallon drums
Class B LLW HIC	Truck	High-integrity container	1 high-integrity container in one Type B shipping container
Class C LLW drums	Rail	55-gallon drum	10 55-gallon drums in one Type B shipping container
Class C LLW HIC	Rail	High-integrity container	1 high-integrity container in one Type B shipping container
Class C LLW drums	Truck	55-gallon drum	10 55-gallon drums in one Type B shipping container
Class C LLW HIC	Truck	High-integrity container	1 high-integrity container in one Type B shipping container
Drum Cell Drums	Truck	71-gallon drum	24 71-gallon drums
Drum Cell Drums	Rail	71-gallon drum	96 71-gallon drums
CH-TRU	Rail	55-gallon drum	14 55-gallon drums in one TRUPACT-II Type B shipping container
CH-TRU	Truck	55-gallon drum	14 55-gallon drums in one TRUPACT-II Type B shipping container
RH-TRU	Rail	55-gallon drum	10 55-gallon drums in one Type B shipping container
RH-TRU	Truck	55-gallon drum	10 55-gallon drums in one Type B shipping container
HLW	Rail	Canister	1 canister in one Type B truck shipping container
HLW	Truck	Canister	5 canisters in one Type B rail shipping container

Acronyms: LLW = low-level waste; HIC = high-integrity container; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; HLW = high-level radioactive waste

For the maximum reasonably foreseeable transportation rail accident involving Class A LLW, the maximally exposed individual would receive a radiation dose of about 9.2 rem (Table D-20). This is equivalent to a risk of a latent cancer fatality of about 5.5×10^{-3}. The probability of this accident is about 2×10^{-6} per year. The population would receive a collective radiation dose of about 2,600 person-rem from this rail accident involving Class A LLW. This could result in about 2 latent cancer fatalities.

Alternative A. For waste shipped under Alternative A, the maximum reasonably foreseeable truck or rail transportation accident with the highest consequences would involve CH-TRU waste. Because one transuranic package transporter (TRUPACT-II) shipping container was assumed to be involved in either the truck or rail accident, the consequences for the truck or rail accident are the same. However, the probabilities of the truck and rail accidents are slightly different. The probability of the truck accident was 6×10^{-7} per year; for rail, the probability of the accident was 1×10^{-7} per year. The maximally exposed individual would receive a radiation dose of about 25 rem from this accident (Table D-20),

Table D-20. Consequences of Severe Transportation Accidents[a]

Case	Mode	Severity Category	Individual Dose (rem)	Individual LCF	Population Dose (person-rem)	Population LCF
Class A LLW drums	Rail	6	9.2	5.5×10^{-3}	2,600	1.6
Class A LLW boxes	Rail	6	2.1	1.2×10^{-3}	580	0.35
Class A LLW drums	Truck	6	4.6	2.8×10^{-3}	1,300	0.78
Class A LLW boxes	Truck	6	1.0	6.2×10^{-4}	290	0.18
Class B LLW drums	Rail	6	15	9.2×10^{-3}	4,300	2.6
Class B LLW HIC	Rail	6	9.8×10^{-4}	5.9×10^{-7}	0.30	1.8×10^{-4}
Class B LLW drums	Truck	6	7.7	4.6×10^{-3}	2,200	1.3
Class B LLW HIC	Truck	6	2.5×10^{-4}	1.5×10^{-7}	0.088	5.3×10^{-5}
Class C LLW drums	Rail	6	7.5×10^{-3}	4.5×10^{-6}	2.3	1.4×10^{-3}
Class C LLW HIC	Rail	6	9.8×10^{-3}	5.9×10^{-6}	3.0	1.8×10^{-3}
Class C LLW drums	Truck	6	1.9×10^{-3}	1.1×10^{-6}	0.67	4.0×10^{-4}
Class C LLW HIC	Truck	6	2.5×10^{-3}	1.5×10^{-6}	0.88	5.3×10^{-4}
Drum Cell Drums	Rail	6	0.010	6.1×10^{-6}	2.7	1.6×10^{-3}
Drum Cell Drums	Truck	6	1.8×10^{-3}	1.1×10^{-6}	0.51	3.1×10^{-4}
CH-TRU	Rail	6	25	0.015	6,600	4.0
CH-TRU	Truck	6	25	0.015	6,600	4.0
RH-TRU	Rail	6	0.20	1.2×10^{-4}	55	0.033
RH-TRU	Truck	6	0.045	2.7×10^{-5}	13	7.7×10^{-3}
HLW	Rail	6	0.64	3.8×10^{-4}	170	0.10
HLW	Truck	6	0.013	7.9×10^{-6}	3.6	2.2×10^{-3}

Acronyms: LCF = latent cancer fatality; LLW = low-level waste; HIC = high-integrity container; CH-TRU = contact-handled transuranic waste; RH-TRU = remote-handled transuranic waste; HLW = high-level radioactive waste

a. Impacts are for stable meteorological conditions. Population impacts are in an urban area.

which is equivalent to a latent cancer fatality risk of 0.015. The population would receive a collective radiation dose of approximately 6,600 person-rem from this accident. This could result in about 4 latent cancer fatalities.

Alternative B. For waste shipped under Alternative B, the maximum reasonably foreseeable truck or rail transportation accident with the highest consequences would involve CH-TRU waste. Because one TRUPACT-II shipping container was assumed to be involved in either the truck or rail accident, the consequences for the truck or rail accident are the same. However, the probabilities of the truck and rail accidents are slightly different. The probability of the truck accident was 8×10^{-7} per year; for rail, the probability of the accident was 3×10^{-7} per year. The maximally exposed individual would receive a radiation dose of about 25 rem from this accident (Table D-20), which is equivalent to a latent cancer fatality risk of 0.015. The population would receive a collective radiation dose of approximately 6,600 person-rem from this accident. This could result in about 4 latent cancer fatalities.

Using the screening procedure in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* (DOE 2002c), the sum of fractions of the biota concentration guides for the Class A LLW accidents and the CH-TRU accident were less than 1. Therefore, the radioactive releases from the Class A LLW accidents and the CH-TRU accident are not likely to cause persistent, measurable deleterious changes in populations or communities of terrestrial or aquatic plants or animals.

D.8 REFERENCES

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APPENDIX E

RESPONSES TO PUBLIC COMMENTS

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APPENDIX E
RESPONSES TO PUBLIC COMMENTS

The WVDP Waste Management EIS was issued in draft on May 16, 2003, for public comment (68 Fed. Reg. 26587). The 45-day comment period ended on June 30, 2003, although DOE also considered comments received after that date. A public hearing on the Draft EIS was held on June 11, 2003, at the Ashford Office Complex near the WVDP site. DOE received comments from 21 individuals, organizations, and agencies. Major issues raised in the comments are identified in the Summary and in Section 1.8.

This Appendix contains all of the comment documents received on the Draft EIS in their entirety, duplicated in the form in which they were received. Each document has been assigned a document number, beginning with 1.0. Individual comments within each document have been identified by brackets marked on the comment document in numerical order. Thus, Comment 1.3 identifies the third comment bracketed in Document Number 1.0. Similarly Comment 10.2 identifies the second comment bracketed in Document Number 10.0.

DOE's responses to comments follow each comment document. The responses are numbered according to the document number and comment number for that document. To find DOE's response to any person's or organization's comments, locate the person or organization in the list which follows by document number and turn to the corresponding page.

Table E-1. WVDP Waste Management EIS Commenters

Comment Number	Date Received	Name and Address of Commenter	Page Number
0001	06/11/03	Tim Waddell 110 Newport Drive Oak Ridge, TN 37830	E-5
0002	05/20/03	Jim Pickering PO Box 51 Arcade, NY 14009-0051	E-6
0003	06/11/03	Dr. Paul Piciulo NYSERDA 10282 Rock Springs Road West Valley, NY 14171-9799	E-9
0004	06/11/03	Kathy McGoldrick Coalition on West Valley Nuclear Wastes PO Box 458 Ellicottville, NY 14731	E-11
0005	06/12/03	W. Lee Poe, Jr. 807 Rollingwood Rd Aiken, SC 29801	E-13
0006	06/16/03	W. Lee Poe, Jr. 807 Rollingwood Rd Aiken, SC 29801	E-18

Comment Number	Date Received	Name and Address of Commenter	Page Number
0007	06/23/03	Andrew L. Raddant Regional Environmental Officer U.S. Department of the Interior Office of Environmental Policy and Compliance 408 Atlantic Avenue Room 142 Boston, MA 02210-3334 (617) 223-8565	E-22
0008	06/24/03	Michael A. Wilson, Program Manager Nuclear Waste Program State of Washington Dept. of Ecology 1315 W. 4th Ave. Kennewick, WA 99336-6018 (509) 735-7581	E-24
0009	06/30/03	Barbara Youngberg, Chief Radiation Section NYSDEC Division of Solid and Hazardous Materials Bureau of Hazardous Waste and Radiation Management 625 Broadway, Eighth Floor Albany, NY 12233-7255 (518) 402-8579	E-36
0010	06/30/03	John A. Owsley, Director Tennessee Department of Environment and Conservation DOE Oversight Division 761 Emory Valley Road Oak Ridge, TN 37830-7072 (865) 481-0995	E-38
0011	06/30/03	Robert E. Knoer on behalf of the Coalition on West Valley Nuclear Wastes 14 Lafayette Square Suite 1700 Buffalo, NY 14203 (716) 855-1673	E-39
0012	06/30/03	Lee Lambert on behalf of the West Valley Citizen Task Force c/o Holland & Associates 700 N. Trade Avenue Landrum, SC 29356	E-43
0013	06/30/03	Laura McDade, President and Leonore Lambert, RW Monitor League of Women Voters 1272 Delaware Avenue Buffalo, NY 14209-2401 (716) 884-3550	E-45

Comment Number	Date Received	Name and Address of Commenter	Page Number
0014	06/30/03	Norman A. Mulvenon, Chair Local Oversight Committee (LOC) Citizens' Advisory Panel Oak Ridge Reservation 102 Robertsville Road, Suite B Oak Ridge, TN 37830 (865) 483-1333	E-47
0015	06/30/03	Michael Raab, Deputy Commissioner Erie County Department of Environment and Planning Edward A. Rath County Office Building 95 Franklin Street Buffalo, NY 14202-3973 (716) 858-6370	E-50
0016	06/30/03	Ken Niles, Assistant Director Oregon Office of Energy 625 Marion Street, NE, Suite 1 Salem, OR 97301-3742 (503) 378-4040	E-52
0017	06/30/03	Paul Piciulo, Director West Valley Site Management Program NYSERDA 10282 Rock Springs Road West Valley, NY 14171-9799 (716) 942-4387	E-56
0018	07/07/03	Robert W. Hargrove, Chief Strategic Planning and Multi-Media Programs Branch US EPA, Region 2 290 Broadway New York, NY 10007-1866 (Contact Mark Westrate at 212-637-3789)	E-63
0019	07/14/03	David R. Bradshaw, Mayor City of Oak Ridge PO Box 1 Oak Ridge, TN 37831-0001	E-66
0020	07/23/03	Rickey L. Armstrong, Sr., President The Seneca Nation of Indians 62 Eagle Street Salamanca, NY 14779	E-67
0021	07/31/03	Savannah River Site Citizens Advisory Board WSRC Building 742-A, Room 190 Aiken, SC 29808	E-73
0022	06/11/03	Dr. Paul Piciulo NYSERDA 10282 Rock Springs Road West Valley, NY 14171-9799	E-77

Comment Number	Date Received	Name and Address of Commenter	Page Number
0023	06/11/03	Kathy McGoldrick Coalition on West Valley Nuclear Wastes PO Box 458 Ellicottville, NY 14731	E-89
0024	06/11/03	Jim Pickering PO Box 51 Arcade, NY 14009-0051	E-99
0025	06/11/03	Jeremy Olmsted Springville, New York	E-103

Document #0001: Comment 1.1
Tim S. Waddell

From: "Tim S Waddell" <twaddell@mnsci.com>
To: <allens@wvnsco.com>
Date: 6/11/03 8:40AM
Subject: Comment on WVDP Waste Management EIS

I am not in favor of sending TRU waste to the Oak Ridge Reservation.] 1.1

Regards,

Tim Waddell
110 Newport Drive
Oak Ridge, TN 37830

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Document #0001: Response

1.1. The shipment of waste to offsite locations for interim storage such as at the Oak Ridge Reservation is not DOE's preferred alternative. Under the preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

Document #0002: Comments 2.1 – 2.11
James L. Pickering, LLB, JD, PhD

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JAMES L.PICKERING,L.L.B.,JD,PHD
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2.

JOHN CHAMBERLAIN
WEST VALLEY DEMONSTRATION PROJECT
10282 ROCK SPRINGS ROAD
WEST VALLEY,NEW YORK
14171-9799

PUBLIC COMMENT ON
DRAFT WASTE MANAGEMENT EIS

1.STAKEHOLDER LETTER ACCOMPANING DRAFT AND SUMMERY VIA WILLIAMS STATES IN PAR 2 "**ACTIVELY MANAGE WASTE STORAGE ***LONG TERM STEWARDSHIP"**

PL96-368 MANDATES OFF SITE DISPOSAL OF WASTE STORAGE TANKS. 2.1

LONG TERM STEWARDSHIP IS NOT AN OPTION UNDER PL.96-368.

2 . 1 ABOVE INDICATES THAT STAFF DOES NOT KNOW HOW TO DEAL WITH TANKS FOR TRANSHIPMENT OFFSITE
AND 2.2

INTENDS TO PERSUE A JOB SECURITY COURSE OF ACTION VIA THESE TANKS.

3. 1.ABOVE IS A VIOLATION OF PL96-368 WHICH MANDATES ONLY ONE EIS 2.3

4. S-1 PAR 1.0 CONTINUES 2 ABOVE IN VIOLATION OF PL.96-368 2.4

2

5. P-S-11 PAR 2 IS ABOLD FACE LIE IN THAT WYOMING COUNTY SOIL AND WATER CONSERVATION DISTRICT OFFICE HAS ACQUIFER MAPS FOR WERSTERN NEW YORK CLEARLY SHOWING THAT ACQUIFERS OF VARIOUS LEVELS OVERLAP EACH OTHER SUCH THAT THERE IS A POTENTIAL FOR CONTAMINATION.

FURTHER OTHER DOCUMENTATION IS AVALIABLE FROM OTHER GOVERNMENT SOURCES THAT CLEARLY SAHOW THAT THE STATE FACILITIES AT GOWANDA DO TAKE WATER FROM THE CATTARAGUS CREEK BASIN AND THAT AN ANDMINISTRATIVE MIRACLE WAS ACCOMLISHED WHICH CHANGEF THE CREEK CLASSIFICATION FROM "C" TO "B"(DRINKABLE) THE BACK TO "C" SO THAT THAT WATER COULD BE USED AT THE FACILITIES. 2.5

6.ANOTHER BOLD FACE LIE APPEARS ON PAGE S-11 PAR 4 I THE LAST SENTENCE IN THAT WVDP PUBLIC PRESENTATION UNDER CONSENT DECREE DASTED 5-13-03 PUBLIC WAS PRESENTED WITH NEW CONSTRUCTION REQUIRING EPA REVIEW AND THE FACT THAT EPA WAS MADCE A CO – CONSPIRATOR TO THE PROCESS OF AVOIDING RESPONSIBILITIES UNDER PL 96-368 2.6

7. PAGE S-12 PAR CONCERNING ASSUMPTION OF ISOLATION IS UNFOUNDED IN VIEW OF 5 ABOVE. 2.7

8.ABANDONED AGRICULTURAL LANDS MENTIONED ON PAGE S-14 PAR 3 SHOULD HAVE BEEN UTILIZED AS TEST FARM TO IDENTIFY WHAT IF ANY CROPS COULKD BE GROWN ON THESE SITES AFTER RELEASE FOR PUBLIC USE. 2.8

9.ONCE AGAIN DOE USES FALSE MATH TO PRESENT ALLEGED DATEA RESPECTING LATENT CANCER ON PAGE S-18 PAR 2 IN THAT THERE IS NO SUCH THING AS LESS THAN 1 2.9

10 . DOE ATTEMPTS TO JUSTIFY THE DEATH OF A SINGLE CITIZEN BY THE USE OF FALSE DATA OF 9 ABOVE IN ALL OF THE SO CALLED ALTERNATIVES AS AN EXCUSE FOR NOT TOTALLY REMOVING RADIOACTIVE WASTE FROM THE SITE. 2.10

11.PAGE S-26 DOCUMENT IN TOTAL IS FRAUDULENTLY PRESENTED ,ILLEGAL AND UNFOUNDED IN FACT AS IT IS SUMMARIZED IN 7.0 2.11

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Document #0002: Comment 2.12
James L. Pickering, LLB, JD, PhD

3

THIS DRAFT EIS SHOULD BE SCRAPPED AS ILLEGAL, UNSUBSTANTIATED IN FACT AND FRAUDULENTED PRESENTED BY DOE STAFF. 2.12

RESPECTFULLY SUBMITTED FOR THE RECORD TO BE READ AT THE PUBLIC HEARING ON JUNE 11,03 AT WHEN EVEW THIS CITIZEN SHOWS UP.

5-15-03

JAMES L. PICKERING.

0002, 3 of 3
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Document #0002: Responses

2.1. This comment relates to scope of the Decommissioning and/or Long-Term Stewardship EIS and will be addressed in that ongoing NEPA process.

2.2. The disposition of WVDP HLW tanks will be addressed in the Decommissioning and/or Long-Term Stewardship EIS.

2.3. The West Valley Demonstration Project Act (Public Law No. 96-368, included in Appendix A of this EIS) requires DOE to decontaminate and decommission the tanks and other facilities of the Western New York Service Center in which the HLW solidified under the project was stored (Section 2(a)(5)). The statute also states that DOE must prepare required environmental impact analyses of the project (Section 2(b)(3)(D)). In DOE's view, the West Valley Demonstration Project Act allows the preparation of more than one EIS.

2.4. DOE has met or will meet all of the vitrification, waste management, and decommissioning requirements set forth in the West Valley Demonstration Project Act. This WVDP Waste Management EIS addresses the continued onsite storage of waste and the shipment of waste for offsite disposal or for offsite storage. The *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (WIPP SEIS-II) analyzed the transportation and disposal of TRU waste, including waste generated and stored at the WVDP site. The *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (Yucca Mountain Repository EIS) analyzed the transportation and disposal of HLW, including waste generated and stored at the WVDP site. The

Decommissioning and/or Long-Term Stewardship EIS will evaluate alternatives for completing DOE's obligations under the Act.

2.5. DOE reviewed its original sources and confirmed that information provided in the Draft EIS regarding hydrologic conditions at the site is correct. Minor changes, for clarity, were added to the Final EIS in the discussion of surface water (Section 3.2.1) and groundwater (Section 3.2.2).

2.6. As stated in response to Comment 2.4, DOE believes that it has or is meeting its responsibilities under the West Valley Demonstration Project Act.

2.7. DOE reviewed its original sources and confirmed that information provided in the Draft EIS regarding hydrologic conditions at the site is correct. Minor changes, for clarity, were added to the Final EIS in the discussion of groundwater (Section 3.2.2).

2.8. The utilization of abandoned lands as a test farm is outside of the scope of the Waste Management EIS.

2.9. The calculations conducted for the human health assessment show that, based on the expected doses, no latent cancer fatalities would be expected for the maximally exposed worker or member of the public or for the worker or public populations affected by the no action or action alternatives. Using the appropriate risk factors (see Appendix C) and multiplying those by the anticipated doses results in numbers less than 1.

2.10. The data show that no deaths (latent cancer fatalities) would be expected as a result of doses received in the implementation of any of the alternatives analyzed in this EIS. DOE's preferred alternative (Alternative A) is to ship LLW and mixed LLW offsite for disposal and to continue to store TRU waste and HLW until offsite disposal facilities are available.

2.11. DOE believes that its conclusion as stated in the Summary is accurately stated and based on the analysis described in the EIS.

2.12. DOE believes that the WVDP Waste Management EIS fully complies with NEPA and is based on referenced, factual information.

Document #0003: Comments 3.1 – 3.4 New York State Energy Research and Development Authority

Comments of the New York State Energy Research and Development Authority on the West Valley Demonstration Project Draft Waste Management Environmental Impact Statement
Presented at the Public Comment Session on June 11, 2003
Ashford Office Complex

My name is Paul Piciulo and I am Director of the West Valley Site Management Program for the New York State Energy Research and Development Authority, more commonly referred to as NYSERDA. I am here to provide oral comments on the Waste Management Environmental Impact Statement on behalf of NYSERDA. NYSERDA also will be submitting written comments to the U.S. Department of Energy (DOE) prior to closure of the formal public comment period.

Our most important issue of concern regarding the Waste Management EIS is inclusion of the analysis to add grout to High-Level Waste Tanks 8D-1 and 8D-2 and the annulus surrounding each tank. NYSERDA believes that this activity, and alternatives for grouting the tanks, should 3.1
not have been included in this Waste Management EIS. Long-term management options for the High-Level Waste Tanks are more appropriately analyzed in the *Environmental Impact Statement to Evaluate Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center.* The reasons for this are threefold. First, the March 26, 2001 scoping for this Waste Management EIS did not include grouting of the 3.2
high-level waste tanks. Second, the analysis of grouting the High-Level Waste Tanks in the Waste Management EIS is inconsistent with policy announced by the U.S. Nuclear Regulatory Commission (NRC) stating that the impacts of making a Waste Incidental to Reprocessing 3.3
determination, which is a prerequisite for grouting the tanks, should be analyzed in the Decommissioning EIS. Lastly, Resource Conservation and Recovery Act regulations preclude treatment by grout stabilization until NRC has rendered its final decision on whether the Decommissioning EIS preferred alternative meets the criteria in the Commission's Policy 3.4
Statement. I will now provide a more detailed explanation of these three concerns.

The proposed scope for the Waste Management EIS, as published in the Federal Register 3.2
on March 26, 2001 (66 Fed. Reg. 16447), did not include grouting the tanks. The scope

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0003, 1 of 3

indicated that the Waste Management EIS would "include such activities as removal of loose contamination; removal of hardware and equipment; nonstructural decontamination of walls, ceilings, and floors; and flushing and/or removal of vessels and piping." Grouting of the tanks was not included in the description of the proposed action or the preliminary alternatives to be 3.2
evaluated. Thus, it appears that evaluation of grouting the tanks is beyond the scope of this Waste Management EIS. The Federal Register Notice indicated that: "The remaining facilities for which the DOE is responsible, along with all final decommissioning and/or long-term stewardship actions to be taken by the DOE and NYSERDA, will be evaluated in [the Decommissioning EIS]."

Additionally, the residual waste in the High-Level Waste Tanks remains high-level waste, at the very least until a determination is made that such waste is incidental to reprocessing, in accordance with the requirements established by the NRC in the *U.S. Nuclear Regulatory Commission Decommissioning Criteria for the West Valley Demonstration Project at the West Valley Site; Final Policy Statement*, on February 1, 2002 (67 Fed. Reg. 5003). The Final Policy Statement makes it clear that the NRC intends to use the Decommissioning EIS to render a decision on the acceptability of DOE's Waste Incidental to Reprocessing determinations. NRC states that: 3.3

> "The resulting calculated dose from the incidental waste is to be integrated with all the other calculated doses from the remaining material at the entire NRC-licensed site to ensure that the License Termination Rule criteria are met. This is appropriate because the Commission does not intend to establish separate dose standards for various sections of the NRC-licensed site."

> "It is the Commission's expectation that it will apply this criteria at the WVDP site following the completion of DOE's site activities. In this regard, the impacts of identifying waste as incidental to reprocessing and not high-level waste should be considered in the DOE's environmental reviews."

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0003, 2 of 3

Document #0003: Comments 3.3 – 3.5
New York State Energy Research and Development Authority

NRC even more clearly defines its expectations in a June 17, 2002 letter from Richard A. Meserve to myself.

"The Decommissioning EIS will address DOE Waste Incidental to Reprocessing determinations. NRC will review and comment on DOE Waste Incidental to Reprocessing determinations as a Cooperating Agency. NRC will also be rendering its final decision on DOE's Waste Incidental to Reprocessing determination in NRC's decision on whether the preferred alternative meets the criteria in the Commission's Policy Statement."

Thus, until the Decommissioning EIS is completed and NRC has made its determination regarding the tank residuals, such materials must continue to be managed as high-level waste and any decision to grout the tanks based on the Waste Management EIS would be premature. 3.3

Finally, the residual waste in the High-Level Waste Tanks is both high-level waste and Resource Conservation and Recovery Act (RCRA) characteristic waste. It is NYSERDA's understanding that, at this time, the only form of treatment accepted for such waste is vitrification. As long as the tank residual waste is high-level waste, in other words until NRC has rendered its final decision on DOE's Waste Incidental to Reprocessing determination in its decision on whether the Decommissioning EIS preferred alternative meets the criteria in the Commission's Policy Statement, current RCRA requirements preclude treatment by grout stabilization. Thus, under RCRA regulations, a determination must be made with respect to the Waste Incidental to Reprocessing issue before a decision to grout the tanks can be made. 3.4

NYSERDA requests that DOE reconsider its inclusion of High-Level Waste Tank grouting in the Waste Management EIS. As I mentioned earlier, NYSERDA will be providing more detailed written comments prior to the closure of the formal public comment period. 3.5

Thank you for this opportunity to share our concerns.

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0003, 3 of 3

Document #0003: Responses

3.1. The Draft WVDP Waste Management EIS analyzed the use of retrievable, low-strength grouting for the interim stabilization of the HLW tanks should that become necessary before decisionmaking about the site is completed. As stated in the Draft EIS, this grout would be sufficiently flexible to provide shielding and would not prohibit exhumation of the tanks should DOE decide to remove the tanks in the future. However, DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

3.2. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

3.3. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

3.4. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

3.5. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

Document #0004: Comments 4.1 –4.7
Kathy McGoldrick

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Comments on West Valley Demonstration Project Waste Management Environmental Impact Statement

- I would suggest that this DEIS being commented on is not a valid document. The splitting of the 1996 DEIS into two separate EISs may not be a legitimate NEPA action. This split also violates the 1987 Stipulation of Compromise Settlement between the US Department of Energy and the United States of American and the Coalition on West Valley Nuclear Wastes. 4.1
- Both Alternatives A and B rely on shipment of classes B and C low-level waste off-site without completion of the entire EIS process, a clear violation of the 1987 contract signed with the Coalition and of NEPA. 4.2
- The 45-day comment period is a violation under the terms of the Stipulation of Compromise. In that Stipulation, a six month comment period was agreed upon. 4.3
- The following are comments regarding the alternatives being presented in the 2003 Waste Management DEIS:
  - Shipment offsite for interim management (Alternative B) would increase transportation risks because each shipment would have to be made twice. 4.4 Interim storage, as we have suggested many times in the past, would avoid this problem. In comments on the 1996 DEIS, it was suggested that there be an alternative which would store packaged waste onsite for a limited amount of time (say 25 years). This would be true "interim" storage with the real intent of eventual shipment. We need to be cognizant of the time lag that may entail due to the reticence of other political and geographic entities to accept this waste, or even to allow it to be transported through these entities, due to the serious threat of terrorism. Our interim storage alternative should take this factor into account. **However, when waste can leave West Valley, it must. For many reasons, West Valley is not a suitable site for permanent disposal of radioactive waste.** 4.5
  - For obvious reasons, management of the high level waste tanks (under Alternative A) must not include changing the groundwater patterns or pressures around the tanks without first closely studying the effects of such. 4.6
  - The grouting of the high level waste storage tanks and their surrounding vaults (in Alternative B) would violate NEPA because it could limit closure alternatives yet to be considered in the Closure EIS now being written. 4.7

Document #0004: Responses

4.1. The scope of the EIS that DOE began in 1988, with a draft in 1996, is now addressed in two EISs: the WVDP Waste Management EIS and the Decommissioning and/or Long-Term Stewardship EIS. Waste management activities, including offsite shipment for disposal, have utility independent from actions that might be taken to decommission WVDP and the requirements for long-term stewardship. In addition, the waste management activities described in the WVDP Waste Management EIS will not affect the range of alternatives available for decommissioning or long-term stewardship. Therefore, DOE does not believe that its NEPA strategy represents impermissible segmentation of the action.

The Stipulation of Compromise (included in Appendix A of this EIS) does not preclude the preparation of more than one EIS. DOE believes that it has complied and continues to comply with the Stipulation.

4.2. The Stipulation of Compromise (included in Appendix A of this EIS) does not preclude the preparation of more than one EIS. DOE would not ship any Class B or C LLW, TRU waste, or HLW until the Final EIS and a Record of Decision are issued, completing the NEPA process for this proposed action.

4.3. The 6-month comment period in the Stipulation applies to an EIS prepared for the decommissioning of the site and is not applicable to the Draft WVDP Waste Management EIS prepared for the offsite transportation and disposal (or storage) of LLW, mixed LLW, TRU waste, and HLW. DOE has committed to a 6-month comment period for the Decommissioning and/or Long-Term Stewardship Draft EIS.

4.4.	DOE recognizes the increased environmental impacts inherent in shipping waste offsite for storage prior to disposal, including increased transportation risk and human health risks to workers and the public at the offsite locations. These impacts are analyzed and acknowledged in the Draft and Final WVDP Waste Management EISs. Under DOE's preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.	
4.5.	Under DOE's preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged. In the context of this EIS, DOE does not intend to dispose of radioactive or hazardous waste at the WVDP site.	
4.6.	Neither the active ventilation of the HLW tanks and the annulus surrounding the tanks under the No Action Alternative and Alternative A nor the use of retrievable grout for interim stabilization of the tanks under Alternative B as analyzed in the Draft EIS would change the groundwater patterns or pressures around the tanks. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.	
4.7.	DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.	

Document #0005: Comments 5.1 – 5.2
W. Lee Poe, Jr.

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June 13, 2003
807 E. Rollingwood, Rd.
Aiken, SC 29801

Mr. Daniel W. Sullivan
Document Manager
DOE West Valley Area Office
PO Box 191
West Valley, NY 14171-0191

Report sent by e-mail. daniel.w.sullivan@wv.doe.gov

Dear Mr. Sullivan:

Comments on Draft Summary of
West Valley Demonstration Project
Waste Management
Draft Environmental Impact Statement of April 2003

I would like to offer the following comments on the Draft Summary of the WVDP EIS for waste management (DOE/EIS – 0337D). These comments are on the draft summary. I requested a copy of the full EIS and it arrived this afternoon but I have not looked at it yet. I plan to offer comments on the full EIS but I thought the comments on the Summary should be sent now and the remainder of the comments later.

My comments are:

1) As identified in Section 2, the EIS impacts other sites, like SRS, Hanford etc. I can find no information on how these other sites were involved in the scoping for the EIS. I know there was no meeting to hear public comments in the Savannah River Site area. I consider it vital to have public input from the areas surrounding each potential site considered in the EIS. Normally, I can find what scoping process used by reading a shortened version of it in the Summary. I can only find information on NOIs that were published on WV decontamination and long-term stewardship (pages S1 & S2). This tells me very little about the NOI process at other affected sites. 5.1

2) The coversheet abstract explains the justification for the EIS's evaluation of "operation over the next 10 years". This seems to be a reasonable time period but since the HLW geologic repository at Yucca Mountain has yet to start up the EIS needs to evaluate the environmental impacts of a delay in startup of the geologic repository. I suggest that a supplement be added for all of the alternatives considering the environmental impacts of storage on or near surface beyond the 10 year period to show what I think will be the small impacts of a delay in the YM repository. 5.2

WVDP WM EIS Summary 1

Document #0005: Comments 5.3 – 5.8
W. Lee Poe, Jr.

3) The information on the pedigree of the various West Valley EISs and agreements is unclear. (Pages S1 & S2). The compliance strategy that limits the scope of this EIS on pages S4 and S5 also is unclear. It apparently has the impact of limiting the environmental impacts considered in this EIS by telling me they have been previously covered in other EISs. I hope that I can find these other impacts in the cumulative section of the full EIS. They should also be covered in the summary. If not, and it doesn't seem to be covered, this is akin to segmentation which is not allowed in NEPA. 5.3

4) The Summary should describe the amount of waste involved for each category of waste. This should be given in Section 1 in either the Background or in a new section following the Facilities Section. It is important to know the amount of waste before considering the alternatives evaluated in Section 2. 5.4

5) The No Action Alternative (page S7) is titled Continuation of Waste Management Activities. This does not seem to be a No Action alternative. If this EIS is going to describe it as the No Action, more description on why it is the No Action should be given. 5.5

A second comment on this No Action Alternative is what happens if the Judge doesn't resolve the waste incidental to reprocessing (WIR) law-suite at Idaho. This would prevent closing the HLW Tanks or the use of the "waste removal to the extent that is technically and economically practical". It is my understanding this portion of DOE Order 5480-1 is the offending portion. 5.6

6) I am deeply troubled on Alternative A and B over the first full sentence on page S8 saying that "if some or all of the WVDP's TRU waste did not meet these requirements, the Department would need to explore other alternatives for disposal of this waste". I assume a similar condition would also apply to WVDP's HLW. With no assurances that both the TRU and HLW will meet WIPP and YM requirements respectively no path for disposal is available. These two Alternatives are invalid alternatives. **For example in Alternative B, shipment of the WVDP TRU and HLW to another site places the burden for acceptability of the WVDP waste at the two repositories on the shipper to the repositories not on WVDP. Alternative A becomes the same as the No Action Alternative or continuation of storage at WVDP.** WVDP needs to get assurances from WIPP and YM that the involved waste is in an acceptable form before implementing this EIS. 5.7

7) The last sentence under Offsite Activities (page S9) describing environmental activities of interim storage or disposal states these impacts have already been considered in other EISs and are not covered in this EIS. If these impacts are part of this EIS, even though they have been covered earlier, they should again be given in this EIS and not omitted. This EIS must give the DOE decision-maker all of the information so they can make reasonable decisions. Do not comparmentalize and show minimal impacts. 5.8

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JUN 1 2 2003
0005, 2 of 4

WVDP WM EIS Summary 2

Document #0005: Comments 5.9 – 5.16
W. Lee Poe, Jr.

8) Is the title (ORNL) correctly used to describe the Oak Ridge Reservation? (See Page S16) 5.9

9) The description of SRS is poor. The major portion of SRS was operation of nuclear reactors to produce plutonium and to separate the plutonium from the irradiated fuel and purify it and produce plutonium for nuclear weapons. This was not mentioned. The SRS description and others interim storage site descriptions should be written by the individual sites and not someone who has never been at the individual sites. (I draw this conclusion from the wording in the EIS summary.) 5.10

10) The third sentence of the second paragraph of Section 4.0 (page S17) seems to be incorrect. It is saying that in interim storage of WVDP TRU and HLW in Alternative B will not require facilities for storage of the WVDP waste. I strongly question this fact. The interim storage sites do have ongoing activities that store similar materials but storage capacity for the added volume of waste may not be available. This needs to be evaluated by the personnel at the interim storage sites. As an example, at SRS storage capacity for their own HLW will be taxing available storage capacity during this time with no WVDP waste. The impacts of this extra volume of waste must be included in the EIS. 5.11

In that same second paragraph, it is stated "work force requirements are assumed to be the same under all alternatives". Again I question such a simplifying statement. Affected sites must be brought into ensure the environmental impacts quoted reflect realism. 5.12

11) The number of transportation vehicles required, shown on page S19, is the same for alternative A and B. This cannot be the case. In alternative B waste is shipped twice, this latter condition is recognized on Table S-2. Table S-2 states that WVDP will ship 270 truck or 172 rail shipments of TRU and 300 truck or 60 rail shipments of HLW to the interim storage site. 5.13

12) The EIS states "the Offsite Impacts (page S20) have been addressed in earlier NEPA documents". I question this statement, the interim storage of WVDP waste will require extra storage capacity. 5.14

The logic in the same paragraph stating that WVDP waste represents <2% of the total waste and concluding that the interim storage would be very minor (< 1 latent cancer facility) is inappropriate. The analysis for the interim storage should be made using interim storage site personnel and not waved off with over-arching insupportable assumption. If the analysis shows the assumption to be correct, it will then be supportable. 5.15

13) Because of my earlier comments on environmental impacts, Table 2 data for Alternative B should show some difference for the various interim storage sites. 5.16

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0005, 3 of 4

WVDP WM EIS Summary 3

Document #0005: Comments 5.17 – 5.18
W. Lee Poe, Jr.

14) The summary Table S2 shows essentially no LCF and no distinguishing feature between the three alternatives. I suggest adding person-rem to show some difference between alternatives. **As this table exists now and how the Conclusion is written, how can DOE reach a decision between the No Action Alternative and Alternative A? It is however clear that Alternative B is the poorest.** I find these conclusions counter evident but they are based upon this Summary. There has been no text on why the No Action Alternative is undesirable. It should be added if there is really some drive to get the waste out of WVDP. 5.17

I am sure that as I read the full EIS I will see why some of my comments are not evident but the summary is a stand-alone document. Again this document is comments on the Summary. I will provide further comments on the EIS as a whole as soon as I have mastered it. 5.18

If you have any questions on these comments or I can be of further assistance, please call me at (803) 642-7297.

Sincerely

W. Lee Poe, Jr.

0005, 4 of 4
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JUN 1 2 2003

WVDP WM EIS Summary 4

Document #0005: Responses

5.1. A scoping meeting was held during the 30-day scoping period on April 10, 2001, at West Valley, New York. The scoping period was announced in the *Federal Register* and on the DOE NEPA web page, and comments were solicited from any interested party.

While scoping meetings were not held at any of the offsite locations, members of the public around those sites were aware of the potential for such actions to occur, based on DOE's prior NEPA analyses and decisions. Further, the Draft EIS was provided to the relevant state agencies near the proposed offsite locations for comment. Comments were received and considered from stakeholders near the Hanford Site, Oak Ridge Reservation, and SRS. DOE has considered input from members of the public near the offsite locations.

5.2. The Draft and Final EISs evaluate the impacts of managing waste that is already in the WVDP inventory and that might be generated over the next 10 years. DOE determined that 10 years was the appropriate analysis period in light of its intention to complete decisionmaking on the decommissioning and/or long-term stewardship of the WVDP site within that time period. Treatment, storage, and disposal facilities are currently available for most of the waste and DOE expects to ship the waste, as described in the preferred alternative, within the next 10 years. The EIS acknowledges that the HLW may remain at WVDP for more than 10 years. However, it also describes both the annual and the total impacts that could occur over the 10-year period. The total impacts would remain the same, but would be spread out over more years if, for example, a transportation campaign or a geologic repository were delayed. In addition, DOE did evaluate long-term, onsite storage of HLW in the No Action Alternative for the Yucca Mountain Repository EIS.

5.3. The scope of the EIS that DOE began in 1988, with a draft in 1996, is now addressed in two EISs: the WVDP Waste Management EIS and the Decommissioning and/or Long-Term Stewardship EIS. Waste management activities, including offsite shipment for disposal, have utility independent from actions that might be taken to decommission WVDP and the requirements for long-term stewardship. In addition, the waste management activities described in the WVDP Waste Management EIS will not affect the range of alternatives available for decommissioning or long-term stewardship. Therefore, DOE does not believe that its NEPA strategy represents impermissible segmentation of the action. Impacts at receiving sites are identified in the EISs specified in Chapter 1.

5.4. The amount of waste that would be shipped under each of the alternatives is contained in Chapter 2 (see Tables 2-2 and 2-3). This level of detail is not provided in the Summary, although the impacts of the waste shipments are described in the Summary (Section 4.0 and Tables S-3 and S-4).

5.5. The No Action Alternative represents a continuation of the status quo. The Council on Environmental Quality NEPA implementing regulations recognize this as an acceptable no action scenario.

5.6. Disposition of any wastes that would rely on determinations made under the Waste Incidental to Reprocessing provisions of DOE Order 435.1 would be dependent upon resolution of related legal issues.

5.7. TRU waste at WVDP could be disposed of at WIPP if the waste is determined to meet the requirements for disposal in that repository. If some or all of WVDP's TRU does not meet these requirements, DOE would need to explore other alternatives for disposal of the waste. Additional NEPA review would be conducted if DOE were to propose to dispose of TRU waste at a location other than WIPP.

HLW generated at the WVDP site is eligible for disposal in a geologic repository. This waste volume (up to 300 canisters) was specifically analyzed in the Yucca Mountain Repository EIS (Appendix A, Section A.2.3.5.1).

The shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative, TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

5.8. Offsite impacts are addressed in Chapter 4 of the Draft and Final EISs (Sections 4.3.4, 4.4.4, and 4.5.4).

5.9. As noted in the Summary, Oak Ridge National Laboratory (ORNL) is part of the Oak Ridge Reservation (ORR). In its TRU waste Record of Decision following the issuance of the WM PEIS, DOE stated that each site that has generated or would generate TRU waste would store it onsite prior to shipment to WIPP for disposal (63 Fed. Reg. 3629 (1998). However, DOE also stated that it may decide to ship TRU waste from sites where it may be impractical to prepare it for disposal to other sites where DOE has or will have the necessary capability. The sites that could receive TRU waste from other sites are the Idaho National Engineering and Environmental Laboratory (INEEL), ORR, Savannah River Site (SRS), and the Hanford Site. DOE has prepared a *Final Environmental Impact Statement for Treating Transuranic (TRU)/Alpha Low Level Waste at the Oak Ridge National Laboratory* (DOE/EIS-0305-F).

5.10. DOE confirmed that its description of SRS is accurate. Further information on SRS can also be found in the WM PEIS.

5.11. The Summary text identified in the comment refers to the WVDP site. The waste management actions at the WVDP site under all alternatives would be conducted in existing facilities by the existing workforce and would not involve any new construction or building demolition.

With respect to actions at offsite locations, appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste or HLW volumes to an offsite location for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity, and impacts to workers and the affected public.

5.12. The Summary text identified in the comment refers to the WVDP site. Work force requirements at the WVDP site are assumed to be the same under all alternatives. Based on its experience and knowledge of the site and its operations, DOE believes this assumption is appropriate.

5.13. The information presented on Page S-19 of the Draft EIS did state that total shipments under Alternative B would be higher than under Alternative A but provided incorrect shipment numbers. This text has been revised in the Final EIS to specify the total shipments under Alternative B, as given in Table S-2, Appendix D, and Section 4.4.2. Under Alternative A, the number of shipments would be 2,550 by truck or 847 by rail. Under Alternative B, the number of shipments would be 3,120 by truck or 1,079 by rail, which counts the shipments from WVDP to the interim storage sites and the shipments from the interim storage sites to the disposal sites separately. DOE would ship the same volume of TRU waste and HLW from WVDP to the interim storage sites as from the interim storage sites to the disposal sites under Alternative B.

5.14. Impacts of the storage of TRU waste and HLW at various DOE sites have been addressed in earlier NEPA documents (see Section 1.7 for a complete listing and description of these documents). However, appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste or HLW volumes to an offsite location for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity, and impacts to workers and the affected public.

5.15. Offsite impacts are addressed in Chapter 4 of the Draft and Final EISs (Sections 4.3.4, 4.4.4, and 4.5.4).

5.16. Table S-3 provides a summary of human health impacts at offsite locations.

5.17. Table S-2 reports impacts associated with the alternatives. Person-rem is a dose, not an impact. In addition, person-rem are provided in Chapter 4 (see Tables 4-1 through 4-4, 4-7 through 4-10, 4-13, and 4-14).

The difference between the No Action Alternative and Alternative A is that under Alternative A, Class B and C LLW would be shipped offsite. Under the No Action Alternative only Class A LLW would be shipped offsite. In addition, implementation of Alternative A would move DOE closer to completion of its responsibilities under the West Valley Demonstration Project Act.

5.18. The Summary serves as an overview of the material provided in the EIS and for that reason some information included in the EIS itself is necessarily left out of the Summary. DOE believes that the Summary provides an accurate synopsis of the analyses and findings that are explained more fully in the EIS.

Document #0006: Comments 6.1 – 6.4
W. Lee Poe, Jr.

0006, 1of3
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JUN 16 2003

June 16, 2003
807 E. Rollingwood, Rd.
Aiken, SC 29801

Mr. Daniel W. Sullivan
Document Manager
DOE West Valley Area Office
PO Box 191
West Valley, NY 14171-0191

Report sent by e-mail. daniel.w.sullivan@wv.doe.gov

Dear Mr. Sullivan:

Comments on Draft of
West Valley Demonstration Project
Waste Management
Draft Environmental Impact Statement of April 2003

Additional Comments to Those Dated 6/13/03

I would like to offer the following additional comments on the Draft of the WVDP EIS for waste management (DOE/EIS – 0337D). These comments are in addition to those I offered on the Summary on June 13.

From my review of the DEIS, Alternative A should be accepted as DOE preferred Alternative as soon as DOE can assure that the waste meets specifications for shipment to WIPP and YM. 6.1

I find that all of the environmental impacts are lower than I would have expected. I did not attempt to recalculate these values. I do think the impacts in Alternative B do not adequately consider the interim storage site impacts. (Values used were from Programmatic EISs that are indicative of general waste not those found at WVDP. WVDP waste should be analyzed for interim storage away from WVDP if there is any interest in implementing Appendix B. 6.2

My specific comments are:

1) The last sentence under 1.7 (page 1-13) states that "information from these earlier NEPA documents has been either extracted for use in this EIS or incorporated by reference". I found many places where neither was done. 6.3

2) The first sentence on page 1-15 seems out of place in this EIS. It raises the question, that is not answered, of what process DOE will use to ship waste that is not prepared for disposal. I suggest deleting that paragraph. If it is left in the EIS, the safety of 6.4

WVDP WM DEIS 1

Document #0006: Comments 6.4 – 6.12
W. Lee Poe, Jr.

shipping waste from one site to another that does not meet shipping or disposal criteria must be explained. 6.4

3) The last sentence on page 1-15 raises the same point I already commented on the Summary as comment 6. DOE must get assurances from WIPP and YM that the involved waste is in an acceptable form before implementing this EIS. 6.5

4) I found the answer to my comment 1 on the Summary on scoping on page 1-17. There was no scoping for this EIS near the interim storage sites. DOE should be sensitive and allow potentially affected stakeholders the opportunity to be involved in the scoping of EISs that may affect them. I further note that no copies of the DEIS were sent to those same stakeholders. 6.6

5) Table 2-4 is a little better than Table S-2 in that it has actual numbers. (See comment 14 on the summary comments.) I think the person-rem should be given as well as the number of LCF. 6.7

6) Section 3.9 (page 3-25 & 26) does not describe the site implication of interim storage at sites other than WVDP. This description should be analyzed and added. 6.8

7) The first sentence in the third paragraph of Section 4 (page 4-1) draws a conclusion that is probably incorrect. The judgment that no interim storage impacts exist in Alternative B because similar activities exist at the site is not viable unless they have been evaluated. 6.9

8) Impacts of interim storage away from WVDP in Alternative B do not seem to be included. (Page 4-7) 6.10

9) The Cumulative Impacts section is very weak. It basically says there are no cumulative impacts. Yet it identifies that WV past operations have contaminated the soil and the farmers get a dose commitment each time they plow the fields. The EIS further doesn't include the effect of D&D or the cumulative effects of interim storage at other sites. Section 3 lists noninvolved workers impacts and I concluded it should have been included in this cumulative section. I was very unimpressed with this section. 6.11

10) A major weakness in the EIS is the description for No Action Alternative. I walk away from reading the EIS that there is no detrimental impact to WVDP should the No Action be chosen. If this had been the case, I am sure DOE would not have prepared the EIS. I spoke to this in my comments on the Summary and after reading the full EIS, I have not changed my mind on this weakness. 6.12

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0006, 2of3

WVDP WM DEIS 2

Document #0006: Comments
W. Lee Poe, Jr.

If you have any questions on these comments or I can be of further assistance, please call me at (803) 642-7297.

Sincerely

W. Lee Poe, Jr.

0006, 3 of 3
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JUN 16 2003

WVDP WM DEIS 3

Document #0006: Responses

6.1. DOE has identified Alternative A as its preferred alternative.

6.2. Impacts of the storage of TRU waste and HLW at various DOE sites are described in the Draft and Final WVDP Waste Management EISs and have been addressed in earlier NEPA documents (see Section 1.7 for a complete listing and description of these documents). However, appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste or HLW volumes to an offsite location for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity, and impacts to workers and the affected public.

6.3. As stated in Section 1.7, the documents described in that section are incorporated by reference. In addition, some information from those documents was specifically extracted and used in the assessment of impacts, particularly those at offsite locations (see Sections 4.3.4, 4.4.4, and 4.5.4).

6.4. Minor changes were made to the sentence for clarification.

6.5. TRU waste at WVDP could be disposed of at WIPP if the waste is determined to meet the requirements for disposal in that repository. If some or all of WVDP's TRU does not meet these requirements, DOE would need to explore other alternatives for disposal of the waste. Additional NEPA review would be conducted if DOE were to propose to dispose of TRU waste at a location other than WIPP.

HLW generated at the WVDP site is eligible for disposal in a geologic repository. This waste volume (up to 300 canisters) was specifically analyzed in the Yucca Mountain Repository EIS (Appendix A, Section A.2.3.5.1). The shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative, TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

6.6. A scoping meeting was held during the 30-day scoping period on April 10, 2001, at West Valley, New York. The scoping period was announced in the *Federal Register* and on the DOE NEPA web page, and comments were solicited from any interested party.

While scoping meetings were not held at any of the offsite locations, members of the public around those sites were aware of the potential for such actions to occur, based on DOE's prior NEPA analyses and decisions. Further, the Draft EIS was provided to the relevant state agencies and others near the proposed offsite locations for comment. Comments were received and considered from stakeholders near the Hanford Site, Oak Ridge Reservation, and SRS. DOE has considered input from members of the public near the offsite locations.

6.7. Tables S-2 and 2-4 are identical and report impacts associated with the alternatives. Person-rem is a dose, not an impact. In addition, person-rem are provided in Chapter 4 (see Tables 4-1 through 4-4, 4-7 through 4-10, 4-13, and 4-14).

6.8. Section 3.9 describes the affected environment at the offsite locations considered in the WVDP Waste Management EIS. Impacts at these sites are described in Chapter 4, Environmental Consequences. Impacts at offsite locations are addressed in Sections 4.3.4, 4.4.4, and 4.5.4.

6.9. The sentence referred to in the comment is accurate. The actions at the WVDP site would occur in the facilities listed. Appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste or HLW volumes to an offsite location for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity, and impacts to workers and the affected public.

6.10. The commenter is correct. The Human Health Impacts in Section 4.2.1 and the Transportation Impacts in Section 4.2.2 do not include impacts of offsite storage under Alternative B. Offsite impacts are summarized in Section 4.2.3 and are described in more detail in Sections 4.3.4, 4.4.4, and 4.5.4.

6.11. In accordance with Council on Environmental Quality NEPA-implementing regulations and guidance, DOE considered the cumulative impact of past radioactive releases, existing contamination, and future releases on human health in the region around the WVDP site. No other potentially cumulative impacts were identified, including those impacts reasonably foreseeable as a result of the Decommissioning and/or Long-Term Stewardship EIS and those resulting from transportation as analyzed in the WMPEIS and the WIPP SEIS II.

Appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste or HLW volumes to an offsite location for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity, and impacts to workers and the affected public.

6.12. DOE agrees that implementation of the No Action Alternative would result in small impacts over the 10-year period of time analyzed in the EIS. Over time, however, removal of waste from WVDP to a disposal site would reduce risk. In addition, DOE is responsible for the facilities used in the WVDP HLW vitrification effort and for disposal of the LLW, mixed LLW, TRU waste, and HLW produced by the WVDP HLW solidification program. The Draft and Final WVDP Waste Management EISs analyze potential disposal paths for the wastes that are currently stored onsite and that will be generated by ongoing activities. As indicated in the description of the No Action Alternative (Section 2.3), there is limited storage space available at the WVDP site. Thus, DOE prefers to ship the waste to safe and secure disposal facilities appropriate for each waste type rather than store it onsite.

After the publication of the Final EIS, DOE will issue a Record of Decision. This document will state what DOE's decision is, identify the alternatives considered in reaching its decision, and specify the alternative or alternatives that are considered to be environmentally preferable. DOE will also identify and discuss the factors that were balanced by the agency in making its decision and state how those considerations entered into its decision.

Document #0007: Comments 7.1 – 7.3
U.S. Department of the Interior, U.S. Fish and Wildlife Service

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
408 Atlantic Avenue – Room 142
Boston, Massachusetts 02210-3334

Comment #0007

JUN 2003 Received DOE-WV

June 19, 2003

(ER-03/0473)

Mr. Daniel W. Sullivan
Document Manager
DOE-West Valley Area Office
PO Box 191
West Valley, NY 14171-0191

Dear Mr. Sullivan:

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the West Valley Demonstration Project, Cattaraugus County, West Valley, New York. Our comments are as follows.

Federally-listed Species

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. In addition, no habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act is required with the U.S. Fish and Wildlife Service (Service) at this time. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered.

Because our information on the presence of Federally-listed species is frequently updated, we recommend that the Department of Energy contact the Service's New York Field Office, 3817 Luker Road, Cortland, NY 13045, for updated information on the presence of listed species or their habitat within one year prior to starting the proposed action. 7.1

Environmental Impact Statement Comments

The DEIS adequately describes the environmental resources in the revised project area. The Department is concerned about the existing levels of contamination of soil and groundwater that were mentioned in the DEIS, but not discussed in detail. Any remediation efforts or increases in the areal extent or levels of contamination should be coordinated with this office of the Department, and the Service's New York Field Office. 7.2

To reduce the likelihood of an accidental release of contamination, the Department recommends that the project sponsors and contractor conform to all Federal and State regulations pertaining to the transport of hazardous/contaminated material. Contingency plans for accidental releases should be developed prior to initiation of the proposed action. If the project sponsor and contractors comply with Federal and State regulations for the transportation of this material, develop contingency plans to 7.3

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Document #0007: Comment 7.3
U.S. Department of the Interior, U.S. Fish and Wildlife Service

minimize the adverse effects of an accidental release, and contact the Service's New York Field Office for information on Federally-listed species prior to initiating the proposed action, the Department does not anticipate that this project will have significant impacts on fish and wildlife resources, or their habitats, under our jurisdiction. 7.3

Thank you for the opportunity to provide input on the DEIS. Please contact me at (617) 223-8565 if you have any questions concerning this correspondence, or if I can be of further assistance.

Sincerely,

Andrew L. Raddant
Regional Environmental Officer

cc:

FWS, NYFO, Cortland, NY (A. Chmielowski)

0007, 2 of 2
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Document #0007: Responses

7.1. DOE will consult with the U.S. Fish and Wildlife Service regarding possible updates on the presence at the WVDP site of any threatened or endangered species protected under the Endangered Species Act.

7.2. Remediation efforts as the Department of the Interior has defined them at the WVDP site are outside the scope of the WVDP Waste Management EIS and will be addressed in the Decommissioning and/or Long-Term Stewardship EIS.

7.3. DOE does conform to all federal and state regulations pertaining to the transport of hazardous/contaminated material and has contingency plans in place for accidental releases. Appendix D of the Draft and Final EISs includes a discussion of the applicable transportation regulations. Contingency plans for dealing with accidental releases during transportation would be in place prior to the start of the transportation campaign.

Document #0008: Comments 8.1 – 8.2
State of Washington, Department of Ecology

file TRU + Dan

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

JUN 2003
Received
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0008, 1 of 9

June 20, 2003

Mr. Daniel W. Sullivan
Document Manager
West Valley Area Office
United States Department of Energy
P. O. Box 191
West Valley, New York 14171-0191

Dear Mr. Sullivan:

Re: Draft West Valley Demonstration Project Waste Management Environmental Impact Statement, West Valley, New York DOE/EIS – 0337D

The Washington State Department of Ecology (Ecology) has received and reviewed the Draft West Valley Demonstration Project Waste Management Environmental Impact Statement (WVDP WM EIS). Ecology's review of the WVDP WM EIS has focused on omissions, inadequacies, and adverse impact issues that relate to storage, treatment, or disposal of wastes at Hanford

The purpose and need statement says, in part: "To fulfill its responsibilities under the West Valley Demonstration Project act, DOE needs to identify a disposal path for the wastes that are currently stored onsite and that will be generated in the future and to determine a management strategy for the existing waste storage tanks." Some aspects of the analysis relating to all the alternatives are of concern to the state of Washington, and significant components of Alternative B are simply not acceptable to the state.

Specifically, the two forward action alternatives propose shipping additional volumes (21,000 cubic meters) of Low Level Waste (LLW) and Mixed Low Level Waste (MLLW) for disposal at Hanford. 8.1
These are significantly larger than volumes estimated in the Revised Draft Hanford Solid Waste Program EIS. In addition, Alternative B includes shipping Transuranic (TRU) and High Level Waste (HLW) to Hanford. The LLW and MLLW volumes will compound the impacts of inadequate waste treatment and the lack of groundwater mitigation measures needed to protect public health and the environment from wastes and contamination already disposed of or released to the environment at Hanford. With regard to Alternative B:

- Ecology is not amenable to the importation of HLW for interim storage (which may be very long-term) at the Hanford Site pending availability of the National High Level Waste Repository. Further, this treated waste does not conform with the planned HLW canister storage design planned to be built at the Hanford Site. Neither the Revised Draft Hanford Solid Waste EIS nor the WVDP WM EIS include analyses of significant adverse environmental impacts that may result from operation of facilities needed to store the additional HLW waste described in the WVDP WM EIS. 8.2

3817

Document #0008: Comments 8.3 – 8.5
State of Washington, Department of Ecology

Mr. Daniel W. Sullivan
June 20, 2003
Page 2

- Proposing to ship TRU waste without a disposal path to Hanford is not acceptable. The storage (and potential treatment) of West Valley Demonstration Project TRU at Hanford was not analyzed in either the Waste Management Programmatic EIS or the WIPP Second Supplemental EIS. Further, the state of Washington filed a lawsuit to stop shipment of TRU wastes to Hanford, based on lack of adequate National Environmental Policy Act coverage and lack of acknowledgement of the state's mixed waste management authority, especially as it applies to TRU waste that may not meet requirements for WIPP disposal. The Federal District Court for the Eastern District of Washington issued a preliminary injunction prohibiting additional shipments, pending the outcome of this litigation. 8.3

- The transportation analysis should include more route detail for shipments to Hanford. It should also include an analysis of potential risks from terrorism and diversion. 8.4

In summary, the WVDP WM EIS raises significant questions in the face of the state of Washington's priority concern that Hanford Site waste be cleaned up before substantial additional non-Hanford wastes are added to the site's environmental burden. Additional information is needed to address the cumulative impacts and appropriate treatment and waste management capabilities needed to process non-Hanford waste. Because such information was likewise lacking in DOE's Revised Draft Hanford Site Solid Waste Environmental Impact Statement (RHSWEIS), Ecology hereby incorporates by reference its June 10, 2003 comments on the RHSWEIS. Ecology's detailed comments on the WVDP WM EIS are attached. 8.5

Thank you for the opportunity to comment on this document.

Sincerely,

for.

Michael A. Wilson
Program Manager
Nuclear Waste Program

Enclosure

cc: (see next page)

0008, 2 of 9

RECEIVED
JUN 24 2003

Document #0008: Comment
State of Washington, Department of Ecology

Mr. Daniel W. Sullivan
June 20, 2003
Page 3

cc: Nick Ceto, USEPA
Mike Gearheard, USEPA
Keith Klein, USDOE/RL
Roy Schepens, USDOE/ORP
The Honorable Robert Wahpat, Chairman, Yakama Nation
The Honorable Ross K. Sockzehigh, Tribal Council Chair, Yakama Nation
The Honorable Gary Burke, Chair, Board of Trustees, Confederated Tribes of the Umatilla Indian Reservation
The Honorable Samuel N. Penney, Chairman, Nez Perce Tribal Committee
Rick Gay, CTUIR
Stuart Harris, CTUIR
Patrick Sobotta, NPT
Russell Jim, YN
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Administrative Record

0008, 3 of 9
RECEIVED
JUN 24 2003

Document #0008: Comments 8.6 – 8.8
State of Washington, Department of Ecology

Comment Number	West Valley DP WM EIS Section Reference	Washington State Department of Ecology Comment	References
1	Sec. 1.6, Table 1-1	The definition of transuranic waste (TRU) at West Valley given in Table 1-1 is "material contaminated with radioactive elements of atomic number greater than 20, and neptunium, plutonium, americium, and curium, and that are in concentrations greater than 10 nanocuries/gram (nCi/g) or in such concentrations as [the] NRC may prescribe to protect public health and the environment." A parenthetic statement following says that if the wastes are disposed offsite, the applicable definition at the disposal site will be used. In theory, Hanford might then receive mixed wastes that would not meet the common definition of 100 nCi/gram for transuranic (TRU) waste. These wastes might exceed the volume of LLMW shown in the WVDP WM EIS. The Washington State Department of Ecology (Ecology) requests the WVDP identify any volumes of waste that could be shipped from West Valley as TRU, but could be received at the Hanford Site, designated as LLMW, treated, then disposed at Hanford LLMW burial grounds. 8.6	
2	Sec. 1.6, Table 1-1	In the table, TRU waste is classified as Contact Handled and Remote Handled Waste. Capability to process RH TRU will not be available at the Hanford until 2013. Ecology notes that shipment of RH TRU to Hanford within the next 10 years, which might mean that waste with no known means of treatment and no path for disposal could be received on the Hanford Site. The action is not acceptable to Ecology. 8.7	
3	Sec. 1.7.1.2, p. 1-14	Reference is made to the US Department of Energy's plan to ship TRU to selected sites for where it would be prepared for disposal within the next 10 years. Ecology does not support shipment of RH TRU to the Hanford Site before 2013, because RH TRU handling capacity will not be available at Hanford until then, per the Revised Draft Hanford Solid Waste EIS. In addition, receipt and management of TRU waste is the subject of litigation; therefore, discussion of storage of TRU generated off of the Hanford Site should await the Court's decision. 8.8	

Page 1 of 8

RECEIVED
JUN 24 2003
0008, 4 of 9

Document #0008: Comments 8.9 – 8.12
State of Washington, Department of Ecology

Comment Number	West Valley DP WM EIS Section Reference	Washington Department of Ecology Comment	References	
4	1.7,1.6	The description of the HSW-EIS is accurate, but fails to point out that the HSW-EIS does not include storage of WVDP TRU in its analysis.		8.9
5	Table 2.6, p. 2-21	Ecology has reviewed the information presented on Human Health impacts from disposal of LLW and MLLW at Hanford under the three alternatives. For both the no-action alternative (Class A LLW) and Alternative B (LLW and MLLW), the latent cancer fatality to the maximally exposed individual is 10 orders of magnitude less at the Nevada Test Site (3.0E-16 and 2.1E-15) than at Hanford (6.9E-8 and 5.1E-6). Such dramatic differences in risk would appear to preclude Hanford from serious consideration		8.10
6	Table 2.6, p. 2-21	Ecology reviewed the human health impacts for storage interim storage of TRU waste under Alternative B. Hanford's latent cancer fatality for the population is two orders of magnitude (1.7E-3) greater than that at SRS (2.3E-5), and at a level (nearly 2 fatalities per 1000 population) that is not acceptable given the option of storage at SRS. For that reason, Ecology does not support interim storage of TRU at Hanford.		8.11
7	Tables 2-6 and C-10	The use of the WM-PEIS estimates for storage and treatment of off-site TRU under its "centralized" alternatives is probably bounding. However, one should not assume there will be no treatment at the interim storage site for RH-TRU and certain mixed CH-TRU, since WIPP acceptance criteria are not yet in place for such wastes. Some treatment may be necessary at interim storage sites. In addition, the use of the (dated) WM-PEIS analysis presents some anomalies—e.g. a significant difference in worker health effects for interim storage between Hanford and Savannah River.	RHSW EIS assumption: LLMW received from West Valley will arrive treated to the Hanford Solid Waste Acceptance Criteria and will require no further treatment.	8.12

Page 2 of 6

RECEIVED
JUN 24 2003
0008, 5 of 9

Document #0008: Comments 8.13 – 8.16
State of Washington, Department of Ecology

Comment Number	West Valley DP WM EIS Section Reference	Washington State Department of Ecology Comment	References	
8	Page 2-15, Table 2-3	An escalated volume of mixed LLW (MLLW), which appears to be 223 cubic meters (7,889 cubic feet) in the table, is based on waste volumes that are currently in storage and projections of additional wastes that could be generated from ongoing operations over the next ten years. In comparison, *The Revised Draft Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement, Volume II, Appendix C, Page C.4, Table C.1* states that West Valley Nuclear Services MLLW volume expectations for accelerated cleanup and closure, with shipment and disposal sites identified to be Hanford or the Nevada Test Site (NTS), is 26 cubic meters. Ecology requests WVDP identify the volume discrepancy to allow evaluation of current expectations for MLLW disposal to Hanford or Nevada Test Site (NVT).		8.13
9	C-10	There is a disconnect between the assumption that LLW and MLLW disposal impacts at Hanford (and NTS) are a proportion of WM-PEIS impacts and the specific inventory assumptions in the Hanford Solid Waste EIS. WVDP volume estimates are both larger than those contained in the HSW-EIS and larger than two per cent of the volumes considered in the HSW-EIS.		8.14
10	D.3	We appreciate the use of RADTRAN 5 and 2000 census data for calculation of impacts of transportation from WVDP to Hanford. It would be very helpful, however, to have a map showing the "representative routes" that are described in the tables. Choice of routes may make a significant difference to emergency preparedness in western states.		8.15
11	3.9.2	It is not accurate to say that I-182 and U.S. 12 and 395 "run through the Hanford Site."		8.16

Page 3 of 6

RECEIVED
JUN 24 2003
0008, 6 of 9

Document #0008: Comments 8.17 – 8.18
State of Washington, Department of Ecology

Comment Number	West Valley DP WM EIS Section Reference	Washington State Department of Ecology Comment	References	
12	Summary Sec. 2.0, p. S-8	Alternative A states that TRU waste shipments could occur in the next 10 years if the waste were determined to meet all the requirements of disposal at WIPP. It also states that if some or all of WVDP's TRU waste did not meet these requirements, the USDOE would need to explore other alternatives. In the National TRU Waste Management Plan, Table 3.1.-1, p.38 WVDP is said to have 77.2 cubic meters of stored CH TRU, 16.0 cu. m. projected to be generated for a total of 93.2 cu. m. The volume to be disposed is 0.0 cu. m. Footnote (5) states that the waste is of commercial origin and does not meet the Land Withdrawal Act requirement for disposal at WIPP. If this volume of CH-TRU waste is included in the volume to be stored at Hanford, the environmental impacts of that storage must be evaluated.	National TRU Management Plan, DOE/NTP-96-1204, Rev. 3, Table 3.1-1, Stored, Projected, and Disposal Volumes of CH TRU Waste by Site, pp. 38-39.	8.17
13	Summary Sec. 2.0, p. S-8	Alternative A states that TRU waste shipments could occur in the next 10 years if the waste were determined to meet all the requirements of disposal at WIPP. It also states that if some or all of WVDP's TRU waste did not meet these requirements, the USDOE would need to explore other alternatives. In the National TRU Waste Management Plan, Table 3.1.-2, p. 40, WVDP is said to have 470.5 cubic meters of stored RH TRU, 8.4 cu. m. projected to be generated for a total of 478.9 cu. m. The volume to be disposed is 0.0 cu. m. Footnote (8) states that the waste is of commercial origin and does not meet the Land Withdrawal Act requirement for disposal at WIPP. If this volume of RH-TRU waste is included in the volume to be shipped, the environmental impacts of that storage must be evaluated.		8.18

RECEIVED
JUN 2 4 2003
0008, 7 of 9

Page 4 of 6

Document #0008: Comments 8.19 – 8.21
State of Washington, Department of Ecology

Comment Number	West Valley DP WM EIS Section Reference	Washington State Department of Ecology Comment	References	
14	Summary Sec. 5.0, p. S-25	Ecology noted that the final paragraph on the page stated that analyses associated with transportation to the receiving sites associated with WVPD WM EIS were also addressed in the Final Waste Management Programmatic EIS and the WIPP Phase I Supplemental EIS. Transportation analyses in the WM PEIS are outdated, therefore, the transportation analyses are no longer valid. The WIPP SEIS-II did not address transportation of TRU waste from WV to Hanford; therefore, Ecology does not consider the analyses of risks from transportation to be adequate.		8.19
15	Section 2.5, Table 2-3, pp. 2-14 through 2-16	Ecology does not support shipment of HLW from WVDP to Hanford for several reasons. First, the USDOE Office of River Protection recently informed Ecology that original plans to build a second high-level waste (HLW) Canister Storage Building to store vitrified tank waste have been abandoned. Further, Ecology was informed that shipments of vitrified HLW to the geologic repository will begin as early as 2012 to reduce the need for onsite storage and to expedite disposal. Ecology has not agreed that the USDOE may treat tank waste by other than vitrification, so the volume of vitrified HLW that will require interim storage will be significant.		8.20
16	Section 2.5, Table 2-3, pp. 2-14 through 2-16	Ecology does not support shipment of HLW from WVDP to Hanford because the USDOE Office of River Protection recently informed Ecology that original plans to build a second high-level waste (HLW) Canister Storage Building to store vitrified tank waste have been abandoned. With space limited to one facility, there will not be sufficient space to store HLW from offsite.		8.21

RECEIVED
JUN 2 4 2003
0008, 8 of 9

Page 5 of 6

Document #0008: Comments 8.22 – 8.24
State of Washington, Department of Ecology

Comment Number	West Valley DP WM EIS Section Reference	Washington State Department of Ecology Comment	Reference	
17	Section 2.5, Table 2-3, pp. 2-14 through 2-16	Ecology does not support shipment of HLW from WVDP to Hanford because Ecology has seen no information in the WVDP WM EIS that confirms that the waste will be in a configuration that allows it to be stored in the Canister Storage Building. If the WVDP HLW will be stored elsewhere on the Hanford Site, Ecology will require prior approval of the location.		8.22
18	Section 2.5, Table 2-3, pp. 2-14 through 2-16	Ecology does not support shipment of HLW from WVDP to Hanford because Ecology has not seen any evidence that the WVDP HLW will be allowed to be disposed in the geologic repository or that the repository will be available to receive the waste.		8.23
19	Appendix D, Section D.8, pp. D-10 through D-19 and C.7.1 through D.7.3 pp. D-20 through 28	The risk of terrorist attack on shipments of waste between WVDP and Hanford are not included in the transportation accident analyses. Ecology does not deem transportation terrorist attack analyses to be complete unless they address social, psychological, and economic disruption.		8.24

RECEIVED
JUN 2 4 2003
0008, 9 of 9

Page 8 of 8

Document #0008: Responses

8.1. The inclusion of Hanford as a potential receiving site for disposal of LLW and mixed LLW in the action alternatives in this EIS (Draft and Final) is consistent with DOE's decision under the WM PEIS to designate Hanford and NTS as regional disposal sites for LLW and mixed LLW from DOE generator sites that do not have comparable facilities to dispose of these wastes. DOE expects changes in inventory estimates from individual generators over time, due to several factors, including improved methods of evaluation or changes in mission. Most recently, for example, this West Valley Waste Management EIS analyzed approximately 19,194 and 221 cubic meters of LLW and mixed LLW (rounded conversion from cubic feet) respectively for potential disposal at Hanford, while the *Hanford Site Solid (Radioactive and Hazardous) Waste Program Environmental Impact Statement* (HSW EIS) analyzed 11,297 and 26 cubic meters of LLW and mixed LLW respectively from the WVDP Site. As will be addressed in the Final HSW EIS, these differences in waste volumes would not significantly change the impacts reported in the Final HSW EIS for Upper Bound LLW and mixed LLW inventories. This is because these differences (approximately 7,898 cubic meters of LLW and 200 cubic meters of mixed LLW) represent a small fraction of the Upper Bound volumes analyzed for LLW (631,427 cubic meters) and for mixed LLW (198,852 cubic meters) in the HSW EIS. DOE intends to ensure that its waste treatment capabilities and practices comply with all applicable requirements, and this would apply to any waste received at Hanford from other DOE sites. Similarly, mitigation measures to be described in the Final HSW EIS for Hanford's and other generators' wastes would also apply to any LLW and mixed LLW disposed of at Hanford from the WVDP Site.

NEPA implementing regulations (40 CFR 1502.14(a)) require agencies to evaluate all reasonable alternatives in an EIS. Accordingly, Alternative B analyzed the transportation of TRU waste and vitrified HLW from the WVDP site to other sites including Hanford for interim storage, until these wastes can be shipped for disposal to WIPP and Yucca Mountain respectively. Depending on costs and cleanup schedules at the WVDP site, interim storage of the WVDP TRU waste and HLW at other sites is a reasonable alternative, but DOE's preferred course of action is to ship the wastes directly to WIPP or Yucca Mountain.

8.2 DOE analyzed the interim storage at Hanford of vitrified HLW from the WVDP site under the Regionalized Alternative 2 and Centralized Alternative of the WM PEIS. In this WVDP Waste Management EIS, DOE also contemplated Hanford as a potential interim storage site for the WVDP vitrified HLW, in accordance with implementing requirements under NEPA (40 CFR 1502.14(a)), for agencies to evaluate all reasonable alternatives. The completed West Valley Demonstration Project has produced 275 canisters (this EIS analyzes 300 canisters) containing vitrified HLW in a borosilicate glass form, consistent with current requirements for all DOE sites, including Hanford, at the planned repository at Yucca Mountain. DOE is preparing a license application for submission to the Nuclear Regulatory Commission in order to make the repository available for nuclear wastes that qualify for disposal there, such as vitrified HLW from DOE sites. DOE's preferred alternative in this EIS is to ship the WVDP vitrified HLW directly to Yucca Mountain for disposal.

The potential onsite impacts of storing the WVDP HLW canisters at Hanford were not analyzed in the HSW EIS (Draft) nor this WVDP Waste Management EIS (Draft and Final), because that action is not within the scope of either EIS. However, this WVDP Waste Management EIS (Draft and Final) did analyze potential transportation impacts of shipping the canisters to Hanford. Further, DOE is preparing an *Environmental Impact Statement for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks at the Hanford Site, Richland, Washington* ([Tanks EIS], 68 Fed. Reg. 1,052, January 8, 2003). In the various Tanks EIS alternatives, DOE proposes to build 2 to 64 buildings in addition to the existing Canister Storage Building, for a storage capacity of 8,300 to 172,800 HLW canisters. DOE believes the storage capacity to be analyzed in the Hanford Tanks EIS would account for the incremental impacts potentially associated with the comparatively small number of canisters from the WVDP site. Nevertheless, DOE would not make a final decision to ship the WVDP canisters until the Tanks EIS is completed and DOE had reviewed all of the pertinent factors related to the WVDP canister specifications and the Hanford canister storage specifications.

8.3 The West Valley Demonstration Project Act directs DOE to dispose of TRU waste; accordingly, indefinite storage is not an option open to DOE. In the WM PEIS and the WIPP SEIS-II, the storage and processing of WVDP TRU waste at Hanford was not specifically analyzed because DOE did not contemplate this site-specific action at the time these EISs were prepared. Similarly, the Revised Draft HSW EIS also did not include WVDP TRU waste in its analyses. However, under Alternative B of this WVDP Waste Management EIS (Draft and Final) DOE has analyzed the potential impacts of shipping approximately 1,372 cubic meters of TRU waste to other DOE sites, including Hanford, for interim storage in accordance with NEPA-implementing requirements (40 CFR 1502.14(a)) that require agencies to consider all reasonable alternatives. This EIS also analyzes shipping this waste from the storage sites to WIPP for disposal, consistent with the WIPP SEIS-II.

In the Final HSW EIS, DOE will estimate the potential onsite impacts of storing the WVDP TRU waste and processing the waste through the existing Waste Receiving and Processing Facility and modified T-Plant or a new facility at Hanford. The increment to health impacts on workers and the general population resulting from the interim storage and processing of TRU waste from the WVDP site is expected to be so small that it would not significantly change the results reported in the Hanford Solid Waste EIS for the Upper Bound TRU waste volume.

Shipping TRU waste to Hanford for storage until it can be disposed of at WIPP is not DOE's preferred alternative; rather, DOE prefers to ship this waste directly to WIPP for disposal. In any case, DOE would await resolution of the pending litigation before deciding to send TRU waste to Hanford. Any such decision would comply with applicable legal requirements.

8.4 For transportation analysis, DOE relies on the commonly accepted transportation models, which generally select the most direct routes between origins and destinations, using interstate highways to the extent possible. For this EIS, representative highway and rail routes were analyzed using the routing computer code Web TRAGIS (Johnson and Michelough, 2000), which maximizes the use of interstate highways in accordance with all applicable requirements. The routes analyzed may not be the actual routes that DOE would use.

Terrorism and other intentional destructive acts cannot be analyzed in transportation accident risk analyses prepared for NEPA documents in the same way as accidents, because the information needed to calculate probabilities is unknowable. Nevertheless, accident analyses may be used to provide insight into the potential consequences of intentional destructive acts because the consequences of such acts may be comparable to those from severe accidents. The HSW EIS (Volume II, Appendix H) contains such a discussion for potential waste shipments to Hanford from other DOE sites. Although the probability of an attack on a waste shipment cannot be known, DOE believes that LLW, mixed LLW, and TRU shipments would not present an attractive target. Further, the containers used for transporting these wastes are designed with safeguards appropriate to the potential hazard.

8.5 The LLW, mixed LLW, TRU waste and vitrified HLW considered for shipment to Hanford in this WVDP Waste Management EIS have characteristics similar to Hanford's wastes of the same waste type. The WVDP wastes would be shipped only if they met Hanford's waste acceptance criteria and all other applicable requirements. Further, the WVDP wastes would not require storage or processing facilities other than those existing or planned for Hanford's wastes. DOE believes the increment of WVDP wastes added to those analyzed for the Upper Bound Volumes in the Final HSW EIS are so small that they would not significantly change the results reported in the HSW EIS cumulative impacts.

The cumulative impact analysis in the HSW EIS assumed an Upper Bound volume that included wastes from off site. The Hanford Only volume analyzed in the cumulative impacts did not include wastes from off site. This approach was used to permit an identification of the incremental impacts that potentially could be associated with receipt of off site wastes under the various HSW EIS alternatives.

8.6 The definition of TRU waste in Table 1-1 was provided in this WVDP Waste Management EIS (Draft and Final) for historical accuracy, because this definition was used for TRU waste at all DOE sites at the time the West Valley Demonstration Project Act was enacted. However, this EIS (Draft and Final) reported and analyzed mixed LLW and TRU waste based on the current definition used at all DOE sites of 100 nCi/gram of transuranic elements as the minimum concentration defining TRU waste. In other words, DOE does not regard as TRU waste any waste that does not meet the definition of TRU waste in DOE Order 435.1 and does not propose to ship TRU waste to Hanford for disposal there as mixed LLW. The TRU waste that was analyzed under Alternative B for shipment to Hanford was analyzed for interim storage and subsequent shipment to WIPP for disposal.

8.7 DOE intends to complete Hanford's RH TRU processing facility to comply with DOE's policy to dispose of its TRU waste at WIPP. Any RH-TRU waste from other sites that may be stored at Hanford would be subject to the same policy for TRU waste disposal and would be processed in the modified T-Plant or a new facility for disposal at WIPP. As stated in this WVDP Waste Management EIS (Draft and Final), DOE is considering all available paths forward to meet its requirement under the West Valley Demonstration Project Act to dispose of waste generated as a result of Project Activities. Indefinite storage of the WVDP TRU waste at any site is not an option open to DOE under the Act.

8.8 If DOE were to send WVDP's RH-TRU waste to Hanford before an RH TRU handling capacity were available, the waste would be stored in a facility having existing safe storage capability such as the T-Plant, until the RH TRU waste processing facility could prepare the waste for shipment to WIPP. Hanford will continue to store its own RH-TRU until it can be accepted at WIPP, and DOE believes the potential incremental impacts posed by storing WVDP TRU waste there would be very small. However, this is not DOE's preferred alternative. In any case, DOE would await resolution of the referenced, pending litigation prior to deciding whether to send TRU waste to Hanford. Any such decision would comply with applicable legal requirements.

8.9 DOE will address the storage and processing of the WVDP TRU waste at Hanford in the Final HSW EIS. DOE will estimate the onsite impacts of processing WVDP TRU waste through the existing Waste Receiving and Processing Facility (for CH-TRU waste) and the T-Plant or new facility addressed in that EIS. The increment to health impacts on workers and the general population resulting from the interim storage and processing of TRU waste from the WVDP site is expected to be so small that it would not significantly change the results reported for the Upper Bound Volume in the Final HSW EIS.

8.10 The latent cancer fatality estimates for the maximally exposed individual are small for both sites and indicate that no incidence of cancer would be expected to result from disposing of LLW and mixed LLW from the WVDP site at either Hanford or NTS. This small risk does not provide a meaningful basis for discriminating between the two sites. Nevertheless, in arriving at a final decision under this EIS, DOE would consider potential health impacts along with all other pertinent factors.

8.11 The commentor's interpretation of the risk estimates is incorrect. The expected number of fatalities per 1,000 people is not two. Rather, the estimate of about 2E-3 latent cancer fatalities refers to the total number of cancer fatalities expected among the entire potentially affected population at Hanford (all people within 50 miles of the Hanford site). In other words, this estimate indicates that no one would be harmed either at Hanford or the Savannah River Site. This small population risk does not provide a meaningful basis for discrimination between the sites.

That notwithstanding, any decision to ship the WVDP TRU waste off site for interim storage and processing would consider pertinent analysis of potential health impacts at the candidate receiving sites, along with all other relevant factors. As stated in this WVDP Waste Management EIS (Draft and Final), DOE prefers to ship this waste directly to WIPP for disposal.

8.12 This WVDP Waste Management EIS reported potential impacts at receiving sites for WVDP TRU waste as a fraction of those reported in the WM-PEIS as an estimate. The Final HSW EIS will address the storage and processing of TRU waste from the WVDP site. DOE believes that final WIPP acceptance criteria are not necessary to estimate potential impacts of transporting, storing and processing Hanford's and other sites' TRU waste for the purposes of analysis in the HSW EIS and this WVDP Waste Management EIS. The analyses assume that all waste received at Hanford from other DOE sites would meet Hanford's waste acceptance criteria, which provides a base of information for adequate analysis, in addition to the waste inventories.

8.13 This WVDP Waste Management EIS analyzed approximately 221 cubic meters (rounded conversion from cubic feet) of mixed LLW for potential disposal at Hanford, while the Revised Draft HSW EIS analyzed 26 cubic meters of mixed LLW from the WVDP site. As will be addressed in the Final HSW EIS, DOE believes this difference of approximately 200 cubic meters would not significantly change the impacts reported in the Final HSW EIS for Upper Bound mixed LLW inventories. This difference is a small fraction of the Upper Bound volume analyzed for mixed LLW (198,852 cubic meters) in the HSW EIS.

8.14 The inclusion of Hanford as a potential disposal site for LLW and mixed LLW in this WVDP Waste Management EIS (Draft and Final) is consistent with DOE's designation of Hanford and NTS under the WM PEIS as regional LLW and mixed LLW disposal sites for other DOE sites. DOE estimated potential impacts at receiving sites as a fraction of the WM PEIS impacts, based on the LLW and mixed LLW volumes analyzed in this WVDP Waste Management EIS.

The total volume of WVDP LLW analyzed in this EIS (Draft and Final) is less than 2% of the total volume analyzed in the Centralized Alternative 1 of the WM PEIS, and is approximately 3% of the Upper Bound volume for LLW analyzed in the HSW EIS. (The volume of mixed LLW analyzed in this WVDP Waste Management EIS is approximately 0.1% of the Upper Bound volume analyzed for mixed LLW in the HSW EIS.) DOE believes these proportions are sufficiently close that impact estimates derived from the WM PEIS are adequate.

Nevertheless, in the Final HSW EIS, DOE will address these small differences in the WVDP LLW and mixed LLW inventories analyzed in this EIS (Draft and Final) and in the Revised Draft HSW EIS. DOE expects that inventory estimates from individual generators will change over time, due to several factors, including improved methods of evaluation or changes in mission. The Revised Draft HSW EIS used inventory data available at the time the site data were compiled. However, this WVDP Waste Management EIS used updated inventories and analyzed 19,194 and 221 cubic meters (rounded from cubic feet) of LLW and mixed LLW respectively for potential disposal at Hanford. The Revised Draft HSW EIS analyzed 11,297 and 26 cubic meters of LLW and mixed LLW respectively from the WVDP site. As will be addressed in the Final HSW EIS, these differences would not significantly change the impacts reported in the Final HSW EIS for Upper Bound LLW and mixed LLW inventories. This is because the incremental differences (approximately 7,898 cubic meters for LLW and approximately 200 cubic meters for mixed LLW) represent such a small fraction of the Upper Bound volumes analyzed for LLW (631,427 cubic meters) and for mixed LLW (198,852 cubic meters) in the HSW EIS.

8.15 DOE uses commonly accepted transportation models, which generally select the most direct routes between origins and destinations, using interstate highways to the extent possible. For this EIS, representative highway and rail routes were analyzed using the routing computer code Web TRAGIS (Johnson and Michelough, 2000), which maximizes the use of interstate highways in accordance with all applicable requirements. The routes analyzed may not be the actual routes that DOE would use.

DOE routinely plans actual transportation campaigns well in advance, with appropriate notice to affected State and local jurisdictions along the transportation route. DOE has long maintained a transportation program that provides assistance to all affected States and local jurisdictions in maintaining emergency preparedness capabilities, including training, and DOE transportation personnel remain available for assistance during transportation campaigns in the event of an incident.

8.16 In this Final EIS, DOE has modified Section 3.9.2 to state that these highways run near the Hanford Site.

8.17 The inventory data in the National TRU Waste Management Plan are based on information available at the time of preparation. The inventory estimates in this WVDP Waste Management EIS (1,120 cubic meters of CH-TRU waste) are derived from more current projections. As stated in this EIS, (Draft and Final) DOE prefers to ship this waste directly to WIPP. DOE will continue to update its TRU Waste planning documents on a regular basis to reflect changes in its TRU waste inventory.

8.18 The inventory data in the National TRU Waste Management Plan were based on information available at the time of preparation. The inventory estimates in this WVDP Waste Management EIS (252 cubic meters of RH-TRU waste) are derived from more current projections. As stated in this EIS, (Draft and Final) DOE prefers to ship this waste directly to WIPP. DOE will continue to update its TRU waste planning documents on a regular basis to reflect changes in its TRU waste inventory.

8.19 In this EIS (Draft and Final), DOE referenced the transportation analyses in the WM PEIS and the WIPP SEIS-II for national context. The WM PEIS analyses, for example, were intended to support decisions about where DOE would locate key radioactive and hazardous waste management functions, i.e., in a decentralized, regionalized or centralized national configuration of DOE sites. Any updates to the supporting data would apply to all of the DOE sites considered in these National-level EISs and would not change the bases on which the programmatic waste management decisions were made. Further, DOE does not agree that the WM PEIS analyses are no longer valid. Updates to the supporting data, such as using new census data, would not significantly change the potential environmental impacts reported in the WM PEIS or the WIPP SEIS-II. Transportation analyses contained in the HSW EIS indicate that results using new census data are similar to those reported in the WM PEIS.

Nevertheless, under Alternative B of this WVDP Waste Management EIS (Draft and Final), DOE analyzed the potential transportation impacts of shipping approximately 1,372 cubic meters of TRU waste from the WVDP site to Hanford for interim storage and processing for shipment to WIPP and shipping this waste from Hanford to WIPP. This site-specific analysis used 2000 census data, waste inventories that have been updated since the WM PEIS and WIPP SEIS-II were prepared, and current, commonly accepted analytic methodology. DOE believes these analyses satisfy applicable requirements under NEPA. In the Final HSW EIS, DOE will also include a comparison of the methodology used in this WVDP Waste Management EIS for transportation impact analysis to that used in the Final HSW EIS, for general information.

8.20 The West Valley Demonstration Project has completed its HLW vitrification mission, having generated a total of 275 HLW canisters. Under DOE's non-preferred alternative (Alternative B) in this WVDP Waste Management EIS (Draft and Final), DOE analyzed the storage of 300 HLW canisters until they could be shipped to Yucca Mountain for disposal. DOE is currently preparing the Tanks EIS. In the various Tanks EIS alternatives, DOE proposes to build 2 to 64 buildings in addition to the existing Canister Storage Building, for a storage capacity of 8,300 to 172,080 HLW canisters. DOE believes the storage capacity to be analyzed in the Hanford Tanks EIS would account for the incremental impacts potentially associated with the comparatively small number of canisters from the WVDP site. Nevertheless, DOE would not make a decision to ship the WVDP canisters until the Tanks EIS is completed.

8.21 Under DOE's non-preferred alternative (Alternative B) in this WVDP Waste Management EIS (Draft and Final), DOE analyzed the storage of 300 WVDP canisters containing vitrified HLW until they could be shipped to Yucca Mountain for disposal. DOE is currently preparing the Tanks EIS. In the various Tanks EIS alternatives, DOE proposes to build 2 to 64 buildings in addition to the existing Canister Storage Building, for a storage capacity of 8,300 to 172,080 HLW canisters. DOE believes the storage capacity to be analyzed in the Hanford Tanks EIS would account for the incremental impacts potentially associated with the comparatively small number of canisters from the WVDP site. Nevertheless, DOE would not make a decision to ship the WVDP canisters until the Tanks EIS were complete.

8.22 The HLW canisters produced by the West Valley Demonstration Project contain a borosilicate glass waste form consistent with current requirements for immobilizing DOE's HLW. DOE prefers to ship these canisters directly to Yucca Mountain.

However, before making any decision to ship the WVDP canisters to Hanford and in order to ensure safety and security, DOE would review all factors related to the WVDP canister specifications and the Hanford canister storage and handling facility specifications. As examples, such factors include but are not limited to, overall canister size, radiation dose rate, thermal conductivity and heat capacity of the WVDP waste, the equipment at Hanford used to move the canisters, and the individual canister storage structures at Hanford. Also before making any decision to ship WVDP HLW canisters to Hanford, DOE would consult with the State of Washington regarding safety and security in accordance with all applicable requirements.

8.23 DOE included the inventory and characteristics of WVDP's HLW in their analysis presented in the *Final Environmental Impact Statement for a Geologic Repository for the Disposal* *of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250F, February 2002). This FEIS also addressed transportation impacts of shipping this HLW from WVDP to Yucca Mountain. The HLW canisters produced at the WVDP site contain a borosilicate glass waste form consistent with current requirements for immobilizing DOE's HLW, and DOE expects that these canisters will be acceptable for disposal at Yucca Mountain. The Nuclear Waste Policy Act of 1982, as amended, defines high-level radioactive waste as, "highly radioactive material resulting from the reprocessing of spent nuclear fuel" and stipulates that the geologic repository would be designed for the permanent disposal of spent nuclear fuel and high-level radioactive waste. Furthermore, the Nuclear Regulatory Commission (NRC) has made a generic determination in 10 CFR 51.23 that, "the Commission believes there is reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century, and sufficient repository capacity will be available within 30 years beyond the licensed life of operation of any reactor to dispose of the commercial high-level waste and spent fuel originating in such reactor and generated up to that time." DOE is now preparing an application, to be submitted to the NRC in 2004, for a construction authorization for the geologic repository at Yucca Mountain, Nevada. DOE currently plans to obtain the appropriate NRC license and open the repository in 2010. DOE prefers to ship the WVDP HLW directly to Yucca Mountain.

8.24 Terrorism and other intentional destructive acts are not accidents and cannot be analyzed in accident risk analyses prepared for NEPA documents in the same way as accidents.

In analyzing accident risks under NEPA, DOE considers the range of foreseeable accidents, including low probability/high consequence events and higher probability/lower consequence events. "Risk" refers to the product obtained by multiplying probability of occurrence for an event times the event's consequences. DOE considers all three factors (probability, consequence, and risk) in its accident analyses under NEPA. The probability of malevolent acts, however, is unknowable. Therefore, meaningful risk estimates cannot be conducted in the same way as for accidents.

Nevertheless, accident analyses may be used to provide insight into the potential consequences of intentional destructive acts because the consequences of such acts may be comparable to those from severe accidents. The Hanford Solid Waste EIS (Volume II, Appendix H) contains such a discussion for potential waste shipments from other DOE sites to Hanford.

Although the probability of attack on a waste shipment cannot be known, DOE believes that LLW, mixed LLW, and TRU shipments would not present an attractive target. Further, the containers used for transporting these materials are designed with safeguards appropriate to the potential hazard.

Regarding social, psychological, and economic disruption associated with intentional destructive acts, DOE does not agree that these impacts can be meaningfully evaluated. In general, such impacts are too speculative for analysis. There are no reliable methods for predicting such impacts with any degree of certainty and the uncertainty is irreducible. DOE addressed key issues relevant to this topic in greater detail in the *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250F, February 2002, see Appendix N).

Document #0009: Comments 9.1 – 9.2
New York State Department of Environmental Conservation

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials
Bureau of Hazardous Waste and Radiation Management
Radiation Section, Eighth Floor
625 Broadway, Albany, New York 12233-7255
Phone: (518) 402-8579 • FAX: (518) 402-8646
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

June 30, 2003

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JUN 3 0 2003

E-Mailed & USPS Mailed

Mr. Daniel Sullivan
DOE West Valley Area Office
P.O. Box 191
West Valley, NY 14171-0191

Dear Mr. Sullivan:

Re: West Valley Demonstration Project Waste Management Draft Environmental Impact Statement

This letter transmits the comments of the New York State Department of Environmental Conservation's radiation control program on the West Valley Demonstration Project Waste Management Draft Environmental Impact Statement, DOE/EIS-0377D, April 2003 (WM DEIS).

While we support the efforts of the DOE to move forward with waste removal at the site, we do not agree with two aspects of the DEIS: the alternative to place grout in the HLW tanks 9.1 and the incomplete discussion of the disposal of transuranic wastes (TRU wastes). The grouting alternative, if selected, will bias the decision-making process for the follow-on Decommissioning and/or Long-Term Stewardship EIS (DLTS EIS), and there is no substantive basis for the divergence from the original scope for this EIS of active management of the HLW tanks. 9.2 We do not oppose the approach of a separate WM EIS, as long it is written to fully address the proposed alternatives, and the work performed and decisions made do not affect the NEPA process for the DLTS EIS. We urge DOE to eliminate the grouting alternative from the EIS. With that option removed, we would support Alternative B as the preferred alternative.

Our detailed comments are enclosed. If you have any questions, please call Timothy Rice or me. Thank you for the opportunity to comment on this document.

Sincerely,

Barbara Youngberg

Barbara Youngberg
Chief, Radiation Section

cc: w/encl. - J. Eng, USEPA, Region II
C. Glenn, USNRC
P. Piciulo, NYSERDA, West Valley

Document #0009: Comment 9.1
New York State Department of Environmental Conservation

ENCLOSURE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID & HAZARDOUS WASTE
BUREAU OF HAZARDOUS WASTE & RADIATION MANAGEMENT
RADIATION SECTION

Comments On
West Valley Demonstration Project Waste Management
Draft Environmental Impact Statement (WM DEIS)

June 30, 2003

1. Grouting of The HLW Tanks Should Not Be Included in This DEIS.

The DEIS incorrectly concludes that the waste management actions proposed in the WM DEIS would not prejudge the range of alternatives to be considered or the decisions to be made for the DLTS EIS (page 1-9). On page 2-16, the DEIS asserts that the introduction of grout into the high level waste (HLW) tanks and vaults "would not constitute an irreversible action." This may be technically true. The grout may be able to be removed in the future. However, the DEIS does not address the fact that removal of the grout would likely constitute a significant increase in the complexity, cost, and risk involved in removal of the tanks under the Decommissioning and/or Long-Term Stewardship EIS (DLTS EIS), thus changing the risk/benefit equation in favor of leaving the HLW tanks in place.

The introduction of grout into the tanks would have a direct impact on the National Environmental Policy Act (NEPA) process for the second, DLTS EIS. Specifically, introduction 9.1 of grout into the HLW tanks and vaults as part of the WM EIS would bias the decision-making process of the DLTS EIS in favor of a closure alternative that would leave the HLW tanks in place. This would violate both the spirit and letter of the NEPA. The potential for just such a negative connection between the two EISes has been the subject of numerous comments from the public and regulators. DOE has repeatedly assured interested parties that separation of the 1996 DEIS into two separate, and supposedly independent, EISes would not result in decisions made within the scope of the WM EIS having an impact on the NEPA process for the second, DLTS EIS. We strongly recommend that the DOE remove the grout "interim stabilization" of the HLW tanks and vaults from consideration in the WM EIS.

The DEIS does not explain the need for grouting the tanks and in particular, it does not provide any reasoning to demonstrate the need for the different approaches to managing the tanks in Alternatives A and B. Nor does the DEIS evaluate and compare other available alternatives for actively managing these tanks.

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Page 1 of 2

Document #0009: Comments 9.1 – 9.3
New York State Department of
Environmental Conservation

Further, adding the grouting option to this DEIS introduces a passive management method for the HLW tanks. There is no substantive argument presented for diverging from the original scope for the WM EIS of active management of the HLW tanks. Therefore, this option is beyond the scope of this DEIS and belongs in the DLTS EIS.

We strongly recommend that the DOE remove the grout "interim stabilization" of the HLW tanks and vaults from consideration in this EIS. Further, we recommend that in place of grouting the tanks, the DOE explore all reasonable alternatives available to it for actively managing the tanks. 9.1

2. The TRU Waste Disposal Option Should Be Fully Described.

On the first page of the WM EIS Summary, the DOE proposes to "Ship transuranic (TRU) radioactive wastes to the Waste Isolation Pilot Plant (WIPP)." The document goes on to say that, "TRU waste shipments to WIPP could occur within the next 10 years if the TRU waste were determined to meet all the requirements for disposal in this repository." Additionally, it states, "If some or all of the WVDP's TRU waste did not meet these requirements, the Department would need to explore other alternatives for disposal of this waste."

Each of these statements is true. However, they imply that acceptance is merely a matter of determining whether the wastes meet certain unspecified technical acceptance criteria for WIPP. Rather, it is our understanding that the largest impediment to acceptance of this waste at WIPP is that the DOE has characterized the West Valley TRU wastes as commercial in nature, while WIPP only has a mandate to accept defense related wastes. Since 60% or more of the fuel reprocessed at West Valley came from the DOE weapons manufacturing complex, the wastes at the site should rightly be classified as defense related. It is within the DOE's power to resolve this issue, and we urge the DOE to do so. Without this change in classification, or an existing agreement for storage of these wastes at another DOE complex site, the DOE has failed to present a viable option for removal of TRU waste from the site, making the only viable option continued on-site storage. 9.2

3. If DOE Deletes the Grouting Option, We Recommend Alternative B as the Preferred Alternative.

Alternative A proposes disposing of all low-level wastes (LLW) and mixed wastes off-site, and storing TRU wastes and the vitrified HLW on-site until they can be transported directly to a disposal site. DOE projects that the storage time for the vitrified waste will run until at least 2025, and possibly longer. Alternative B would remove all relevant wastes from the site, and from New York State, within ten years. This aspect of Alternative B would present lower risks to the citizens and environment of New York. We would, therefore, support Alternative B, if it did not also include the introduction of grout into and around the bottoms of Tanks 8D-1 and 8D-2 for "interim stabilization." 9.3

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Page 2 of 2

Document #0009: Responses

9.1. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

9.2. TRU waste at WVDP could be disposed of at WIPP if the waste is determined to meet the requirements for disposal in this repository. If some or all of WVDP's TRU does not meet these requirements, DOE would need to explore other alternatives for disposal of the waste. Additional NEPA review would be conducted if DOE were to propose to dispose of TRU waste at a location other than WIPP.

The shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative, TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

9.3. Alternative A is DOE's preferred alternative. DOE has eliminated the option of placing retrievable grout in the HLW tanks as an interim stabilization measure under Alternative B. After the publication of the Final EIS, DOE will issue a Record of Decision. This document will state what DOE's decision is, identify the alternatives considered in reaching its decision, and specify the alternative or alternatives that are considered to be environmentally preferable. DOE will also identify and discuss the factors that were balanced by the agency in making its decision and state how those considerations entered into its decision.

Document #0010: Comments 10.1 – 10.2
State of Tennessee, Department of Environment and Conservation

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DOE OVERSIGHT DIVISION
761 EMORY VALLEY ROAD
OAK RIDGE, TENNESSEE 37830-7072

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June 20, 2003

Daniel W. Sullivan
Document Manager
DOE West Valley Area Office
PO Box 191
West Valley, NY 14171-0191

Draft Environmental Impact Statement (EIS) for the Waste Management West Valley Demonstration Project (WVDP) Cattaraugus County, NY (DOE/EIS-0337D)

The Tennessee Department of Environment and Conservation, DOE Oversight Division has reviewed the above subject document in accordance with the requirements of the National Environmental Policy Act (NEPA) and associated regulations of 40 CFR 1500-1508 and 10 CFR 1021 as implemented.

General Comment
Alternative A is defined as the preferred option. It would not involve Tennessee (ORNL) as an interim storage facility for TRU waste and is likewise the state's preferred option. 10.1

Specific Comment
Section 2.0 Description of Alternatives, Page S-8 Alternative B - Offsite Shipment of LLW and Mixed LLW to Disposal, Shipment of HLW and TRU Waste to Interim Storage, and Interim Stabilization of the Waste Storage Tanks. Tennessee has concerns about Alternative B because it could involve Oak Ridge as a potential interim storage facility for the TRU wastes from WVDP. In the past, the state has made its position clear on not accepting the storage or disposition of out-of state waste. 10.2

If you have any questions concerning these comments, please contact me at (865) 481-0995.

Sincerely
John A. Owsley
John A. Owsley
Director

cc: Alan Leiserson, TDEC - OGC

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Document #0010: Responses

10.1. The shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

10.2. The WM PEIS studied the potential for nationwide impacts of managing radioactive and hazardous wastes. DOE issued separate RODs for all of the waste types analyzed in the WM PEIS. For TRU waste, DOE decided that each site that has generated or would generate TRU waste would store it onsite prior to shipment to WIPP for disposal (63 Fed. Reg. 3629 (1998)). However, the Department may decide to ship TRU waste from sites where it may be impractical to prepare it for disposal to other sites where DOE has or will have the necessary capability. The sites that could receive TRU waste from other sites are INEEL, ORR, SRS, and the Hanford Site. Thus, DOE's analysis in the Draft and Final WVDP Waste Management EISs of the interim storage of WVDP TRU waste is consistent with analyses conducted for the WM PEIS and with decisions reached on the basis of that document.

As noted above, the shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative (Alternative A), TRU waste would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

Document #0011: Comments
Coalition on West Valley Nuclear Wastes

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June 27, 2003

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JUN 30 2003

VIA FEDERAL EXPRESS

Daniel W. Sullivan
DOE Document Manager
West Valley Area Office
U.S. Department of Energy
10282 Rock Springs Road
West Valley, NY 14171

Re: Coalition on West Valley Nuclear Wastes
Our File No. 11-023

Dear Mr. Sullivan:

Enclosed please find the Coalition on West Valley Nuclear Wastes' Public Comment submitted in Response to the U.S. Department of Energy's Notice of Availability, 68 Fed. Reg. 26587-26588 (May 16, 2003).

Thank you for your consideration.

Very truly yours,

KNOER, CRAWFORD & BENDER, LLP

Robert E. Knoer

REK:ss
Enclosure

cc: Carol Borgstrom, Director, Office of NEPA Policy and Compliance (*via Federal Express*)
The Honorable Hilary Rodham Clinton
The Honorable Charles E. Schumer

Document #0011: Comments 11.1 – 11.2
Coalition on West Valley Nuclear Wastes

Public Comment Submitted by the

COALITION ON WEST VALLEY NUCLEAR WASTES
Sharp Street
East Concord, New York 14055
(716) 441-3168

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In Response to the

U.S. DEPARTMENT OF ENERGY

Notice of Availability
68 Fed. Reg. 26587-26588 (May 16, 2003)

The following is submitted in response to the U.S. Department of Energy's "Notice of Availability of the West Valley Demonstration Project Draft Waste Management Environmental Impact Statement" (hereinafter referred to as the "Notice").

This response addresses two categories of comment. First, the Coalition on West Valley Nuclear Wastes & Radioactive Waste Campaign brought an action against the United States Department of Energy, the New York State Energy Research and Development Authority and the State of New York in United States District Court for the Western District of New York under Civ. Action No. 86-1052-C. That action resulted in a Stipulation of Compromise Settlement (hereinafter sometimes referred to as "Stipulation") which was ordered entered by the Honorable John T. Curtin, United States District Judge on May 27, 1987. A copy of the Stipulation is attached.

Pursuant to that Stipulation of Compromise Settlement, certain conditions with regard to the Environmental Impact Statement and procedures for determining an appropriate clean up at the West Valley Demonstration Project would be undertaken. It is the position of the Coalition on West Valley Nuclear Wastes that portions of the Stipulation of Compromise Settlement are violated by the actions as described in the Notice appearing in 68 F.R. 26587. 11.1

The approach being proposed by the US Department of Energy is violative of the National Environmental Policy Act and regulations issued thereunder by various federal agencies and authorities. The DOE must take these legal requirements into consideration in determining how to proceed forward with the West Valley Demonstration Project closure and/or long term management at the Western New York Nuclear Service Center. 11.2

Document #0011: Comments 11.1 – 11.2
Coalition on West Valley Nuclear Wastes

SPECIFIC COMMENTS

1. The Stipulation of Compromise Settlement (hereinafter "Stipulation") requires that "the closure Environmental Impact Statement - including the scoping process - shall begin no later than 1988 . . ." This requirement is binding. DOE cannot unilaterally create a new environmental impact process that supersedes or substantially modifies the process carried out in 1988. 11.1

2. The EIS process begun in 1988 led to issuance of the 1996 Completion and Closure Draft EIS. A Final EIS or Record of Decision has not yet been issued. Thus, the EIS process specified in the Stipulation has not yet been completed. Pursuant to the draft summary dated April 2003 prepared by the U.S. Department of Energy:

   "The continuation of the *Draft Environmental Impact Statement for Completion of the West Valley Demonstration Project and Closure or Long-Term Management of Facilities at the Western New York Nuclear Service Center*, also referred to as the 1996 Completion and Closure Draft EIS, will be accomplished with a revised *Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center EIS*." p.S-1 11.1 & 11.2

   The segmentation of these two elements of the closure of the West Valley Demonstration Project is inappropriate under the terms of the Stipulation of Compromise and under the requirements of the National Environmental Policy Act.

3. The provisions of the Stipulation apply to any and all Environmental Impact Statements into which the closure EIS that began in 1988 may be split. Paragraph 3 of the Stipulation defines the scope of the closure EIS very broadly, such that it covers disposal of all "[Class A] [Class B/C] wastes generated as a result of the activities of the West Valley Demonstration Project as mandated by the United States Congress under the West Valley Demonstration Project Act." 11.1

4. This separate EIS will violate provisions of the Stipulation. The Stipulation requires that "the closure Environmental Impact Statement process - including the scoping process - shall begin no later than 1988 . . ." DOE cannot unilaterally create a new EIS with a new scoping process that supersedes or substantially modifies the scoping process carried out in 1988. As specified in the Stipulation, the EIS is a *closure* EIS. DOE cannot unilaterally change the purpose of the project and thus the scope of the EIS. 11.1

5. According to the Notice published in the *Federal Register* on May 16, 2003, DOE intends to dispose of certain low-level and mixed wastes prior to completion of the West Valley closure EIS. The Stipulation allows off-site disposal of Class A wastes in accordance with applicable law but does not allow any disposal (offsite or otherwise) of Class B/C wastes until the closure EIS is completed. 11.1

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Document #0011: Comments 11.1 – 11.6
Coalition on West Valley Nuclear Wastes

6. According to the Notice published in the *Federal Register* on May 16, 2003, DOE intends to provide a 45-day public comment period. The Stipulation requires a six month public comment period. 11.1

7. The actions of decontamination, decommissioning and/or long term stewardship are clearly interconnected in the context of the West Valley Demonstration Project. Segmentation of this project is inappropriate under the Stipulation of Compromise and under federal and state environmental review law. 11.1 & 11.2

8. Shipment of Classes B and C low level waste. Shipment offsite for interim management (Alternative B) would increase transportation risks because each shipment would have to be made twice. Interim storage would avoid this outcome. In comments on the 1996 DEIS we asked for an alternative which would store packaged waste onsite for a limited time (25 years) for eventual shipment. We have made our position on this clear repeatedly. When waste can leave, it should. West Valley is not a suitable site for permanent disposal of waste. 11.3

9. Consideration of temporary onsite storage is explicitly rejected in this DEIS. (This EIS does not consider any new onsite disposal or indefinite storage because other sites are available and a determination has been made that construction of storage facilities at WV would not be practical or reasonable. p.S-9.) 11.4

10. High Level Waste Tanks. Management of the high level waste tanks (under Alternative A) must not include changing the ground water patterns or pressures around them. 11.5

11. Grouting of HLW waste tanks (Alternative B) would violate NEPA because it would limit closure alternatives to be considered in the Closure EIS now being written. 11.6

The Coalition further refers the DOE to various comments made prior as well as to the positions taken by various parties in the action entitled NRDC, et al. v. Richardson, et al., filed under Case No. 01-CV-413 in the U.S. District Court for the District of Idaho.

Dated: June 27, 2003

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TO: Mr. Daniel W. Sullivan
DOE Document Manager
West Valley Area Office
U.S. Department of Energy
10282 Rock Springs Road
West Valley, New York 14171

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Document #0011: Comments
Coalition on West Valley Nuclear Wastes

TO: Carol Borgstrom, Director
Office of NEPA Policy and Compliance (EH-42)
Office of the Assistant Secretary for Environment, Safety and Health
U.S. Department of Energy
1000 Independence Avenue, SW
Washington D.C. 20585

TO: The Honorable Hillary Rodham Clinton
Western New York Office
Guaranty Building
Suite 208
28 Church Street
Buffalo, New York 14202

TO: The Honorable Charles E. Schumer
Western New York Office
111 West Huron Street
Room 620
Buffalo, New York 14202

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Document #0011: Responses

11.1. The Stipulation of Compromise (included in Appendix A of this EIS) requires *inter alia* the preparation of an EIS to address the disposal of LLW on the WVDP site, and does not preclude the preparation of more than one EIS. The 6-month comment period in the Stipulation applies to an EIS prepared for the decommissioning of the site and is not applicable to the Draft WVDP Waste Management EIS prepared for the offsite transportation and disposal (or storage) of LLW, mixed LLW, TRU waste, and HLW. DOE has committed to a 6-month comment period on the Decommissioning and/or Long-Term Stewardship Draft EIS. DOE believes that it has complied and continues to comply with the Stipulation.

11.2. The scope of the EIS that DOE began in 1988, with a draft in 1996, is now addressed in two EISs: the WVDP Waste Management EIS and the Decommissioning and/or Long-Term Stewardship EIS. Waste management activities, including offsite shipment for disposal, have utility independent from actions that might be taken to decommission WVDP and the requirements for long-term stewardship. In addition, the waste management activities described in the WVDP Waste Management EIS will not affect the range of alternatives available for decommissioning or long-term stewardship. Therefore, DOE does not believe that its NEPA strategy represents impermissible segmentation of the action.

11.3. DOE recognizes the increased environmental impacts inherent in shipping waste offsite for storage prior to disposal, including increased transportation risk and human health risks to workers and the public at the offsite locations. These impacts are analyzed and acknowledged in the Draft and Final WVDP Waste Management EISs. Under DOE's preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

11.4. The No Action Alternative analyzes the continued onsite storage of existing Class B and C LLW, TRU waste, and HLW. In the discussion of alternatives considered but not analyzed (Section 2.6 of the Draft and Final EISs), DOE explained that the EIS does not consider the construction of additional storage capacity at the WVDP site. DOE does not consider it reasonable to analyze an alternative to construct and maintain storage at the WVDP site because of the cost of new facilities and maintenance of existing facilities.

11.5. Neither the active ventilation of the HLW tanks and the annulus surrounding the tanks under the No Action Alternative and Alternative A nor the use of retrievable grout for interim stabilization of the tanks under Alternative B as analyzed in the Draft EIS would change the groundwater patterns or pressures around the tanks. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

11.6. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

Document #0012: Comments 12.1 – 12.6
West Valley Citizen Task Force

West Valley Citizen Task Force

June 30, 2003

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Daniel Sullivan
NEPA Compliance Officer
WVDP WM EIS
10282 Rock Springs Road, WV-49
West Valley, NY 14171-9799

Dear Mr. Sullivan:

The West Valley Citizen Task Force (CTF) has already expressed concerns about splitting the environmental impact statement (EIS) for the West Valley site, since both the National Environmental Policy Act (NEPA) and the West Valley Demonstration Project (WVDP) Act seem to call for one process. 12.1

Now that the EIS has been split, we believe the decommissioning EIS will be the most important issue to be addressed. This waste management EIS appears to deal with lesser issues. We trust it will not distract the Department from the more important task of completing the decommissioning EIS. 12.2

As we expressed in our scoping comments in 2001, we continue to be concerned that the decommissioning phase could get bogged down if the DOE/NYSERDA disagreements continue. 12.3

There are two issues in Alternative B that we would like to address. We disagree with the proposal to put grout into the underground tanks. However retrievable the grout may seem at the moment, it will prejudice the choices in the decommissioning EIS. The grout would make future tank removal more difficult, and would unfairly facilitate in-place closure of the tanks. 12.4

Our other concern with Alternative B is the proposal to use interim storage at other sites. Interim storage will involve many more shipments, costs and risks, and create unnecessary public controversy. 12.5

We call your attention to an obvious oversight. Figure 3-5 improperly excludes residents of Canada living within a 50-mile radius of the site. The map suggests that over 500,000 people live on the American side of the Niagara River and places a zero on the Canadian side. The figure should be revised to show more than 100,000 people living between Port Colborne, on Lake Erie, and Niagara Falls, Ontario. 12.6

Very truly yours,

Lenore S. Lambert

Lee Lambert
on behalf of the
West Valley Citizen Task Force

W V

Document #0012: Responses

12.1. The scope of the EIS that DOE began in 1988, with a draft in 1996, is now addressed in two EISs: the WVDP Waste Management EIS and the Decommissioning and/or Long-Term Stewardship EIS. Waste management activities, including offsite shipment for disposal, have utility independent from actions that might be taken to decommission WVDP and the requirements for long-term stewardship. In addition, the waste management activities described in the WVDP Waste Management EIS will not affect the range of alternatives available for decommissioning or long-term stewardship. Therefore, DOE does not believe that its NEPA strategy represents impermissible segmentation of the action.

12.2. DOE agrees that the larger issues of closure are being addressed in the Decommissioning and/or Long-Term Stewardship EIS. DOE is working with the cooperating agencies to complete that document as expeditiously as possible.

12.3. DOE continues to work with NYSERDA in implementing its responsibilities under the West Valley Demonstration Project Act.

12.4. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

12.5. DOE recognizes the increased environmental impacts inherent in shipping waste offsite for storage prior to disposal, including increased transportation risk and human health risks to workers and the public at the offsite locations. These impacts are analyzed and acknowledged in the Draft and Final WVDP Waste Management EISs. Under DOE's preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

12.6 Figure 3-5 has been revised to include the Canadian population within 80 kilometers (50 miles) of the WVDP site.

Document #0013: Comments 13.1 – 13.3
The League of Women Voters of Buffalo/Niagara

THE LEAGUE OF WOMEN VOTERS OF BUFFALO / NIAGARA
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0013
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JUN 3 0 2003

Daniel W. Sullivan
Document Manager
DOE West Valley Area Office
P.O. Box # 191
West Valley, NY 14171-0191

June 26, 2003

COMMENT: Draft Waste Management Environmental Impact Statement (EIS) for the West Valley Demonstration Project

Dear Mr. Sullivan,

We were pleased to note that the Department responded to public concerns and chose to limit the scope of this EIS to onsite waste management and offsite waste transportation issues. By excluding decontamination activities as proposed in the March 2001 Notice of Intent (NOI) the Department has made it easier for us to approve of the plans thus far.

This is not to say that we approve of splitting the EIS, merely that we can understand the need to move ahead with waste management as much as can be done under the circumstances: The breakdown in negotiations between the DOE and New York State Energy Research and Development Authority (NYSERDA) is very troubling to us, as it appears that choosing an alternative for final closure of the site cannot be accomplished until the two entities can agree on their respective responsibilities. 13.1

Splitting the EIS seems to have resulted in an opportunity to change the words in the title of the EIS from *Completion* (of the Project) and *Closure or Long-term Management* (of WVNSC facilities), to *Decommissioning and/or Long-term Stewardship*. We trust that the terminology change does not suggest a change in the Department's commitment to what may well become very long-term public health and safety issues. 13.2

On the present EIS, our concerns parallel those of the West Valley Citizen Task Force (CTF).

1. Population figures for Canada should have been included in the tables of impacts on people living and working within a fifty-mile radius of the site. For the decommissioning and/or long-term stewardship EIS we hope you will include Canadian population figures and also consider the likelihood of huge population increases in both countries over the many years that material from the site might remain a hazard. 13.3

Document #0013: Comments 13.4 – 13.6
The League of Women Voters of Buffalo/Niagara

LWV comment, WMEIS 6.03 2

2. We agree that Alternative A is more acceptable than Alternative B. In fact, Alternative B is not acceptable at all. The idea of grouting the material with the intent that it can be dug up at some future time, is speculative at best. Since no one has ever dealt with material of this sort for the hundreds of years that even the low-level waste will remain radioactive, there is no guarantee that the grout will indeed remain soft or that the cost and risk of removal will not rise in the future. Considering that this is an unsuitable site for burial, the obvious question is, if it is ever to be removed, why not remove it now? 13.4

3. Although holding material at the site raises the specter of a possible lengthy wait for its removal from our area, the interim storage scenario requiring the transportation of material twice seems unjustifiable on the basis of risk and cost, not to mention the possibility that the interim terminal might tend to become permanent for residents of those areas, an unfair projection of our problem onto someone else. 13.5

Therefore, we agree that, of the three alternatives listed, Alternative A is best. Nevertheless, we expect the material to be stabilized and, if at all possible, above-ground-retrievable to minimize the hazard while awaiting its ultimate removal from the area. 13.5

In conclusion, we would be remiss if we did not remind the Department of its response to a call from citizens near DOE sites for public discussion about nuclear material and waste management. DOE approached the League of Women Voters Eduction Fund (LWVEF) in 1996 to convene a National Dialogue process. Even though the Department overrode LWVEF recommendations for several regional and national workshops in various areas of the country, and even though over 80 environmental groups boycotted the two workshops that were finally held in San Diego and Chicago in June 1998, the participants of the *Interstite Discussions on Nuclear Material and Waste* agreed on two major points: 13.6

- The Secretary of Energy should initiate a *National Dialogue on Nuclear Material and Waste.*
- The Secretary of Energy should develop a national *Waste Management Strategy* "... and Congress must back this strategy with long term funding to carry it out."

We hope to see both recommendations followed in the near future.

Sincerely,

Laura McDade/LJ
President, League of Women Voters of Buffalo/Niagara

Lenore S. Lambert
RW monitor

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Document #0013: Responses

13.1. The scope of the EIS that DOE began in 1988, with a draft in 1996, is now addressed in two EISs: the WVDP Waste Management EIS and the Decommissioning and/or Long-Term Stewardship EIS. Waste management activities, including offsite shipment for disposal, have utility independent from actions that might be taken to decommission WVDP and the requirements for long-term stewardship. DOE believes that proceeding with the waste management component will allow the Department to make progress in meeting its obligations under the West Valley Demonstration Project Act.

13.2. The change in the title of the document does not change or diminish DOE's responsibilities under the West Valley Demonstration Project Act.

13.3. A discussion of potential impacts to the affected Canadian population has been added to Section 3.6 and Section 4.1.1.1. DOE does not anticipate "huge" population increases.

13.4. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

13.5. DOE recognizes the increased environmental impacts inherent in shipping waste offsite for storage prior to disposal, including increased transportation risk and human health risks to workers and the public at the offsite locations. These impacts are analyzed and acknowledged in the Draft and Final WVDP Waste Management EISs. Under DOE's preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

13.6. Establishing a National Dialogue on Nuclear Material and Waste is outside of the scope of the WVDP Waste Management EIS.

Document #0014: Comments 14.1 – 14.4
Oak Ridge Reservation Local Oversight Committee

LOC INC
Oak Ridge Reservation Local Oversight Committee

0014
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June 30, 2003

Daniel W. Sullivan
Document Manager
DOE West Valley Area Office
P.O. Box 191
West Valley, NY 14171-0191

Subject: *Comments on Draft West Valley Demonstration Project Waste Management Environmental Impact Statement (DOE/EIS-0337D, April 2003)*

Dear Mr. Sullivan:

The Citizens' Advisory Panel (CAP) of the Oak Ridge Reservation (ORR) Local Oversight Committee, Inc. (LOC) offers comments on the draft West Valley Demonstration Project (WVDP) Waste Management (WM) Environmental Impact Statement (EIS). The CAP supports Alternative A (preferred alternative); however there are several aspects of the EIS that are problematic. 14.1

It is not clear that WVDP's transuranic (TRU) waste will be accepted by the Waste Isolation Pilot Project (WIPP) for disposal. WVDP's TRU waste does not meet the definition of such waste accepted by WIPP, especially because WIPP is designated for defense waste. The subject EIS should clearly state what proportion, if any, of WVDP's TRU waste would meet the definition of TRU waste accepted by U.S. Department of Energy (DOE) and the Nuclear Regulatory Commission, and what classification would apply to the remainder of this waste stream. In addition, the TRU waste generated by WVDP includes 9,000 cubic feet of remote-handled (RH) TRU waste, which WIPP is not yet permitted to accept. Because WIPP may not be adequately sized for disposal of all TRU waste currently in the DOE basic inventory, even a waiver to allow WVDP's off-specification waste stream to be disposed may not be sufficient to guarantee room for it, especially the RH TRU waste which is limited in its placement within disposal rooms. Furthermore, if a modification to the facility's New Mexico state permit is required, granting of any such waiver could be stalled indefinitely. 14.2

The CAP is opposed to Alternative B, in particular the option of shipping TRU waste to the Oak Ridge Reservation for interim storage. Our opposition is based in large part on site equity issues. The ORR was once the regional radioactive waste disposal site for the eastern United States. Many of the environmental problems on the ORR stem from mishandling of these wastes, including past burial of TRU waste. If additional wastes are to be sent to ORR, they must be accompanied by sufficient funding for construction of a long term storage facility, ongoing surveillance and maintenance, pre-shipping processing, transportation, and final disposal, as well as applicable overhead costs. 14.3

The ORR holds the largest inventory of RH TRU waste of any site in the DOE complex, as well as a substantial amount of contact-handled (CH) TRU waste. Because WIPP is not yet permitted to receive RH TRU waste, the inventory at ORR is currently without a disposal pathway for this waste stream. No additional TRU waste, either RH or CH, should come to ORR until Oak Ridge Operations can dispose of its existing inventory. 14.4

Anderson • Meigs • Rhea • Roane • City of Oak Ridge • Knox • Loudon • Morgan

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Document #0014: Comment 14.5
Oak Ridge Reservation Local Oversight Committee

D.W. Sullivan
6/30/03
Page 2 of 2

The WVDP WM EIS is deficient in that it does not properly evaluate the options under Alternative B. Instead, the reader is referred to earlier National Environmental Policy Act (NEPA) documents. However, the most applicable document in this situation, *Final EIS for Treating TRU/Alpha Low Level Waste at the Oak Ridge National Laboratory (DOE/EIS-0305-F, 2002)*, does not evaluate the impact of offsite waste being shipped to ORR. Other cited NEPA documents are years out of date and do not reflect demographic and site-related changes. There is no basis for properly comparing the various alternatives and the options under Alternative B without a more detailed WVDP WM EIS. 14.5

The LOC is a non-profit regional organization funded by the state of Tennessee, established to provide local government and citizen input into the environmental management, decision-making and operation of the DOE's Oak Ridge Reservation. The Board of Directors of the LOC is composed of elected and appointed officials from the City of Oak Ridge and the seven counties surrounding and downstream of the ORR, and the chair of the Citizens' Advisory Panel. The CAP is a stakeholder organization with up to 20 members with diverse backgrounds who represent the greater ORR region; the CAP supports Board interests by reviewing and providing recommendations on DOE decisions and policies.

The CAP appreciates the opportunity to comment on the WVDP WM EIS.

Sincerely,

for Norman A. Mulvenon
Chair, LOC Citizens' Advisory Panel

cc: LOC Document Register
LOC CAP
LOC Board
John Owsley, Director, TDEC DOE-O
Betsy Child, Commissioner, TDEC
Gerald Boyd, Manager, DOE ORO
Steve McCracken, Assistant Manager for EM, DOE ORO
David R. Allen, NEPA Compliance Officer, DOE ORO
Jesse Roberson, Assistant Secretary for EM, DOE HQ
Carol Borgstrom, Director, NEPA Oversight, DOE HQ
Pat Halsey, FFA Coordinator, DOE ORO
David Mosby, Chair, ORSSAB
Amy Fitzgerald, City of Oak Ridge
Harold Johnson, NEPA Compliance Officer, Carlsbad Field Office
Paul Dunnigan, NEPA Compliance Officer, Richland Operations Office
Roger Twitchell, NEPA Compliance Officer, Idaho Engineering & Environmental Laboratory
Drew Grainger, NEPA Compliance Officer, Savannah River Operations Office
Mike Skougard, NEPA Compliance Officer, Nevada Test Site

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Document #0014: Responses

14.1. Alternative A is DOE's preferred alternative. Under this alternative, TRU waste would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

14.2. TRU waste at WVDP could be disposed of at WIPP if the waste is determined to meet the requirements for disposal in that repository. If some or all of WVDP's TRU does not meet these requirements, DOE would need to explore other alternatives for disposal of the waste. Additional NEPA review would be conducted if DOE were to propose to dispose of TRU waste at a location other than WIPP.

If wastes were shipped offsite, waste that met the current definition of mixed LLW would be shipped and disposed of as such, and TRU waste shipped to an offsite location for interim storage or disposal would meet the current definition of TRU waste. Appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste volumes to ORNL, or any other offsite location, for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity given the configuration of the waste, and impacts to workers and the affected public.

The shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative, TRU waste would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

14.3. The shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

Appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste volumes to ORNL, or any other offsite location, for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity given the configuration of the waste, and impacts to workers and the affected public.

14.4. The WM PEIS studied the potential for nationwide impacts of managing radioactive and hazardous wastes. DOE issued separate RODs for all of the waste types analyzed in the WM PEIS. For TRU waste, DOE decided that each site that has generated or would generate TRU waste would store it onsite prior to shipment to WIPP for disposal (63 Fed. Reg. 3629 (1998)). However, the Department may decide to ship TRU waste from sites where it may be impractical to prepare it for disposal to other sites where DOE has or will have the necessary capability. The sites that could receive TRU waste from other sites are INEEL, ORR, SRS, and the Hanford Site.

Thus, DOE's analysis in the Draft and Final WVDP Waste Management EISs of the disposal or interim storage of WVDP TRU waste is consistent with analyses conducted for the WM PEIS and with decisions reached on the basis of that document. However, the shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

14.5. DOE recognizes that information in NEPA documents that were prepared several years ago would need to be updated. Appropriate NEPA reviews would be conducted before any decision was made to ship specific TRU waste volumes to ORNL, or any other offsite location, for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity given the configuration of the waste, and impacts to workers and the affected public.

Document #0015: Comments
County of Erie, Department of Environment and Planning

County of Erie

JOEL A. GIAMBRA
COUNTY EXECUTIVE

DEPARTMENT OF ENVIRONMENT & PLANNING

LAURENCE K. RUBIN
COMMISSIONER

MICHAEL RAAB
DEPUTY COMMISSIONER
ENVIRONMENTAL COMPLIANCE SERVICES

June 27, 2003

0015
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JUN 3 0 2003

Mr. Daniel W. Sullivan
United States Department of Energy
Ohio Field Office
West Valley Demonstration Project
10282 Rock Springs Rd.
West Valley, NY 14171-9799

Re: SEQR Review (M617-03-407)
West Valley Demonstration Project (WVDP) – Waste Management DEIS

Dear Mr. Sullivan:

Pursuant to Article 8 of the Environmental Conservation Law and to adopted procedures, Erie County has reviewed the West Valley Demonstration Project (WVDP) – Waste Management DEIS, referred to us on May 12, 2003.

Erie County has no objections as to its content. We would like, however, to offer the following comments for your consideration.

COMMENTS:

While it is apparent the project may predominantly impact the Town of West Valley, this plan has potential regional implications.

A. Relationship to County Plans

The Guiding Principals for Countywide Land Use Planning – December, 1999.

- Stream and Stream Corridor Preservation

The WVDP is in proximity to the Cattaraugus Creek and several of its tributaries. Two of these tributaries (Buttermilk Creek and Frank's Creek) run directly through or within proximity to the WVDP. The Cattaraugus Creek Stream Corridor and its watershed are recognized by Erie County as having Countywide significance.

EDWARD A. RATH COUNTY OFFICE BUILDING, 95 FRANKLIN STREET, BUFFALO, NEW YORK 14202-3973 • (716) 858-6370 • FAX (716) 858-7713 • www.erie.gov

Document #0015: Comments 15.1 – 15.7
County of Erie, Department of Environment and Planning

Since the WVDP draft plan includes the continuation of on-site waste storage tank management and the storage of high-level waste, Erie County strongly encourages that the most stringent measures be taken to ensure the protection of these streams, their watersheds, and downstream areas from leaching contamination. 15.1

B. General Comments on the Three Proposed Alternatives

- The Department of Energy is ultimately responsible for remediating this site. 15.2
- The West Valley site should be decontaminated to the fullest extent possible and as soon as possible. 15.3
- All contaminated waste should be shipped to permanent storage facilities as soon as possible. 15.4
- The West Valley site is not suitable for permanent or semi-permanent storage of waste. This is due to the surrounding geology of the area and its proximity to Lake Erie. 15.5
- Grouting/cementing or encasing waste storage tank systems/facilities in place over an extended number of years will only serve to complicate future remediation efforts. 15.6
- High-level wastes should not be reclassified to other categories, i.e., incidental waste, since reclassification will increase the risks associated with the handling and storage of these materials. 15.7

Please note that statutory review and approval procedures and criteria may apply, regardless of any environmental determinations pursuant to SEQR. Thank you for the opportunity to provide Erie County's comments.

Very truly yours,

Michael Raab

MICHAEL RAAB
Deputy Commissioner

MR:ewb

C: L. K. Rubin, Commissioner – Erie County Department of Environment and Planning
A. H. Eszak, Deputy Commissioner – Planning and Economic Development
M. B. Mitskovski, Director of Energy Development and Management

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Document #0015: Responses

15.1. In its ongoing management of the HLW tanks, DOE will continue to take all reasonable and practicable measures to protect the Cattaraugus Creek Stream Corridor and its watershed.

15.2. The West Valley Demonstration Project Act (included in Appendix A of this EIS) requires DOE to decontaminate and decommission the tanks and other facilities of the Western New York Service Center in which the HLW solidified under the project was stored (Section 2(a)(5)). The statute also states that DOE must prepare required environmental impact analyses of the project (Section 2(b)(3)(D)). DOE has met or will meet all of the vitrification, waste management, and decommissioning requirements set forth in the West Valley Demonstration Project Act.

15.3. As a result of public scoping comments and DOE's further evaluation of activities that might be required over the next 10 years, decontamination actions were removed from the scope of this EIS. The Decommissioning and/or Long-Term Stewardship EIS is addressing the decontamination of the WVDP site.

15.4. Under the preferred alternative (Alternative A), LLW and mixed LLW would be shipped offsite for disposal. TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

15.5. In the context of this EIS, DOE does not intend to dispose of radioactive or hazardous waste at the WVDP site.

15.6. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

15.7. Disposition of any wastes that would rely on determinations made under the Waste Incidental to Reprocessing provisions of DOE Order 435.1 would be dependent upon resolution of related legal issues.

Document #0016: Comments 16.1 – 16.2
Oregon Office of Energy

06/30/03 12:20 503 378 6457 OR OFFICE ENERGY 001

Oregon
Theodore R. Kulongoski, Governor

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June 30, 2003

0016
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JUN 3 0 2003

Daniel W. Sullivan
Document Manager
West Valley Area Office
U.S. Department of Energy
P.O. Box 191
West Valley, NY 14171-0191

Dear Mr. Sullivan:

Re: Draft West Valley Demonstration Project Waste Management Environmental Impact Statement, West Valley, New York, DOE/EIS – 0337D.

We appreciate the opportunity to provide comments on the draft West Valley EIS. We became aware of the EIS only recently and have had limited time to review it.

Oregon has a tremendous stake in ensuring the safe and timely cleanup of the Hanford Site. Hanford is only 35 miles from the Oregon border. The Columbia River flows through the Hanford Site, then continues downstream past prime Oregon farmlands and fisheries. The threat to the Columbia River is Oregon's greatest concern at Hanford. In addition, the primary transportation corridors to and from Hanford travel through a minimum 200 miles of Oregon. Oregon acts to ensure the safe transport of radioactive waste that is shipped across Oregon to Hanford almost every day.

We fully agree with, support and reiterate the comments provided by our colleagues at the Washington State Department of Ecology, dated June 20, 2003. We find it completely unacceptable to propose that either high-level waste or transuranic waste be transported from West Valley to Hanford for indefinite storage. In both cases, such wastes would not have a definitive path out of Hanford and would complicate waste storage and handling activities at Hanford. The Hanford Site has significant waste retrieval and treatment problems associated with its own high-level and transuranic wastes. Hanford cleanup must not be complicated by having to deal with waste from other sites. 16.1

In addition, we strongly believe that the transport of these wastes should be minimized. DOE should, whenever possible, transport waste directly from each generating site to a final disposal site. It should not increase transportation – and the associated risks – by sending waste to intermediate sites for indefinite storage. 16.2

Document #0016: Comments 16.3
Oregon Office of Energy

06/30/03 12:21 503 378 6457 OR OFFICE ENERGY 002

Oregon Comments on the West Valley Demonstration Project Draft Waste Management EIS
June 30, 2003
Page 2 of 3

West Valley's proposal to send low-level and mixed low-level waste to Hanford also raises concerns for Oregon. The Department of Energy recently released a second revised draft of the Hanford Solid Waste EIS (HSW-EIS, DOE/EIS-0286D, March 2003). We include our comments made in that EIS as an attachment. These comments must be fully resolved before new decisions can be made involving waste disposal at Hanford. By selecting alternatives which are dependent on Hanford for waste storage or disposal, DOE has made the West Valley EIS dependent on the Hanford EIS. This reliance may lead to significant delays in your cleanup activities.

The U.S. Department of Energy (and predecessor agencies) disposed of immense amounts of dangerous and radioactive waste to the soils of the Hanford site. These have contaminated the vadose zone, groundwater and the Columbia River and resulted in three of the most dangerous waste sites on the National Priorities list. 16.3

It is inappropriate for DOE to consider disposing of additional wastes to Hanford's soils without first understanding the impacts of the wastes already there, and without first doing an adequate cleanup of those wastes. The West Valley EIS focuses in large part on alternatives which do precisely this, and which exclude any reasonable alternatives involving on-site disposal, the use of commercial facilities or other DOE sites in the eastern United States.

If you have questions about these comments, please contact Mr. Dirk Dunning on my staff at (503) 378-3187, or myself at (503) 378-4906.

Sincerely,

Ken Niles

Ken Niles
Assistant Director

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JUN 3 0 2003

Document #0016: Comments
Oregon Office of Energy

06/30/03 12:22 503 378 6457 OR OFFICE ENERGY 003

Oregon Comments on the West Valley Demonstration Project Draft Waste Management EIS
June 30, 2003
Page 3 of 3

Cc: Oregon Congressional Delegation
Mike Wilson, Washington Department of Ecology
Nick Ceto, U.S. Environmental Protection Agency
Keith Klein, USDOE\RL
Roy Schepens, USDOE\ORP
Armand Minthorn, CTUIR
Russell Jim, Yakama Nation
Patrick Sobotta, Nez Perce Tribe
Shelley Cimon, Chair, Oregon Hanford Cleanup Board
Todd Martin, Chair, Hanford Advisory Board

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JUN 30 2003

Document #0016: Responses

16.1. The WM PEIS studied the potential for nationwide impacts of managing radioactive and hazardous wastes. DOE issued separate RODs for all of the waste types analyzed in the WM PEIS. For TRU waste, DOE decided that each site that has generated or would generate TRU waste would store it onsite prior to shipment to WIPP for disposal (63 Fed. Reg. 3629 (1998)). However, the Department may decide to ship TRU waste from sites where it may be impractical to prepare it for disposal to other sites where DOE has or will have the necessary capability. The sites that could receive TRU waste from other sites are INEEL, ORR, SRS, and the Hanford Site.

For HLW, DOE decided to store immobilized HLW at the sites where it was generated until it is accepted for disposal at a geologic repository (64 Fed. Reg. 4661 (1999)). However, in the WM PEIS, DOE analyzed various alternatives for the management of HLW, including consolidation of WVDP HLW at SRS (Regionalized Alternative 1) or Hanford (Regionalized Alternative 2 and Centralized Alternative) for storage prior to disposal at a geologic repository.

Thus, DOE's analysis in the Draft and Final WVDP Waste Management EISs of the disposal or interim storage of WVDP waste is consistent with analyses conducted for the WM PEIS and with decisions reached on the basis of that document.

Appropriate NEPA reviews would be conducted before any decision were made to ship specific TRU waste or HLW volumes to an offsite location for interim storage. Such reviews would address site-specific and cumulative impacts, including the availability of existing storage capacity, the need for additional storage capacity, and impacts to workers and the affected public.

Waste shipped to interim storage locations would be packaged in a form that met the waste acceptance criteria of the disposal site; no additional treatment would be expected.

TRU waste at WVDP could be disposed of at WIPP if the waste is determined to meet the requirements for disposal in that repository. If some or all of WVDP's TRU does not meet these requirements, DOE would need to explore other alternatives for disposal of the waste. Additional NEPA review would be conducted if DOE were to propose to dispose of TRU waste at a location other than WIPP.

HLW generated at the WVDP site is eligible for disposal in a geologic repository. This waste volume (up to 300 canisters) was specifically analyzed in the Yucca Mountain Repository EIS (Appendix A, Section A.2.3.5.1).

The shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative, TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

16.2. DOE recognizes the increased environmental impacts inherent in shipping waste offsite for storage prior to disposal, including increased transportation risk and human health risks to workers and the public at the offsite locations. These impacts are analyzed and acknowledged in the Draft and Final WVDP Waste Management EISs.

16.3. The WM PEIS studied the potential for nationwide impacts of managing radioactive and hazardous wastes. DOE issued separate Records of Decision (ROD) for all of the waste types analyzed in the WM PEIS. In its ROD for LLW and mixed LLW, DOE decided to perform minimum treatment at all sites and continue onsite disposal of LLW at INEEL, Los Alamos National Laboratory, ORR, and SRS (65 Fed. Reg. 10061 (2000)). In addition, DOE decided to make the Hanford Site and Nevada Test Site available to all DOE sites for LLW disposal. For mixed LLW, DOE decided to treat the waste at the Hanford Site, INEEL, ORR, and SRS, and to dispose of mixed LLW at Hanford and NTS (65 Fed. Reg. 10061 (2000)). Thus, DOE's analysis in the Draft and Final WVDP Waste Management EISs of the disposal of LLW and mixed LLW at Hanford is consistent with analyses conducted for the WM PEIS and with decisions reached on the basis of that document. DOE recognizes that additional NEPA documentation is being prepared for disposal operations at Hanford and that shipment of WVDP waste to Hanford for disposal could not proceed until that NEPA process is completed.

16.4 As noted in the response to Comment 16.3, DOE's analysis in the Draft and Final WVDP Waste Management EISs of the disposal of LLW and mixed LLW at Hanford is consistent with analyses conducted for the WM PEIS and with decisions reached on the basis of that document (65 Fed. Reg. 10061 (2000)). In particular, DOE has decided that it will not dispose of radioactive or hazardous waste at the WVDP site and thus did not consider onsite disposal in the WVDP Waste Management EIS. Moreover, consideration of onsite disposal in this WVDP Waste Management EIS would prejudice the range of alternatives to be addressed in the Decommissioning and/or Long-Term Stewardship EIS currently in progress. DOE does consider disposal of LLW and mixed LLW at NTS and at a commercial site under Alternatives A and B (see Section 2.4 for a description of Alternative A and Section 2.5 for a description of Alternative B), in addition to disposal at

Hanford. DOE has already determined that disposal of waste from offsite generators will not be considered at any DOE sites in the eastern United States (65 Fed. Reg. 10061 (2000)).

Document #0017: Comments
New York State Energy Research and Development Authority

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June 30, 2003

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Alice C. Williams, Director
U.S. Department of Energy
West Valley Demonstration Project
10282 Rock Springs Road
West Valley, NY 14171-9799

SUBJECT: West Valley Demonstration Project Waste Management Environmental Impact Statement (Draft-April 2003)

Dear Ms. Williams:

The New York State Energy Research and Development Authority is submitting the attached written comments on the subject document prepared by the U.S. Department of Energy (DOE). Also included with the written comments, is a copy of the oral comments that I presented at the June 11, 2003 Public Comment Session hosted by your organization.

NYSERDA looks forward to hearing how our comments have been addressed by DOE.

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Document #0017: Comments
New York State Energy Research and Development Authority

Ms. Alice C. Williams
Page 2
June 30, 2003

If you have any questions regarding these comments, please contact me at (716) 942-4378.

Sincerely,

WEST VALLEY SITE MANAGEMENT PROGRAM

Paul L. Piciulo

Paul L. Piciulo, Ph.D.
Director

PLP/amd
Attachments
(1) *NYSERDA Comments on Waste Management DEIS*
(2) *Comments of the New York State Energy Research and Development Authority on the West Valley Demonstration Project Draft Waste Management Environmental Impact Statement*, Presented at the Public Comment Session on June 11, 2003

cc: D. W. Sullivan, USDOE-WV (w/atts.)
R. F. Warther, USDOE-OH (w/atts.)
M. W. Frei, USDOE-EM-30 (w/atts.)
P. A. Giardina, USEPA (w/atts.)
D. M. Gillen, NRC-TWFN (w/atts.)
E. E. Dassatti, NYSDEC (w/atts.)
P. R. Smith, NYSERDA-Albany (w/atts.)
H. Brodie, NYSERDA-Albany (w/atts.)
T. H. Attridge, NYSERDA-WV (w/atts.)
P. J. Bembia, NYSERDA-WV (w/atts.)
C. L. Gerwitz, NYSERDA-WV (w/atts.)
T. L. Sonntag, NYSERDA-WV (w/atts.)

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Document #0017: Comments 17.1 – 17.3
New York State Energy Research and Development Authority

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NYSERDA Comments
Draft Report: *West Valley Demonstration Project Waste Management Environmental Impact Statement*
dated April 2003

General Comments:

1. **The U.S. Department of Energy (DOE) Proposed Action.** The New York State Energy Research and Development Authority (NYSERDA) supports the DOE proposed action to ship all Project wastes off site for disposal. 17.1

2. **Inclusion of Actions Not Requiring Additional National Environmental Policy Act (NEPA) Coverage** In Section 1.4, Alternatives, of the Waste Management Environmental Impact Statement (EIS), DOE identifies its proposed actions (also referred to as the preferred alternative) as:
   (1) *continue onsite management of Project-generated waste controlled by DOE under the West Valley Demonstration Project (WVDP) until they can be sent to offsite disposal,*
   (2) *ship, over the next 10 years, all wastes with acceptable offsite disposal destinations, and*
   (3) *manage the emptied, ventilated HLW tanks, until future decommissioning decisions are made.*

The shipment of wastes described in Action 2 is the only one of the three that doesn't appear to already have adequate National Environmental Policy Act (NEPA) coverage. Action 1, the continued on-site management of the Project-generated wastes, is an ongoing activity for which DOE presumably has adequate NEPA coverage, and consequently does not need to be covered in the Waste Management EIS. Action 3 is not appropriate for assessment in the Waste Management EIS because: 1) the continued management of the HLW tanks, the preferred alternative, is an ongoing activity for which DOE presumably has adequate NEPA coverage; and, 2) any assessment of placing grout in the tanks is connected to the Decommissioning EIS (see the following NYSERDA general comment). Thus, it does not appear necessary or appropriate to include either of these activities in the Waste Management EIS. [While NYSERDA has provided specific comments below on the analyses of these actions, our position remains that inclusion of these actions for analysis is not appropriate.] 17.2

In addition to the NEPA analysis of Actions 1 and 3 being unnecessary and/or inappropriate for inclusion in the Waste Management EIS, viable alternatives to the proposed actions were not included in the EIS. Alternatives or variations of continued on-site management of wastes that were not included in the Waste Management EIS include construction of additional on-site waste storage capacity or re-configuring the current on-site management such as construction of a dry-cask storage system for the glass logs. Alternative tank stabilization actions that were not included in the Waste Management EIS include the addition of corrosion inhibitors to the tanks, complete grouting of the tanks or tank exhumation. NYSERDA does not endorse the inclusion of these alternatives in the Waste Management EIS because we believe they are more appropriately analyzed in the Decommissioning and/or Long-Term Stewardship EIS. Instead, we believe these actions should be removed from scope of the Waste Management EIS. 17.3

Page 1 of 5

Document #0017: Comments 17.4 – 17.6
New York State Energy Research and Development Authority

3. **Proposed Stabilization of the HLW Tanks:** Contrary to what is stated in the Waste Management EIS, NYSERDA believes that stabilization of the HLW tanks by adding grout, one of the waste management actions analyzed, would prejudge the range of alternatives to be considered or the decisions to be made for eventual decommissioning and/or long-term stewardship of the WVDP. NYSERDA believes it is not appropriate to include this analysis in the Waste Management EIS, and we believe that any decision to add grout to the HLW tanks would be premature until the U.S. Nuclear Regulatory Commission (NRC) has rendered a decision about whether the residual waste in the HLW tanks is to be considered Waste Incidental to Reprocessing, as part of the Decommissioning and/or Long-Term Stewardship EIS. [For further information on this comment, see attached NYSERDA comments presented at the June 11, 2003 Public Comment Session.] 17.4

4. **Connection of the Waste Management EIS to the Decommissioning and/or Long-Term Stewardship EIS.** In Section 1.2.2 of the Waste Management EIS, it is noted that DOE limited the scope of the EIS to on-site and off-site waste management actions due to concerns that decontamination actions originally proposed in the March 26, 2001 Notice of Intent (NOI) were connected to the decommissioning and/or long-term stewardship actions. NYSERDA believes the connection of the two actions was a valid concern and agrees with DOE's decision not to include decontamination in the Waste Management EIS. Similarly, the action of adding 40 inches of grout to the HLW tanks and annulus, which was not included in the NOI for public comment, would also be connected to decommissioning and/or long-term stewardship actions and should be eliminated from the scope of the Waste Management EIS. 17.5

5. **Inference of the Need for Splitting the EIS Process and the Negotiation Impasse Between DOE and NYSERDA.** In Section 1.2.1, Litigation and NEPA Compliance History, the following statements are made:

   "Despite long negotiations, DOE and NYSERDA have been unable to reach an agreement on a preferred future course of action for the closure of the Center (GAO 2001)."

   "To allow the Department to continue to meet its obligations under the West Valley Demonstration Project Act, DOE is preparing two EISs..."

   These statements suggest that unsuccessful negotiations were the reason for splitting the EIS into two parts (waste management and decommissioning); this is not true and must be corrected. 17.6

   The NOI for the Waste Management EIS (including plans for splitting the EIS into two parts) was issued on March 26, 2001, well before the acknowledgment of an impasse in negotiations (January 2003). Further, before the NOI was even published, DOE publicly stated that *"they are proposing the split to meet federal Environmental Policy Act regulations and to insure that funding for the project continues,"* (Buffalo News, September 26, 2000). At a September 25, 2000 Citizen Task Force Meeting, in response to concerns regarding the need to split the EIS, DOE stated that its *"legal counsel feels that the agency needs more NEPA coverage under a new EIS for the Decontamination/Waste Management activities."* We request that this misrepresentation be corrected.

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Page 2 of 5

Document #0017: Comments 17.7 – 17.12
New York State Energy Research and Development Authority

6. **Remote Handled Waste Facility (RHWF) Operations.** Operation of the RHWF has not yet begun, and thus the actual operations data (from 1995 through 1999) used to characterize the impacts on worker and public health from "ongoing operations," as defined in Section 1.4 of the Waste Management EIS, would need to be adjusted for this additional operational activity. The operational impacts and resources needed for RHWF operations would appear to affect only Alternatives A and B, but not to affect the no action alternative. These differences should be quantified and accounted for in the analyses of the alternatives. 17.7

7. **Irreversible or Irretrievable Commitment of Resources.** The addition of grout to the HLW tanks and annulus would involve an irreversible or irretrievable commitment of resources that would increase the volume of waste that would have be exhumed and disposed of offsite under Alternatives 1 and 2 of the Decommissioning and/or Long-Term Stewardship EIS presented in the NOI published on March 13, 2003. The Waste Management EIS includes no consideration of the resources that it would take to retrieve the grout in the HLW storage tanks (under Alternative B) should a future decision to exhume the tanks be made. The environmental and human health impacts of such activities is also absent. 17.8

<u>Specific Comments</u>:

- **Page 1-1, Introduction** - The waste volumes evaluated in the Waste Management EIS are identified as those wastes that are either currently in storage or that would be generated over the next 10 years from ongoing operations and decontamination activities. The Waste Management EIS provides no further description of the waste generating activities that were analyzed, but summarizes the quantities of wastes that will be shipped under Alternatives A and B in Table 2-3, *Waste Volumes, Containers and Shipments Under Alternatives A and B*. A footnote to Table 2-3 identifies the source of this table to be the report: *Decontamination and Waste Management Environmental Impact Statement Engineering Report* (Marschke 2001). Further, it is stated that waste volumes from Marschke 2001 were escalated by 10 percent to account for uncertainties in future waste projections, packaging efficiency and choice of shipping container (though it is not clear which values from Marschke 2001 were escalated). Therefore, the EIS should be revised to describe the waste generation activities (i.e., operations, decontamination, etc.) that form the basis for the waste volumes presented in Table 2-3. 17.9
- **Page 1-7, Section 1.1.3.1 (Management Responsibilities at the Center)** - The last sentence of the first paragraph should read as follows: *"NYSERDA is also responsible for making a timely application for an NRC license, as may be required for NYSERDA to assume possession of the Project Premises and Project Facilities upon completion of the Project (Article VI)."* 17.10
- **Page 1-7, Section 1.1.3.2 (Project Facilities and Areas)** - The description of Project Facilities and Areas should be revised to add the RHWF. The RHWF is a major Project Facility that will be used to size reduce, characterize and package Low-Level Radioactive Wastes (LLRW) and Transuranic (TRU) wastes. Also, exclusion of the RHWF from this section is not consistent with Section 2.2.5 of the Waste Management EIS which describes the purpose and use of the RHWF. 17.11
- **Page 1-8, Section 1.1.3.2 (Project Facilities and Areas)** - The last paragraph in this section describes a change in scope of this EIS from the original scope described in the March 26, 2001 17.12

Page 3 of 5

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Document #0017: Comments 17.12 – 17.18
New York State Energy Research and Development Authority

NOI. The purpose of this section of the EIS is to describe the on-site waste management facilities and areas and therefore the last paragraph appears to be out of place. 17.12

- **Pages 2-1 to 2-4, Section 2.1 (Overview of the Alternatives)** - NYSERDA does not support the inclusion of ongoing management of the HLW tanks in the Waste Management EIS, however, we offer the following additional concern. The waste mobilization and transfer pumps are suspended in the HLW tanks. Under Alternative B, the addition of 40 inches of grout to the HLW tanks will cover the bottom portions of these pumps and therefore make future removal of the pumps more difficult. The Waste Management EIS should include the analysis of the additional resources needed and the associated impacts that would result if a future decision to remove the HLW tanks is made. 17.13
- **Page 2-19, Figure 2-4 (Summary of Normal Operational Impacts at West Valley)** - The figure lists *"No Impact"* for Alternatives A and B under the *"Noise and Aesthetics"* impact area. Considering an estimated 2,550 truck shipments and 847 rail shipments for Alternative A and 3,120 truck shipments and 1,079 rail shipments for Alternative B, it is hard to reconcile a determination of *"No impact."* The EIS should describe the basis for making this determination. 17.14
- **Page 2-20, Table 2-5, Summary of Accident Impacts at West Valley** - NYSERDA does not support the inclusion of ongoing management of the HLW tanks in the Waste Management EIS; however, we offer the following additional concern. It is not apparent that impacts to groundwater and surface water from the tank collapse scenarios (including any doses from those impacts) are included in the calculation of accident impacts. 17.15
- **Pages 2-21 and 2-22, Table 2-6 (Summary of Offsite Human Health Impacts)** - This table appears incomplete as there are 13 references to data that is not available (listed as NA). It is not clear whether this information is going to be available sometime in the future or will never be available. This should be corrected in the EIS. 17.16
- **Page 3-1, Section 3.1 (Geology and Soils)** - This section contains a very brief description of the geologic setting for the Western New York Nuclear Service Center, developed from information in the 1996 Project Completion and Site Closure DEIS. There has been significant work over the last several years on the structural geology and seismicity of Western New York (see *An Update of the Structural Geology in the Vicinity of the Western New York Nuclear Service Center, West Valley New York*, URS Corporation, May 2002, and *Neotectonics and Seismicity in the Eastern Great Lakes Basin*, Tectonophysics, Vol. 353). Section 3.1 of the Waste Management EIS should be revised to provide an updated description of the geologic setting and seismicity in the vicinity of the Western New York Nuclear Service Center. 17.17
- **Page 3-6, Section 3.2.2 (Groundwater)** - The first sentence of the second paragraph refers to *"two aquifers."* The previous paragraph refers only to the *"Cattaraugus Creek Basin Aquifer System."* The EIS Should be revised to clearly identify the two aquifers referred to in this paragraph. In addition, the groundwater flow path through the Kent Recessional unit to Buttermilk Creek should be described in this section. 17.18

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Page 4 of 5

Document #0017: Comment 17.19

New York State Energy Research and Development Authority

- **Page D-9, Table D-4 (Unit Risk Factors for Incident Free Transportation)** - It is not clear why the dose for a rail worker *"in moving vehicle"* and the *"walk-around inspection"* is considered *"Not Applicable."* Please explain this in the EIS. 17.19

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Page 5 of 5

Document #0017: Comments 17.20 – 17.22

New York State Energy Research and Development Authority

Comments of the New York State Energy Research and Development Authority on the West Valley Demonstration Project Draft Waste Management Environmental Impact Statement
Presented at the Public Comment Session on June 11, 2003
Ashford Office Complex

My name is Paul Piciulo and I am Director of the West Valley Site Management Program for the New York State Energy Research and Development Authority, more commonly referred to as NYSERDA. I am here to provide oral comments on the Waste Management Environmental Impact Statement on behalf of NYSERDA. NYSERDA also will be submitting written comments to the U.S. Department of Energy (DOE) prior to closure of the formal public comment period.

Our most important issue of concern regarding the Waste Management EIS is inclusion of the analysis to add grout to High-Level Waste Tanks 8D-1 and 8D-2 and the annulus surrounding each tank. NYSERDA believes that this activity, and alternatives for grouting the tanks, should not have been included in this Waste Management EIS. Long-term management options for the High-Level Waste Tanks are more appropriately analyzed in the *Environmental Impact Statement to Evaluate Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center.* The reasons for this are threefold. First, the March 26, 2001 scoping for this Waste Management EIS did not include grouting of the high-level waste tanks. Second, the analysis of grouting the High-Level Waste Tanks in the Waste Management EIS is inconsistent with policy announced by the U.S. Nuclear Regulatory Commission (NRC) stating that the impacts of making a Waste Incidental to Reprocessing determination, which is a prerequisite for grouting the tanks, should be analyzed in the Decommissioning EIS. Lastly, Resource Conservation and Recovery Act regulations preclude treatment by grout stabilization until NRC has rendered its final decision on whether the Decommissioning EIS preferred alternative meets the criteria in the Commission's Policy Statement. I will now provide a more detailed explanation of these three concerns. 17.20 17.21 17.22 17.23

The proposed scope for the Waste Management EIS, as published in the Federal Register on March 26, 2001 (66 Fed. Reg. 16447), did not include grouting the tanks. The scope indicated that the Waste Management EIS would "include such activities as removal of loose contamination; removal of hardware and equipment; nonstructural decontamination of walls, ceilings, and floors; and flushing and/or removal of vessels and piping." Grouting of the tanks was not included in the description of the proposed action or the preliminary alternatives to be evaluated. Thus, it appears that evaluation of grouting the tanks is beyond the scope of this Waste Management EIS. The Federal Register Notice indicated that: "The remaining facilities for which the DOE is responsible, along with all final decommissioning and/or long-term stewardship actions to be taken by the DOE and NYSERDA, will be evaluated in [the Decommissioning EIS]." 17.21

Additionally, the residual waste in the High-Level Waste Tanks remains high-level waste, at the very least until a determination is made that such waste is incidental to reprocessing, in accordance with the requirements established by the NRC in the *U.S. Nuclear Regulatory Commission Decommissioning Criteria for the West Valley Demonstration Project at the West Valley Site; Final Policy Statement,* on February 1, 2002 (67 Fed. Reg. 5003). The Final Policy Statement makes it clear that the NRC intends to use the Decommissioning EIS to render a decision 17.22

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Page 1 of 2

Document #0017: Comments 17.22 – 17.24
New York State Energy Research and Development Authority

on the acceptability of DOE's Waste Incidental to Reprocessing determinations. NRC states that:

> "The resulting calculated dose from the incidental waste is to be integrated with all the other calculated doses from the remaining material at the entire NRC-licensed site to ensure that the License Termination Rule criteria are met. This is appropriate because the Commission does not intend to establish separate dose standards for various sections of the NRC-licensed site."

> "It is the Commission's expectation that it will apply this criteria at the WVDP site following the completion of DOE's site activities. In this regard, the impacts of identifying waste as incidental to reprocessing and not high-level waste should be considered in the DOE's environmental reviews."

NRC even more clearly defines its expectations in a June 17, 2002 letter from Richard A. Meserve to myself.

> "The Decommissioning EIS will address DOE Waste Incidental to Reprocessing determinations. NRC will review and comment on DOE Waste Incidental to Reprocessing determinations as a Cooperating Agency. NRC will also be rendering its final decision on DOE's Waste Incidental to Reprocessing determination in NRC's decision on whether the preferred alternative meets the criteria in the Commission's Policy Statement."

Thus, until the Decommissioning EIS is completed and NRC has made its determination regarding the tank residuals, such materials must continue to be managed as high-level waste and any decision to grout the tanks based on the Waste Management EIS would be premature. 17.22

Finally, the residual waste in the High-Level Waste Tanks is both high-level waste and Resource Conservation and Recovery Act (RCRA) characteristic waste. It is NYSERDA's understanding that, at this time, the only form of treatment accepted for such waste is vitrification. As long as the tank residual waste is high-level waste, in other words until NRC has rendered its final decision on DOE's Waste Incidental to Reprocessing determination in its decision on whether the Decommissioning EIS preferred alternative meets the criteria in the Commission's Policy Statement, current RCRA requirements preclude treatment by grout stabilization. Thus, under RCRA regulations, a determination must be made with respect to the Waste Incidental to Reprocessing issue before a decision to grout the tanks can be made. 17.23

NYSERDA requests that DOE reconsider its inclusion of High-Level Waste Tank grouting in the Waste Management EIS. As I mentioned earlier, NYSERDA will be providing more detailed written comments prior to the closure of the formal public comment period. Thank you for this opportunity to share our concerns. 17.24

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Page 2 of 2

Document #0017: Responses

17.1. Thank you for your comment.

17.2. DOE has analyzed the continuing management of WVDP-generated waste in earlier NEPA reviews and documents. Those activities were included as part of the action alternatives because of the potential for cumulative impacts. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.3. In the discussion of alternatives considered but not analyzed (Section 2.6 of the Draft and Final EISs), DOE explained that the EIS does not consider the construction of additional storage capacity at the WVDP site. DOE does not consider it reasonable to analyze an alternative to construct and maintain storage at the WVDP site because of the cost of new facilities and maintenance of existing facilities.

DOE is not aware of any corrosion-inhibiting technology that would be feasible, beyond that which is already being performed by use of the nitrogen inerting system for the annuli of Tanks 8D-1 and 8D-2. Complete grouting of the tanks or tank exhumation are issues that relate to the decommissioning and/or long-term stewardship of the site and, as such, will be addressed in that EIS.

17.4. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.5. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.6. DOE reviewed the material and believes that it has accurately stated its reasoning.

17.7. The RHWF is not currently operating and is not expected to operate until 2004. Because no data are available regarding operations from the RHWF, in its analysis of ongoing activities, DOE used actual operational data from vitrification activities in 1995 through 1999 and determined that the data from those years would be more than the future emissions from the RHWF and thus would bound the analysis (see Section 4.1.1.1 and Appendix C, Section C.3).

17.8. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.9. Clarification was added to the description of Table 2-3 to indicate that the ongoing operations are described in Section 2.3.

17.10. The change was made as suggested.

17.11. DOE did not include the RHWF in the discussion of the project facilities that store waste because no waste will be stored in the facility.

17.12. DOE reviewed the paragraph and believes it conveys information useful to the reader and is located in an appropriate location.

17.13. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.14. Table 2-4 is a summary table, and the discussion of the impacts can be found in Chapter 4. In Table 2-4 of the Final EIS, DOE refers the reader to Chapter 4 to obtain additional information regarding impacts.

17.15. The EIS (both draft and final) does analyze tank collapse scenarios (see Appendix C, Sections C.4.4 and C.4.5). Groundwater and surface pathways were not analyzed because it was assumed that the contents of the tanks would be released to the atmosphere. This would result in the exposure of a higher concentration of radionuclides to a larger number of people than would be the case with a groundwater or surface water pathway. For this reason, the analysis bounds the impacts of a tank collapse scenario in which the contents would be released into the groundwater or surface water. The long-term impacts of tank failure should the tanks remain in place, including potential exposure to contaminated groundwater, will be addressed in the Decommissioning and/or Long-Term Stewardship EIS.

17.16. The sources for the information in Table 2-6 are the WM PEIS and the WIPP SEIS-II. The information marked "NA" on the table was not presented in either of the source documents and, for that reason, is not available.

17.17. DOE acknowledges that additional information on this topic exists, but decided not to include a more detailed examination of that information in the Final WVDP Waste Management EIS because it is not relevant to the actions being proposed. However, this information will be examined in the Decommissioning and/or Long-Term Stewardship EIS, where information regarding the geologic setting of the site is relevant.

17.18. Clarifications were added to the Final EIS in the discussion of groundwater (Section 3.2.2).

17.19. The doses apply to the truck scenario, not the rail scenario; therefore, they are denoted "not applicable" for the rail scenario in Table D-4 (see footnote "a" to Table D-4). For example, in the truck scenario, the doses for workers who inspect the truck are called a "walk-around" inspection dose. This same type of dose for the rail scenario is denoted an "in-transit rail stop" dose.

17.20. The Draft WVDP Waste Management EIS analyzed the use of retrievable, low-strength grouting for the interim stabilization of the HLW tanks should that become necessary before decisionmaking about the site is completed. As stated in the Draft EIS, this grout would be sufficiently flexible to provide shielding and would not prohibit exhumation of the tanks should DOE decide to remove the tanks in the future. However, DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.21. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.22. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.23. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

17.24. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

Document #0018: Comments
U.S. Environmental Protection Agency

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Alice C. Williams, Director
West Valley Demonstration Project
Department of Energy
10282 Rock Spring Road
West Valley, New York 14171-9799

Class: LO

Dear Ms. Williams:

The Environmental Protection Agency (EPA) has reviewed the draft environmental impact statement (EIS) on Waste Management for the West Valley Demonstration Project (CEQ# 030224), located in West Valley, New York. This review was conducted in accordance with Section 309 of the Clean Air Act, as amended (42 U.S.C. 7609, PL 91-604 12(a), 84 Stat. 1709), and the National Environmental Policy Act (NEPA).

The Waste Management draft EIS details the Department of Energy's (DOE) proposal to ship radioactive wastes that are either currently in storage, or that will be generated from operations over the next 10 years, to offsite locations, and to continue its onsite waste management activities. The document notes that decommissioning and/or long-term stewardship decisions will be reached in a separate EIS that is expected for release in 2004. In 1996, a draft EIS was released for public comment for the Completion of the West Valley Demonstration Project and Closure or Long-Term Management of the Western New York Nuclear Services Center. EPA's October 4, 1996 comment letter on the draft EIS rated the document as EO, indicating we had environmental objections. Our objections were related to clean-up levels, ground and surface water impacts, the accuracy of the risk assessment, and the potential loss of institutional controls. Rather than issue a final EIS, the DOE proposed the preparation of two separate NEPA documents to address the issues raised on the 1996 draft EIS; the current Waste Management EIS and the Decommissioning EIS.

In addition to the No-Action Alternative, the Waste Management draft EIS evaluates two action alternatives. Under Alternative A (preferred), radioactive wastes would be shipped to offsite locations over a ten-year period and the high-level waste tanks and vaults would be managed without additional interim stabilization measures. Under Alternative B, over a ten-year period, the DOE proposes to ship radioactive wastes to offsite locations for disposal or interim storage, and add retrievable grout to high-level waste storage tanks and vaults. Based on our review of the draft EIS, EPA offers the following comments.

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Document #0018: Comments 18.1 – 18.7
U.S. Environmental Protection Agency

While EPA has an overall lack of objections with the proposed Waste Management actions, we believe that the draft EIS lacked specific documentation in some areas. For example, although the draft EIS envisions a ten-year period for ongoing operations, and EPA supports the expeditious removal of wastes, the final EIS should include information and analyses to determine the consequences or impacts from shipping radioactive wastes to offsite locations beyond the ten-year period. While not anticipated, waste shipments could occur beyond the ten-year period, therefore, this should be analyzed in the final EIS. 18.1

Footnote B to Table 2-3 indicates that the volumes of transuranic (TRU) waste are for wastes that meet the Nuclear Regulatory Commission(NRC)/DOE definition which is greater than 100nCi/g of alpha-emitting radionuclides with half-lives greater than 20 years. The West Valley Demonstration Project (WVDP) Act defines TRU waste as waste contaminated with transuranics in concentrations greater than 10 nCi/g. EPA believes the final EIS should identify the estimated volume of wastes that meet the TRU definition, and a discussion and analysis of how this waste will be managed. 18.2

Appendix C and Section 4.1.1.2 refer to fourteen accidents that were evaluated, with Table 2-5 summarizing only eleven accidents. EPA notes that Class B low-level radioactive waste (LLW) container accidents were not evaluated. EPA believes that the final EIS should include Class B LLW, or provide the rationale for its exclusion from the evaluation. 18.3

In addition to the comments above, EPA has the following recommendations:

- Under the No-Action and Alternative A, EPA recommends the final EIS (perhaps Section 2.2.2, Tank Farm) describe the ongoing operation of ventilating the waste storage tanks and surrounding vaults to prevent moisture. 18.4
- Under the description of Alternative B in Chapter 2, EPA recommends that the final EIS describe how the retrievable grout is an alternative to ventilating the waste storage tanks and surrounding vaults to prevent moisture corrosion. 18.5
- EPA recommends re-titling the three sets of tables (Tables 4-3& 4-4, 4-9& 4-10, and 4-15& 4-16) to identify the alternative with which each set is associated. 18.6
- The term "lag storage" used in Section 2.2.3 is confusing for buildings/structures used to handle containerized contact-handled waste. An explanation of the use of this term should be considered for the final EIS 18.7

In summary, EPA rates the document as LO, indicating that we have a lack of objections with the project and do no foresee significant adverse environmental impacts from the implementation of the proposed project. However, in order to provide a complete and thorough analysis of the proposed Waste Management activities, the aforementioned information and recommendations in this letter should be included in the final EIS.

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Document #0018: Comments
U.S. Environmental Protection Agency

Thank you for the opportunity to comment. Should you have any questions concerning this letter, please contact Mark Westrate of my staff at (212) 637-3789.

Sincerely yours,

Robert W. Hargrove, Chief
Strategic Planning and Multi-Media Programs Branch

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Document #0018: Responses

18.1. The Draft and Final EISs evaluate the impacts of managing waste that is already in the WVDP inventory and that might be generated over the next 10 years. DOE determined that 10 years was the appropriate analysis period in light of its intention to complete decisionmaking on the decommissioning and/or long-term stewardship of the WVDP site within that time period. DOE expects to ship the waste, as described in the preferred alternative, within the next 10 years to available treatment, storage, and disposal facilities. The EIS acknowledges that the HLW may remain at WVDP for more than 10 years. However, it also describes both the annual and the total impacts that could occur over the 10-year period. The total impacts would remain the same, but would be spread out over more years if, for example, a transportation campaign or a geologic repository were delayed. In addition, DOE did evaluate long-term, onsite storage of HLW in the No Action Alternative for the Yucca Mountain Repository EIS.

18.2. TRU waste is currently defined by NRC and DOE as waste containing more than 100 nanocuries of alpha-emitting isotopes, with half-lives greater than 20 years, per gram of waste. However, in the West Valley Demonstration Project Act, passed in 1980, TRU waste is defined as material contaminated with radioactive elements that have an atomic number greater than 92 in concentrations greater than 10 nanocuries per gram. The volume of TRU waste analyzed in the Draft and Final Waste Management EISs is that which meets the current (more than 100 nanocuries per gram) definition of TRU waste. This is appropriate because DOE is not proposing to dispose of any radioactive waste at the WVDP site. The volume of mixed LLW analyzed in the Draft and Final Waste Management EISs includes waste that meets the definition of TRU waste under the West Valley

Demonstration Project Act (that is, waste with greater than 10 nanocuries but no more than 100 nanocuries per gram of alpha-emitting isotopes). If wastes were shipped offsite, waste that met the current definition of mixed LLW would be shipped and disposed of as such, and TRU waste shipped to an offsite location for interim storage or disposal would meet the current definition of TRU waste.

18.3. As noted in Appendix C and Section 4.1.1.2, 14 facility accidents were evaluated in the Draft EIS. In Table 2-5, the impacts of the drum puncture, pallet drop, and box puncture accidents for Class A LLW were included for the No Action Alternative. The impacts of the drum puncture, pallet drop, and box puncture accidents for Class C LLW were included for Alternatives A and B (the impacts for a Class A or B LLW container under these alternatives would be less). Thus, the potential impacts from a total of 14 accident scenarios were described in Table 2-5 of the Draft EIS. However, in the Final EIS, DOE has eliminated the option of placing retrievable grout in the HLW tanks as an interim stabilization measure under Alternative B. As a result, two of the original 14 accident scenarios evaluated in the Draft EIS (Containment System Failure During Interim Stabilization of Tank 8D-2, and Collapse of Tank 8D-2 [Grouted]) were also eliminated, reducing the number of accident scenarios evaluated in the Final EIS to 12. An explanatory footnote has been added to Table 2-5 of this Final EIS to clarify that the impacts of the drum puncture, pallet drop, and box puncture accidents are evaluated for both Class A LLW (for the No Action Alternative) and Class C LLW (for Alternatives A and B)

18.4. DOE added a description of the ongoing operation of ventilating the waste storage tanks in the Final EIS (see Section 2.3).

18.5. DOE decided to remove the option under Alternative B to place retrievable grout in the HLW tanks as an interim stabilization measure. DOE has eliminated the discussion and analysis of the use of retrievable grout in the Final EIS.

18.6. The titles of Tables 4-3, 4-4, 4-9, and 4-10 were changed to identify the alternative with which they are associated. Tables 4-15 and 4-16 were deleted as a result of DOE's decision to eliminate the option of placing retrievable grout in the HLW tanks as an interim stabilization measure under Alternative B.

18.7. An explanation of the term was added in the Final EIS (see Section 1.1.3.2 and the glossary).

Document #0019: Comments 19.1 – 19.2
City of Oak Ridge, Office of the Mayor

CITY OF
OAK RIDGE

OFFICE OF THE MAYOR

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July 9, 2003

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Mr. Daniel P. Sullivan
WVDP WM EIS
10282 Rock Springs Road, WV-49
West Valley, NY 14171-9799

West Valley Demonstration Project Draft Waste Management Environmental Impact Statement (DOE/EIS-0337D)

Dear Mr. Sullivan:

It has come to the attention of the City of Oak Ridge that the subject Department of Energy (DOE) environmental impact statement (EIS) identifies interim storage at Oak Ridge National Laboratory (ORNL) as an option (not DOE's preferred alternative) for management of transuranic (TRU) radioactive waste from the West Valley, New York, Demonstration Project site.

The City of Oak Ridge strongly opposes the transfer of West Valley TRU waste to Oak Ridge for interim storage. The DOE has not been able to arrange for the timely removal of TRU waste that is already stored here, and it would not be in the best interest of our community to increase the inventory of stored TRU waste by importing additional material from another DOE site. 19.1

Also, please note that the EIS has an error regarding the location of the Oak Ridge Reservation (ORR). Text on pages S-16 and 3-26 states that the ORR is located west of Knoxville "in the rolling terrain between the Cumberland Mountains and the Great Smoky Mountains." This incorrectly implies that the ORR is in the middle of an uninhabited region. There is no mention of the City of Oak Ridge, within whose city limits almost all of the ORR (including ORNL) lies. Descriptions of the other candidate management sites correctly identify the nearest cities. Please correct the description of the ORR to state that it is in the City of Oak Ridge. 19.2

Sincerely,

David R. Bradshaw

David R. Bradshaw
Mayor

cc: Gerald Boyd, Manager, DOE Oak Ridge Operations
Stephen McCracken, Assistant Manager for Environmental Management, DOE Oak Ridge Operations

Document #0019: Responses

19.1. The WM PEIS studied the potential for nationwide impacts of managing radioactive and hazardous wastes. DOE issued separate RODs for all of the waste types analyzed in the WM PEIS. For TRU waste, DOE decided that each site that has generated or would generate TRU waste would store it onsite prior to shipment to WIPP for disposal (63 Fed. Reg. 3629 (1998)). However, the Department may decide to ship TRU waste from sites where it may be impractical to prepare it for disposal to other sites where DOE has or will have the necessary capability. The sites that could receive TRU waste from other sites are INEEL, ORR, SRS, and the Hanford Site.

Thus, DOE's analysis in the Draft and Final WVDP Waste Management EISs of the disposal or interim storage of WVDP waste is consistent with analyses conducted for the WM PEIS and with decisions reached on the basis of that document.

However, the shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

19.2. DOE corrected the description of ORR in the Final EIS (see Section 3.9.5).

Document #0020: Comments 20.1 – 20.2
The Seneca Nation of Indians

THE SENECA NATION OF INDIANS

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TREASURER .... *Shelley R. Huff, P.O. Box 157, Lawtons, NY 14091*

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July 10, 2003

Mr. Daniel Sullivan
U.S. Department of Energy
West Valley Demonstration Project
10282 Rock Springs Road
West Valley, NY 14171

SUBJECT: Comments on West Valley Demonstration Project Waste Management Draft Environmental Impact Statement (DEIS)

Dear Mr. Sullivan:

My staff has completed its review of the above-referenced document and prepared the attached comments.

As you know, the activities at the West Valley Demonstration Project have the potential to directly affect our communities on the Cattaraugus and Allegany territories. After reading this DEIS and the alternatives for shipping stored waste off of the site, it is not possible to determine the extent of impact to either of our communities, since the transportation routes are not identified. 20.1 In addition, although the risks of implementing the alternatives are reported to be very low, we are not certain the risk assessment considered factors unique to our population. 20.2

We support your efforts to meet challenges in cleaning up and closing down the West Valley Demonstration Project. We trust that the US Department of Energy will work with our government in finalizing this impact statement and reaching the Record of Decision, as per Executive Order 13084, the Government-to-Government Relations with Native American Tribal Governments Executive Memorandum of April 29, 1994, and the US Department of Energy's American Indian and Alaska Native Tribal Government Policy. I am confident that the DOE will continue to improve environmental conditions at the site. By working with us on a government-to-government basis, we can have a positive role in

Document #0020: Comments
The Seneca Nation of Indians

Page 2
July 10, 2003

ensuring that our future generations are not harmed by a legacy of waste left behind at the West Valley Demonstration Project.

Please call Lisa Maybee or Gayla Gray, at 716-532-2546/4900 if you should have any questions regarding our comments.

Sincerely,

Rickey L. Armstrong

Rickey L. Armstrong, Sr., President
SENECA NATION OF INDIANS

cc: EPD
Bryan Bower, DOE WVDP

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Document #0020: Comments 20.3 – 20.13
The Seneca Nation of Indians

Page/Section	Comment	
General Comment	How will our pertinent comments from the 1996 draft environmental impact statement be identified and applied to the development of this EIS?	20.3
1-1, first bullet	To our knowledge, the proposed Yucca Mountain Repository is not a geologic repository because the site's geology alone will not contain the waste. Waste placed in Yucca Mountain will require stewardship in perpetuity. We suggest changing to "federal repository" here and throughout the document.	20.4
1-11	Why isn't Greater-Than-Class C waste considered under the alternatives?	20.5
1-13, Table 1-1	The table should include a definition of Class A low level waste since this waste type is shipped under all alternatives.	20.6
2-9 through 2-11, Section 2.2.3	Does LSA 1 contain 37,000 cubic feet of low level waste (i.e., storage capacity minus available storage space)? These descriptions of the waste storage areas do not include the amount of waste stored in each area. Why not do the math? Since this DEIS is supposed to focus on waste management, it would be helpful to the reader to state the quantity of waste currently managed in these areas.	20.7
2-13, Table 2-2, Number of Shipments	Does this column enumerate truck *plus* rail shipments for the given number of containers, or truck *or* rail shipments for the given number of containers? Does rail mean railcar? What determines whether a shipment occurs by truck or by railcar?	20.8
2-14, second full paragraph	Do all of these disposal sites have rail service?	20.9
3-5, second paragraph	Cattaraugus Creek water is used to irrigate tomato fields in Chautauqua County.	20.10
3-23, Figure 3-8	Oil Spring Reservation is incorrectly identified. It is on the border between Allegany and Cattaraugus Counties. The correct spelling is Allegany Reservation.	20.11
3-25	What roads and railroads serve the area around Envirocare?	20.12
4-1, second	There is a potential for direct and indirect impacts fro	20.13

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Document #0020: Comments 20.13 – 20.21
The Seneca Nation of Indians

Page/Section	Comment	
paragraph, 4th sentence	transportation. How and where are these impacts evaluated?	20.13
4-2, Section 4.1.1, & C-3, Table C-2	Non-fatal health effects to the exposed population should also be evaluated. This section should state how the evaluation of human health impacts considers the overall health of the person receiving the dose. The very young, elderly, and persons with compromised health due to diabetes or high blood pressure (for example) may be more susceptible to non-fatal or fatal cancers.	20.14
	How does the evaluation consider people who practice a subsistence lifestyle? The risk assessment should include exposures from consuming venison, inhaling wood smoke (i.e., burning firewood from trees that preferentially uptake radionuclides), inhaling water vapor from Cattaraugus Creek and Lake Erie, drinking surface water *and* groundwater, and consuming fish from Cattaraugus Creek.	20.15
4-6, Section 4.2.1	Who is the maximally exposed individual?	20.16
4-7, Section 4.2.2, first paragraph, second sentence	What causes the higher impact from rail transportation?	20.17
Sections 4.3.2, 4.4.2, 4.5.2	What would be the impacts from a terrorist attack?	20.18
Sections 4.3.3.3, 4.4.3.3, 4.5.3.3	It is unclear who the maximally exposed individual (MEI) is for these scenarios or why the MEI's dose is less than the population's dose. Who comprises the population? If individuals in the population experience the greater health effect, wouldn't they be the MEI?	20.19
5-1, fourth paragraph	This paragraph needs clarification. What is the definition of "past operations" in the second sentence? Does "past operations" mean during reprocessing and/or 1982 to present? This dose was 13 person-rem, but the fourth sentence parenthetically says the radiation dose to workers and the public in the past was 2.5 person-rem.	20.20
Appendix C	Appendix C does not describe the assumptions or methodology used to assess ecological risk, as per the draft technical standard on a graded approach for evaluating radiation doses to aquatic and terrestrial biota.	20.21

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Document #0020: Comments 20.22 – 20.25
The Seneca Nation of Indians

Page/Section	Comment	
C-27	It is disingenuous to average the dose over an area having a 50-mile radius when the dose is not experienced equally across this area. The dose is primarily received by the people living downwind of the site, by people who access Cattaraugus Creek and its tributaries leading from the site, and by people who use the natural and agricultural resources growing in areas that are impacted by releases from the site. What are the doses to these people?	20.22
D-19, Section D.6.7, first paragraph	This paragraph acknowledges that other delayed health effects can occur and gives the conversion factors; however, total risks are not conveyed to the reader in Section D.7 (Results).	20.23
D-27, Alternative A	Isn't the probability of a truck accident greater than that for rail?	20.24
D-27 & D-28, Alternatives A & B	A severe accident under each of these alternatives would result in three latent cancer fatalities for the exposed population and a 0.012 risk of latent cancer fatality for the maximally exposed individual. If individuals in the population experience the greater health effect, wouldn't they be the MEI?	20.25

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Document #0020: Responses

20.1. DOE analyzed the potential environmental impacts associated with the transportation of radioactive waste from the WVDP site to each of the other locations included in this EIS for disposal or interim storage in Chapter 4 (see Sections 4.1.2, 4.2.2, 4.3.3, 4.4.3, and 4.5.3) and Appendix D. DOE routinely plans actual transportation campaigns well in advance, with appropriate notice to affected State and local jurisdictions along the transportation route. DOE has long maintained a transportation program that provides assistance to all affected States and local jurisdictions in maintaining emergency preparedness capabilities, including training, and DOE transportation personnel remain available for assistance during transportation campaigns in the event of an incident.

20.2. In Section 4.6, the Draft EIS addressed the subsistence consumption of fish from Cattaraugus Creek. For atmospheric releases of radioactivity material from the WVDP site, the EIS considered the inhalation of radioactive gases and particulates in the air, ingestion of cultivated crops, and external exposure from radioactive material in the air or on the ground. Inhaling radioactive material in wood smoke or water vapor was not considered in the analysis. However, because of the dispersion of wood smoke and dilution by the water in Cattaraugus Creek or Lake Erie, the radiation doses through these pathways would be much lower than inhaling the radioactive material directly from the air, which is analyzed in the Draft and Final EISs. Ingestion of surface water and groundwater was not included because there is no documented use of local surface water or downgradient groundwater wells as drinking water by local residents.

The WVDP Annual Site Environmental Monitoring Reports address the inhalation of radioactive gases and particulates in air; ingestion of cultivated crops; and ingestion of fish, beef, and milk.

20.3. DOE reviewed comments received on the Draft Cleanup and Closure EIS issued in 1996 and found that they addressed only closure and related issues. For this reason, all of those comments are being considered in the context of the continuation of the 1996 Draft Cleanup and Closure EIS, which is now known as the Decommissioning and/or Long-Term Stewardship EIS.

20.4. As explained in the Yucca Mountain Repository EIS, DOE considers the repository to be a geologic repository.

20.5. The only Greater-than-Class-C waste at WVDP is NYSERDA pre-Project waste in the NRC-licensed Disposal Area and the State-licensed Disposal Area. The disposition of these wastes will be evaluated in the Decommissioning and/or Long-Term Stewardship EIS.

20.6. A definition of Class A LLW was added to Table 1-1 in the Final EIS.

20.7. Class A waste continues to be shipped and the waste stored onsite is moved among the available storage facilities to increase efficiency. Thus, the waste volume and type of waste stored in each facility changes frequently. For this reason, DOE did not include the waste volumes stored in each location, but rather included the storage capacity of each facility and the total volumes of waste to be shipped.

20.8. In Table 2-2, the "Number of Shipments" column shows the number of truck shipments required to ship 145,000 cubic feet of Class A LLW under the No Action Alternative and the number of rail shipments required to ship 145,000 cubic feet of Class A LLW under the No Action Alternative. Rail means shipment in railcars; the analysis assumes that each rail shipment involves one railcar (see Appendix D, Section D.4). In practice, the decision on whether to use truck or rail depends on many factors, such as shipping container availability, efficiency, schedule, operational constraints, and cost.

20.9. All of the sites considered in this EIS but Nevada Test Site and the Yucca Mountain repository have direct rail access. Text was added to Section 3.9 and Section D.3 to clarify this.

20.10. This information was added to Section 3.2.1 in the Final EIS.

20.11. These corrections were made in the Final EIS (Figure 3-8).

20.12. This information was added to Section 3.9.1 in the Final EIS.

20.13. DOE analyzed the potential environmental impacts associated with the transportation of radioactive waste from the WVDP site to other locations for disposal or interim storage in Chapter 4 (see Sections 4.1.2, 4.2.2, 4.3.3, 4.4.3, and 4.5.3) and Appendix D.

20.14. DOE's analyses recognize that the principal potential human health effect from exposure to low doses of radiation is cancer. In Appendix C of the EIS (both draft and final), DOE explains that other health effects such as nonfatal cancers and genetic effects can occur as a result of chronic exposure to radiation. Inclusion of the total incidence of nonfatal cancers and severe genetic effects from radiation exposure increases the total detriment by 40 to 50 percent, compared to the change for latent cancer fatalities (see Appendix C, Section C.1). Estimates of latent cancer fatalities as a result of waste management activities (including transportation) are provided for each alternative. The risk factor used for estimating potential latent cancer fatalities in the general population takes into account that children (who are more susceptible to adverse impacts from radiation exposure) are included in the population group.

20.15. In Section 4.6, the Draft and Final EISs address the subsistence consumption of fish from Cattaraugus Creek. For atmospheric releases of radioactivity material from the WVDP site, the EIS considered the inhalation of radioactive gases and particulates in the air, ingestion of cultivated crops, and external exposure from radioactive material in the air or on the ground. In addition, the WVDP Annual Site Environmental Monitoring Reports address the inhalation of radioactive gases and particulates in air; ingestion of cultivated crops; and ingestion of fish, beef, and milk. Ingestion of surface water and groundwater was not included because there is no documented use of local surface water or downgradient groundwater wells as drinking water by local residents.

Inhaling radioactive material in wood smoke or water vapor was not considered in the analysis. However, because of the dispersion of wood smoke and dilution by the water in Cattaraugus Creek or Lake Erie, the radiation doses through these pathways would be much lower than inhaling the radioactive material directly from the air, which is analyzed in the Draft and Final EISs.

20.16. As described in Appendix C, Section C.6, radiation doses were evaluated at the locations of nearby residences for airborne releases during normal operations and at the WVDP site boundary for releases during accidents to provide a realistic estimate of the maximally exposed individual radiation doses.

20.17. In terms of the total fatalities from truck versus rail, truck transportation has slightly higher impacts than rail transportation for Alternatives A and B, while rail has slightly higher impacts for the No Action Alternative (see Tables 4-6, 4-12, and 4-15). The differences are due to several factors, including the route distances, the population densities along the routes, state-level accident rates along the routes, and the number of shipments.

20.18. With respect to potential risks from terrorism or diversion, DOE did describe the human health consequences of a transportation accident; the accident with the highest consequences would involve CH-TRU waste. DOE did not analyze, nor is it relevant to analyze, how such a transportation accident could occur (for example, as a result of a terrorist incident).

20.19. As described in Appendix C, Section C.6, radiation doses were evaluated at the locations of nearby residences for airborne releases during normal operations and at the WVDP site boundary for releases during accidents to provide a realistic estimate of the maximally exposed individual radiation doses. Population radiation doses included contributions from all directions for distances up to 80 kilometers (50 miles) from airborne releases during normal operations and from an onsite evaluation point located 640 meters (2,100 feet) from the postulated accident. The MEI dose is smaller than the population dose because the MEI dose is to one individual and the population dose is the dose received by everyone in the affected population collectively (not individually). The risk of a latent cancer fatality to the MEI is the risk one individual could face in dying from cancer caused by exposure to radiation from activities at the WVDP. The risk of a latent cancer fatality in a population is the number of additional cancers that might be experienced in the entire affected population as a result of the exposure of the population to radiation from activities at the WVDP.

20.20. In the Final EIS, the sentence was changed to read "The net impact from these past operations to the regional population near the Center has been estimated to be approximately 13 person-rem."

20.21. The assumptions and methodology used to assess ecological risk are described in *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, referenced in Chapter 4 as DOE 2002. A brief description of the methods used to evaluate ecological risk has been added to Appendix C.

20.22. The dose is not averaged over the 80-kilometer (50-mile) radius, as stated by the commenter. Rather, it is integrated over the 80-kilometer (50-mile) radius, which means that all the potential doses within the 80 kilometer (50-mile) radius are added together.

20.23. The total impacts (i.e., risks) of transporting the radioactive material are contained in the last column of Tables 4-6, 4-12, 4-15, D-15, D-16, and D-17. In addition, the total impacts (i.e., risks) are discussed in the text of Chapter 4 for each alternative (Sections 4.3.3.1, 4.4.3.1, and 4.5.3.1) and Section D.7.1.

20.24. The EIS lists the probabilities of the maximum reasonably foreseeable accidents in Sections 4.3.3.3, 4.4.3.3, and 4.5.3.3, and in Section D.7.3.

20.25 The MEI dose is smaller than the population dose because the MEI dose is to one individual and the population dose is the dose received by everyone in the affected population collectively (not individually). The risk of a latent cancer fatality to the MEI is the risk one individual could face in dying from cancer caused by exposure to radiation from activities at the WVDP. The risk of a latent cancer fatality in a population is the number of additional cancers that might be experienced in the entire affected population as a result of the exposure of the population to radiation from activities at the WVDP.

Document #0021: Comments
Savannah River Site Citizens Advisory Board
(Recommendation 169)

Savannah River Site
CITIZENS ADVISORY BOARD
A U.S. Department of Energy Site-Specific Advisory Board

July 23, 2003

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0021, 1 of 12

Mr. Jeff Allison, Manager
U.S. Department of Energy
Savannah River Operations Office
Aiken, S.C. 29808

Dear Mr. Allison:

On behalf of the SRS CAB, I'm pleased to forward you the following five recommendations, all of which were adopted on July 22, 2003:

Recommendation 165- SRS National Pollution Discharge Elimination System
Recommendation 166- Historic Preservation at SRS
Recommendation 167- Deactivation & Decommissioning Plan
Recommendation 168- R Reactor Seepage Basin
Recommendation 169- Draft West Valley Demonstration Project WM EIS

Recommendations 165 and 168 are being sent to SCDHEC for response as well and all three agencies will recieve Recommendation 169 for response. Your assistance in forwarding recommendations to DOE-Headquarters as appropriate is greatly appreciated.

We look forward to your written response prior to our next Board meeting to be held September 23, 2003, in Aiken, S.C. We appreciate your timely consideration of the enclosed advice.

Sincerely,

Wade Waters

Wade Waters
Chair

cc: Sandra Waisley, DOE-HQ
Fred Dowd, DOE-HQ
Charles Anderson, DOE-SR
Alice Doswell, DOE-SR
Daniel Sullivan, DOE West Valley
SSAB Chairs

Document #0021: Comments
Savannah River Site Citizens Advisory Board
(Recommendation 169)

Savannah River Site
CITIZENS ADVISORY BOARD
A U.S. Department of Energy Site-Specific Advisory Board

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Wendell Lyon
Darryl Nettles
Harold Rahn
Donna Richardson
Lola Richardson
Murray Riley
DeAnne Smoak
William Vogele
Carolyne Williams
Gloria Williams-Way
William Willoughby

Ex-Officio Members
DOE
Alice Doswell
Charlie Anderson
EPA
Robert Pope
Dawn Taylor
SCDHEC
Keith Collinsworth
Myra Reece
State of Georgia
James Sanders

July 23, 2003

Mr. J.I. Palmer, Jr., Regional Administrator
U.S. Environmental Protection Agency, Region IV
Sam Nunn Atlanta Federal Center
61 Forsyth St., SW
Atlanta, Ga. 30303

Dear Mr. Palmer:

On behalf of the SRS Citizens Advisory Board, I'm pleased to forward you a recommendation adopted during our meeting held July 22, 2003, in Columbia, S.C. Robert Pope and Dawn Taylor, EPA Ex-Officio members were in attendance.

Recommendation 169 addresses alternatives for disposition of West Valley Demonstration Project waste. Four additional recommendations are included for your information as well.

We look forward to your written response to Recommendation 169 prior to our next Board meeting to be held September 22-23, 2003, in Aiken, S.C. We appreciate your timely consideration of the enclosed advice.

Sincerely,

Wade Waters

Wade Waters
Chair

cc: Robert Pope, EPA Region IV
Dawn Taylor, EPA Region IV

0021, 2 of 12
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Document #0021: Comments
Savannah River Site Citizens Advisory Board
(Recommendation 169)

Savannah River Site
CITIZENS ADVISORY BOARD
A U.S. Department of Energy Site-Specific Advisory Board

July 23, 2003

Mr. Lewis Shaw, Deputy Commissioner
South Carolina Department of Health
and Environmental Control
2600 Bull Street
Columbia, S.C. 29201

Dear Mr. Shaw:

On behalf of the SRS Citizens Advisory Board, I'm pleased to forward you several recommendations adopted during our meeting held July 22, 2003, in Columbia, S.C. Keith Collinsworth was the Ex-Officio representative in attendance.

Recommendation 165 addresses the SRS National Pollution Discharge Elimination System Permit Revision. Recommendation 168 addresses the R Reactor Seepage Basin and Recommendation 169 addresses alternatives for disposition of waste from the West Valley Demonstration Project.

Two additional recommendations are also included for your information as well.

We look forward to your written response prior to our next Board meeting to be held September 22-23, 2003, in Aiken, S.C. We appreciate your timely consideration of this advice.

Sincerely,

Wade Waters

Wade Waters
Chair

cc: Keith Collinsworth, SCDHEC

0021 3 of 12
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Document #0021: Comments
Savannah River Site Citizens Advisory Board
(Recommendation 169)

Pages 4 – 10 are not included in this document because they do not relate to WVDP or this EIS. As noted on Page 1, these pages consist of:

Recommendation 165- SRS National Pollution Discharge Elimination System
Recommendation 166- Historic Preservation at SRS
Recommendation 167- Deactivation & Decommissioning Plan
Recommendation 168- R Reactor Seepage Basin

See Recommendation 169 on the following pages.

Document #0021: Comment 21.1
Savannah River Site Citizens Advisory Board
(Recommendation 169)

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0021, 11 of 12

Savannah River Site
Citizens Advisory Board

Recommendation 169

Draft WVDP Waste Management Environmental Impact Statement

Background

In accordance with directives in the West Valley Demonstration Project (WVDP) Act, DOE is responsible for facilities used in connection with the WVDP High Level Waste (HLW) vitrification effort and for the disposal of the Low Level Waste (LLW), mixed LLW, HLW, and TRU waste produced by the WVDP HLW solidification program. To fulfill its responsibilities under this Act, DOE needs to identify a disposal path for wastes that are currently stored onsite and that will occur over the next 10 years and to determine a management strategy for the existing waste storage tanks. The April draft EIS focuses on DOE's responsibilities to dispose of wastes and continue to safely mange the waste storage tanks.

The Draft WVDP Waste Management EIS analyzes three alternatives for the continued onsite waste management and shipment of wastes to offsite disposal (Ref. 1). Under the No Action Alternative, Continuation of Ongoing Waste Management Activities, waste management would include continued storage of existing Class B and Class C LLW, TRU waste and HLW. Limited amounts of Class A LLW would be shipped to offsite disposal and the remainder would be stored onsite.

Under Alternative A (Preferred Alternative), Offsite Shipment of HLW, LLW, Mixed LLW, and TRU Wastes to Disposal and Ongoing Management of the Waste Storage Tanks, DOE would ship Class A, B, and C LLW and mixed LLW to one of two DOE potential disposal sites (Washington or Nevada) or to a commercial disposal site (such as Envirocare); ship TRU waste to WIPP in New Mexico; and ship HLW to the proposed Yucca Mountain HLW Repository.

Under Alternative B, Offsite Shipment of LLW, Mixed LLW to Disposal, Shipment of HLW and TRU Waste to Interim Storage, and Interim Stabilization of the Waste Storage Tanks, LLW and mixed LLW would be shipped offsite for disposal at the same locations as Alternative A. TRU wastes would be shipped for interim storage at one of five DOE sites: Hanford in Washington; Idaho National Engineering and Environmental Laboratory (INEEL); Oak Ridge National Laboratory (ORNL); Savannah River Site (SRS); or WIPP. TRU wastes would subsequently be shipped to WIPP or remain at WIPP for disposal. HLW would be shipped to SRS or Hanford for interim storage, with subsequent shipment to Yucca Mountain for disposal.

Comment

The SRS Citizens Advisory Board (CAB) supports the Preferred Alternative but can accept Alternative B, specifically SRS receiving waste shipments from WVDP provided that certain stipulations apply. The SRS CAB is on record recommending that the vitrified HLW from WVDP come to SRS for storage prior to shipment to Yucca Mountain, contingent upon the opening of Yucca Mountain and other commitments (Ref. 2 & 3). The CAB was not unanimous concerning this decision and some of the dissenting opinions were based on equity considerations (Ref. 4). Since then, the SRS CAB has supported the DOE regional waste disposal concept as 21.1

Recommendation 169
Adopted July 22, 2003

Document #0021: Comment 21.2
Savannah River Site Citizens Advisory Board
(Recommendation 169)

proposed in the Waste Management Programmatic Environmental Impact Statement (Ref. 5). Under this concept, SRS has the potential to receive LLW from seven DOE facilities. The CAB supported the efforts of DOE to optimize waste disposal across the DOE complex and held the view that the regional concept should be viewed with a national perspective instead of a parochial one. However, the SRS CAB was very clear that its support for a regional disposal concept was contingent upon other states participating in the concept. The SRS CAB fully expects equable treatment (Ref. 6). If wastes are going to be received at SRS from other DOE facilities, then concessions and acceleration of SRS waste disposal are expected.

Recommendation

The SRS Citizens Advisory Board (CAB) recommends to the three agencies that TRU waste and HLW coming to SRS be accepted from WVDP if the following conditions are met:

1. TRU Waste storage shall be available at SRS to accept WVDP TRU waste or funding (above site mission operating budget) shall be available to design and construct such storage facilities. 21.1
2. SRS high activity TRU waste (Pu-238) is placed on a priority disposal schedule and all appropriate shipping containers are made available to comply with the Performance Management Plan shipping schedule. In addition, for every volume of WVDP transuranic waste received by SRS, a shipment of high activity SRS transuranic waste equal to twice the receiving volume shall be shipped to WIPP.
3. A HLW shipping and receiving facility shall be constructed and operational at SRS in order to be able to ship SRS vitrified HLW canisters to the HLW repository prior to receiving WVDP HLW.
4. A second glass waste canister storage building should be constructed and operational at SRS prior to receiving WVDP HLW.
5. Both the WVDP and SRS HLW shipments are included along with the first shipments of defense nuclear waste to Yucca Mountain.
6. Funding shall be made available to cover any additional handling costs.
7. Any transuranic waste shipped to SRS for temporary storage must be designated as defense waste packaged in a form that meets the WIPP WAC so that it may be shipped directly for disposal without any further processing by SRS. Certified and licensed shipping containers must be available for its future shipment for disposal.

References

1. Draft West Valley Demonstration Project Waste Management Environmental Impact Statement, DOE/EIS-0337D, April 2003.
2. Citizens Advisory Board Recommendation No. 51 (adopted November 18, 1997). "Environmental Management Integration High Level Waste."
3. Citizens Advisory Board Recommendation No. 82 (adopted March 23, 1999), "Waste Management programmatic Environmental Impact Statement Record of Decision for High Level Waste."
4. Citizens Advisory Board Recommendation No. 63 (adopted July 28, 1998). "Political, Regulatory, and State Equity Issues and Treatment, Storage, and Disposal of Defense-Related Nuclear Wastes and Material."
5. Citizens Advisory Board Recommendation No. 72 (adopted November 17, 1998), " Waste Management programmatic Environmental Impact Statement
6. Citizens Advisory Board Recommendation No. 118 (adopted March 28, 2000). "Waste Management Equity Issues."

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AUG 0 8 2003
0021 12 of 12

Recommendation 169
Adopted July 22, 2003

Document #0021: Responses

21.1. The WM PEIS studied the potential for nationwide impacts of managing radioactive and hazardous wastes. DOE issued separate RODs for all of the waste types analyzed in the WM PEIS. For TRU waste, DOE decided that each site that has generated or would generate TRU waste would store it onsite prior to shipment to WIPP for disposal (63 Fed. Reg. 3629 (1998)). However, the Department may decide to ship TRU waste from sites where it may be impractical to prepare it for disposal to other sites where DOE has or will have the necessary capability. The sites that could receive TRU waste from other sites are INEEL, ORR, SRS, and the Hanford Site.

Thus, DOE's analysis in the Draft and Final WVDP Waste Management EISs of the disposal or interim storage of WVDP waste is consistent with analyses conducted for the WM PEIS and with decisions reached on the basis of that document.

However, the shipment of waste to offsite locations for interim storage is not DOE's preferred alternative. Under the preferred alternative (Alternative A), TRU waste and HLW would continue to be stored at the WVDP site until such time as disposal offsite could be arranged.

After the publication of the Final EIS, DOE will issue a Record of Decision. This document will state what DOE's decision is, identify the alternatives considered in reaching its decision, and specify the alternative or alternatives that are considered to be environmentally preferable. DOE will also identify and discuss the factors that were balanced by the agency in making its decision and state how those considerations entered into its decision.

21.2 Thank you for your comment.