SWEIS Yearbook – 2002

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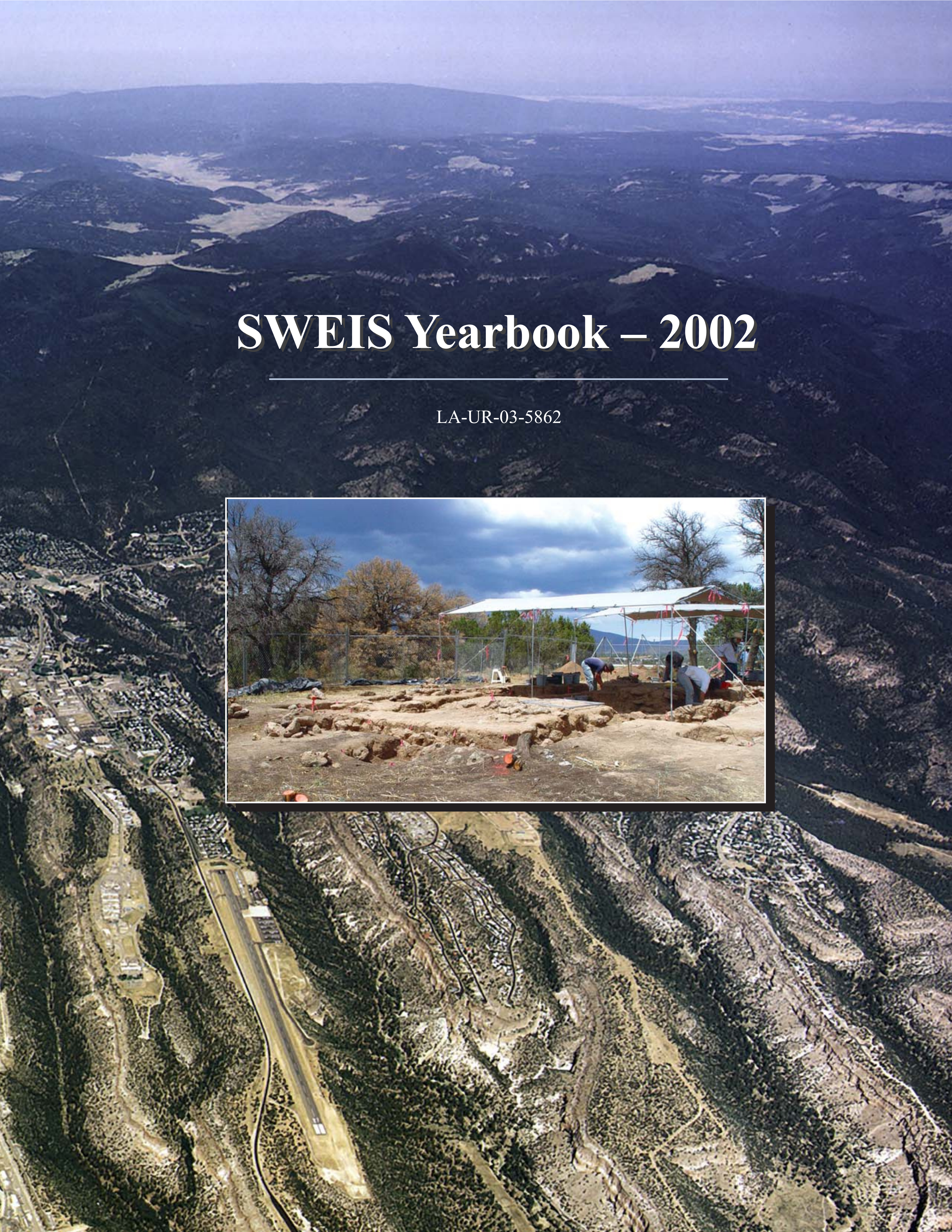

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SWEIS Yearbook—2002

Comparison of 1998 to 2002 Data to Projections of the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory

Ecology Group
Risk Reduction and Environmental Stewardship Division

Los Alamos
NATIONAL LABORATORY

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Acronyms

AFCI	Advanced Fuel Cycle Initiative
ALARA	as low as reasonably achievable
AOC	area of concern
BA	biological assessment
BSL	Biosafety Level
CASA	Critical Assembly and Storage Area
CDC	Centers for Disease Control
CDIS	Change During Interim Status
CINT	Center for Integrated Nanotechnologies
Ci	curie
CMR	Chemical and Metallurgy Research
CRMT	Cultural Resources Management Team
CSP2000	Comprehensive Site Plan for 2000
CX	categorical exclusion
CX-TBD	the planned activity is anticipated to be within categorical exclusion
CY	calendar year
DARHT	Dual-Axis Radiographic Hydrodynamic Test (facility)
D&D	Decommissioning and demolition
DOE	US Department of Energy
DVRS	Decontamination and Volume Reduction System
DX	Dynamic Experimentation (Division)
EA	environmental assessment
EA-CX	an environmental assessment found the proposed activity to be within categorical exclusion
EA-FONSI	an environmental assessment was conducted with a finding of no significant impact
EA-TBD	an environmental assessment has not been conducted but is anticipated
EIS	environmental impact statement
EIS Draft	an EIS was drafted and issued for public comment
EIS-Prep	an EIS has been determined to be needed and is currently being prepared
EIS-ROD	an EIS was written and record of decision issued
EIS-TBD	a determination of need for EIS is not yet complete, but an EIS is anticipated
EPA	US Environmental Protection Agency
ER	Environmental Restoration (Project)
ESA	Engineering Sciences and Applications (Division)
FIRP	Facilities and Infrastructure Recapitalization Program
FITS	Facility Improvement Technical Support (building)
FTE	full-time equivalent (employee)
FY	fiscal year
GPP	General Plant Project
HC	Hazard Category
HEPA	high-efficiency particulate air (filter)
HEWTF	High Explosives Waste Treatment Facility
HRL	Health Research Laboratory
HSWA	Hazardous and Solid Waste Amendment
HVAC	heating, ventilation, and air conditioning
IAEA	International Atomic Energy Agency
ICE	Irradiation of Chips and Electronics
JCNNM	Johnson Controls Northern New Mexico
kV	kilovolt
LA	Laboratory of Anthropology
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LEDA	Low-Energy Demonstration Accelerator
linac	linear accelerator
LIR	Laboratory Implementing Requirement
LLW	low-level waste
LPSS	Long-Pulse Spallation Source

LWC	lost workday cases (rate)
m	meter
MDA	Material Disposal Area
MeV	million electron volts
MGY	million gallons per year
MLLW	mixed low-level waste
MSL	Materials Science Laboratory
NEPA	National Environmental Policy Act
NFA	no further action
NISC	Nonproliferation and International Security Center
NMED	New Mexico Environment Department
NMSF	Nuclear Materials Storage Facility
NMSHPD	New Mexico State Historic Preservation Department
NNSA	National Nuclear Security Administration
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	US Nuclear Regulatory Commission
NRHP	National Register of Historic Places
OPC	Other Project Costs
OSR	Offsite Source Recovery (Program)
PCB	polychlorinated biphenyl
PE & D	Preliminary Engineering and Design
PHERMEX	Pulsed High-Energy Radiographic Machine Emitting X-rays (facility)
PNM	Public Service Company of New Mexico
PRS	potential release site
psi	pounds per square inch
PTLA	Protection Technology Los Alamos
RAMROD	Radioactive Materials Research Operations and Demonstration (facility)
RANT	Radioactive Assay and Nondestructive Test (facility)
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
RLWTF	Radioactive Liquid Waste Treatment Facility
ROD	record of decision
RTBF	Readiness in Technical Base and Facilities
S-3	Security Systems Group
SCC	Strategic Computing Complex
SHEBA	Solution High-Energy Burst Assembly
SNM	special nuclear material
SO_x	sulfur oxides
SWEIS	Site-Wide Environmental Impact Statement
SWMU	solid waste management unit
TA	Technical Area
TBD	to be determined
TEC	Total Estimated Cost
TEDE	total effective dose equivalent
TFF	Target Fabrication Facility
TRI	total recordable incident (rate)
TRU	transuranic
TSCA	Toxic Substances Control Act
TSFF	Tritium Science and Fabrication Facility
TSTA	Tritium System Test Assembly (facility)
TWISP	Transuranic Waste Inspectable Storage Project
TYCSP	Ten-Year Comprehensive Site Plan
U_3O_8	uranium oxide
UC	University of California
UF/RO	ultrafiltration/reverse osmosis
UNH	uranium nitrate hexahydrate
VCA	voluntary corrective action
WCRR	Waste Characterization, Reduction, and Repackaging (facility)
WETF	Weapons Engineering Tritium Facility
WIPP	Waste Isolation Pilot Plant
WNR	Weapons Neutron Research (facility)
WTA	Western Technical Area

Preface

In the Record of Decision for Stockpile Stewardship and Management, the US Department of Energy (DOE)[1] charged LANL with several new tasks, including war reserve pit production. DOE evaluated potential environmental impacts of these assignments in the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (DOE 1999a). This Site-Wide Environmental Impact Statement (SWEIS) provided the basis for DOE decisions to implement these new assignments at LANL through the SWEIS Record of Decision (ROD) issued in September 1999 (DOE 1999b).

Every five years, DOE performs a formal analysis of the adequacy of the SWEIS to characterize the environmental envelope for continuing operations at LANL. The Annual SWEIS Yearbook was designed to assist DOE in this analysis by comparing operational data with projections of the SWEIS for the level of operations selected by the ROD. As originally planned, the Yearbook was to be published one year following the activities; however, publication was moved approximately six months earlier to achieve timely presentation of the information. Yearbook publications to date include the following:

- "SWEIS 1998 Yearbook," LA-UR-99-6391, December 1999 (LANL 1999, http://lib-www.lanl.gov/cgi-bin/getfile?00460172.pdf).

- "SWEIS Yearbook – 1999," LA-UR-00-5520, December 2000 (LANL 2000a, http://lib-www.lanl.gov/cgi-bin/getfile?LA-UR-00-5520.htm).

- "A Special Edition of the SWEIS Yearbook, Wildfire 2000," LA-UR-00-3471, August 2000 (LANL 2000b, http://lib-www.lanl.gov/cgi-bin/getfile?00393627.pdf).

- "SWEIS Yearbook – 2000," LA-UR-01-2965, July 2001. (LANL 2001, http://lib-www.lanl.gov/la-pubs/00818189.pdf).

- "SWEIS Yearbook – 2001," LA-UR-02-3143, September 2002 (LANL 2002, http://lib-www.lanl.gov/cgi-bin/getfile?00818857.pdf).

- "SWEIS Yearbook – 2002" LA-UR-03-5862, September 2003 (LANL 2003, http://lib-www.lanl.gov/cgi-bin/getfile?LA-UR-03-5862.htm).

The collective set of Yearbooks contains data needed for trend analyses, identifies potential problem areas, and enables decision-makers to determine when and if an updated SWEIS or other National Environmental Policy Act (NEPA) analysis is necessary. This edition of the Yearbook summarizes the data from 1998 to 2002, and provides trend analysis of these data to assist DOE in its decision-making process. A similar summarization will be prepared every five years, as appropriate.

As with previous editions, the covers include inset photographs depicting important events that happened during the calendar year under review. The photograph on the front cover this year represents past human occupation of the Pajarito Plateau with an archaeological excavation on property destined for transfer from the Department of Energy to Los Alamos County. The photograph on the back cover depicts a current capability at the Laboratory—'the Wall' in the Strategic Computing Complex which houses the world's fastest computers.

[1] Congress established the National Nuclear Security Administration (NNSA) within the DOE to manage the nuclear weapons program for the United States. Los Alamos National Laboratory (LANL or Laboratory) is one of the facilities now managed by the NNSA. The NNSA officially began operations on March 1, 2000. Its mission is to carry out the national security responsibilities of the DOE, including maintenance of a safe, secure, and reliable stockpile of nuclear weapons and associated materials capabilities and technologies; promotion of international nuclear safety and nonproliferation; and administration and management of the naval nuclear propulsion program.

References

Department of Energy, 1999a. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," US Department of Energy document DOE/EIS-0238, Albuquerque, NM.

Department of Energy, 1999b. "Record of Decision: SWEIS in the State of New Mexico," 64 FR 50797, Washington, D.C.

Los Alamos National Laboratory, 1999. "SWEIS 1998 Yearbook," Los Alamos National Laboratory report LA-UR-99-6391, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?00460172.pdf).

Los Alamos National Laboratory, 2000a. "SWEIS Yearbook – 1999," Los Alamos National Laboratory report LA-UR-00-5520, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?LA-UR-00-5520.htm).

Los Alamos National Laboratory, 2000b. "A Special Edition of the SWEIS Yearbook, Wildfire 2000," Los Alamos National Laboratory report LA-UR-00-3471, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?00393627.pdf).

Los Alamos National Laboratory, 2001. "SWEIS Yearbook – 2000," Los Alamos National Laboratory report LA-UR-01-2965, Los Alamos, NM. (http://lib-www.lanl.gov/la-pubs/00818189.pdf).

Los Alamos National Laboratory, 2002. "SWEIS Yearbook – 2001," Los Alamos National Laboratory report LA-UR-02-3143, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?00818857.pdf).

Los Alamos National Laboratory, 2003. "SWEIS Yearbook – 2002" Los Alamos National Laboratory report LA-UR-03-5862, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?LA-UR-03-5862.htm).

Executive Summary

In 1999, the US Department of Energy (DOE) published a Site-Wide Environmental Impact Statement (SWEIS) for Continued Operation of Los Alamos National Laboratory (LANL or Laboratory)(DOE 1999a). DOE issued a Record of Decision (ROD) for this document in September 1999 (DOE 1999b).

DOE and LANL implemented a program, the Annual Yearbook, making comparisons between SWEIS ROD projections and actual operations data for two reasons: first, to preserve and enhance the usefulness of the SWEIS as a "living" document, and second, to provide DOE with a tool to assist in determining the continued adequacy of the SWEIS in characterizing existing operations. The Yearbooks from calendar year (CY) 1998 through CY 2001 focus on operations during one calendar year and specifically address the following:

- facility and/or process modifications or additions,
- types and levels of operations during the calendar year,
- operations data for the Key Facilities, and
- site-wide effects of operations for the calendar year.

The 2002 Yearbook is a special edition to assist DOE/National Nuclear Security Administration in evaluating the need for preparing a new SWEIS for LANL. This edition of the Yearbook summarizes the data routinely collected from CY 1998 through CY 2002 as described above. It also contains additional text and tabular summaries as well as a trend analysis. The 2002 Yearbook also indicates the Laboratory's programmatic progress in moving towards the SWEIS projections.

The SWEIS analyzed the potential environmental impacts of scenarios for future operations at LANL. DOE announced in its ROD that it would operate LANL at an expanded level and that the environmental consequences of that level of operations were acceptable. The ROD is not a predictor of specific operations, but establishes boundary conditions for operations. The ROD provides an environmental operating envelope for specific facilities and for the Laboratory as a whole. If operations at LANL were to routinely exceed the operating envelope, DOE would evaluate the need for a new SWEIS. As long as LANL operations remain below the level analyzed in the ROD, the environmental operating envelope is valid. Thus, the levels of operation projected by the SWEIS ROD should not be viewed as goals to be achieved, but rather as acceptable operational levels.

The Yearbooks address capabilities and operations using the concept of "Key Facility" as presented in the SWEIS. The definition of each Key Facility hinges upon operations (research, production, or services) and capabilities and is not necessarily confined to a single structure, building, or technical area. Chapter 2 discusses each of the 15 Key Facilities from three aspects—significant facility construction and modifications that have occurred from 1998 through 2002, the types and levels of operations that occurred from 1998 through 2002, and the 1998 through 2002 operations data. Chapter 2 also discusses the "Non-Key Facilities," which include all buildings and structures not part of a Key Facility, or the balance of LANL.

During 2002, planned construction and/or modifications continued at six of the 15 Key Facilities. These activities were both modifications within existing structures and new or replacement facilities. New structures completed and occupied during 2002 included the Technical Area (TA) 18 Relocation Project Office Building between TA-48 and TA-55, the Vessel Preparation Facility at TA-15, a Camera Room at TA-36-12, a Carpenter Shop at TA-15, the X-Ray Calibration Facility at TA-15, a Warehouse at TA-15, and the transportable office building TA-48-210. Additionally, 13 major construction projects were either completed or continued for the Non-Key Facilities. These projects were as follows:

- Construction continued on the Nonproliferation and International Security Center that was begun in March 2001.
- Atlas was disassembled and relocated to the Nevada Test Site in December 2002.

- Construction of the Emergency Operations Center started in January 2002.

- Construction of the S-3 Security Systems Support Facility started in July 2002.

- Construction of the Decision Applications Division Office Building started in September 2002.

- Construction of the new Medical Facility started in October 2002.

- The Chemistry Division Office Building was constructed, completed, and occupied.

- Construction of the Materials Science and Technology Office Building started in November 2002.

- Construction of the TA-72 Live Fire Shoot House started in November 2002.

- The Security Truck Inspection Station was constructed and became operational.

- The High Pressure Tritium Facility (TA-33-86) underwent decontamination and decommissioning and is now demolished.

- Demolition activities began in July 2002 on the Omega West Reactor Facility.

- TA-41-30 and the front of TA-41-4 were demolished August to October 2002.

The ROD projected a total of 38 facility construction and modification projects for LANL. Twenty projects have now been completed: six in 1998, eight in 1999, two in 2000, and four in 2002. The number of projects started or continued each year were 13 in 1998, 10 in 1999, seven in 2000, and six in both 2001 and 2002.

A major modification project, elimination and/or rerouting of National Pollutant Discharge Elimination System (NPDES) outfalls, was completed in 1999, bringing the total number of permitted outfalls down from the 55 identified by the SWEIS ROD to 20. During 2000, Outfall 03A-199, which will serve the TA-03-1837 cooling towers, was included in the new NPDES permit issued by the US Environmental Protection Agency (EPA) on December 29, 2000. This brings the total number of permitted outfalls up to 21. During 2002, only 17 of the 21 outfalls flowed.

As in the Yearbooks since 1999, this issue reports chemical usage and calculated emissions (expressed as kilograms per year) for the Key Facilities, based on an improved chemical reporting system. The 2002 chemical usage amounts were extracted from the Laboratory's EX3 chemical inventory system rather than the Automated Chemical Inventory System used in the past. The quantities used for this report represent chemicals procured or brought on site by calendar year from 1999 through 2002. Information is presented in Appendix A for actual chemical use and estimated emissions for each Key Facility. Additional information for chemical use and emissions reporting can be found in the annual Emissions Inventory Report as required by New Mexico Administrative Code, Title 20, Chapter 2, Part 73 (20 NMAC 2.73). The most recent report is "Emissions Inventory Report Summary, Reporting Requirements for the New Mexico Administrative Code, Title 20, Chapter 2, Part 73 (20 NMAC 2.73) for Calendar Year 2000" (LANL 2001).

With a few exceptions, the capabilities identified in the SWEIS ROD for LANL have remained constant since 1998. The exceptions are the

- movement of the Nonproliferation Training/Nuclear Measurement School between Pajarito Site and the Chemistry and Metallurgy Research (CMR) Building during 2000 and 2002,

- relocation of the Decontamination Operations Capability from the Radioactive Liquid Waste Treatment Facility (RLWTF) to the Solid Radioactive and Chemical Waste Facilities in 2001,

- transfer of part of the Characterization of Materials Capability from Sigma to the Target Fabrication Facility (TFF) in 2001, and

- loss of Cryogenic Separation Capability at the Tritium Key Facilities in 2001.

Also, following the events of September 11, 2001, the Laboratory was requested to provide support for homeland security.

Since CY 1998, fewer than the 96 capabilities identified for LANL have been active. During 1998, only 87 capabilities were active. The nine capabilities with no activity were Manufacturing Plutonium Components at the Plutonium Complex; both Uranium Processing and Nonproliferation Training at the CMR Building; Accelerator Transmutation of Wastes at the Los Alamos Neutron Science Center (LANSCE); Biologically Inspired Materials and Chemistry, Computational Biology, and Molecular and Cell Biology at the Bioscience Facilities; and both Size Reduction and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 1999, 91 capabilities were active. The five inactive capabilities were Fabrication and Metallography at CMR; both Accelerator Transmutation of Wastes and Medical Isotope Production at LANSCE; and both Size Reduction and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 2000, 89 capabilities were active. The seven inactive capabilities were Fabrication of Ceramic-Based Reactor Fuels at the Plutonium Complex; Diffusion and Membrane Purification at the Tritium Facilities; both Destructive and Nondestructive Assay and Fabrication and Metallography at CMR; Accelerator Transmutation of Wastes and Medical Isotope Production at LANSCE; and both Size Reduction and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 2001, 87 capabilities were active. The nine inactive capabilities were both Manufacturing Plutonium Components and Fabrication of Ceramic-Based Reactor Fuels at the Plutonium Complex; both Cryogenic Separation and Diffusion and Membrane Purification at the Tritium Facilities; both Destructive and Nondestructive Assay and Fabrication and Metallography at CMR; Accelerator Transmutation of Wastes and Medical Isotope Production at LANSCE; and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 2002, 88 capabilities were active. The eight inactive capabilities were Manufacturing Plutonium Components at the Plutonium Complex; both the Cryogenic Separation and the Diffusion and Membrane Purification capabilities at the Tritium Facilities; both the Destructive and Nondestructive Assay and the Fabrication and Metallography capabilities at CMR; both the Accelerator Transmutation of Wastes and the Medical Isotope Production capabilities at LANSCE; and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

As in the preceding calendar years from 1998 through 2001, only three of LANL's facilities operated during 2002 at levels approximating those projected by the ROD—the Materials Science Laboratory (MSL), the Bioscience Facilities (formerly Health Research Laboratory), and the Non-Key Facilities. The two Key Facilities (MSL and Bioscience) are more akin to the Non-Key Facilities and represent the dynamic nature of research and development at LANL. More importantly, none of these facilities are major contributors to the parameters that lead to significant potential environmental impacts. The remaining 13 Key Facilities all conducted operations at or below projected activity levels.

From 1998 through 2002, radioactive airborne emissions from point sources (i.e., stacks) have varied from a low of 1,900 curies during 1999 to a high of approximately 15,400 curies during 2001, 70 percent of the ten-year average of 21,700 curies projected by the SWEIS ROD. The final dose over this same five-year period has varied from a low of 0.32 millirem in 1999 to a high of 1.84 millirem during 2001 (compared to 5.44 projected), with the final dose for 2002 being reported to the EPA by June 30, 2002. Calculated NPDES discharges have ranged from a low of 124 million gallons per year in 2001 to a high of 317 million gallons per year in 1999 compared to a projected volume of 278 million gallons per year. However, the apparent decrease in flows is primarily due to the methodology by which flow was measured and reported in the past. Historically, instantaneous flow was measured during field visits as required in the NPDES permit. These measurements were then extrapolated over a 24-hour day/seven-day week. With implementation of the new NPDES permit on February 1, 2001, data are collected and reported using actual flows recorded by flow meters at most outfalls. At those outfalls that do not have meters, the flow is calculated as before, based on instantaneous flow. Quantities of solid radioactive and chemical wastes generated have ranged from approximately 3.2 percent of the mixed low-level radioactive waste projections during both 1999 and 2002 to 1,291 percent and 1,309 percent of the chemical waste projections during 2001 and 2000, respectively. The extremely large quantities of chemical waste (23.0 million kilograms during 2001 and 27.2 million kilograms during 2000) are a result of Environmental Restoration (ER) Project activities. (For example, the remediation of Material Disposal Area [MDA] P resulted in 21.5 million kilograms, or 88 percent, of the 24.4 million kilograms of chemical waste generated during 2001.) Most chemical wastes are shipped offsite for disposal at commercial facilities; therefore, these large quantities of chemical waste will not impact LANL environs. The chemical waste quantities are the only solid waste type to have met or exceeded the SWEIS ROD projections between 1998 and 2002.

The workforce has been above ROD projections since 1997. The 13,524 employees at the end of CY 2002 represent 2,173 more employees than projected and the highest number of employees over the period. Since 1998, the peak electricity consumption was 394 gigawatt-hours during 2002 and the peak demand was 72 megawatts during 2001 compared to projections of 782 gigawatt-hours with a peak demand of 113 megawatts. The peak water usage was 461 million gallons during 1998 (compared to 759 million gallons projected), and the peak natural gas consumption was 1.49 million decatherms during 2001 (compared to 1.84 million decatherms projected). Between 1998 and 2002, the highest collective Total Effective Dose Equivalent (TEDE) for the LANL workforce was 196 person-rem during 2000, which is considerably lower than the workforce dose of 704 person-rem projected by the ROD.

Measured parameters for ecological resources and groundwater were similar to ROD projections, and measured parameters for cultural resources and land resources were below ROD projections. For land use, the ROD projected the disturbance of 48 acres of new land at TA-54 because of the need for additional disposal cells for low-level radioactive waste. As of 2002, this expansion had not become necessary. However, construction continued on 44 acres of land that are being developed along West Jemez Road for the Los Alamos Research Park. This project has its own National Environmental Policy Act documentation (an environmental assessment), and the land is being leased to Los Alamos County for this privately owned development.

Cultural resources remained protected, and no excavation of sites at TA-54 of LANL has occurred. (The ROD projected that 15 prehistoric sites would be affected by the expansion of Area G into Zones 4 and 6 at TA-54.) However, excavations did occur at the Airport East and White Rock tracts beginning in June 2002 and ending in March 2003. These two land tracts are now available to the County of Los Alamos for development.

As projected by the ROD, water levels in wells penetrating into the regional aquifer continue to decline in response to pumping, typically by several feet each year. In areas where pumping has been reduced, water levels show some recovery. No unexplained changes in patterns have occurred in the 1995–2002 period, and water levels in the regional aquifer have continued a gradual decline that started in about 1977. In addition, ecological resources are being sustained as a result of protection afforded by DOE ownership of LANL. These resources include biological resources such as protected sensitive species, ecological processes, and biodiversity. The recovery and response to the Cerro Grande Fire of May 2000 included a wildfire fuels reduction program, burned area rehabilitation and monitoring efforts, and enhanced vegetation and wildlife monitoring.

In conclusion, LANL operations data mostly fell within projections. Operations data that exceeded projections, such as number of employees or chemical waste from cleanup, either produced a positive impact on the economy of northern New Mexico or resulted in no local impact because these wastes were shipped offsite for disposal. Overall, the 1998 through 2002 operations data indicate that the Laboratory was operating within the SWEIS envelope and still ramping up operations towards the preferred Expanded Alternative in the ROD.

References

Department of Energy, 1999a. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," US Department of Energy document DOE/EIS-0238, Albuquerque, NM.

Department of Energy, 1999b. "Record of Decision: SWEIS in the State of New Mexico," 64 FR 50797, Washington, D.C.

Los Alamos National Laboratory, 2001. "Emissions Inventory Report Summary, Reporting Requirements for the New Mexico Administrative Code, Title 20, Chapter 2, Part 73 (20 NMAC 2.73) for Calendar Year 2000," Los Alamos National Laboratory report, Los Alamos, NM.

Acknowledgments

The Site-Wide Issues Program Office was closed on April 4, 2002. This office prepared the first three editions of the Yearbook and initiated preparation of Yearbook 2001. The Ecology Group of the Risk Reduction and Environmental Stewardship Division accomplished completion of Yearbooks 2001 and 2002. Ken Rea served as document manager; chief contributors were Theresa Rudell, Susan Radzinski, and Peggy Powers. Gil Gonzales prepared the impact analysis in Appendix E.

Jay Brown and Mahavir Jain provided prompt review of the document for classification issues and helped solve several concerns.

Phil Noll provided photographic support and Hector Hinojosa provided editorial support. Kelly Parker served as the designer, combining text and photographs to create a final product, with the help of Diedré Plumlee and Mike Anderson, electronic publication specialists. We would also like to thank Winters Red Star and Andi Kron for creating maps and figures.

Many individuals assisted in the collection of information and review of drafts. Data and information came from many parts of the Laboratory, including facility and operating personnel and those who monitor and track environmental parameters. The Yearbook could not have been completed and verified without their help. Though all individuals cannot be mentioned here, the table below identifies major players from each of the Key Facilities and other operations.

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1.0 Introduction

1.1 The SWEIS

In 1999, the US Department of Energy (DOE)[1] published a Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (DOE 1999a). DOE issued its Record of Decision (ROD) on this Site-Wide Environmental Impact Statement (SWEIS) in September 1999 (DOE 1999b). The ROD identified the decisions DOE made on levels of operation for LANL for the foreseeable future.

1.2 Annual Yearbook

To enhance the usefulness of this SWEIS, a National Environmental Policy Act (NEPA) document, DOE and LANL implemented a program making annual comparisons between SWEIS ROD projections and actual operations via an Annual Yearbook. The Yearbook's purpose is not to present environmental impacts or environmental consequences, but rather to provide data that could be used to develop an impact analysis. The Yearbook focuses on the following:

- Facility and process modifications or additions (Chapter 2). These include projected activities, for which NEPA coverage was provided by the SWEIS, and some post-SWEIS activities for which environmental coverage was not provided. In the latter case, the Yearbook identifies the additional NEPA analyses (i.e., categorical exclusions and environmental assessments) that were performed.

- The types and levels of operations during the calendar year (Chapter 2). Types of operations are described using capabilities defined in the SWEIS. Levels of operations are expressed in units of production, numbers of researchers, numbers of experiments, hours of operation, and other descriptive units.

- Operations data for the Key Facilities, comparable to data projected by the SWEIS ROD (Chapter 2). Data for each facility include waste generated, air emissions, liquid effluents, and number of workers.

- Site-wide effects of operations for the calendar year (Chapter 3). These include measures such as number of workers, radiation doses, workplace incidents, utility requirements, air emissions, liquid effluents, and solid wastes. These effects also include changes in the regional aquifer, ecological resources, and other resources for which the DOE has long-term stewardship responsibilities as an owner of federal lands.

- Trend analysis (Chapter 4). This includes analysis on land use, quantities of waste generated, utility consumption, long-term effects from Laboratory operations, and the Cerro Grande Rehabilitation Project.

- Ten-Year Comprehensive Site Plan (TYSCP; Chapter 5). This is a summary of what the Laboratory is proposing for potential future projects relative to land usage; structure maintenance, construction, and decontamination and demolition; and infrastructure maintenance and improvements.

[1] Congress established the National Nuclear Security Administration (NNSA) within the DOE to manage the nuclear weapons program for the United States. Los Alamos National Laboratory (LANL or Laboratory) is one of the facilities now managed by the NNSA. The NNSA officially began operations on March 1, 2000. Its mission is to carry out the national security responsibilities of the DOE, including maintenance of a safe, secure, and reliable stockpile of nuclear weapons and associated materials capabilities and technologies; promotion of international nuclear safety and nonproliferation; and administration and management of the naval nuclear propulsion program.

- Summary and conclusion (Chapter 6). This chapter summarizes CY 1998 through CY 2002 for the Laboratory in terms of overall facility construction and modifications, facility operations, and operations data and environmental parameters. These data form the basis of the conclusion for whether or not the Laboratory is operating within the envelope of the SWEIS ROD.

- Chemical usage and emissions data (Appendix A). These data summarize the chemical usage and air emissions by Key Facility.

- Nuclear facilities list (Appendix B). This appendix provides a summary of the facilities identified as nuclear at the time the SWEIS was developed through CY 2002.

- Radiological facilities list (Appendix C). These data identify the facilities considered as radiological in CY 2001 and CY 2002 and indicate their categorization at the time the SWEIS was developed.

- Outfall status table (Appendix D). This table delineates outfalls at LANL and chronicles usage history.

- Preliminary Assessment of Potential Impact of LANL Site Boundary Changes and Land Transfer on Accident Analyses in the SWEIS (Appendix E). This appendix provides an assessment of the potential impact of land transfers on the accident analyses in the SWEIS.

- Future projects (Appendix F). This appendix summarizes the projects identified in the TYCSP.

Data for comparison come from a variety of sources, including facility records, operations reports, facility personnel, and the annual Environmental Surveillance Report. The focus on operations rather than on programs, missions, or funding sources is consistent with the approach of the SWEIS.

The Annual Yearbooks provide DOE with information needed to evaluate adequacy of the SWEIS and enables DOE to make decisions on when and if a new SWEIS is needed. Once every five years, DOE will make a formal evaluation of the SWEIS as to its adequacy, and therefore, every fifth year, the Yearbook will not only report the previous years, data on operations, but will also include summaries and trends of the data presented in the previous four editions.

The Yearbooks also provide facilities and managers at the Laboratory a guide in determining whether activities are within the SWEIS operating envelope. The report does not reiterate the detailed information found in other LANL documents, but rather points the interested reader to those documents for the additional detail. The Yearbook serves as a guide to environmental information collected and reported by the various groups at LANL.

The SWEIS analyzed the potential environmental impacts of scenarios for future operations at LANL. DOE announced in its ROD that it would operate LANL at an expanded level and that the environmental consequences of that level of operations were acceptable. The ROD is not a predictor of specific operations, but establishes boundary conditions for operations. The ROD provides an environmental operating envelope for specific facilities and for the Laboratory as a whole. If operations at LANL were to routinely exceed the operating envelope, DOE would evaluate the need for a new SWEIS. As long as LANL operations remain below the level analyzed in the ROD, the environmental operating envelope is valid. Thus, the levels of operation projected by the SWEIS ROD should not be viewed as goals to be achieved, but rather as acceptable operational limits.

1.3 This Yearbook

The ROD selected levels of operations, and the SWEIS provided projections for these operations. This Yearbook compares data from 1998 through 2002 to the appropriate SWEIS projections. Hence, this report uses the phrases "SWEIS ROD projections," "SWEIS ROD," or "ROD" to convey this concept, as appropriate.

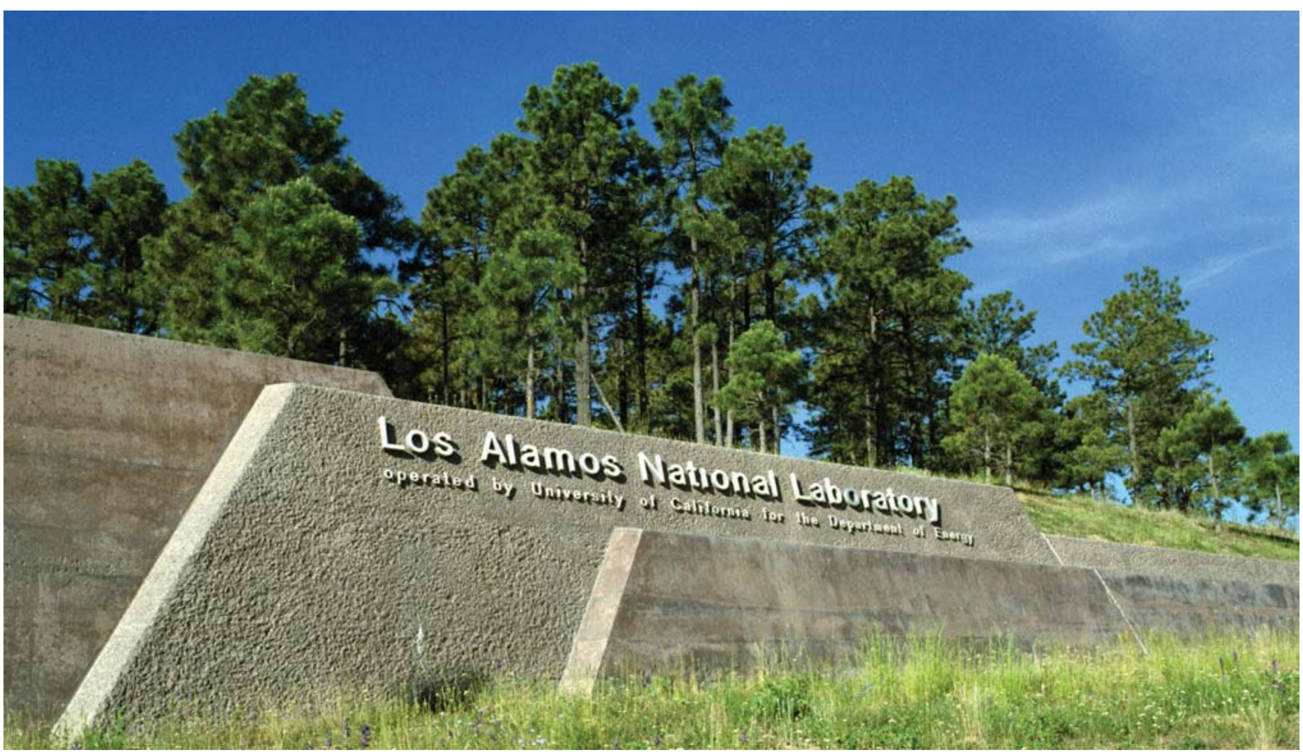
The collection of data on facility operations is a unique effort. The type of information developed for the SWEIS is not routinely collected at LANL. Nevertheless, this information is the heart of the SWEIS and the Yearbook. Although this requires a special effort, the description of current operations and indications of future changes in operations are believed to be sufficiently important to warrant an incremental effort.

This Yearbook represents the fifth year of data collection and comparison. Therefore, this Yearbook includes summaries of the previous four years, trends in the data across these years, and additional information as deemed necessary to enable DOE to use this document as the primary source of information for determination of the adequacy of the existing SWEIS.

1.4 References

Department of Energy, 1999a. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," US Department of Energy document DOE/EIS-0238, Albuquerque, NM.

Department of Energy, 1999b. "Record of Decision: SWEIS in the State of New Mexico," 64 FR 50797, Washington, D.C.



Entrance to LANL

Aerial view–North from Pajarito Road

2.0 Facilities and Operations

LANL has more than 2,000 structures with approximately eight million square feet under roof, spread over an area of approximately 40 square miles. In order to present a logical and comprehensive evaluation of LANL's potential environmental impacts, the SWEIS developed the Key Facility concept. Fifteen facilities were identified that were both critical to meeting mission assignments and

- housed operations that have potential to cause significant environmental impacts, or
- were of most interest or concern to the public (based on comments in the SWEIS public hearings), or
- would be more subject to change because of DOE programmatic decisions.

The remainder of LANL was called "Non-Key," not to imply that these facilities were any less important to accomplishment of critical research and development, but because they did not fit the above criteria (DOE 1999a).

Taken together, the 15 Key Facilities represent the great majority of environmental risks associated with LANL operations. Specifically, the SWEIS projected that the Key Facilities would contribute

- more than 99 percent of all radiation doses to the public,
- more than 90 percent of all radioactive liquid waste generated at LANL,
- more than 90 percent of all radioactive solid waste generated at LANL,
- more than 99 percent of all radiation doses to the LANL workforce, and
- approximately 30 percent of all chemical waste generated by LANL.

Offsite and Onsite Doses

Table 2.0-1 compares the actual maximum offsite doses to the SWEIS projections. As expected, the doses vary from the projection because the pit production mission has not reached maturity. Table 2.0-1 presents the readily available calendar year radiation doses, estimated and actual, to the public from LANL operations. These data have not been captured by facility for the SWEIS Yearbooks.

Table 2.0-1. Maximum Offsite Dose Estimates (mrem)

MAXIMUM OFFSITE DOSE	SWEIS ROD	1998	1999	2000	2001	2002
Estimate	5.44	1.72	0.32	0.65	1.9	1.6
Actual	---	1.72	0.32	0.65	1.84	1.69

Occupational radiation exposures for workers at LANL from CY 1998 through CY 2002 are summarized in Table 2.0-2. The collective Total Effective Dose Equivalent, or collective TEDE, for the LANL workforce during 2002 was 164 person-rem, considerably lower than the workforce dose of 704 person-rem projected for the ROD.

Table 2.0-2. Radiological Exposure to LANL Workers

PARAMETER	UNITS	SWEIS ROD	VALUE FOR 1998	VALUE FOR 1999	VALUE FOR 2000	VALUE FOR 2001	VALUE FOR 2002
Collective TEDE (external + internal)	person-rem	704	161	131	196	113	164
Number of workers with non-zero dose	number	3,548	1,839	1,427	1,316	1,332	1696
Average non-zero dose:							
• external + internal radiation exposure	millirem	Not projected	87.4	92	149	85	96
• external radiation exposure only	millirem	Not projected	Not projected	90	65	83	95

Comparison with the Projected TEDE in the ROD. In addition to being less than the collective TEDE levels in 1993–1995, the collective TEDE for 2002 is less than the TEDE projected in the ROD. The implementation of war reserve pit manufacture, which was approved in the ROD, has not become fully operational at LANL. This contributed to lower doses than projected. The collective dose may increase once the pit manufacture program is fully implemented.

Collective TEDEs for Key Facilities. In general, collective TEDEs by Key Facility or technical area are difficult to determine because these data are collected at the group level, and members of many groups and/or organizations receive doses at several locations. The fraction of a group's collective TEDE coming from a specific Key Facility or technical area can only be estimated. For example, personnel from the Health Physics Operations group and Johnson Controls Northern New Mexico (JCNNM) are distributed over the entire Laboratory, and these two organizations account for a significant fraction of the total LANL collective TEDE.

Radioactive Waste Generation

Tables 2.0-3 through 2.0-8 compare the actual waste generation volumes to the SWEIS projections. As expected, the volumes vary from the projections because the pit production mission has not reached maturity. Please note that the Facility and Waste Operations (FWO) database has been improved and adjusted for waste generator variances.

Table 2.0-3 shows the total amount of radioactive liquid waste treated at LANL. The facilities contributing liquid waste to the Radioactive Liquid Waste Treatment Facility (RLWTF), located at TA-50, can be found in the Annual Reports generated by the RLWTF operating group. Inspection of these reports substantiates the projection of greater than 90 percent of all radioactive liquid waste being generated by the 15 Key Facilities. (The most recent report is LANL 2003.)

Tables 2.0-4 through 2.0-8 show the solid radioactive waste data by Key Facility. The solid radioactive waste data are presented by individual types (LLW, mixed LLW [MLLW], TRU, and Mixed TRU) and summarized overall. Percentage comparisons have been given with and without environmental restoration because the environmental restoration contribution was an unknown at the time of the SWEIS publication.

Chemical Waste Generation

The chemical waste generated by Key Facility is summarized in Table 2.0-9. As with the solid radioactive waste, percentage comparisons have been given with and without environmental restoration because the environmental restoration contribution was an unknown at the time of the SWEIS publication.

Table 2.0-3. Radioactive Liquid Waste Treated at LANL

WASTE TREATMENT ACTIVITY	SWEIS ROD	1998	1999	2000	2001	2002	TOTAL (1998–2002)
Pretreatment of radioactive liquid waste at TA-21	900,000 liters/yr	370,000 liters	45,000 liters	45,000 liters	457,000 liters	30,300 liters	947,300 liters
Percentage of SWEIS projection of pretreatment at TA-21	-	41%	5%	5%	51%	3%	21%
Pretreatment of radioactive liquid waste from TA-55	80,000 liters/yr	39,000 liters	Less than 80,000 liters	9,000 liters	22,000 liters	35,400 liters	Less than 185,400 liters
Percentage of SWEIS projection of pretreatment from TA-55	-	49%	Less than 100%	11%	28%	44%	46%
Solidification of transuranic (TRU) sludge at TA-50	3 m^3/yr	None	5 m^3	5 m^3	None	None	10 m^3
Percentage of SWEIS projection of solidification of TRU sludge	-	0%	167%	167%	0%	0%	67%
Radioactive liquid waste treated at TA-50	35,000,000 liters/yr	23,000,000 liters	20,000,000 liters	19,000,000 liters	14,000,000 liters	11,500,000 liters	87,500,000 liters
Percentage of SWEIS projection of radioactive liquid waste treated at TA-50	-	66%	57%	54%	40%	33%	50%
De-water low-level radioactive waste (LLW) sludge at TA-50	10 m^3/yr	28 m^3	37 m^3	48 m^3	60 m^3	10 m^3	183 m^3
Percentage of SWEIS projection of LLW sludge de-watered at TA-50	-	280%	370%	480%	600%	100%	366%
Radioactive liquid waste treated at TA-53	Not Projected	[a]	[a]	[b]	[b]	243,000 liters	NA
Percentage of SWEIS projection of radioactive liquid waste treated at TA-53	NA	NA	NA	NA	NA	NA	NA

[a] Records of flows into the TA-53 lagoons started in CY 2000.
[b] The first records of flows into the TA-53 RLWTF were reported in the 2002 annual report (LANL 2003).

Table 2.0-4. Low-Level Waste Generation at LANL by Facility (in m^3/yr)

FACILITY	SWEIS ROD	1998	1999	2000	2001	2002	TOTAL (1998–2002)
2.1 Plutonium Complex	754	238	345	199	300	296.3	1,378.30
2.2 Tritium Facility	480	46	47	49	0	90	232.00
2.3 Chemistry and Metallurgy Research (CMR) Building	1,820	124	184	264	448	389	1,409.00
2.4 Pajarito Site	145	4	31.3	14	13	0	62.30
2.5 Sigma Complex	960	3	61	52	0.5	202	318.50
2.6 Materials Science Laboratory (MSL)	0	0	0	0	0	0	0.00
2.7 Target Fabrication Facility (TFF)	10	0	0	0	0.2	0.4	0.60
2.8 Machine Shops	606	27	40.4	409	22	44	542.40
2.9 High Explosives Processing	16	6	8.3	3	1	8.69	26.99
2.10 High Explosives Testing	940	0	0.01	0.6	0	0	0.61
2.11 Los Alamos Neutron Science Center (LANSCE)	1,085	16	70	28	0.1	0	114.10
2.12 Bioscience Facilities	34	7	14	0	0	0	21.00
2.13 Radiochemistry Facility	270	89	44	57	55	34	279.00
2.14 RLWTF	160	132	175	132	517	193	1,149.00
2.15 Solid Radioactive and Chemical Waste Facilities	174	15	21	13	14	35	98.00
Total of LLW for Key Facilities	7,454	707	1,042.01	1,221.60	1,406.80	1,292.39	5,669.80
2.16 Non-Key Facilities	520	386	350	2,781	569	534	4,620
Total of LLW for Key and Non-Key Facilities	7,974	1,092	1,392.01	4,002.60	1,975.80	1,826.39	10,288.80
Percentage of Total from Key Facilities	93.5%	65.7%	74.8%	43.9%	71.2%	70.8%	55.1%
2.17 Environmental Restoration (ER) Project	4,260	744	286	226	621	5,484	7,361
Total of LLW for Non-Key Facilities and ER Project	4,780	1,130	636	3,007	1,190	6,018	11,981
Total LLW = Key + Non-Key and ER Project	12,234	1,837	1,678.01	4,228.60	2,596.80	7,310	17,650.41
Percentage of Total from Key Facilities	60.9%	38.5%	62.1%	28.9%	54.2%	17.7%	32.1%

Table 2.0-5. Mixed Low-Level Waste Generation at LANL by Facility (in m³/yr)

FACILITY	SWEIS ROD	1998	1999	2000	2001	2002	TOTAL (1998–2002)
2.1 Plutonium Complex	13	1.3	3.9	1.75	12.6	3.34	22.89
2.2 Tritium Facility	3	0.1	0	0	0.01	0.8	0.91
2.3 CMR Building	19	3.2	0.4	0.3	0.4	0.9	5.2
2.4 Pajarito Site	1.5	0	7.9	0	0	0	7.9
2.5 Sigma Complex	4	0	0.3	0	1.3	0	1.6
2.6 MSL	0	0	0	0	0	0	0
2.7 TFF	0.4	0	0	0	0	0	0
2.8 Machine Shops	0	0.1	0.03	0.12	0.05	0	0.3
2.9 High Explosives Processing	0.2	0	0	0	0	0	0
2.10 High Explosives Testing	0.9	0	0	0	0	0	0
2.11 LANSCE	1	0.4	0.5	4.9	0.2	0.9	6.9
2.12 Bioscience Facilities	3.4	0	0.01	0	0	0	0.01
2.13 Radiochemistry Facility	3.8	0.3	0.6	1.6	2.8	2.2	7.5
2.14 RLWTF	0	1.3	3.2	2.5	2.6	3.7	13.3
2.15 Solid Radioactive and Chemical Waste Facilities	4	0	0	0	0	0	0
Total of MLLW for Key Facilities	54.2	6.8	16.9	11.13	19.97	11.84	66.64
2.16 Non-Key Facilities	30	55.4	2.5	10.1	9.4	8.7	86.1
Total of MLLW for Key and Non-Key Facilities	84.2	62.2	19.4	21.23	29.37	20.54	152.74
Percentage of Total from Key Facilities	64.4%	10.9%	87.1%	52.4%	68.0%	57.6%	43.6%
2.17 ER Project	548	9.2	1.25	577	28.86	0	616.31
Total of MLLW for Non-Key and ER Project Facilities	578	64.6	3.75	587.1	38.26	8.7	702.41
Total MLLW = Key + Non-Key and ER Project Facilities	632.2	71.4	20.65	598.23	58.23	20.54	769.05
Percentage of Total from Key Facilities	8.6%	9.5%	81.8%	1.9%	34.3%	57.6%	8.7%

Table 2.0-6. TRU Waste Generation at LANL by Facility (in m^3/yr)

FACILITY	SWEIS ROD	1998	1999	2000	2001	2002	TOTAL (1998–2002)
2.1 Plutonium Complex	237	73.3	94	54.1	35.6	40.6	297.9
2.2 Tritium Facility	0	0	0	0	0	0	0
2.3 CMR Building	28	12.7	8.9	24.8	46.5	10.2	103.1
2.4 Pajarito Site	0	0	0	0	0	0	0
2.5 Sigma Complex	0	0	0	0	0	0	0
2.6 MSL	0	0	0	0	0	0	0
2.7 TFF	0	0	0	0	0	0	0
2.8 Machine Shops	0	0	0	0	0	0	0
2.9 High Explosives Processing	0	0	0	0	0	0	0
2.10 High Explosives Testing (Listed as TRU/Mixed TRU)	0.2	0	0	0	0	0	0
2.11 LANSCE	0	0	0	0	0	0	0
2.12 Bioscience Facilities	0	0	0	0	0	0	0
2.13 Radiochemistry Facility	0	0.2	0	0	0	0	0.2
2.14 RLWTF	30	1	0	16.1	0.4	1.9	19.4
2.15 Solid Radioactive and Chemical Waste Facilities	27	20.9	39.9	27.1	9.7	29.5	127.1
Total of TRU Waste for Key Facilities	322.2	108.1	143.2	122.1	92.2	82.2	547.8
2.16 Non-Key Facilities	0	0	0	2.7	24.8	36.8	64.3
Total of TRU Waste for Key and Non-Key Facilities	322.2	108.1	143.2	124.8	117.0	119.1	612.2
Percentage of Total from Key Facilities	100.0%	100.0%	100.0%	97.8%	78.8%	68.9%	89.5%
2.17 ER Project	11	0	0	0	0	0	0
Total of TRU Waste for Non-Key and ER Project Facilities	11	0	0	2.7	24.8	36.8	64.3
Total TRU = Key + Non-Key and ER Project Facilities	333.2	108.1	143.2	124.8	117.0	119.1	612.2
Percentage of Total from Key Facilities	96.7%	100%	100%	97.8%	78.8%	69.0%	89.5%

Table 2.0-7. Mixed TRU Waste Generation at LANL by Facility (in m^3/yr)

FACILITY	SWEIS ROD	1998	1999	2000	2001	2002	TOTAL (1998–2002)
2.1 Plutonium Complex	102	16.8	66	16.8	29.6	54.9	184.1
2.2 Tritium Facility	0	0	0	0	0	0	0
2.3 CMR Building	13	15.8	1.9	1	0.8	16.7	36.2
2.4 Pajarito Site	0	0	0	0	0	0	0
2.5 Sigma Complex	0	0	0	0	0	0	0
2.6 MSL	0	0	0	0	0	0	0
2.7 TFF	0	0	0	0	0	0	0
2.8 Machine Shops	0	0	0	0	0	0	0
2.9 High Explosives Processing	0	0	0	0	0	0	0
2.10 High Explosives Testing (Listed as TRU/Mixed TRU)	0.2	0	0	0	0	0	0
2.11 LANSCE	0	0	0	0	0	0	0
2.12 Bioscience Facilities	0	0	0	0	0	0	0
2.13 Radiochemistry Facility	0	0	0	0	0	0	0
2.14 RLWTF	0	1.4	4.8	0	4.4	0.2	10.8
2.15 Solid Radioactive and Chemical Waste Facilities	0	0	0	7.8	13.1	15.1	36
Total of Mixed TRU Waste for Key Facilities	115.2	34.0	72.2	25.6	47.9	86.8	266.5
2.16 Non-Key Facilities	0	0	15	63	0	0.21	78.21
Total of Mixed TRU Waste for Key and Non-Key Facilities	115.2	34.0	87.2	88.6	47.9	87.01	344.71
Percentage of Total from Key Facilities	100.0%	100.0%	83.8%	28.9%	100.0%	99.8%	77.3%
2.17 ER Project	0	0	0	0	0.2	0	0.2
Total of Mixed TRU Waste for Non-Key and ER Project Facilities	0	0	15	63	0.2	0.21	78.41
Total Mixed TRU = Key + Non-Key and ER Project	115.2	34.0	87.2	88.6	48.1	87.01	344.91
Percentage of Total from Key Facilities	100%	100%	82.8%	28.9%	99.6%	99.8%	77.3%

Table 2.0-8. Overall Solid Radioactive Waste Generation at LANL (in m^3/yr)

FACILITY	SWEIS ROD	1998	1999	2000	2001	2002	TOTAL (1998–2002)
Total of LLW for Key Facilities	7,454.0	707	1,042.01	1,221.6	1,406.80	1,292.39	5,669.80
Total of MLLW for Key Facilities	54.2	6.8	16.9	11.3	19.97	11.84	66.64
Total of TRU for Key Facilities	322.2	108.1	143.2	122.1	92.2	82.2	547.8
Total of Mixed TRU for Key Facilities	115.2	34	72.2	25.6	47.9	86.8	266.5
Total Radioactive Solid Waste for Key Facilities	7,945.6	855.9	1,274.31	1,380.60	1,566.87	1,473.23	6,550.74
Total LLW from Non-Key Facilities	520	386	350	2,781	569	534	4,620
Total MLLW from Non-Key Facilities	30	55.4	2.5	10.1	9.4	8.7	86.1
Total TRU from Non-Key Facilities	0	0	0	2.7	24.8	36.8	64.3
Total Mixed TRU from Non-Key Facilities	0	0	15	63	0	0.21	78.21
Total Radioactive Solid Waste from Non-Key Facilities	550	441.4	367.5	2,857	603.2	579.71	4,849
Total Radioactive Solid Waste for Key and Non-Key Facilities	8,495.6	1,297.3	1,641.81	4,237.6	2,170.07	2,052.94	11,399.74
Percentage of Total Radioactive Solid Waste from Key Facilities	93.5%	66.0%	77.6%	32.6%	72.2%	71.8%	57.5%
Total LLW from ER Project	4,260	744	286	226	621	5.484	7,361
Total MLLW from ER Project	548	9.2	1.25	577	28.86	0	616.31
Total TRU Waste from ER Project	11	0	0	0	0	0	0
Total Mixed TRU Waste from ER Project	0	0	0	0	0.2	0	0.2
Total Radioactive Solid Waste from ER Project	4,819	753.2	287.25	803	650.06	5,484	7,978
Total Radioactive Solid Waste from All Facilities	13,315	2,050.5	1,929.06	5,040.6	2.820.13	7,536.94	19,377.74
Percentage From Key Facilities	59.7%	41.7%	66.1%	27.4%	55.6%	19.5%	33.8%

Table 2.0-9. Chemical Waste Generated at LANL by Facility (in kg/yr)

FACILITY	SWEIS ROD	1998	1999	2000	2001	2002	TOTAL (1998–2002)
2.1 Plutonium Complex	8,400	10,861	2,538	1,563	11,709	14,243	40,914
2.2 Tritium Facility	1,700	195	30	10	2,615	5,164	8,014
2.3 CMR Building	10,800	3,313	4,824	1,837	676	707	11,357
2.4 Pajarito Site	4,000	3,127	1,707	127	91	82	5,134
2.5 Sigma Complex	10,000	22,489	3,208	3,672	1,265	32,397	63,031
2.6 MSL	600	244	154	881	255	149	1,683
2.7 TFF	3,800	2,827	594	1,062	668	904	6,055
2.8 Machine Shops	474,000	4,399	3,955	887	26,474	2,023	37,738
2.9 High Explosives Processing	13,000	12,237	13,329	1,032,985	375,283	15,109	1,448,943
2.10 High Explosives Testing	35,300	444	1,015	60,437	1,337	1,285	64,518
2.11 LANSCE	16,600	55,258	11,060	1,205	4,057	1,999	73,579
2.12 Bioscience Facilities	13,000	2,368	1,691	2,370	1,359	4,504	12,292
2.13 Radiochemistry Facility	3,300	1,990	1,513	12,461	17,725	186,135	219,824
2.14 RLWTF	2,200	384	201	384	68,792	1,143	70,904
2.15 Solid Radioactive and Chemical Waste Facilities	920	327	30	806	449	863	2,475
Total of Chemical Waste for Key Facilities	597,620	120,462	45,848	1,120,688	512,756	266,707	2,066,461
2.16 Non-Key Facilities	651,000	1,506,392	765,395	367,768	1,254,680	334,348	4,228,583
Total of Chemical Waste for Key and Non-Key Facilities	1,248,620	1,626,854	811,243	1,488,456	1,767,436	601,055	6,295,044
Percentage of Total from Key Facilities	47.9%	7.4%	5.7%	75.3%	21.2%	44.4%	32.8%
2.17 ER Project	2,000,000	143,913	14,629,792	26,185,341	28,815,571	1,132,780	67,907,397
Total of Chemical Waste for Non-Key and ER Project Facilities	2,651,000	1,650,305	15,395,187	26,553,109	27,070,251	1,467,128	72,135,980
Total Waste = Key + Non-Key Facilities and ER Project	3,248,620	1,770,767	15,441,086	27,673,797	27,583,007	1,733,835	74,202,492
Percentage of Total from Key Facilities	18.4%	9.3%	0.3%	4.0%	1.9%	15.4%	2.8%

In addition, the Key Facilities (as presented in the SWEIS) comprised 42 of the 48 Category 2 and Category 3 Nuclear Structures at LANL.[1] Subsequently, DOE and LANL have published five lists identifying nuclear facilities at LANL [one in 1998 (DOE 1998a), another in 2000 (DOE 2000a), two in 2001 (LANL 2001a, b), and one in 2002 (LANL 2002a)] that significantly changed the classification of some buildings.

Nuclear and Radiological Facility Designations

Table 2.0-10 shows the nuclear facilities identified in the SWEIS and those identified in 2002 (LANL 2002a). Appendix B provides a summary of the nuclear facilities and a table has been added to each section of this chapter to explain the differences and identify the 23 structures currently listed by DOE as nuclear facilities. Of these 23 structures, all reside within a Key Facility. The only Non-Key Facility listed in 2001 was the former tritium research facility (TA-33-86), but the facility underwent decontamination and decommissioning in 2002, was demolished, and was removed from the nuclear facility list. Appendix C provides a comparison of the facilities identified as radiological when the SWEIS was prepared and those identified as radiological in 2001 and 2002 (LANL 2001c, 2002b). The 2001 and 2002 lists are shorter due to better guidance on the radiological designation.[2]

Definition of Key Facilities

The definition of each Key Facility hinges upon operations[3], capabilities, and location and is not necessarily confined to a single structure, building, or technical area. In fact, the number of structures comprising a Key Facility ranges from one, the MSL, to more than 400 for LANSCE. Key Facilities can also exist in more than a single technical area, as is the case with the High Explosives Testing and High Explosives Processing Key Facilities, which exist in all or parts of five and seven technical areas, respectively.

This chapter discusses each of the 15 Key Facilities from three aspects—significant facility construction and modifications, types and levels of operations, and operations data by calendar year from the publication of the SWEIS through 2002. Each of these three aspects is given perspective by comparing them to projections made by the SWEIS ROD. This comparison provides an evaluation of whether or not data resulting from LANL operations continue to fall within the environmental envelope established by the SWEIS ROD. It should be noted that construction activities projected by the SWEIS ROD were for the 10-year period 1996–2005. All construction activities will not be complete and projected operations may not reach maximum levels until the end of the 10-year period. Table 2.0-11 identifies the construction and modifications projected by the SWEIS ROD and what activity has occurred from 1998-2002. Table 2.0-12 summarizes the projected construction and modifications that have been completed. Table 2.0-13 summarizes the usage of capabilities by facility while Table 2.0-14 concentrates on those capabilities that have been inactive or lost. Table 2.0-15 provides an overview of emissions and solid waste while Table 2.0-16 summarizes flow from the permitted outfalls.

[1] DOE Order 5480.23 (DOE 1992a) categorizes nuclear hazards as Category 1, Category 2, or Category 3. Because LANL has no Category 1 nuclear facilities (usually applied to nuclear reactors), definitions are presented for only Categories 2 and 3:
• Category 2 Nuclear Hazard–has the potential for significant onsite consequences. DOE-STD-1027-92 (DOE 1992b) provides the resulting threshold quantities for radioactive materials that define Category 2 facilities.
• Category 3 Nuclear Hazard–has the potential for only significant localized consequences. Category 3 is designed to capture those facilities such as laboratory operations, LLW handling operations, and research operations that possess less than Category 2 quantities of material. DOE-STD-1027-92 (DOE 1992b) provides the Category 3 thresholds for radionuclides.
The identification of nuclear facilities is based upon the official list maintained by DOE Los Alamos Site Office as of December 2002 (LANL 2002a).

[2] Since the publication of the SWEIS, only two radiological facility lists have been published. The first (LANL 2001c) was published in 2001 and the second (LANL 2002b) in 2002.

[3] As used in the SWEIS and this Yearbook, facility operations include three categories of activities—research, production, and services to other LANL organizations. Research is both theoretical and applied. Examples include modeling (e.g., atmospheric weather patterns) to subatomic investigations (e.g., using the LANSCE linear accelerator [linac]) to collaborative efforts with industry (e.g., fuel cells for automobiles). Production involves delivery of a product to a customer, such as radioisotopes to hospitals and the medical industry. Examples of services provided to other LANL facilities include utilities and infrastructure support, analysis of samples, environmental surveys, and waste management.

Table 2.0-10. LANL Nuclear Facilities – SWEIS and 2002

KEY FACILITY	BUILDING	SWEIS		2002	
		FACILITY	HC	FACILITY	HC
2.1 Plutonium Complex	TA-55-4	Pu-238 Processing	2	TA-55 Plutonium Facility	2
	TA-55-41	Nuclear Material Storage	2		
2.2 Tritium Facilities	TA-16-205	Weapons Engineering Tritium Facility (WETF)	2	TA-16 WETF	2
	TA-16-205A	WETF	2		
	TA-16-450	WETF	2		
	TA-21-155	Tritium System Test Assembly (TSTA)	2	TSTA	2
	TA-21-209	Tritium Science and Fabrication Facility (TSFF)	2	TA-21 TSFF	2
2.3 CMR Building	TA-03-19 (actually TA-3-29)	Chemistry and Metallurgy Research Facility (CMR)	2	TA-03 CMR	2
2.4 Pajarito Site	TA-18-23	KIVA 1	2	TA-18 Los Alamos Critical Experiment Facility	2
	TA-18-26	Hillside Vault	2		
	TA-18-32	KIVA 2	2		
	TA-18-116	KIVA 3	2		
2.5 Sigma Complex	TA-03-66	44 metric tons of depleted uranium storage	3		
	TA-03-159	Thorium storage	3		
2.6 MSL					
2.7 TFF					
2.8 Machine Shops					
2.9 High Explosives Processing	TA-08-22	Radiography Facility	2		
	TA-08-23	Radiography Facility	2	Betaron Building	2
	TA-08-24	Isotope Building	2		
	TA-08-70	Experimental Science	2		
	TA-16-411	Intermediate Device Assembly	2		
2.10 High Explosives Testing					
2.11 LANSCE	TA-53-3M	Experimental Science	3		
				TA-53 1L Target	3
				TA-53 Lujan Center ER-1/2	3
				TA-53 Area A-6	3
2.12 Bioscience					
2.13 Radiochemistry Facility	TA-48-1	Radiochemistry and Hot Cell Facility	3	TA-48 Radiochemistry and Hot Cell Facility	3

Table 2.0-10. LANL Nuclear Facilities – SWEIS and 2002 (continued)

KEY FACILITY	BUILDING	SWEIS		2002	
		FACILITY	HC	FACILITY	HC
2.14 RLWTF	TA-50-1	Main Treatment Plant	2	Main Treatment Plant, pretreatment plant, decontamination operation	3
	TA-50-2	LLW Tank Farm		Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks	3
	TA-50-66	Acid and Caustic Tank Farm		Acid and caustic waste holding tanks	3
	TA-50-90	Holding Tank		Holding Tank	3
2.15 Solid Radioactive and Chemical Waste Facilities	TA-50-37	Radioactive Materials, Research, Operations, and Demonstration (RAMROD)		TA-50 RAMROD	2
	TA-50-69	Waste Characterization, Reduction, and Repackaging (WCRR) Facility Building	2	TA-50 WCRR Facility	3
	TA-50-69 Outside	Nondestructive Analysis Mobile Activities		TA-50 External nondestructive analysis mobile activities outside TA-50-69	2
	TA-50-69 Outside			TA-50 External Drum staging/storage pad and waste container temperature equilibration activities outside TA-50-69	2
	TA-54 Area G	LLW Waste Storage/Disposal	2	TA-54 Storage and Disposal Facility (Area G)	2
	TA-54-33	TRU Drum Preparation	2	Transuranic waste storage fabric dome with TRU waste drum (TRU Waste Inspectable Storage Project [TWISP])	2
	TA-54-38	Radioactive Assay Nondestructive Testing (RANT) Facility	2	TA-54 RANT Facility	3
	TA-54-48	TRU Storage Dome	2		
	TA-54-49	TRU Storage Dome	2		
	TA-54-144	Shed	2		
	TA-54-145	Shed	2		
	TA-54-146	Shed	2		
	TA-54-153	Dome	2		
	TA-54-177	Shed	2		
	TA-54-226	Temporary Retrieval Dome	2		
	TA-54-229	Tension Support Dome	2		
	TA-54-230	Tension Support Dome	2		
	TA-54-231	Tension Support Dome	2		
	TA-54-232	Tension Support Dome	2		
	TA-54-283	Tension Support Dome	2		
	TA-54-Pad2	Storage Pad	2	Recovery of buried TRU waste (TWISP)	2
	TA-54-Pad3	Storage Pad	2		
	TA-54-Pad4	TRU Storage	2		

Table 2.0-10. LANL Nuclear Facilities – SWEIS and 2002 (continued)

KEY FACILITY	BUILDING	SWEIS		2002	
		FACILITY	HC	FACILITY	HC
2.16 Non-Key Facilities	TA-03-40	Physics Building	3		
	TA-03-65	Source Storage	2		
	TA-03-130	Calibration Building	3		
	TA-33-86	Former Tritium Research	3		
	TA-35-2	Nuclear Safeguards Research Facility	3		

Table 2.0-11. Projected Construction and Modifications in the SWEIS ROD

FACILITY	ROD PROJECTION	1998	1999	2000	2001	2002
2.1 Plutonium Complex	Renovation of the Nuclear Material Storage Facility (NMSF)		Design efforts halted.			
	Construction of a new administrative office building		Facilities Improvement Technical Support (FITS) building constructed.			
	Upgrades within Building 55-4 to support continued manufacturing at the existing capacity of 14 pits/year	Upgrades continued.	Upgrades continued.	Upgrades continued.	Upgrades continued.	
	Further upgrades for long-term viability of the facility and to boost production to a nominal capacity of 20 pits/year				CMR Replacement preconceptual design.	CMR Replacement design ongoing.
2.2 Tritium Facilities	Extend the WETF tritium operations into TA-16-450	Significant remodeling of TA-16-450 began.	Remodeling continued.	Remodeling completed.		
2.3 CMR Building	Phase I Upgrades to maintain safe operating conditions for 5 to 10 years	Five of the 11 Phase I Upgrades completed.	Six of the 11 Phase I Upgrades completed before re-baselining.			
	Phase II Upgrades (except seismic) to enable operations for an additional 20 to 30 years		Progress made on 3 of the original 13. before re-baselining.			
	Modifications for production of targets for the molybdenum-99 medical isotope					Incomplete; inactive project.
	Modifications for the recovery of sealed neutron sources					Incomplete; inactive project.
	Modifications for safety testing of pits in the Wing 9 hot cells					Incomplete; inactive project.
2.4 Pajarito Site	Replacement of the portable linac machine					Has not been replaced.
2.5 Sigma Complex	Replacement of graphite collection systems	Completed in 1998.				
	Modification of the industrial drain pipe		Completed in 1999.			
	Replacement of electrical components			Essentially completed.	Add-on assignments continue.	Add-on assignments continue

Table 2.0-11. Projected Construction and Modifications in the SWEIS ROD (continued)

FACILITY	ROD PROJECTION	1998	1999	2000	2001	2002
	Roof replacement	Work done in 1998.	Most of roof replacement done.	Additional work needed.	Additional work needed.	Additional work needed.
	Seismic upgrades	Not started.	Not started.	Not started.	Not started.	Not started.
2.6 MSL	Complete the top floor of the MSL	Unscheduled and not funded.	Unscheduled and not funded.	Unscheduled and not funded.	Unscheduled and not funded.	Unscheduled and not funded.
2.7 TFF	None projected					
2.8 Machine Shops	None projected					
2.9 High Explosives Processing	Construction of the High Explosive Wastewater Treatment Facility (HEWTF)	HEWTF, TA-16-508, became fully operational in 1997.				
	Modification of 17 outfalls and their elimination from the National Pollutant Discharge Elimination System (NPDES) permit	19 outfalls eliminated during 1997 and 1998.				
	Relocation of the Weapons Component Testing Facility		Completed before 1999.			
	TA-16 steam plant conversion	Satellite steam boilers placed in service in 1997 and central plant shutdown.				
2.10 High Explosives Testing	Dual-Axis Radiographic Hydrodynamic Test (DARHT) facility construction and modification	Construction of TA-15-312 continued.	Construction of TA-15-312 continued.	Construction of TA-15-312 completed.		DARHT construction completed.
2.11 LANSCE	Eliminate NPDES Outfall 03A-145 from the Orange Box Building	Eliminated in 1998.				
	Closure of two former sanitary lagoons	Sampling conducted in 1998.	Remediation started in 1999.	Characterization continued; south lagoon sludge and liner removed.	Data analysis and sampling continued.	Cleanup of north lagoon as Interim Action.
	Low-Energy Demonstration Accelerator (LEDA) to become operational in late 1998	Started high-power conditioning.	Maximum power achieved.	Operated.	Shutdown in December until funded.	Inactive until funded.
	Short-Pulse Spallation Source enhancements	Upgrades started.	Installation of new instruments began.	First phase of Proton Storage Ring Upgrade completed.	Proton Storage Ring completed; instruments commissioned.	Upgrades to ion source and 1L line in progress.
	One-megawatt target/blanket					Not completed and not funded.

Table 2.0-11. Projected Construction and Modifications in the SWEIS ROD (continued)

FACILITY	ROD PROJECTION	1998	1999	2000	2001	2002
	New 100-MeV Isotope Production Facility		Construction preparation began.	Construction began.	Facility completed; upgrades to beam line in progress.	Readiness Review planned for July 2003 and commissioning for October 2003.
	Long-Pulse Spallation Source (LPSS), including decontamination and renovation of Area A	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.
	Dynamic Experiment Lab	Not started.	Not started.	Concept revised.		
	Los Alamos International Facility for Transmutation	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.
	Exotic Isotope Production Facility	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.	Not completed and not funded.
	Decontamination and renovation of Area A-East	Not completed.	Not completed.	Not completed.	Not completed.	Not completed.
2.12 Bioscience Facilities	None projected					
2.13 Radiochemistry Facility	None projected					
2.14 RLWTF	Replace influent underground storage tanks	Tank farm upgraded by replacing two of three underground storage tanks with four aboveground steel tanks in 1997.				
	Install an ultrafiltration/reverse osmosis (UF/RO) process	Process installed in 1998.	Process became operational in 1999.			
	Install nitrate reduction equipment	Equipment installed in 1998.	Equipment became operational.		Equipment removed from service.	

Table 2.0-11. Projected Construction and Modifications in the SWEIS ROD (continued)

FACILITY	ROD PROJECTION	1998	1999	2000	2001	2002
2.15 Solid Radioactive and Chemical Waste Facility	Four additional fabric domes for storage of retrieved TRU waste	Three domes constructed and usage of an existing dome changed.	Dome 54-375 completed.			
2.16 Non-Key Facilities	Atlas	Atlas Facility designed and construction began in 1996.	Construction continued in 1999.	Construction completed and major capacitor banks tested.	Readiness for operations in July 2001 and first experiments in September 2001; environmental assessment for relocation to Nevada Test Site	Atlas physically moved to Nevada Test Site before end of December 2002.

Table 2.0-12. Projected Construction and Modifications Completed 1998–2002

1998 OR EARLIER	1999	2000	2001	2002
High Explosives Processing: Construction of HEWTF at TA-16-1508	Plutonium Complex: Constructed FITS Building	Tritium Facilities: Remodel of TA-16-450 and connection to WETF		CMR: re-baseline upgrades (originally listed as Phase 1 and Phase 2 Upgrades)
High Explosives Processing: Modification of flows to 19 outfalls and elimination from NPDES permit	Sigma: Replacement of the graphite collection systems	Non-Key Facilities: Atlas facility in parts of five buildings		High Explosives Testing: DARHT completed
High Explosives Processing: TA-16 Central steam plant replacement	Sigma: Modification of the industrial drain system			LANSCE: New 100-MeV Isotope Production Facility
LANSCE: Modification of three outfalls at TA-53 and elimination from NPDES permit	Sigma: Replacement of electrical components			
RLWTF: Installation of four above-grade tanks for influent liquid waste	High Explosives Processing: Relocation of the Weapons Components Testing Facility			
Solid Radioactive and Chemical Waste Facilities: Construction of four additional fabric domes at Area G for TRU waste storage	LANSCE: making the LEDA operational			
	RLWTF: bringing the new UF/RO process on-line			
	RLWTF: bringing the nitrate reduction equipment on-line			
Projects Completed:				
6	8	2	0	4
Total Completed for 1998–2002: 20				

Table 2.0-13. Capabilities

FACILITY	CAPABILITY	1998	1999	2000	2001	2002
2.1 Plutonium Complex	Plutonium Stabilization	Active	Active	Active	Active	Active
	Manufacturing Plutonium Components	Inactive	Active below SWEIS ROD level	Active below SWEIS ROD level	Inactive	Inactive
	Surveillance and Disassembly of Weapons Components	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Actinide Materials and Science Processing, Research, and Development	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Fabrication of Ceramic-Based Reactor Fuels	Active	Active	Inactive	Inactive	Active
	Plutonium-238 Research, Development, and Applications	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Nuclear Materials Storage, Shipping, and Receiving	Active	Active	Active	Active	Active
2.2 Tritium Facilities	High-Pressure Gas Fills and Processing: WETF	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Gas Boost System Testing and Development: WETF	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Cryogenic Separation: TSTA	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Lost
	Diffusion and Membrane Purification: TSTA, TSFF, WETF	Active below SWEIS ROD level	Active below SWEIS ROD level	Inactive	Inactive	Inactive
	Metallurgical and Material Research: TSTA, TSFF, WETF	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Thin Film Loading: TSFF (WETF by 2001)	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Gas Analysis: TSTA, TSFF, WETF	Active	Active	Active	Active	Active
	Calorimetry: TSTA, TSFF, WETF	Active	Active	Active	Active	Active
	Solid Material and Container Storage: TSTA, TSFF, WETF	Active	Active	Active	Active	Active
2.3 CMR Building	Analytical Chemistry	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Uranium Processing	Inactive	Active	Active	Active	Active
	Destructive and Nondestructive Assay	Active below SWEIS ROD level	Active below SWEIS ROD level	Inactive	Inactive	Inactive
	Nonproliferation Training	Inactive	Active	Active and moved to Pajarito Site	Inactive at CMR	Active
	Actinide Research and Processing	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Fabrication and Metallography	Active below SWEIS ROD level	Inactive	Inactive	Inactive	Inactive
2.4 Pajarito Site	Dosimeter Assessment and Calibration	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Detector Development	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level

Table 2.0-13. Capabilities (continued)

FACILITY	CAPABILITY	1998	1999	2000	2001	2002
	Materials Testing	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Subcritical Measurements	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Fast-Neutron Spectrum	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Dynamic Measurements	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Skyshine Measurements	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Vaporization	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Irradiation	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Nuclear Measurement School	Inactive at Pajarito Site	Inactive at Pajarito Site	Inactive at Pajarito Site	Active	Inactive at Pajarito Site
2.5 Sigma Complex	Research and Development on Materials Fabrication, Coating, Joining, and Processing	Active	Active	Active	Active	Active
	Characterization of Materials	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active at Sigma except for "analyze up to 36 tritium reservoirs/yr"	Active at Sigma except for "analyze up to 36 tritium reservoirs/yr"
	Fabrication of Metallic and Ceramic items	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
2.6 MSL	Materials Processing	Active below SWEIS ROD level	Active	Active	Active	Active
	Mechanical Behavior in Extreme Environment	Active below SWEIS ROD level	Active	Active	Active	Active
	Advanced Materials Development	Active below SWEIS ROD level	Active	Active	Active	Active
	Materials Characterization	Active below SWEIS ROD level	Active	Active	Active	Active
2.7 TFF	Precision Machining and Target Fabrication	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Polymer Synthesis	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Chemical and Physical Vapor Deposition	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Characterization of Materials	Located at Sigma; not active at TFF	Located at Sigma; not active at TFF	Located at Sigma; not active at TFF	Active below SWEIS ROD level	Active below SWEIS ROD level
2.8 Machine Shops	Fabrication of Specialty Components	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Fabrication Utilizing Unique Materials	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level

Table 2.0-13. Capabilities (continued)

FACILITY	CAPABILITY	1998	1999	2000	2001	2002
	Dimensional Inspection of Fabricated Components	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
2.9 High Explosives Processing	High Explosives Synthesis and Production	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	High Explosives and Plastics Development and Characterization	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	High Explosives and Plastics Fabrication	Active	Active	Active	Active	Active
	Test Device Assembly	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Safety and Mechanical Testing	Active	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Research, Development, and Fabrication of High-Power Detonators	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
2.10 High Explosives Testing	Hydrodynamic Tests	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Dynamic Experiments	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Explosives Research and Testing	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Munitions Experiments	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	High-Explosives Pulsed-Power Experiments	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Calibration, Development, and Maintenance Testing	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Other Explosives Testing	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
2.11 LANSCE	Accelerator Beam Delivery, Maintenance, and Development	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Experimental Area Support	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Neutron Research and Technology	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Accelerator Transmutation of Wastes	Inactive	Inactive	Inactive	Inactive	Inactive
	Subatomic Physics Research	Active	Active	Active	Active	Active
	Medical Isotope Production	Active below SWEIS ROD level	Inactive	Inactive	Inactive	Inactive
	High-Power Microwaves and Advanced Accelerators	Active	Active	Active	Active	Active

Table 2.0-13. Capabilities (continued)

FACILITY	CAPABILITY	1998	1999	2000	2001	2002
2.12 Bioscience Facilities	Biologically Inspired Materials and Chemistry	Not in SWEIS ROD	Active	Active	Active	Active
	Computational Biology	Not in SWEIS ROD	Active	Active	Active	Active
	Environmental Biology (formerly Environmental Effects)	Active	Active	Active	Active	Active
	Genomics (formerly Genomic Studies)	Active	Active	Active	Active	Active
	Measurement Science and Diagnostics (formerly Cytometry)	Active	Active	Active	Active	Active
	Molecular and Cell Biology (formerly Cell Biology and DNA Damage and Repair)	Active	Active	Active	Active	Active
	Molecular Synthesis	Not in SWEIS ROD	Active	Active	Active	Active
	Structural Biology (formerly Structural Cell Biology)	Active	Active	Active	Active	Active
	In-Vivo Monitoring	Active	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
2.13 Radiochemistry Facility	Radionuclide Transport Studies	Active	Active	Active	Active	Active
	Environmental Remediation Support	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Ultra-Low-Level Measurements	Active	Active	Active	Active	Active
	Nuclear/Radiochemistry	Active	Active	Active	Active	Active
	Isotope Production	Active	Active	Active	Active	Active
	Actinide/TRU Chemistry	Active	Active	Active	Active	Active
	Data Analysis	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Inorganic Chemistry	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Structural Analysis	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Sample Counting	Active	Active	Active	Active	Active
2.14 RLWTF	Waste Characterization, Packaging, Labeling	Active	Active	Active	Active	Active
	Waste Transport, Receipt, and Acceptance	Active	Active	Active	Active	Active
	Radioactive Liquid Waste Pretreatment	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Radioactive Liquid Waste Treatment	Active	Active	Active	Active	Active
	Decontamination Operations	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Inactive at RLWTF; relocated to Solid Waste Facilities	Inactive at RLWTF; relocated to Solid Waste Facilities

Table 2.0-13. Capabilities (continued)

FACILITY	CAPABILITY	1998	1999	2000	2001	2002
2.15 Solid Radioactive and Chemical Waste Facilities	Waste Characterization, Packaging, Labeling	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Compaction	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Size Reduction	Inactive	Inactive	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Waste Transport, Receipt, and Acceptance	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Waste Storage	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Waste Retrieval	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Other Waste Processing	Inactive	Inactive	Inactive	Inactive	Inactive
	Disposal	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level	Active below SWEIS ROD level
	Decontamination Operations	Inactive at Solid Waste; located at RLWTF	Inactive at Solid Waste; located at RLWTF	Inactive at Solid Waste; located at RLWTF	Active at Solid Waste	Active at Solid Waste
2.16 Non-Key Facilities	Theory, Modeling, and High-performance Computing	Active	Active	Active	Active	Active
	Experimental Science and Engineering	Active	Active	Active	Active	Active
	Advanced and Nuclear Materials Research and Development and Applications	Active	Active	Active	Active	Active
	Waste Management	Active	Active	Active	Active	Active
	Infrastructure and Central Services	Active	Active	Active	Active	Active
	Maintenance and Refurbishment	Active	Active	Active	Active	Active
	Management of Environmental, Ecological, and Cultural Resources	Active	Active	Active	Active	Active

Table 2.0-14. Summary of Inactive Capabilities

FACILITY	1998	1999	2000	2001	2002
2.1 Plutonium Complex	Manufacturing Plutonium Components			Manufacturing Plutonium Components	Manufacturing Plutonium Components
			Fabrication of Ceramic-Based Reactor Fuels	Fabrication of Ceramic-Based Reactor Fuels	
2.2 Tritium Facilities				Cryogenic Separation: TSTA [a]	Cryogenic Separation: TSTA [a]
			Diffusion and Membrane Purification: TSTA, TSFF, WETF	Diffusion and Membrane Purification: TSTA, TSFF, WETF	Diffusion and Membrane Purification: TSTA, TSFF, WETF
2.3 CMR Building	Uranium Processing				
			Destructive and Nondestructive Assay	Destructive and Nondestructive Assay	Destructive and Nondestructive Assay
	Nonproliferation Training				
		Fabrication and Metallography	Fabrication and Metallography	Fabrication and Metallography	Fabrication and Metallography
2.11 LANSCE	Accelerator Transmutation of Wastes	Accelerator Transmutation of Wastes	Accelerator Transmutation of Wastes	Accelerator Transmutation of Wastes	Accelerator Transmutation of Wastes
		Medical Isotope Production	Medical Isotope Production	Medical Isotope Production	Medical Isotope Production
2.12 Bioscience Facilities	Biologically Inspired Materials and Chemistry (not in ROD) [b]				
	Computational Biology (not in ROD) [b]				
	Molecular Synthesis (not in ROD) [b]				
2.15 Solid Radioactive and Chemical Waste Facilities	Size Reduction	Size Reduction			
	Other Waste Processing	Other Waste Processing	Other Waste Processing	Other Waste Processing	Other Waste Processing

[a] Capability lost at TSTA in CY 2001 and not available elsewhere at LANL.

[b] Capability not identified for Health Research Laboratory (now Bioscience Facilities) in the SWEIS ROD. Capability developed in CY 1999.

Table 2.0-15. Summary of Wastes Generated

	SWEIS ROD	1998	1999	2000	2001	2002
Radioactive airborne emissions from point sources						
• in Ci	21,700	8,690	1,900	3,100	15,400	6,150
• Percent of 10-year average of 21,700 Ci	---	<50	<10	15	70	30
• final dose in mrem	5.44	1.72	0.32	0.65	1.84	1.69
Percent of 5.44 mrem	---	32	<6	<12	<34	<23
NPDES discharges in million gallons per year (MGY)	278	212	317	265	124	178
Percent of 278 MGY	---	<77	~114	~95	<45	~64
Chemical Waste in 10^3 kg/yr	3,250	1,771	15,441	27,674	27,583	602
Percent of $3,250 \times 10^3$ kg/yr	---	54.5	475	852	849	18.5
LLW in m^3/yr	12,200	1,837	1,678	4,229	2,597	7,310
Percent of 12,200 m^3/yr	---	15.1	13.8	34.7	21.3	59.9
MLLW in m^3/yr	632	71	21	598	58	21
Percent of 632 m^3/yr	---	11.2	3.3	94.6	9.2	3.3
TRU in m^3/yr	333	108	143	125	117	119
Percent of 333 m^3/yr	---	32.4	42.9	37.5	35.1	35.7
Mixed TRU in m^3/yr	115	34	87	87	48	87
Percent of 115 m^3/yr	---	29.6	75.7	75.7	41.7	75.7

Table 2.0-16. Flow from Permitted Outfalls [a]

FACILITY	OUTFALL	MGY SWEIS ROD	1998	1999	2000	2001	2002
2.1 Plutonium Complex	03A-181	14	8.5	8.54	6.4	0.4	2.8
2.2 Tritium Facilities	05S	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	02A-129	0.1	13.0	8.83	7.9	0.3902	10.8400
	03A-036	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	03A-158	0.2	0.7	0.14	0.7	0.00300	2.5600
	04A-091	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
2.3 CMR Building	03A-021	0.53	3.2	4.45	2.28	0.02090	0.76
2.4 Pajarito Site	None						
2.5 Sigma Complex	03A-022	4.4	12.7	5.77	3.9	0.05	2.0040
	03A-024	2.9	No discharge	No discharge	0	0	0
2.6 MSL	None						
2.7 TFF	04A-127	0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
2.8 Machine Shops	None						
2.9 High Explosives Processing	02A-007	7.4	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	03A-130	0.04	0.1	0.022	0.001	0.002	0.0020
	04A-070	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-083	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-092	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	04A-115	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-157	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	05A-053	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-054	3.6	6.3	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-055	0.13	8.9	0.096	0.085	0.034	0.0275
	05A-056	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-066	0.74	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-067	0.33	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-068	0.06	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-069	0.01	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-071	0.04	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-072	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	05A-096	0.01	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	05A-097	0.01	1.8	No discharge	No discharge	No discharge	0.00
	06A-073	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998

Table 2.0-16. Flow from Permitted Outfalls [a] (continued)

FACILITY	OUTFALL	MGY SWEIS ROD	1998	1999	2000	2001	2002
	06A-074	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	06A-075	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
2.10 High Explosives Testing	03A-028	2.2	0.5	2.81	5	4	0.5027
	03A-185	0.73	1.2	11.42	11	5	0.8773
	04A-101	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-139	None	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-141	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-143	0.018	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	04A-156	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	06A-079	0.54	0.1	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	06A-080	0.03	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	06A-081	0.03	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	06A-082	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	06A-099	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	06A-100	0.04	0.1	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	06A-106 [b]	0.58	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999	Eliminated 1999
	06A-123	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
2.11 LANSCE	03A-047	7.1	13.5	3.4	3.5	0	0
	03A-048	23.4	19.1	19.7	15.6	13.05	23.25
	03A-049	11.3	20.1	10.8	9.6	5.9	0.14
	03A-113	39.8	0.7	3.3	1.8	1.5	0.65
	03A-125	0.18	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	03A-145	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	03A-146	Not listed in SWEIS	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
2.12 Bioscience Facilities	03A-040	2.5	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999	Eliminated 1999
2.13 Radio-chemistry Facility	03A-045	0.87	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-016	None	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-131	None	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	04A-152	None	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-153	3.2	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
2.14 RLWTF	051	9.3	6.1	5.3	4.9	3.6	2.9
2.15 Solid Radio-active and Chemical Waste Facilities	None						

Table 2.0-16. Flow from Permitted Outfalls [a] (continued)

FACILITY	OUTFALL	MGY SWEIS ROD	1998	1999	2000	2001	2002
2.16 Non-Key Facilities	001	114	Active	Active	170	98.75	101.3200
	013	No direct discharge; goes through 001	No direct discharge; goes through 001	No direct discharge; goes through 001	No direct discharge; goes through 001	No direct discharge; goes through 001	No direct discharge; goes through 001
	03A-027	5.8	Active	Active	8.7	0.13	6.6070
	03A-160	5.1	Active	Active	14	0.13	22.9000
	03A-199	Added to permit on 2/1/01	Not on permit	Not on permit	Not on permit	No discharge	No discharge
	03A-042	5.30	No discharge	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	04A-118	1.10	No discharge	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-166	0.01	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
	03A-038	5.80	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-171	0.00	No discharge	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-172	0.00	No discharge	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-173	0.00	No discharge	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-174	0.00	No discharge	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	04A-175	0.00	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-176	0.66	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-177	0.06	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
	03A-034	0.26	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	03A-035	0.04	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-182	0.00	Active	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	04A-186	0.18	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
	06A-132	5.80	No discharge	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	03A-025	0.18	Active	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
	04A-164	0.01	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-161	1.00	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
	03A-148	6.30	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-094	5.30	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
	04A-163	6.20	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
	04A-165	2.00	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
Total Outfalls:							
• **With flow**			18	13	18	18	19
• **Active**			10	10	0	0	0
• **Active and eliminated from permit**			0	7	0	0	0

Table 2.0-16. Flow from Permitted Outfalls [a] (continued)

		MGY					
FACILITY	**OUTFALL**	**SWEIS ROD**	**1998**	**1999**	**2000**	**2001**	**2002**
• **No discharge, but on permit**			12	4	1	2	1
• **No discharge and eliminated from permit**			0	2	0	0	0
• **No direct discharge**			1	1	1	1	1
• **With flow, but later eliminated from permit**			2	7	0	0	0
• **Eliminated from permit during year**			22 during 1997 30 during 1998	16 during 1999	0 during 2000	0 during 2001	0 during 2002
• **No observation**			0	4	0	0	0
• **Added to permit during year**			0 during 1997 0 during 1998	0 during 1999	0 during 2000	1 during 2001	0 during 2002
Total Outfalls at end of year			66 at end of 1998	36 at end of 1999	20 at end of 2000	21 at end of 2001	21 at end of 2002

[a] Eliminated means that the outfall was eliminated from the NPDES permit during the specified year. No discharge means that there was no flow from the outfall. A “0.0” means that there was a very small flow from the outfall. Active means that the outfall was listed on the NPDES permit and did discharge at least once during the year. Active and eliminated from permit means that the outfall was listed on the NPDES permit at the beginning of the year, discharged at least once during the year, and was eliminated from the NPDES permit by the end of the year. No observation means that this outfall was part of a supply well and was not checked during the year because the well was being transferred to Los Alamos County.

[b] This outfall was listed in the SWEIS under the Non-Key Facilities.

This chapter also discusses Non-Key Facilities, which include all buildings and structures not part of a Key Facility, or the balance of LANL. Although operations at Non-Key Facilities do not contribute significantly to radiation doses or generation of radioactive wastes, the Non-Key Facilities represent a significant fraction of LANL. The Non-Key Facilities comprise all or the majority of 30 of LANL's 49 technical areas, and approximately 14,224 of LANL's estimated 26,480 acres. The Non-Key Facilities also employ about half the LANL workforce. The Non-Key Facilities include such important buildings and operations as the Central Computing Facility, the TA-46 sewage treatment facility, and the Main Administration Building. Table 2.0-17 identifies and compares the acreage of the 15 Key Facilities and the Non-Key Facilities. Figure 2-1 shows the location of LANL within northern New Mexico, while Figure 2-2 illustrates the technical areas. Figure 2-3 shows the locations of the Key Facilities.

With the issuance of Nuclear Safety Management (10 CFR 830) on January 10, 2001, on-site transportation also needs to be addressed relative to nuclear hazard categorization (FR 2001). This is a change from the SWEIS. At the time the SWEIS was published, on-site transportation was considered part of the affected environment in Section 4.10.3.1. The on-site transportation of nuclear materials greater than or equal to Hazard Category 3 quantities is addressed in a DOE approved safety analysis (LANL 2002c, DOE 2002a, Steele 2002). The implementation of the analysis and associated controls is under development.

Table 2.0-17. Acreage for Key and Non-Key Facilities

FACILITY	TECHNICAL AREAS	~SIZE (ACRES)
Plutonium Complex	TA-55	93
Tritium Facilities	TA-16 & TA-21	312
CMR Building	TA-03	14
Pajarito Site	TA-18	131
Sigma Complex	TA-03	11
MSL	TA-03	2
TFF	TA-35	3
Machine Shops	TA-03	8
High Explosives Processing	TAs 08, 09, 11, 16, 22, 28, 37	1,115
High Explosives Testing	TAs 15, 36, 39, 40	8,691
LANSCE	TA-53	751
Bioscience Facilities (Formerly Health Research Laboratory)	TA-43, 03, 16, 35, 46	4
Radiochemistry Facility	TA-48	116
RLWTF	TA-50	62
Solid Radioactive and Chemical Waste Facilities	TA-50 & TA-54	943
Subtotal, Key Facilities		12,256
Non-Key Facilities	30 of 49 TAs	14,244
LANL		26,480

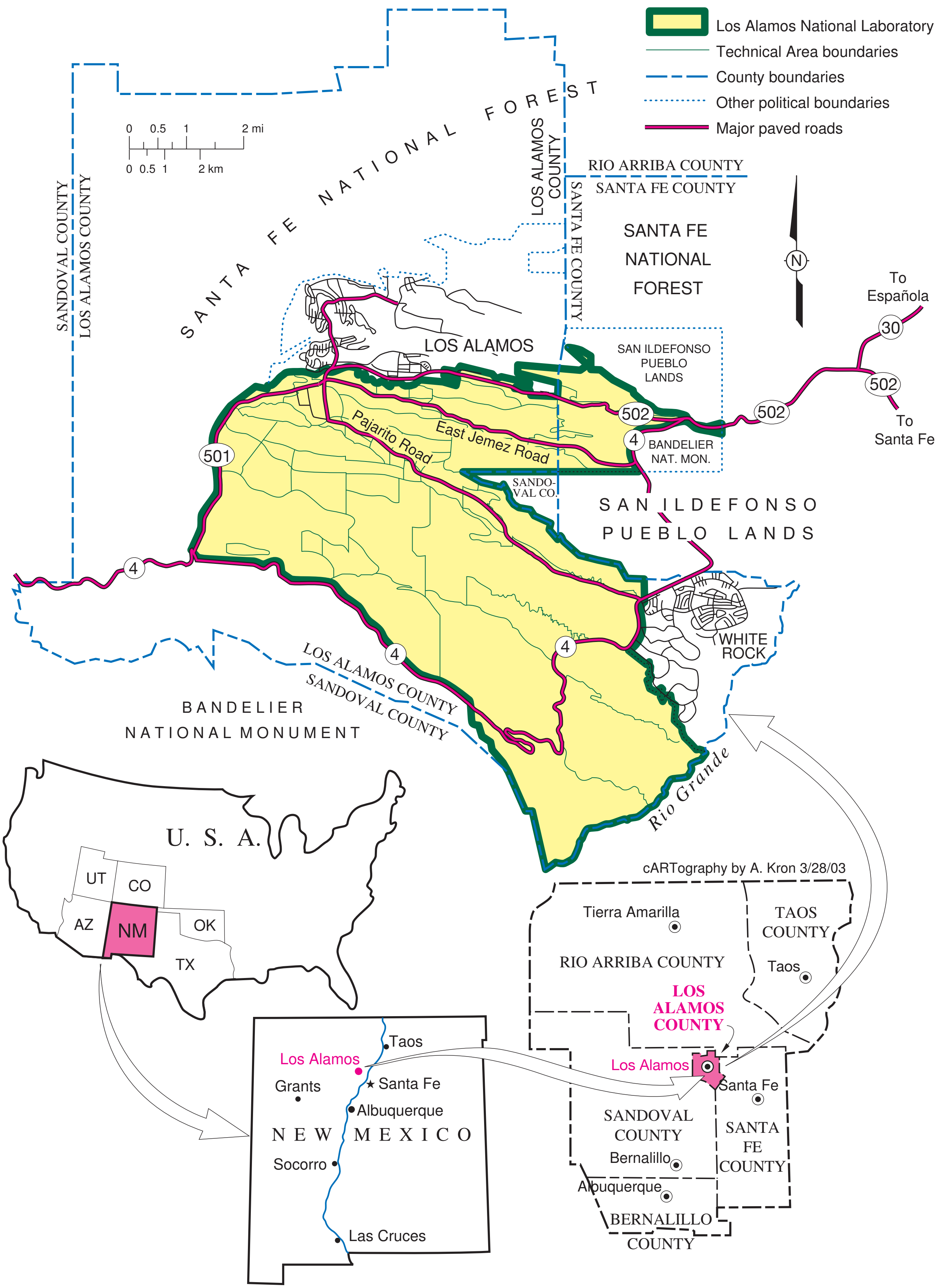


Figure 2-1. Location of LANL.

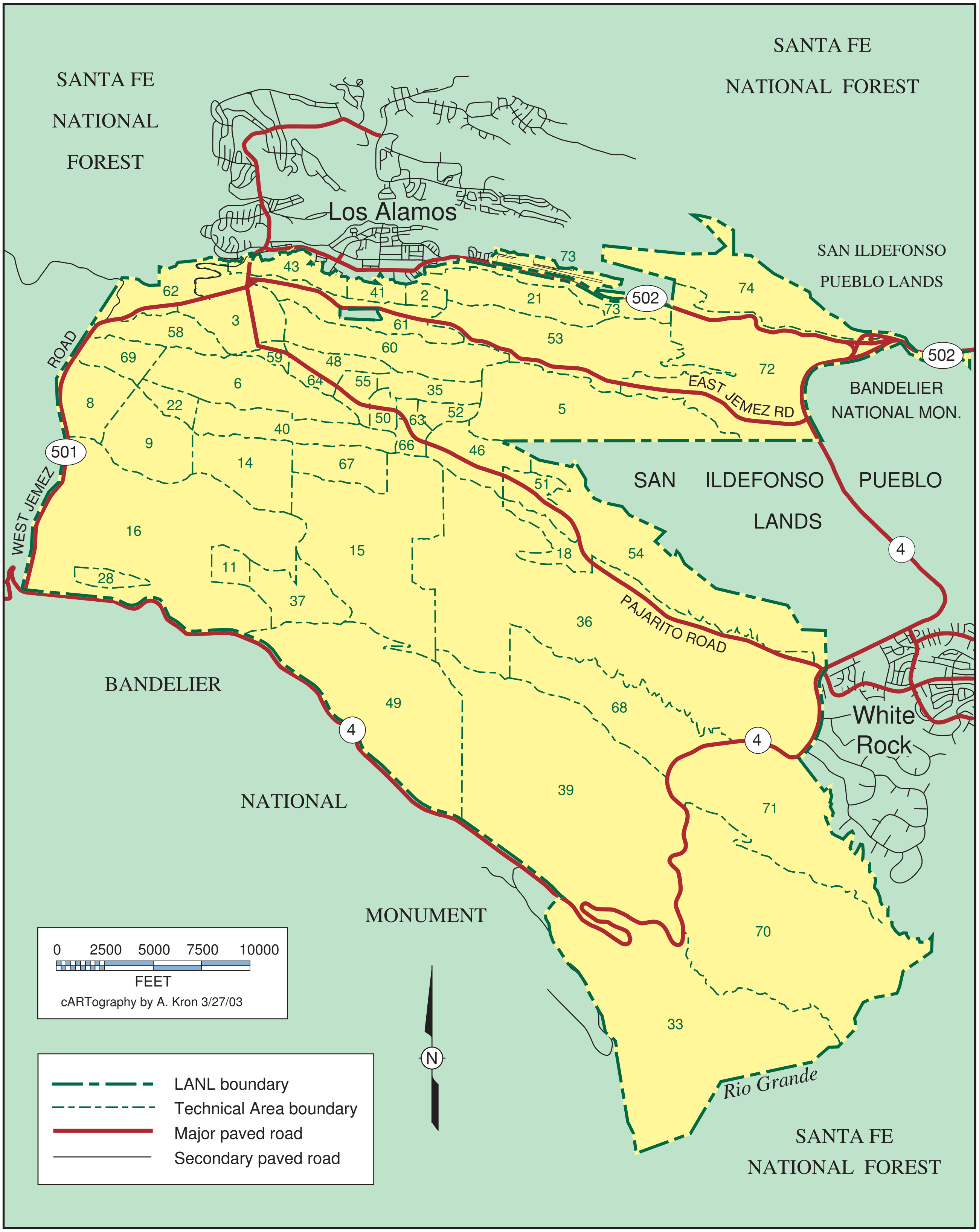


Figure 2-2. Location of technical areas.

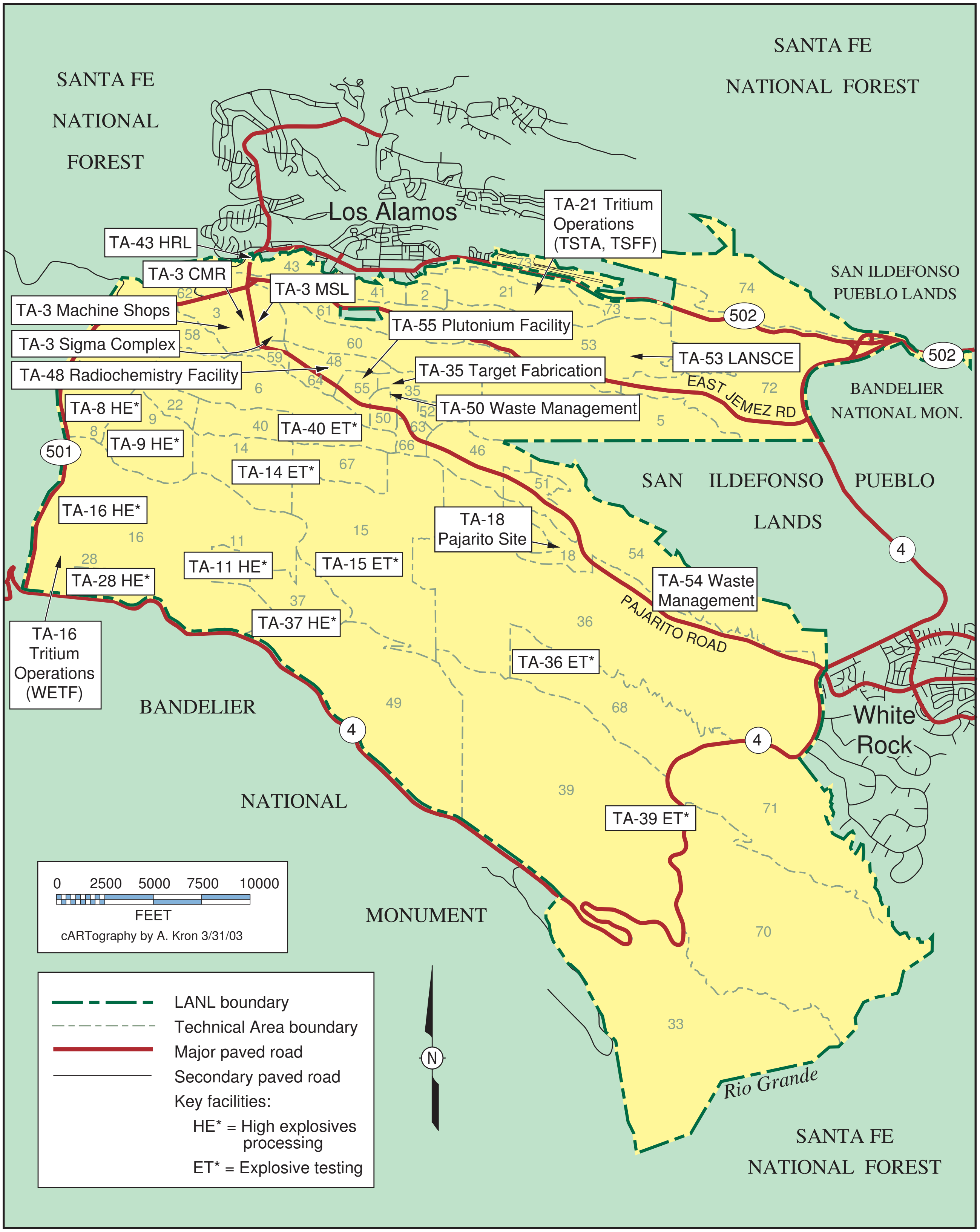


Figure 2-3. Location of Key Facilities.

2.1 Plutonium Complex (TA-55)

The Plutonium Complex Key Facility consists of six primary buildings and a number of lesser buildings and structures. As presented in the SWEIS, this Key Facility contained one operational Category 2 nuclear hazard facility (TA-55-4), two Low Hazard chemical facilities (TA-55-3 and TA-55-5), and one Low Hazard energy source facility (TA-55-7).

The DOE listing of LANL nuclear facilities for both 1998 and 2002 (DOE 1998a, LANL 2002a) retained Building TA-55-4 as a Category 2 nuclear hazard facility as shown in Table 2.1-1.

Table 2.1-1. Plutonium Complex Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-55-0004	PU-238 Processing	2	2	2	2	2	2
TA-55-0041	Nuclear Material Storage	2					

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)

The SWEIS also identified one potential Category 2 nuclear hazard facility (TA-55-41, the Nuclear Material Storage Facility [NMSF]), which was slated for potential modification to bring it into operational status. This was not done, and the DOE removed this facility from its list of nuclear facilities in its April 2000 listing (DOE 2000a). There are currently no plans to use this building for storage of nuclear materials.

2.1.1 Construction and Modifications at the Plutonium Complex

Projected: The SWEIS projected four facility modifications:

- renovation of the NMSF;
- construction of a new administrative office building;
- upgrades within Building 55-4 to support continued manufacturing at the existing capacity of 14 pits per year; and
- further upgrades for long-term viability of the facility and to boost production to a nominal capacity of 20 pits per year.

Aerial view of the Plutonium Complex (TA-55)

Actual: During the period 1996–2002, the new administrative office building was completed and upgrades to maintain existing capacity were undertaken.
In 1999, design efforts for renovation of the NMSF were halted and there are no current plans to continue the renovations. The upgrades included the 1996 installation of a new TA-55 Facility Control System with computers and controls located in the Operations Center and the continuing replacement of the main fire protection water line and pump houses. Explorations for placing parts of CMR and TA-18 at TA-55 began in 2001 and are continuing. Table 2.1.1-1 shows a more detailed comparison of the projected and actual construction and modifications at the Plutonium Complex.

Table 2.1.1-1. Plutonium Complex Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Renovation of the NMSF		Design efforts for renovation of NMSF were halted.			
Construction of a new administrative office building	Design commenced on a new office building.	A new office building, the FITS building was constructed (LANL 1998a).			FITS Parking Lot (not physically started in 2002; LANL 2002d).
				Nuclear Materials Technology FY 2001 Office Building, Manufacturing Technical Support Facility (LANL 2001d, DOE 1996a).	Construction began in 2002
Upgrades within Building 55-4 to support continued manufacturing at the existing capacity of 14 pits per year	Upgrades to maintain existing capacity were continued—1996 installation of a new TA-55 Facility Control System.	Upgrades to maintain existing capacity were continued.	Upgrades to maintain existing capacity were continued.	Upgrades to maintain existing capacity were continued.	
				Nuclear Materials Technology Protect Combustible Materials (LANL 2001e, DOE 1996b).	Continuing in 2002.
			Design of main fire protection water line and pump houses replacement.	TA-55 Fire Protect Yard Main Replacement (LANL 2001f, DOE 1996c).	Completed in 2002 except for repaving scheduled for summer 2003.
				FRIT Transfer System (LANL 2001g, DOE 1996d).	On-going in 2002.
				Nuclear Materials Technology Fire Safe Storage Building (LANL 2001h, DOE 1996e).	Construction not started.
					TA-55 Radiography/ Interim (LANL 2001i).

Table 2.1.1-1. Plutonium Complex Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
					TA-55 Radiography (complements interim; LANL 2001j, LANL 2002e).
					Temporary Parking (False perimeter intrusion detection and assessment system; not completed in 2002; LANL 2002f).
Further upgrades for long-term viability of the facility and to boost production to a nominal capacity of 20 pits per year				CMR Replacement Project Preconceptual Design (LANL 2001k).	Ongoing in 2002 draft environmental impact statement review in 2003.
				TA-18 Relocation Project Office Building (LANL 2001l, DOE 2001a).	Temporary building between TA-55 and TA-48 on north side of Pajarito Road.
				TA-18 Relocation Project CAT III/IV at TA-55 (LANL 2001m, DOE 2001a).	Under consideration at end of 2002.
				TA-18 Relocation Project CAT-I Piece (LANL 2001n, DOE 2001a).	No longer planned for TA-55 at end of 2002.
					CMR Replacement Geotechnical Investigation (LANL 2002g).

2.1.2 Operations at the Plutonium Complex

The SWEIS identified seven capabilities[4] for this Key Facility. No new capabilities have been added; however, one capability, Special Nuclear Materials (SNM) Storage, Shipping, and Receiving, had planned on using the NMSF. Because of changes in plans, the NMSF will not be used for this activity, and SNM storage, shipping, and receiving will continue to be performed at the Plutonium Facility (Building 55-4). For all seven capabilities, activity levels were below those projected by the SWEIS ROD. Table 2.1.2-1 presents details.

2.1.3 Operations Data for the Plutonium Complex

Details of operational data are presented in Table 2.1.3-1. From 1998 through 2002, radioactive air emissions were much less than the SWEIS ROD projections (less than 61 curies in 2002 and less than 5 curies in 2001 compared to 1,000 curies projected). The only wastes to exceed the SWEIS ROD projections have been the chemical wastes in 1998, 2001, and 2002 due to unique events. During 1998, a LANL-wide campaign to identify and dispose of chemicals no longer needed or used resulted in 10,861 kilograms of chemical waste at TA-55 rather than the 8,400 kilograms projected. This campaign was called the Legacy Waste Cleanup Project. It was completed in September 1998 and required facilities to locate and inventory all materials. More than 22,000 items Lab-wide were characterized, collected, and managed. Many items were sent to commercial facilities for treatment and disposal. In 2000, cleanup from the Cerro Grande Fire generated 763 kilograms of construction and demolition debris (previously identified in the Yearbooks as industrial waste) sent to local landfills for disposal. In 2001, the 11,709 kilograms of chemical waste included 10,433 kilograms of solid waste material from the replacement of the hydraulic cylinders at the front gate. This waste consisted of dirt, rocks, concrete chips, and asphalt chips. During 2002, a large transformer adjacent to the Facilities Improvement Technical Support (FITS) building needed to be relocated for the construction of the Manufacturing Technical Support Facility. While the transformer was being moved, it was dropped and non-polychlorinated biphenyl oil spilled from the transformer creating chemical waste (New Mexico Special Waste) that had to be cleaned up.

Radiological Control Technician counts waste container

[4] As defined in the SWEIS, a capability refers to the combination of buildings, equipment, infrastructure, and expertise necessary to undertake types or groups of activities and to implement mission assignments. Capabilities at LANL have been established over time, principally through mission assignments and activities directed by DOE Program Offices.

Table 2.1.2-1. Plutonium Complex/Comparison of Operations

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Plutonium Stabilization	Recover, process, and store the existing plutonium inventory in eight years.	On schedule with focus on highest priority inventory items.	Highest priority items have been stabilized. The implementation plan is being modified between DOE and the Defense Nuclear Facilities Safety Board with a longer completion schedule.	Highest priority items have been stabilized. The implementation plan is being modified between DOE and the Defense Nuclear Facilities Safety Board with a longer completion schedule.	Highest priority items have been stabilized. The implementation plan is being modified between DOE and the Defense Nuclear Facilities Safety Board to be completed by 2010.	Highest priority items have been stabilized. The implementation plan has been modified between DOE and the Defense Nuclear Facilities Safety Board to be completed by 2010.
Manufacturing Plutonium Components	Produce nominally 20 war reserve pits per year. (Requires minor facility modifications.)	There were no war reserve pits produced or accepted by DOE for transfer to the nuclear stockpile.	There were no war reserve pits produced or accepted by DOE for transfer to the nuclear stockpile. Four development pits were fabricated in preparation for eventual war reserve fabrication.	There were no war reserve pits produced or accepted by DOE for transfer to the nuclear stockpile. Two development pits were fabricated in preparation for eventual war reserve fabrication.	There were no war reserve pits produced or accepted by DOE for transfer to the nuclear stockpile.	There were no war reserve pits produced or accepted by DOE for transfer to the nuclear stockpile.
Surveillance and Disassembly of Weapons Components	Pit disassembly: Up to 65 pits per year disassembled. Pit surveillance: Up to 40 pits per year destructively examined and 20 pits per year non-destructively examined.	Consistent with the No Action Alternative, no more than 20 pits were disassembled and no more than 20 pits were examined during 1998.	Less than 65 pits were disassembled during 1999. Less than 40 pits were destructively examined as part of the stockpile evaluation program (pit surveillance) in 1999.	Less than 65 pits were disassembled during 2000. Less than 40 pits were destructively examined as part of the stockpile evaluation program (pit surveillance) in 2000.	Less than 65 pits were disassembled during 2001. Less than 40 pits were destructively examined as part of the stockpile evaluation program (pit surveillance) in 2001.	Less than 65 pits were disassembled during 2002. Less than 40 pits were destructively examined as part of the stockpile evaluation program (pit surveillance) in 2002.
Actinide Materials and Science Processing, Research, and Development	Develop production disassembly capacity. Process up to 200 pits per year, including a total of 250 pits (over four years) as part of disposition demonstration activities.	Fewer than 200 pits were disassembled or converted in 1998.	Fewer than 200 pits were disassembled or converted in 1999.	Fewer than 200 pits were disassembled or converted in 2000.	Fewer than 200 pits were disassembled or converted in 2001.	Fewer than 200 pits were disassembled or converted in 2002.

Table 2.1.2-1. Plutonium Complex/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Actinide Materials and Science Processing, Research, and Development (cont.)	Process neutron sources up to 5,000 Ci/yr. Process neutron sources other than sealed sources.	Processed sources containing ~120 Ci in 1998.	Neutron sources are not currently being disassembled and chemically processed.	Neutron sources are not currently being disassembled and chemically processed.	Neutron sources are not currently being disassembled and chemically processed.	Neutron sources are not currently being disassembled and chemically processed. Off-site sources are being recovered from government, industrial, and academic activities, repackaged, and sent to TA-54 for final disposition. No new sources are being processed.
	Process up to 400 kg/yr of actinides.[b] Provide support for dynamic experiments.	Processed ~140 kg of actinide material in 1998. Supported dynamic experiments. Processed 10 pits through tritium separation at TA-55.	Less than 400 kg/yr of actinides were processed. Support was provided for dynamic experiments.	Less than 400 kg/yr of actinides were processed. Support was provided for dynamic experiments. Less than 12 pits per year were processed through tritium separation in 2000.	Less than 400 kg/yr of actinides were processed. Support was provided for dynamic experiments.	Less than 400 kg/yr of actinides were processed. Support was provided for dynamic experiments.
	Perform decontamination of 28 to 48 uranium components per month.	Decontaminated/ converted 24 uranium components in 1998.	In 1999, less than 48 uranium components were decontaminated.	In 2000, less than 48 uranium components were decontaminated.	In 2001, less than 48 uranium components were decontaminated.	In 2002, less than 48 uranium components were decontaminated per month.

Table 2.1.2-1. Plutonium Complex/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Actinide Materials and Science Processing, Research, and Development (cont.)	Research in support of DOE actinide cleanup activities. Stabilize minor quantities of specialty items. Research and development on actinide processing and waste activities at DOE sites, including processing up to 140 kg of plutonium as chloride salts from the Rocky Flats Environmental Technology Site.	Research supporting DOE actinide cleanup activities continued at low level. Small quantities of plutonium residues from Rocky Flats were processed.	Research supporting DOE actinide cleanup activities continued at low levels. No plutonium residues from Rocky Flats were processed.	Research supporting DOE actinide cleanup activities continued at low levels. No plutonium residues from Rocky Flats were processed.	Research supporting DOE actinide cleanup activities continued at low levels. No plutonium residues from Rocky Flats were processed.	Research supporting DOE actinide cleanup activities continued at low levels. No plutonium residues from Rocky Flats were processed.
	Conduct plutonium research and development and support. Prepare, measure, and characterize samples for fundamental research and development in areas such as aging, welding and bonding, coatings, and fire resistance.	Sample preparation and characterization continued.	Sample preparation and characterization continued.	Sample preparation and characterization continued.	Sample preparation and characterization continued.	Sample preparation and characterization continued.
	Fabricate and study nuclear fuels used in terrestrial and space reactors. Fabricate and study prototype fuel for lead test assemblies.	Minimal terrestrial and space reactor fuel development occurred in 1998.	Minimal terrestrial and space reactor fuel development occurred in 1999.	Minimal terrestrial and space reactor fuel development occurred in 2000.	Minimal terrestrial and space reactor fuel development occurred in 2001.	The DOE/Office of Nuclear Energy Advanced Fuel Cycle Initiative (AFCI) is fabricating actinide nitride fuels for irradiation in a reactor environment. Lead test assemblies are being considered for the future.

Table 2.1.2-1. Plutonium Complex/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Actinide Materials and Science Processing, Research, and Development (cont.)	Develop safeguards instrumentation for plutonium assay.	Continued support of safeguards instrumentation development.	Continued support of safeguards instrumentation development.	Continued support of safeguards instrumentation development.	Continued support of safeguards instrumentation development.	Continued support of safeguards instrumentation development.
	Analyze samples in support of actinide reprocessing and research and development activities.	Analysis of actinide samples at TA-55 continued in support of actinide reprocessing and research and development activities.	Analysis of actinide samples at TA-55 continued in support of actinide reprocessing and research and development activities.	Analysis of actinide samples at TA-55 continued in support of actinide reprocessing and research and development activities.	Analysis of actinide samples at TA-55 continued in support of actinide reprocessing and research and development activities.	Analysis of actinide samples at TA-55 continued in support of actinide reprocessing and research and development activities.
Fabrication of Ceramic-Based Reactor Fuels	Build mixed oxide test reactor fuel assemblies and continue research and development on fuels.	Manufactured ~11 kg of mixed oxide fuel in 1998.	Manufactured ~10 kg of mixed oxide fuel in 1999.	No mixed oxide fuel was manufactured in 2000.	No mixed oxide fuel was manufactured in 2001.	AFCI mixed oxide fuels are being fabricated for irradiation testing.
Plutonium-238 Research, Development, and Applications	Process, evaluate, and test up to 25 kg/yr plutonium-238. Recycle residues and blend up to 18 kg/yr plutonium-238.	Recovered ~0.5 kg and processed ~1.5 kg of plutonium-238 in 1998.	Recovered ~0.5 kg of plutonium-238 and processed ~1.0 kg of plutonium-238 for heat source fuel in 1999.	Recovered ~0.65 kg of plutonium-238 and processed ~0.75 kg of plutonium-238 for heat source fuel in 2000.	Recovered ~1.1 kg of plutonium-238 and processed ~0.70 kg of plutonium-238 for heat source fuel in 2001.	Recovered ~1.5 kg of plutonium-238 and processed ~2.2 kg of plutonium-238 for heat source fuel.
Nuclear Materials Storage, Shipping, and Receiving	Store up to 6,600 kg SNM in the NMSF; continue to store working inventory in the vault in Building 55-4; ship and receive SNM as needed to support LANL activities.	NMSF not operational as a storage vault. Building 55-4 vault levels remained approximately constant with 1996 levels.	NMSF is not operational as a storage vault and there are no current plans to complete the modifications required to use the facility as a storage vault. Building 55-4 vault levels remained approximately constant with 1996 levels.	Because of changes in plans, the NMSF will not be used for this activity, and SNM storage, shipping, and receiving will continue to be performed at the Plutonium Facility (Building 55-4). Building 55-4 vault levels remained constant at levels identified during preparation of the SWEIS.	Because of changes in plans, the NMSF will not be used for this activity, and SNM storage, shipping, and receiving will continue to be performed at the Plutonium Facility (Building 55-4). Building 55-4 vault levels remained approximately constant at levels identified during preparation of the SWEIS.	Because of changes in plans, the NMSF will not be used for this activity, and SNM storage, shipping, and receiving will continue to be performed at the Plutonium Facility (Building 55-4). Building 55-4 vault levels remained approximately constant at levels identified during preparation of the SWEIS.

Table 2.1.2-1. Plutonium Complex/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
	Conduct non-destructive assay on SNM at the NMSF to identify and verify the content of stored containers.	NMSF not operational as a storage vault and was not used for nondestructive assay.	NMSF not operational as a storage vault and was not used for non-destructive assay.	The NMSF is not operational as a storage vault and was not used for non- destructive assay.	The NMSF is not operational as a storage vault and was not used for non-destructive assay.	The NMSF is not operational as a storage vault and was not used for non-destructive assay.

[a] Includes renovation of the NMSF (which is no longer planned for use), construction of new technical support office building, and upgrades to enable the production of nominally 20 war reserve pits per year.

[b] The actinide activities at the CMR Building and at TA-55 are expected to total 400 kilograms per year. The future split between these two facilities was not known, so the facility-specific impacts at each facility were conservatively analyzed at this maximum amount. Waste projections that are not specific to the facility (but are related directly to the activities themselves) are only projected for the total of 400 kilograms per year.

Table 2.1.3-1. Plutonium Complex/Operations Data

PARAMETER	UNITS [a]	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Plutonium-239 [b]	Ci/yr	2.70E-05	6.20E-08	1.2E-07	2.4E-06	3.2E-08	8.1E-08
Plutonium-238	Ci/yr	Not projected [c]	Not detected	Not detected	1.1E-07	1.0E-08	1.4E-08
Americium-241	Ci/yr	Not projected [c]	Not detected	5.4E-08	3.3E-07	6.2E-09	1.6E-08
Other actinides [d]	Ci/yr	Not projected [c]	Not detected	Not detected	Not detected	3.2E-07	1.2E-07
Tritium in Water Vapor	Ci/yr	7.50E+2	4.80E-01	3.1E-01	3.1E-01	7.4E-01	1.6E+0
Tritium as a Gas	Ci/yr	2.50E+2	1.40E+0	1.45E+0	6.1E+0	2.5E+0	5.9E+01
Uranium-234	Ci/yr	Not projected [c]	Not detected	2.0E-08	Not detected	Not detected	6.8E-08
Uranium-238	Ci/yr	Not projected [c]	Not detected	5.1E-08	Not detected	Not detected	1.6E-07
NPDES Discharge [e]							
Number of outfalls	---	1	1	1	1	1	1
Total Discharge	MGY	14	8.5	8.54	6.4	0.4	2.8
03A–181 [f]	MGY	14	8.5	8.54	6.4	0.4	2.8
Wastes:							
Chemical	kg/yr	8,400	10,861	2,538	1,563	11,709	14,243
LLW [g]	m^3/yr	754 [h]	238	345	199	300	296.3
MLLW	m^3/yr	13 [h]	1.3	3.9	1.75	12.6	3.34
TRU	m^3/yr	237 [i]	73.3	94.3	54.1	35.6	40.6
Mixed TRU	m^3/yr	102 [i]	16.8	66	16.8	29.6	54.9
Number of Workers	FTEs	1,111 [j] 589 [j]	526 [j]	589 [j]	572 [j]	635 [j]	689 [j]

[a] Ci/yr = curies per year; MGY = million gallons per year; FTEs = full-time equivalent workers.
[b] Projections for the SWEIS were reported as plutonium or plutonium-239, the primary material at TA-55.
[c] The radionuclide was not projected in the SWEIS ROD because it was either dosimetrically insignificant or not isotopically identified.
[d] These radionuclides include isotopes of thorium.
[e] NPDES is National Pollutant Discharge Elimination System.
[f] This outfall flowed all four quarters during CY 1999, 2000, and 2001.
[g] LLW = low-level radioactive waste; MLLW = mixed low-level radioactive waste; TRU = transuranic.
[h] Includes estimates of waste generated by the facility upgrades associated with pit fabrication.
[i] The SWEIS provided data for TRU and mixed TRU wastes in Chapter 3 and Chapter 5. However, projections made had to be modified to reflect the decision to produce nominally 20 pits per year.
[j] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for 1998 through 2002 operations is routinely collected information and represents only University of California (UC) employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

Glovebox lines

Waste transfer

2.1.4 Cerro Grande Fire Effects at the Plutonium Complex

On Monday, May 8, 2000, LANL officially closed because of the Cerro Grande Fire. At 1328 hours on May 10, because of worsening fire conditions, Building TA-55-4 was put into off-normal operations status (e.g., normal operations were terminated, some of the facility systems were shut down, and program operations that relied upon those systems required alternative services). In addition, zones 2 and 3 ventilation systems were shut down to reduce intake ventilation airflow. Ventilation systems in all other support buildings at TA-55 were also shutdown in an effort to mitigate facility damage from heavy smoke and blowing embers. At 2130 hours, because of fire encroaching on the fenced perimeter intrusion detection and assessment systems area surrounding TA-55, Building TA-55-4 was completely shut down and entombed (e.g., all massive vault-type doors were shut and locked). Shortly thereafter at 0010 hours on May 11, Operations Center personnel were ordered to evacuate. Protection Technology Los Alamos (PTLA) continued to perform rounds to ensure that the security envelope at TA-55 remained intact. On May 12, a limited number of facility operations personnel returned to TA-55 for an initial condition assessment. Power was partially restored to recover security and fire suppression systems. Building TA-55-4 was found to be stable with no indication of contamination. The uninterruptible power supply system, Operations Center ventilation, and vault cooling system were re-energized. A Facility Recovery Plan was written, approved, and implemented in the days that followed. On May 15, the facility again resumed around-the-clock manning of the Operations Center. On May 22, all Building TA-55-4 systems were operable and Building TA-55-4 was again placed in full operations status.

Although fire encroached on the fenced perimeter intrusion detection and assessment systems area surrounding TA-55, none of the buildings suffered serious fire damage.

2.2 Tritium Facilities (TA-16 and TA-21)

This Key Facility consists of tritium operations at TA-16 and TA-21. Tritium operations are conducted primarily in three buildings: The WETF (Building TA-16-205), the TSTA (Building TA-21-155), and the TSFF (Building TA-21-209). Limited operations involving the removal of tritium from actinide material are conducted at LANL's TA-55 Plutonium Facility; however, these operations are small in scale and this operation was not included as part of the Tritium Facilities in the SWEIS. The tritium emissions from TA-55, however, are included in the TA-55 Key Facility.

The three facilities, (WETF, TSTA, and TSFF) had tritium inventories greater than 30 grams during the 1996–2002 timeframe and thus are Category 2 nuclear facilities. However, the scope of the tritium activities at TSTA and TSFF is now being reduced. Programmatic activities at TSTA have been discontinued. Only work supporting tritium inventory removal and facility deactivation is now conducted at TSTA. The tritium inventory at the end of 2002 was estimated to be less than 20 grams. During 2003, the inventory will be reduced to less than 1.6 grams and it is expected that LANL and DOE will reclassify the facility to a radiological facility (less than 1.6 grams tritium). TSTA will be placed in a stable surveillance and maintenance mode until decommissioning and demolition funding become available.

Programmatic activities at the TSFF are also being reduced and are expected to be moved to WETF and TA-16-202 in 2003. The TSFF transition to radiological facility is estimated to occur in 2006. When funding becomes available the TSFF will be deactivated.

As shown in Table 2.2-1, the Nuclear Hazard Classification of these three facilities has remained constant. Although WETF was separated into its three component buildings in the SWEIS, it is now considered a single building.

Table 2.2-1. Tritium Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-16-0205 [f]	WETF	2	2	2	2	2	2
TA-16-0205A [f]	WETF	2					
TA-16-0450 [f]	WETF	2					
TA-21-0155	TSTA	2	2	2	2	2	2
TA-21-0209	TSFF	2	2	2	2	2	2

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)
[f] In 2002, TA-16-205 and TA-16-205A are nuclear facilities while TA-16-450 is not operational with tritium. When the WETF Safety Analysis Report is approved and an operational readiness review is completed, TA-16-205, -205A, and -450 will be considered one facility.

2.2.1 Construction and Modifications at the Tritium Facilities

Projected for the Tritium Facilities: The ROD projected extending the WETF tritium operations into TA-16-450.

Actual for WETF: No major upgrades were made to the WETF at TA-16 during the period 1996-1998. However, significant remodeling to the adjacent building, TA-16-450, was begun with the goal of extending the WETF tritium processing area into Building 450 (as was projected by the ROD). The remodeling of TA-16-450 continued in 1999 and was completed in 2000. No major upgrades were made to the WETF at

TA-16 during 1999, 2000, and 2001. Upgrade of a part of the WETF roof to meet current seismic requirements was begun in November 2000 and was completed in March 2001. This modification involved additional structural attachment of the existing roof to the facility walls. NEPA review for the re-roofing was provided by Categorical Exclusion (DOE 1998b). A new WETF office building (Building 824) was completed in November 2001. This work was also done under a Categorical Exclusion (DOE 1998c).

During 2002, there were no new major construction activities or building modifications at WETF at TA-16. The operational readiness review to extend the tritium processing area of WETF into Building 450 was started in 2002. At the completion of the operational readiness review, Building 450 will be integrated into WETF tritium operations. The modification of Building 450 is to accommodate neutron tube target loading operations and related research. This modification was addressed by the SWEIS ROD and has its own NEPA coverage via an environmental assessment and Finding of No Significant Impact (DOE 1995a).

Actual for TSTA and TSFF: A new cooling tower was installed to replace the original TSTA cooling tower at TA-21 (DOE 2000b). This reduced the amount of tritium released into the LANL liquid radioactive waste system. No other modifications to either TSTA or TSFF were made during the period 1996–1998. In November 1999, DOE determined that the TSTA facility has completed its mission and the tritium will be removed from TSTA in the next several years. During 2001, only a limited experimental program was carried out in TSTA, and this program was completed by June 2001. There were no facility modifications made to the TA-21 facilities from 1999 through 2002.

A summary of construction and modification activities is presented in Table 2.2.1-1.

2.2.2 Operations at the Tritium Facilities

The SWEIS identified nine capabilities for this Key Facility. No new capabilities have been added, and one, Cryogenic Separation at TSTA, has been deleted. Table 2.2.2-1 lists the nine capabilities identified in the SWEIS and presents CY 1998 through CY 2002 operational data for each of these capabilities. Operations in 1998 through 2002 were below the SWEIS ROD projections and remained within the established environmental envelope. For example, in 2002, 25 High-Pressure Gas Fill operations were conducted (compared to 65 fills projected by the SWEIS ROD), and approximately 20 gas boost system tests and gas processing operations were performed (compared to 35 projected).

Tritium water collection drums

Table 2.2.1-1. Tritium Facilities Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
WETF at TA-16					
Extend the WETF tritium operations into TA-16-450	Significant remodeling of TA-16-450 begun (DOE 1995a).	Remodeling of TA-16-450 continued.	Remodeling of TA-16-450 completed.		
			Upgrade of WETF roof began (DOE 1998b).	WETF roof upgrade completed.	
				Several existing systems upgraded.	
				WETF office building completed (DOE 1998c).	
TSTA and TSFF at TA-21					
		New cooling tower for TSTA (DOE 2000b).			
	Outfall 05S, 03A-036, and 04A-091 eliminated from NPDES permit.				
		DOE determined that TSTA mission completed.		TSTA completed limited experimental program.	
					Cross country transfer line to TA-50 removed (See Section 2.14).

Table 2.2.2-1. Tritium Facilities/Comparison of Operations

CAPABILITY	SWEIS ROD[a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
High-Pressure Gas Fills and Processing: WETF	Handling and processing of tritium gas in quantities of up to 100 g with no limit on number of operations per year. Capability used ~65 times per year.	Approximately 30 high-pressure gas fills/processing operations.	Approximately 19 high-pressure gas fills/processing operations.	Approximately 25 high-pressure gas fills/processing operations.	Approximately 25 high-pressure gas fills/processing operations.	Approximately 25 high-pressure gas fills/processing operations were conducted in 2002.
Gas Boost System Testing and Development: WETF	System testing and gas processing operations involving quantities of up to 100 grams. Capability used ~35 times per year.	Approximately 25 gas boost tests and operations.	Approximately 14 gas boost tests and operations.	Approximately 10 gas boost tests and operations.	Approximately 30 gas boost tests and operations.	Approximately 20 gas boost tests and operations.
Cryogenic Separation: TSTA	Tritium gas purification and processing in quantities up to 200 grams. Capability used five to six times per year.	One cryogenic separation operation.	One cryogenic separation operation.	One cryogenic separation operation.	This capability was disabled at TSTA and will no longer be used. A system to separate hydrogen isotopes using a chromatographic process was tested. The testing did not use tritium.	This capability was disabled at TSTA and will no longer be used.
Diffusion and Membrane Purification: TSTA, TSFF, WETF	Research on tritium movement and penetration through materials. Expect six to eight experiments per month. Capability also used continuously for effluent treatment.	Approximately five to eight experiments per month. Capability not used for continuous effluent treatment.	Approximately zero. Capability not used for continuous effluent treatment.	Capability not used in 2000.	Capability not used in 2001.	Capability not used in 2002.
Metallurgical and Material Research: TSTA, TSFF, WETF	Capability involves materials research including metal getter research and application studies. Small quantities of tritium support tritium effects and properties research and development. Contributes <2% of LANL's tritium emissions to the environment.	Activities resulted in <1% tritium emissions from each facility.	Activities resulted in <1% tritium emissions from each facility.	Activities resulted in <1% tritium emissions from each facility.	Activities resulted in <1% tritium emissions from each facility.	Activities resulted in <1% tritium emissions from each facility.

Table 2.2.2-1. Tritium Facilities/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Thin Film Loading: TSFF (WETF by 2001)	Chemical bonding of tritium to metal surfaces. Current application is for tritium loading of neutron tube targets; perform loading operations up to 3,000 units per year.	Approximately 600 units were loaded. Operations occurred at both TSFF and WETF.	Approximately 600 units were loaded. Operations occurred at TSFF and WETF.	Approximately 600 units were loaded. Operations occurred at TSFF.	Approximately 900 units were loaded. Operations occurred at TSFF.	Approximately 1,100 units were loaded. Operations occurred at TSFF.
Gas Analysis: TSTA, TSFF, WETF	Analytical support to current capabilities. Operations estimated to contribute <5% of LANL's tritium emissions to the environment.	Gas analysis operations were continued at all three facilities. No changes in facility emissions occurred from this activity.	Gas analysis operations were continued at all three facilities. No changes in facility emissions occurred from this activity.	Gas analysis operations were continued at all three facilities. No changes in facility emissions occurred from this activity.	Gas analysis operations were continued at all three facilities. No changes in facility emissions occurred from this activity.	Gas analysis operations were continued at all three facilities. No changes in facility emissions occurred from this activity.
Calorimetry: TSTA, TSFF, WETF	This capability provides a measurement method for tritium material accountability. Contained tritium is placed in the calorimeter for quantity measurements. This capability is used frequently, but contributes <2% of LANL's tritium emissions to the environment.	Calorimetry activities were continued at WETF and TSFF. No changes occurred in facility emissions from this activity.	Continues at WETF and TSFF. No changes occurred in facility emissions from this activity.	Continues at WETF and TSFF. No changes occurred in facility emissions from this activity.	Calorimetry activities were conducted at WETF and TSFF. No changes occurred in facility emissions from this activity.	Calorimetry activities were conducted at WETF and TSFF. No changes occurred in facility emissions from this activity.
Solid Material and Container Storage: TSTA, TSFF, WETF	Storage of tritium occurs in process systems, process samples, inventory for use, and as waste. Onsite storage could increase by a factor of 10 over levels identified during preparation of the SWEIS, with most of the increase occurring at WETF.	The storage at TSTA and TSFF remained constant. The storage at WETF has increased by ~10% over levels identified during preparation of the SWEIS.	The storage at TSTA and TSFF remained constant. The storage at WETF has increased by ~10% over levels identified during preparation of the SWEIS.	The storage at TSTA and TSFF remained constant. The storage at WETF has increased by ~10% over levels identified during preparation of the SWEIS.	The storage at TSTA and TSFF decreased. The storage at WETF has increased by ~5% over levels identified during preparation of the SWEIS.	The storage at TSTA and TSFF decreased. The storage at WETF has increased by ~5% over levels identified during preparation of the SWEIS.

[a] Includes the remodel of Building 16-450 to connect it to WETF in support of neutron tube target loading.

2.2.3 Operations Data for the Tritium Facilities

Neither TRU nor mixed TRU waste was generated in 2000 and 2001. From 1998 through 2002, most data for operations at the Tritium Facilities were slightly below levels projected by the SWEIS ROD. An exception to this was the airborne releases of elemental tritium from WETF. During January 2001, approximately 7,600 curies of elemental tritium were released from the facility during a single event. The other exceptions are the generation of 2,615 kilograms and 5,164 kilograms of chemical waste in 2001 and 2002 from WETF. In 2001, 2,353 kilograms of chemical waste were generated from refrigerant replacement at TA-16-450. The 2002 waste volume is 3,464 kilograms over the amount projected in the SWEIS ROD. Over 4,000 kilograms of the 2002 chemical waste were generated from refrigerant replacement at TA-16-450.

The outfall flows at the Tritium Facilities were below levels projected in the ROD for 1998 and 1999. (Appendix D provides information on outfall usage at LANL.) In 2000, the NPDES outfall discharges from TA-21 were significantly higher than those projected by the SWEIS ROD. This increase was a result of the methods used for estimating the flow. These outfalls discharge on a batch flow basis and one is seasonally out of service. However, the Discharge Monitoring Reports from the Water Quality and Hydrology group are based on infrequent sampling and assume round-the-clock flow, thus substantially overestimating the actual discharge flow. With the 2001 implementation of the newly issued NPDES permit, the Water Quality and Hydrology group has been able to acquire direct flow measurements for all outfalls enabling the use of real data instead of estimates.

During 2001, the cross-country transfer line, dedicated to the transfer of radioactive liquid wastes from the TA-21 Tritium Facilities to the TA-50 RLWTF, was taken out of service, flushed, drained, and capped. Environmental protection was the primary reason for removing this pipeline from service; it was a single-walled pipe for its entire length (~two miles). Reduction of radioactive liquid waste volumes generated at the TA-21 facilities enabled the line to be taken out of service; the smaller volumes can now be transported from TA-21 to TA-50 or TA-53 by truck. The TSTA cooling tower blowdown was changed from the liquid radioactive waste system to the outfall on the southwest end of TA-21, Building 209.

During 2002, the cross-country transfer line was mostly removed as part of land transfer. Operational data from 1998 through 2002 are summarized in Table 2.2.3-1. The 2002 TSTA releases for tritium in water vapor were greater than estimated in the ROD because of the deactivation activities.

2.2.4 Cerro Grande Fire Effects at the Tritium Facilities

Threat of wildfire caused the Laboratory to close on Monday, May 8, 2000, and enter emergency operations. Because the closure was on a Monday, the Tritium Facilities were already in a safe condition from being in safe weekend configuration. During the fire, no damage was incurred at the Tritium Facilities. While TA-21 facilities were only remotely threatened by fire, the fire burned up to and around WETF at least three times. Because of previous fuel thinning at TA-16 around the WETF and onsite fire support during the fire, no facility or office structures were damaged.

During the Laboratory closure, the safety systems at the Tritium Facilities remained operational and the facilities remained in safe weekend configuration. The Tritium Facilities were never placed into shutdown mode. Facility operations personnel responded several times to facility alarms and maintenance needs. No increase in tritium emission occurred as a result of the fire. Restoration of full operating capabilities (returning to operations) of the Tritium Facilities proceeded without problems or delays.

A lessons-learned exercise was conducted after the fire with Tritium Facilities personnel. This resulted in several suggestions for personnel and system improvements that will improve safety should a similar incident occur in the future.

Table 2.2.3-1. Tritium Facilities (TA-16 and TA-21)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
• TA-16, WETF, Elemental tritium	Ci/yr	3.0E+2	2.3E+1	2.4E+1	3.9E+1	7.7E+3	3.0E+2
• TA-16, WETF, Tritium in water vapor	Ci/yr	5.0E+2	2.2E+2	1.4E+2	2.2E+2	2.0E+2	1.0E+2
• TA-21, TSTA, Elemental tritium	Ci/yr	1.0E+2	1.3E+1	1.7E+1	2.5E+1	7.1E+0	4.1E+1
• TA-21, TSTA, Tritium in water vapor	Ci/yr	1.0E+2	6.9E+1	4.9E+1	1.5E+2	5.8E+1	4.8E+2
• TA-21, TSFF, Elemental tritium	Ci/yr	6.4E+2	7.3E+1	9.2E+1	2.5E+2	3.1E+1	2.6E+1
• TA-21, TSFF, Tritium in water vapor	Ci/yr	8.6E+2	3.1E+2	3.3E+2	5.1E+2	3.9E+2	5.8E+2
NPDES Discharge:							
Total Discharges	MGY	0.3	13.7	8.97	8.6	0.3932 [b]	13.4000
• 05S (Sewage Treatment Plant, TA-21) [a]	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
• 02A-129 (TA-21)	MGY	0.1	13.0	8.83	7.9	0.3902 [b]	10.8400
• 03A-036 (TA-21) [a]	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
• 03A-158 (TA-21)	MGY	0.2	0.7	0.14 [c]	0.7	0.00300	2.5600
• 04A-091 (TA-16) [a]	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
Wastes:							
Chemical	kg/yr	1,700	195	30	10	2,615 [d]	5,164 [e]
LLW	m^3/yr	480	46	47	49	0	90
MLLW	m^3/yr	3	0.1	0	0	0.01	0.8
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	123 [f] 28 [f]	31 [f]	28 [f]	24 [f]	25 [f]	20 [f]

[a] Outfalls eliminated before 1999: 05S (TA-21), 03A-036 (TA-21), and 04A-091 (TA-16). Consolidation and removal of outfalls has resulted in projected NPDES volumes underestimating actual discharges from the exiting outfalls.
[b] Discharge quantity is not considered significantly different from the SWEIS ROD.
[c] This outfall only discharged two quarters during CY 1999.
[d] During CY 2001, 2,350 kilograms of the chemical waste are from refrigerant replacement at TA-16-450.
[e] Over 4,000 kilograms of the chemical waste in CY 2002 are from refrigerant replacement at TA-16-450.
[f] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for 1998 through 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CY 1998 through CY 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the 10-year window represented by the SWEIS ROD.

Tree-thinning operations on Two-Mile Mesa

2.3 Chemistry and Metallurgy Research Building (TA-03)

The CMR Building Key Facility was designed and constructed in 1952 to house analytical chemistry, plutonium metallurgy, uranium chemistry, engineering design, and drafting. However, at the time the SWEIS ROD was issued, CMR was described as "a production, research, and support center for actinide chemistry and metallurgy research and analysis, uranium processing, and fabrication of weapon components." It consists of a main building (TA-03-29) and a radioactive liquid waste pump house, TA-03-154. The CMR consists of three floors: a basement, first floor, and an attic. It has seven independent wings connected by a common corridor. Throughout its history, the CMR has operated as a category 2 nuclear facility.

As shown in Table 2.3-1, DOE has identified the CMR facility, in various levels of detail, as a Category 2 nuclear facility since the publication of the SWEIS ROD.

Table 2.3-1 CMR Building with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [a]
TA-03-0029	CMR	2		2		2	2
TA-03-0029	Radiochemistry Hot Cell		2	2	2		
	Actinide chemistry and metallurgy research and analysis					2	
TA-03-0029	SNM Vault		2	2	2		
TA-03-0029	Nondestructive analysis/nondestructive examination Waste Assay		2	2	2		
TA-03-0029	IAEA Classroom [f]			2	2		
TA-03-0029	Wing 9 (Enriched Uranium)		2	2	2		

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)
[f] The IAEA (International Atomic Energy Agency) Classroom was used to conduct Nonproliferation Training. In CY 2001, this capability was moved to Pajarito Site (TA-18) and renamed the "Nuclear Measurement School." However, the capability was returned to and operated in CMR in CY 2002.

2.3.1 Construction and Modifications at the CMR Building

The ROD projected five facility modifications by December 2005:

- Phase I Upgrades to maintain safe operating conditions for 5–10 years;
- Phase II Upgrades (except seismic) to enable operations for an additional 20–30 years;
- modifications for production of targets for the molybdenum-99 medical isotope;
- modifications for the recovery of sealed neutron sources; and
- modifications for safety testing of pits in the Wing 9 hot cells.


Alpha box insert for a hot cell

During the 1996–1998 time period, only the Phase I Upgrades were in progress. By the end of 1998, all 11 of these upgrades had been started, but only five of the 11 Phase I Upgrades were completed. Concurrently, in August 1998, DOE approved the CMR Basis for Interim Operations, and in the fall of 1998, DOE determined that extensive upgrades to CMR would not be cost effective.

In 1999, DOE directed the CMR Upgrades Project to re-baseline including only those upgrades needed to ensure compliance with the Basis for Interim Operations. These upgrades were required for the facility to be reliable through 2010. During 1999, some work was done on the remaining Phase I Upgrades and three of the 13 Phase II Upgrades. Under the Phase I Upgrades, work on the continuous air monitors in the building wings was completed; work on the wing electrical systems and the interim improvements to the duct washdown system continued; and work on the power distribution system, the stack monitoring system, and the improvements to acid vents and drains stopped. Under the Phase II Upgrades, the standby power for the operations center was not completed. This project was removed during re-baselining and the upgrades to both the operations center and the fire protection system were in progress.

The new baseline was approved in October 1999 and included 16 upgrades necessary to ensure worker safety, public safety, environmental compliance, and reliability of services to safety systems. Table 2.3.1-1 identifies these 16 upgrades and their status during 2002. The table also indicates additional modifications at CMR.

All 16 upgrades under the re-baselining were completed by March 2002; the Project submitted all Turnover/Closeout documentation to DOE in July 2002; and the DOE approved Turnover/Closeout in November 2002.

2.3.2 Operations at the CMR Building

The eight capabilities identified in the SWEIS for the CMR Facility are presented in Table 2.3.2-1. No new capabilities have been added, but one capability (Nonproliferation Training) was removed from CMR in 2000 and relocated back to CMR from TA-18 in 2002.

2.3.3 Operations Data for the CMR Building

Operations data from research, services, and production activities at the CMR Building were well below those projected by the SWEIS ROD. Radioactive air emissions were less than one curie per year from 1998 through 2002 (compared to 1,645 projected)—principally because processing of irradiated molybdenum-99 targets in the hot cells did not occur. Of the wastes generated, only TRU waste in 2001 and mixed TRU in 1998 and 2002 have exceeded SWEIS ROD projections; the others remained low, ranging from about 2 percent to about 25 percent of these projections. The TRU and mixed TRU wastes were above projections due to remodeling activities. Table 2.3.3-1 provides details of these and other operational data.

2.3.4 Cerro Grande Fire Effects at the CMR Building

Cerro Grande Fire effects on the CMR Building and its associated operations were minimal. Programs did suffer downtime and loss of productivity during the evacuation. No direct fire damage occurred and recovery was limited to cleaning or replacement of air system filters.

CMR Building

Table 2.3.1-1. CMR Building Construction and Modifications

	ACTUAL CONSTRUCTION AND MODIFICATION						
SWEIS ROD PROJECTION	**DESCRIPTION OF UPGRADES/ MODIFICATIONS**	**1998 YEARBOOK**	**1999 YEARBOOK [a]**	**2000 YEARBOOK [b]**	**2001 YEARBOOK**	**2002 YEARBOOK**	**2002 COMPLETION STATUS OF UPGRADES**
Phase I Upgrades to maintain safe operating conditions for 5 to10 years	Phase I Upgrades:	Five of the 11 Phase I Upgrades completed by end of 1998.	Six of the 11 Phase I Upgrades completed by end of 1999.				Phase I Upgrades were re-baselined in 1999.
	Continuous Air Monitors	95% complete 1. Continuous air monitors in building wings.	95% complete.				Installed, but never became operational.
	Heating, ventilation, and air conditioning (HVAC) blowers and motors (Wing 7 only, balance moved to Phase II)	100% complete 2. HVAC blowers.					Cancelled; became out of scope.
	Electrical	80% complete 3. Wing electrical systems.	80% complete, work continuing.				Modified and completed.
		70% complete 4. Power distribution system.	70% complete, work stopped.				Cancelled.
	Stack monitors	90% complete 5. Stack monitoring system.	90% complete, work stopped.				Completed; modified.
	Uninterruptible power supply	100% complete 6. Uninterruptible power supply for stack monitors in wings.					Incomplete; out of scope with re-baselining. Never turned over.
	Duct Work Modification	90% complete 7. Interim improvements to the duct washdown system.	90% complete, continuing.				Out of scope with re-baselining.
	Acid Vents and Drains (Immediate repairs, remaining scope moved to Phase II)	40% complete 8. Improvements to acid vents and drains.	40% complete, work stopped.				Out of scope with re-baselining.

Table 2.3.1-1. CMR Building Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION						
	DESCRIPTION OF UPGRADES/ MODIFICATIONS	1998 YEARBOOK	1999 YEARBOOK [a]	2000 YEARBOOK [b]	2001 YEARBOOK	2002 YEARBOOK	2002 COMPLETION STATUS OF UPGRADES
	Sanitary Sewer	100% complete 9. Modify the sanitary sewer system.					Completed–plugged drains.
	Fire Protection (Title 1/Fire Hazard Analysis, remaining scope moved to Phase 2)	100% complete 10. Fire hazard analysis.					Fire Hazard Analysis completed.
	Engineering Assessment/CDR & EA	100% complete. 11. Engineering assessment and conceptual design.					Completed.
	Safety Analysis Report	Basis for Interim Operation completed August 1998.					Basis for Interim Operation completed August 1998.
Phase II Upgrades (except seismic) to enable operations for an additional 20 to 30 years	Phase II Upgrades:		Progress was made on 3 of the original 13 Phase II Upgrades during 1999.				
	Seismic/Tertiary Confinement						Out of scope with re-baselining.
	Security Related to Tertiary Confinement						Out of scope with re-baselining.
	Ventilation/Confinement Zone Separation						Out of scope with re-baselining.
	Operation Center		25% complete.	0% complete, in design.	80% complete, construction.	100% completed.	Modified; completed.
	Standby Power/Communications						Modified; completed.
	Wing 1 HVAC Upgrades (includes Decontamination)						Out of scope with re-baselining.
	Wing 2 and 4 Safe Standby						Out of scope with re-baselining.

Table 2.3.1-1. CMR Building Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION						
	DESCRIPTION OF UPGRADES/ MODIFICATIONS	1998 YEARBOOK	1999 YEARBOOK [a]	2000 YEARBOOK [b]	2001 YEARBOOK	2002 YEARBOOK	2002 COMPLETION STATUS OF UPGRADES
	Chilled Water Upgrades						Incomplete; out of scope with re-baselining.
	Main Vault Upgrades						Out of scope with re-baselining.
	Acid Vent and Drains (beyond Phase I)						Out of scope with re-baselining.
	Fire Protection Upgrades		25% complete.	40% complete, in design.	100% complete.	100% completed.	Modified; completed.
	Exhaust Wash Down Recycle						Out of scope with re-baselining.
	Standby Power for Operation Center		100% complete.				Completed.
	Modifications under Rebaselining						
	Motor Control Centers	Completed.					
	Fire Alarm Control Panels		Completed.				
	Transient Combustible Loading		Completed.				
	Air Compressors Replacement			80% complete, in construction.	100% completed.		
	HVAC Delta P Indicators			100% completed.			
	Duct Wash Down System Assessment	Completed.					
	Duct Wash Down System Design and Construction			75% complete, in construction.	100% completed.		
	Stack Monitors FE 14, 19, 20, 23, 24, 28, and 32 (Phase A)			100% completed.			
	Emergency Personnel Accountability System			60% complete, in construction.	95% complete, turnover.	100% completed.	
	Wing 9 Ventilation Assessment		Completed.				
	Ventilation System Filter Replacement Assessment			Completed.			

Table 2.3.1-1. CMR Building Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION						
	DESCRIPTION OF UPGRADES/ MODIFICATIONS	1998 YEARBOOK	1999 YEARBOOK [a]	2000 YEARBOOK [b]	2001 YEARBOOK	2002 YEARBOOK	2002 COMPLETION STATUS OF UPGRADES
	Hood Wash Down			65% complete, in construction.	100% completed.		
	Stack Monitors FE 15, 29, and 33 (Phase B)			90% completed.	100% completed.		
	Emergency Lighting			55% complete, in construction.	100% completed.		
	1952 Sprinkler Head Replacement			100% completed.			
	Ventilation System Filter Replacement Design and Construction (Wing 9)			45% complete, in design.	100% completed.		
	West Bank Hot Cell Controls/Radiation Monitors			40% complete, in design.	95% complete, turnover.	100% completed.	
	West Bank Hot Cell Delta P Indicators			55% complete, in design.	95% complete, turnover.	100% completed.	
	Fire Protection System			40% complete, in design.	100% complete.	100% completed.	
	Emergency Notification			35% complete, in design.	90% complete, turnover.	100% completed.	
	Operations Center			0% complete, in design.	80% complete, construction.	100% completed.	
	Internal Power Distribution			40% complete, in design.	90% complete, turnover.	100% completed.	
Modifications for production of targets for the molybdenum-99 medical isotope							Incomplete–inactive project.
Modifications for the recovery of sealed neutron sources							Incomplete–inactive project.
Modifications for safety testing of pits in the Wing 9 hot cells							Incomplete–inactive project

Table 2.3.1-1. CMR Building Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION						
	DESCRIPTION OF UPGRADES/ MODIFICATIONS	1998 YEARBOOK	1999 YEARBOOK [A]	2000 YEARBOOK [B]	2001 YEARBOOK	2002 YEARBOOK	2002 COMPLETION STATUS OF UPGRADES
	Other/additional modifications:						
	East Bank Hot Cell Controls/Radiation Monitors						Completed.
	East Bank Hot Cell Delta P Indicators						Completed.
	Wing 9 Modifications for Bolas Grande						Started.
	Wing 3 Modifications for Bolas Grande						Started.
	Material Recovery in Wing 9						Started.
	Clean-out of Waste Storage Tanks						Started.

[a] During 1999, Phase I and II Upgrades were re-baselined to include only those needed to ensure compliance with the Basis of Interim Operations.
[b] Construction disrupted by Cerro Grande Fire.

Table 2.3.2-1. CMR Building (TA-03)/Comparison of Operations

CAPABILITY	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Analytical Chemistry	Sample analysis in support of a wide range of actinide research and processing activities. Approximately 7,000 samples per year.	Approximately 4,000 samples were analyzed.	Approximately 2,926 samples were analyzed.	Approximately 2,150 samples were analyzed.	Approximately 2,500 samples were analyzed.	Approximately 2,800 samples were analyzed.
Uranium Processing	Activities to recover, process, and store LANL highly enriched uranium inventory by 2005. Includes possible recovery of materials resulting from manufacturing operations.	No activity.	Activities to recover and process highly enriched uranium were performed. Three shipments to Y-12 involved packaging and repackaging.	Activities to recover and process highly enriched uranium were performed. Four to five shipments were made to Y-12.	Highly enriched uranium was repackaged. Five shipments were made to Y-12 at Oak Ridge National Laboratory. Other material was moved to TA-18.	Highly enriched uranium was repackaged. Two batches of solid uranium nitrate hexahydrate (UNH) were converted to triuranium octocide (U_3O_8). Also three batches of UNH liquids were converted to U_3O_8. All items are from TA-18.
Destructive and Nondestructive Analysis	Evaluate 6 to 10 secondaries per year through destructive/ nondestructive analyses and disassembly.	Performed nondestructive analysis on two secondaries.	Performed nondestructive analysis on less than 10 secondaries.	No activity. Project is no longer active, and capability was not used in 2000.	No activity. Project is no longer active, and capability was not used in 2001.	No activity. Project is no longer active, and capability was not used in 2002.
Nonproliferation Training	Nonproliferation training involving SNM. No additional quantities of SNM, but may work with more types of SNM than present during preparation of the SWEIS.	No activity. Project inactive.	Five weeks of SNM nonproliferation training conducted. Two weeks involved Category 2 quantities of SNM.	Training was conducted in August 2000. This capability was moved back to TA-18, and no more training is planned at CMR Building because of a change in status.	This capability was moved back to TA-18, and no more training is planned at CMR Building because of a change in status.	This capability returned to CMR and operated at CMR during 2002.

Table 2.3.2-1. CMR Building (TA-03)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Actinide Research and Processing [b]	Process up to 5,000 Ci/yr plutonium-238/beryllium and americium-241/beryllium neutron sources. Process neutron sources other than sealed sources. Stage up to 1,000 Ci/yr plutonium-238/beryllium and americium-241/beryllium sources in Wing 9 floor holes.	Received a few small-quantity sources. Level well below that projected by the SWEIS ROD.	No source processing activity.	No activity.	No activity.	No activity.
	Introduce research and development effort on spent nuclear fuel related to long-term storage and analyze components in spent and partially spent fuels.	No activity.	No activity.	No activity.	Analyzed ~50 samples in 2001.	
	Metallurgical microstructural/ chemical analysis and compatibility testing of actinides and other metals. Primary mission to study long-term aging and other material effects. Characterize about 100 samples per year. Conduct research and development in hot cells on pits exposed to high temperatures.	Metallurgical microstructural/ chemical analysis and compatibility testing of actinides and other metals. Primary mission to study long-term aging and other material effects. Characterize about 100 samples per year. Conduct research and development in hot cells on pits exposed to high temperatures.	Performed microstructural characterization tests on ~50 samples. No research and development on pits exposed to high temperatures.	Performed microstructural characterization tests on ~50 samples containing less than 20 grams of plutonium per sample. No research and development on pits exposed to high temperatures.	Performed microstructural characterization tests on ~200 samples containing less than 20 grams of plutonium per sample.	Performed microstructural characterization tests on ~200 samples containing less than 20 grams of plutonium per sample.

Table 2.3.2-1. CMR Building (TA-03)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
	Analysis of TRU waste disposal related to validation of the Waste Isolation Pilot Plant (WIPP) performance assessment models. TRU waste characterization. Analysis of gas generation such as could occur in TRU waste during transportation to WIPP. Performance Demonstration Program to test nondestructive analysis/nondestructive examination equipment. Demonstrate actinide decontamination technology for soils and materials. Develop actinide precipitation method to reduce mixed wastes in LANL effluents.	No decontamination technology activity. Studies on TRU waste and WIPP performance assessment models ongoing.	Final analysis conducted on experiments.	Decontamination performed on 15 drum scales, and decontamination was started on 34 liter drum scales. This operation is expected to terminate in 2001.	This is no longer an ongoing program.	No activity. Project was terminated.
Fabrication and Metallography	Produce 1,080 targets per year, each containing ~20 grams uranium-235, for the production of molybdenum-99, plus an additional 20 targets/wk for 12 weeks. Separate fission products from irradiated targets to provide molybdenum-99. Ability to produce 3,000 six-day curies of molybdenum-99/wk.[c]	Coated ~300 targets for molybdenum-99.	No work performed.	No activity. Project was terminated.	No activity. Project was terminated.	No activity. Project was terminated.

Table 2.3.2-1. CMR Building (TA-03)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
	Support complete highly enriched uranium processing, research and development, pilot operations, and casting. Fabricate metal shapes, including up to 50 sets of highly enriched uranium components, using 1 to 10 kg highly enriched uranium per operation. Material recovered and retained in inventory. Up to 1,000 kg annual throughput.	No activity.	No activity.	No activity.	No activity.	No activity.

[a] Includes completion of Phase I and Phase II Upgrades, except for seismic upgrades, modifications for the fabrication of molybdenum-99 targets, modifications for the Radioactive Source Recovery Program, and modification for safety testing of pits.

[b] The actinide activities at the CMR Building and at TA-55 are expected to total 400 kg/yr. The future split between these two facilities is not known, so the facility-specific impacts at each facility are conservatively analyzed at this maximum amount. Waste projections, which are not specificto the facility (but are related directly to the activities themselves), are only projected for the total of 400 kg/yr.

[c] Molybdenum-99 is a radioactive isotope that decays to form metastable technetium-99, a radioactive isotope that has broad applications in medical diagnostic procedures. Both isotopes are short-lived, with half-lives (the time in which the quantity of the isotope is reduced by 50 percent) of 66 hours and 6 hours, respectively. These short half-lives make these isotopes both attractive for medical use (minimizes the radiation dose received by the patient) and highly perishable. Production of these isotopes is therefore measured in “six-day curies,” the amount of radioactivity remaining after six days of decay, which is the time required to produce and deliver the isotope to hospitals and other medical institutions.

Table 2.3.3-1. CMR Building (TA-03)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Total Actinides[a]	Ci/yr	7.60E-4	2.62E-5	3.0E-5	1.0E-5	5.9E-8	2.7E-5
Selenium-75	Ci/yr	Not projected	6.66E-6	Not detected	Not detected	Not detected	Not detected
Krypton-85	Ci/yr	1.00E+2	Not measured	Not measured [b]	Not measured [b]	Not measured [b]	Not measured
Xenon-131m	Ci/yr	4.50E+1	Not measured	Not measured [b]	Not measured [b]	Not measured [b]	Not measured
Xenon-133	Ci/yr	1.50E+3	Not measured	Not measured [b]	Not measured [b]	Not measured [b]	Not measured
Tritium Water	Ci/yr	Negligible	Not measured	Not measured [b]	Not measured [b]	Not measured [b]	Not measured
Tritium Gas	Ci/yr	Negligible	Not measured	Not measured [b]	Not measured [b]	Not measured [b]	Not measured
Technetium-99	Ci/yr	Not projected [c]	Not measured	9.2E-4	Not measured	Not measured	Not measured
NPDES Discharge:							
Number of outfalls	---	1	1	1	1	1	1
Total Discharge	MGY	0.53	3.2	4.45	2.28	0.02090	0.76
03A–021 [d]	MGY	0.53	3.2	4.45	2.28	0.02090	0.76
Wastes:							
Chemical	kg/yr	10,800	3,313	4,824	1,837	676	707
LLW [e]	m^3/yr	1,820	124	184	264	448	389
MLLW	m^3/yr	19	3.2	0.4	0.3	0.4	0.9
TRU	m^3/yr	28 [f]	12.7	8.9	24.8	46.5	10.2
Mixed TRU	m^3/yr	13 [f]	15.8	1.9	1	0.8	16.7
Number of Workers	FTEs	367 [g] 204 [g]	218 [g]	204 [g]	190 [g]	192 [g]	201 [g]

[a] Includes uranium, plutonium, americium, and thorium.

[b] Potential emissions during the period were sufficiently small that measurement of these radionuclides was not necessary to meet facility or regulatory requirements.

[c] The radionuclide was not projected in the ROD because it was either dosimetrically insignificant or not isotopically identified.

[d] This outfall discharged all four quarters during CY 1999.

[e] Wastes (e.g., 4,000 cubic meters LLW) from the Phase II CMR Upgrades are included.

[f] The SWEIS provided the data for TRU and mixed TRU wastes in Chapter 3 and Chapter 5. However, the projections made had to be modified to reflect the decision to produce nominally 20 pits per year.

[g] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for 1998 through 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the 10-year window represented by the SWEIS ROD.

2.4 Pajarito Site (TA-18)

The Pajarito Site Key Facility is located entirely at TA-18. Principal activities are design and performance of nuclear criticality experiments and detector development in support of emergency response, nonproliferation, and arms control.

The SWEIS defined the facility as having a main building (18-30), three outlying, remote-controlled critical assembly buildings then known as “kivas” (18-23, -32, -116), and a number of additional support buildings, including the hillside vault (18-26). During 2000, in response to concerns expressed by two Native American Indian Pueblos (Santa Ana and Picuris), the term “kiva” (which has religious significance to these Native Americans), was replaced with the acronym CASA (Critical Assembly and Storage Area).

As shown in Table 2.4-1, DOE lists this whole Key Facility as a Category 2 facility and identifies seven buildings with nuclear hazard classification. The four buildings identified in the SWEIS (TA-18-23, -26, -32, and -116) have remained Category 2 nuclear facilities. The additions represent buildings with inventories meeting the current nuclear facility classification guidelines. It is interesting to note that the IAEA classroom (Building TA-18-258) represents a capability that was originally at TA-18, transferred to the CMR Building, and then brought back to TA-18 in 2000. The IAEA schools have been returned to CMR in 2002. All other schools remain at TA-18.

The new Authorization Basis, comprised of a Basis of Interim Operation document and Technical Safety Requirements, was submitted to NNSA on March 14, 2002, and approved by NNSA on July 31, 2002. Implementation of the new Authorization Basis, including the Technical Safety Requirements, is in progress and scheduled to be completed by June 2004. The new Authorization Basis adds safety measures to TA-18 operations in the form of both engineered and administrative controls.

Table 2.4-1. Pajarito Site Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-18	Site Itself		2	2	2	2	2
TA-18-0023	SNM Vault (CASA 1)	2	2	2	2	2	
TA-18-0026	Hillside Vault	2	2	2	2	2	
TA-18-0032	SNM Vault (CASA 2)	2	2	2	2	2	
TA-18-0116	Assembly Building (CASA 3)	2	2	2	2	2	
TA-18-0127	Accelerator used for weapons x-ray		2	2	2	2	
TA-18-0129	Calibration Laboratory		2	2	2	2	
TA-18-0247	Sealed Sources		3	3			
TA-18-0258	IAEA Classroom (Trailer) [f]		2				

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)
[f] The IAEA Classroom was used to conduct Nonproliferation Training. In CY 2001, this capability was moved to Pajarito Site (TA-18) and renamed the “Nuclear Measurement School.” However, the capability was returned to and operated in CMR in CY 2002.

2.4.1 Construction and Modifications at the Pajarito Site

Projected: The SWEIS ROD projected replacement of the portable linac machine.

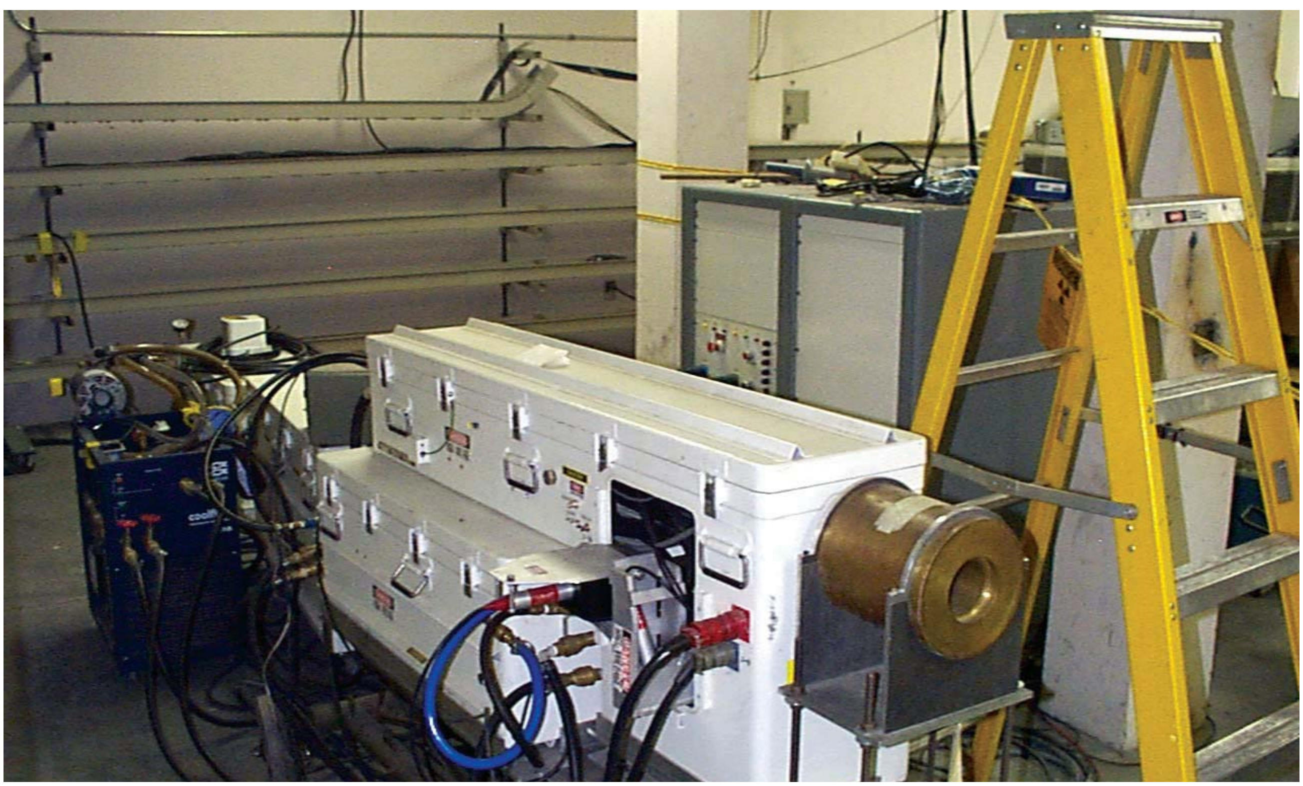
Actual: The portable linac has not been replaced. Construction projects for 2001 consist of the installation of two office trailers (Buildings 300 and 301) and security enhancements. In 2002, a cable tray relocation occurred (DOE 2001a).

Proposed: The environmental impact statement ROD for TA-18 relocation was issued for public comment on August 30, 2002, listing the Device Assembly Facility at the Nevada Test Site as the preferred alternative. The ROD was approved on December 5, 2002 (DOE 2002b).

Table 2.4.1-1 indicates the construction and modifications that have occurred at TA-18.

Table 2.4.1-1. Pajarito Site Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Replacement of the portable linac	Not done.	Not done.	Not done.	Not done.	Not done.
				Installation of two office trailers (Buildings 300 and 301)	
				Security enhancements	
					Cable tray relocation (DOE 2001a).



An accelerator

2.4.2. Operations at the Pajarito Site

The SWEIS identified nine capabilities for this Key Facility. No research capabilities have been deleted. However, the Nuclear Measurement School (IAEA classroom returned to CMR) that was originally moved from TA-18 to CMR (before the SWEIS), was moved back to TA-18 in 2000 and then returned to CMR in 2002.

The TA-18 facility experienced a safety stand down on August 12, 1998, that lasted into April 1999. As a result, only a limited number (54) of criticality experiments were performed during 1998, along with more than 100 subcritical tests. This total of 154 experiments is approximately a factor of seven below the ROD projection of a maximum of 1,050 experiments in any given year.

Since 1999, the facility has experienced normal operations. TA-18 conducted 188 criticality experiments in 1999 and a total of 140 in both 2000 and 2001. The TA-18 facility experienced normal operations during 2002, except for the Solution High-Energy Burst Assembly (SHEBA) critical assembly that was on operational downtime starting August 2000. SHEBA was restarted in February 2003. The TA-18 facility conducted 160 criticality experiments in 2002. This total of 160 experiments represents only about 15 percent of the SWEIS ROD projection of a maximum of 1,050 experiments in any given year.

In addition, the nuclear material inventory level has remained below the SWEIS ROD projection. For 2002 the material inventory was reduced by 10 percent, and there was not a significant increase in nuclear weapons components and materials at the facility. Table 2.4.2-1 provides details.

Examining hemispheres

Table 2.4.2-1. Pajarito Site (TA-18)/Comparison of Operations

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Dosimeter Assessment and Calibration	Perform up to 1,050 criticality experiments per year.	Performed 54 experiments.	Performed 188 experiments.	Performed 140 experiments.	Performed 140 experiments.	Performed 140 experiments.
Detector Development	Develop safeguards instrumentation and perform research and development for nuclear materials, light detection and ranging experiments, and materials processing. Increase nuclear materials inventory by 20%, and replace portable linac.	Same activities as in 1995. Increased nuclear materials inventory by 5%. Did not replace the portable accelerator.	Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999. Did not replace the portable linac.	Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999, and a 15% increase in 2000. Did not replace the portable linac.	The nuclear materials inventory for 2001 was approximately the same as the 2000 inventory. Did not replace the portable linac.	The nuclear materials inventory for 2002 was approximately the same as the 2001 inventory. Did not replace the portable linac.
Materials Testing	Perform up to 1,050 criticality experiments per year. Develop safeguards instrumentation and perform research and development for nuclear materials, light detection and ranging experiments, and materials processing.	Performed 54 experiments.	Performed 188 experiments.	Performed 140 experiments.	Performed 140 experiments.	Performed 160 experiments.
Subcritical Measurements	Perform up to 1,050 criticality experiments per year. Develop safeguards instrumentation and perform research and development for nuclear materials, light detection and ranging experiments, and materials processing. Increase nuclear materials inventory by 20%.	Performed 54 experiments. Increased nuclear materials inventory by 5%.	Performed 188 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999.	Performed 140 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999, and a 15% increase in 2000. The SKUA critical assembly was de-fueled at DOE's request and is no longer available for criticality experiments.	Performed 140 experiments. The nuclear materials inventory for 2001 was approximately the same as the 2000 inventory. The SKUA critical assembly was de-fueled at DOE's request and is no longer available for criticality experiments.	Performed 160 experiments. The nuclear materials inventory for 2001 was approximately the same as the 2000 inventory. The SKUA critical assembly was de-fueled at DOE's request and is no longer available for criticality experiments. All expected SKUA material shipments will be completed by May 2003.

Table 2.4.2-1. Pajarito Site (TA-18)/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Fast-Neutron Spectrum	Perform up to 1,050 criticality experiments per year. Develop safeguards instrumentation and perform research and development for nuclear materials, light detection and ranging experiments, and materials processing. Increase nuclear materials inventory by 20%, and increase nuclear weapons components and materials.	Performed 54 experiments. Increased nuclear materials inventory by 5%. Slight increase in nuclear weapons components and materials.	Performed 188 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999. Slight increase in nuclear weapons components and materials in 1998, no additional increase in 1999.	Performed 140 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999, and a 15% increase in 2000. Slight increase in nuclear weapons components and materials in 1998, no additional increase in 1999.	Performed 140 experiments. The nuclear materials inventory for 2001 was approximately the same as the 2000 inventory. Slight increase in nuclear weapons components and materials in 1998, no additional increase in 1999 through 2001.	Performed 160 experiments. The nuclear materials inventory for 2001 was approximately the same as the 2000 inventory. Significant decrease in nuclear weapons components and materials in 1999 and 2002, no additional increase in 1999 through 2002.
Dynamic Measurements	Perform up to 1,050 criticality experiments per year. Develop safeguards instrumentation and perform research and development for nuclear materials, light detection and ranging experiments, and materials processing. Increase nuclear materials inventory by 20%.	Performed 54 experiments. Increased nuclear materials inventory by 5%.	Performed 188 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999.	Performed 140 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999, and a 15% increase in 2000.	Performed 140 experiments. The nuclear materials inventory for 2001 was approximately the same as the 2000 inventory.	Performed 160 experiments. The nuclear materials inventory for 2002 was decreased by 10%.
Skyshine Measurements	Perform up to 1,050 criticality experiments per year.	Performed 54 experiments.	Performed 188 experiments.	Performed 140 experiments.	Performed 140 experiments.	Performed 160 experiments.
Vaporization	Perform up to 1,050 criticality experiments per year.	Performed 54 experiments.	Performed 188 experiments.	Performed 140 experiments.	Performed 140 experiments.	Performed 160 experiments.
Irradiation	Perform up to 1,050 criticality experiments per year. Develop safeguards instrumentation and perform research and development for nuclear materials, interrogation techniques, and field systems. Increase nuclear materials inventory by 20%.	Performed 54 experiments. Increased nuclear materials inventory by 5%.	Performed 188 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999.	Performed 140 experiments. Increased nuclear materials inventory by 5% in 1998, no additional increase in 1999, and a 15% increase in 2000.	Performed 140 experiments. The nuclear materials inventory for 2001 was approximately the same as the 2000 inventory.	Performed 160 experiments. The nuclear materials inventory for 2002 was approximately the same as the 2001 inventory.

Table 2.4.2-1. Pajarito Site (TA-18)/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Nuclear Measurement School (relocated from CMR and renamed. At CMR it was called "Nonproliferation Training").	Not in SWEIS ROD (was located in CMR). IAEA schools are at CMR.				This capability was located at TA-18 in years past, but had been moved to CMR. In the effort to reduce the CMR Building to a Category 3 nuclear facility, these operations were moved back to TA-18, necessitating the transfer of additional nuclear material to the facility for use in the classes.	This capability returned to CMR and operated at CMR during 2002.

[a] Includes replacement of the portable linac.

2.4.3 Operations Data for the Pajarito Site

Research activities have remained well below those projected by the SWEIS ROD; consequently, operations data were also well below projections. The chief environmental measure of activities at the Pajarito Site is the estimated radiation dose to a hypothetical member of the public, referred to as the maximally exposed individual. The dose has remained below the SWEIS ROD projection. The dose estimated to result from 2002 activities was 1.0 millirem, compared to 28.5 millirem per year projected by the SWEIS ROD.

Chemical waste generation at Pajarito Site has been below the ROD projection from 1998 through 2002. Operational data are detailed in Table 2.4.3-1.

The chemical and low-level wastes generated in 2002 were shipped in 2003.

Table 2.4.3-1. Pajarito Site (TA-18)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions Argon-41 [a]	Ci/yr	1.02E+2	1.8E-1 [a]	4.9E-1 [a]	8.0E-1 [a]	2.9E-1	1.6E-1
External Penetrating Radiation	mrem/yr	28.5 [b]	3	2.6	2.5	4.2	1.0
NPDES Discharge	MGY	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls
Wastes:							
Chemical	kg/yr	4,000	3,127	1,707	127	91	82
LLW	m^3/yr	145	4	31.3	14	13	0
MLLW	m^3/yr	1.5	0	7.9 [c]	0	0	0
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	95 [d] 70 [d]	65 [d]	70 [d]	73 [d]	73 [d]	78 [d]

[a] These values are not stack emissions. The SWEIS ROD projections are from Monte Carlo modeling. Values are from the first 394-foot (120-meter) radius. Other isotopes (nitrogen-13 and oxygen-15) are not shown because of very short half-lives.

[b] Page 5-116, Section 5.3.6.1, "Public Health," of the SWEIS.

[c] The 7.9 cubic meters of MLLW in CY 2000 were generated as a result of maintenance activities.

[d] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for 1998 through 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

"Hummer"

2.4.4 Cerro Grande Fire Effects at the Pajarito Site

The Cerro Grande Fire damaged no facilities at TA-18. A Facility Recovery Plan was issued on May 22, 2000. The Facility Manager implemented this plan by establishing the Facility Recovery Team to perform safety reconnaissance and condition assessment of the facility. The assessment identified no deficiencies or significant environmental, safety, and health issues. Specifically, there was no need for additional oversight by managers or subject matter experts, no need for compensatory measures for facility systems, and no need for interim or unusual operations.

The fire destroyed much of the vegetation in and around TA-18. Because TA-18 is located in a canyon bottom, post-fire flooding became a major concern and a flood contingency plan was designed for protecting personnel, infrastructure, and nuclear material at risk. A plan for personnel safety was issued that included five flood condition warnings with varying responses, including facility evacuation (Condition 5). The infrastructure was protected by construction of earthern berms up-canyon northwest of CASA 1 and the SHEBA building and at the bridge crossing the stream channel to CASA 2 and CASA 3. Additional measures included clearing and deepening the stream channel running through the facility and installation of barriers, sandbags, and sheet piling at several locations to channel the flow of potential floods away from key structures. Some portable structures, such as metal sheds used to store radioactive sources, were moved to higher ground. Nuclear material at risk was protected by moving uranium solutions used for critical assembly fuel to storage locations on higher ground. Finally, a flood retention structure was built by the Army Corps of Engineers up Pajarito Canyon from the facility outside of Facility Management Unit 74 boundaries to protect the facility from floods. NEPA analysis for actions taken in response to the Cerro Grande Fire, including the installation of certain flood and sediment retention structures, was provided by a Special Environmental Analysis (DOE 2000c).

Flood retention structure during construction

2.5 Sigma Complex (TA-03)

The Sigma Complex Key Facility consists of four principal buildings: the Sigma Building (03-66), the Beryllium Technology Facility (03-141), the Press Building (03-35), and the Thorium Storage Building (03-159). Primary activities are the fabrication of metallic and ceramic items, characterization of materials, and process research and development. As shown in Table 2.5-1, this Key Facility had two Category 3 nuclear facilities, 03-66 and 03-159 identified in the SWEIS; however, in April 2000, Building 03-159 was downgraded from a hazard category 3 nuclear facility to a radiological facility and removed from the nuclear facilities list. In March 2001, Building 03-66 was downgraded from a hazard category 3 nuclear facility and removed from the nuclear facilities list (LANL 2002a). In September 2001, Buildings 03-35, 03-66, and 03-159 were placed on the radiological facility list (LANL 2002b). Building 03-141 is a Non-nuclear Moderate Hazard Facility.

Table 2.5-1. Sigma Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-03-0066	44 metric tons of depleted uranium storage	3	3	3			
TA-03-0159	thorium storage	3	3				

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)

2.5.1 Construction and Modifications at the Sigma Complex

Projected: The SWEIS projected significant facility changes for the Sigma Building itself and completion of the conversion of the Rolling Mill Building (TA-03-141) into the Beryllium Technology Facility. The five upgrades planned for the Sigma Building were

- replacement of graphite collection systems,
- modification of the industrial drain system,
- replacement of electrical components,
- roof replacement, and
- seismic upgrades.

In addition, the ROD projected completion of the development of the Beryllium Technology Facility (DOE 1993a).

Actual: Three of five planned upgrades of the Sigma Building are done, one is essentially done, and one remains undone. They are

- replacement of graphite collection systems–completed in 1998,
- modification of the industrial drain system–completed in 1999,
- replacement of electrical components–essentially completed in 2000; however, add-on assignments will continue,
- roof replacement–most of the roof was replaced in 1998 and 1999; however, additional work needs to be done, and
- seismic upgrades–not started.

Construction of the Beryllium Technology Facility, formerly known as the Rolling Mill Building, was completed during 1999. The Beryllium Technology Facility, a state-of-the-art beryllium processing facility, has 16,000 square feet of floor space, of which 13,000 are used for beryllium operations. The remaining 3,000 square feet will be used for general metallurgical activities. The mission of the new facility is to maintain and enhance the beryllium technology base that exists at LANL and to establish the capability for fabrication of beryllium powder components. Research will also be conducted at the Beryllium Technology Facility and will include energy- and weapons-related uses of beryllium metal and beryllium oxide. As discussed in Section 2.8, Machine Shops, beryllium equipment was moved from the shops into the Beryllium Technology Facility in stages during 2000 and 2001. The authorization to begin operations in the Beryllium Technology Facility was granted by DOE in January 2001.

Table 2.5.1-1 indicates the construction and modifications that have occurred at the Sigma Complex.

Sigma Building

Table 2.5.1-1. Sigma Complex Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Sigma Building Upgrades					
• Replacement of graphite collection systems	Completed in 1998.				
• Modification of the industrial drain system	Completed in 1998.				
• Replacement of electrical components	Worked on.	Worked on.	Completed.	Additional work being done.	Additional work being done.
• Roof replacement	Worked on; largely completed.				Additional work needed.
• Seismic upgrades	Not started.	Not started.	Not started.	Not started.	Not started.
Beryllium Technology Facility	Decontamination, decommissioning, and reconfiguration of Rolling Mill Building (DOE 1993a).	Reconfiguration completed.	Beryllium equipment moved in stages from Building 03-39.	DOE authorization to begin operations.	

2.5.2 Operations at the Sigma Complex

The SWEIS identified three capabilities for the Sigma Complex. No new capabilities have been added, and none has been deleted. As indicated in Table 2.5.2-1, activity levels for all capabilities during the 1998 to 2002 timeframe were less than levels projected by the SWEIS ROD.

2.5.3 Operations Data for the Sigma Complex

Levels of research and operations were less than those projected by the SWEIS ROD; consequently, operations data were also below projections. Waste volumes and NPDES discharge volumes were all lower than projected by the SWEIS ROD except for chemical waste generated in 2002. Table 2.5.3-1 provides details.

2.5.4 Cerro Grande Fire Effects at the Sigma Complex

Cerro Grande Fire effects on the Sigma Key Facility and its associated operations were minimal. Programs at Sigma did suffer downtime and loss of productivity during the evacuation, initial damage assessment, and recovery and reentry phases. No direct fire damage occurred and recovery was limited to cleaning or replacement of air system filters.

Table 2.5.2-1. Sigma Complex (TA-03)/Comparison of Operations

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Research and Development on Materials Fabrication, Coating, Joining, and Processing	Maintain and enhance capability to fabricate items from metals, ceramics, salts, beryllium, enriched uranium, depleted uranium, and other uranium isotope mixtures including casting, forming, machining, polishing, coating, and joining.	Capability maintained and enhanced, as projected.	Capability maintained and enhanced, as projected.	Capability maintained and enhanced, as projected.	Capability maintained and enhanced, as projected.	Capability maintained and enhanced, as projected.
Characterization of Materials	Maintain and enhance research and development activities on properties of ceramics, oxides, silicides, composites, and high-temperature materials. Characterize components for accelerator production of tritium.	Modest increase in research and development. Totals of 255 assignments and 1,200 specimens were characterized.	Modest increase in research and development. Totals of 248 assignments and 1,300 specimens were characterized.	Totals of 227 assignments and 1,070 specimens were characterized.	Totals of 184 assignments and 961 specimens were characterized.	Totals of 153 assignments and 759 specimens were characterized.
	Analyze up to 36 tritium reservoirs per year.	Total of 36 tritium reservoirs analyzed.	Less than 36 tritium reservoirs analyzed.	Total of 3 tritium reservoirs analyzed.	Activity transferred to TFF (See Table 2.7.2-1.) [b]	Activity transferred to TFF (See Table 2.7.2-1.) [b]
	Develop library of aged non-SNM materials from stockpiled weapons and develop techniques to test and predict changes. Store and characterize up to 2,500 non-SNM component samples, including uranium.	Less than 2,500 non-SNM component samples, including uranium, stored in library.	Approximately 500 non-SNM materials samples and 500 non-SNM component samples stored in library.	Approximately 1,000 non-SNM materials samples and 1,000 non-SNM component samples stored in library.	Approximately 500 non-SNM materials samples and 500 non-SNM component samples stored in library.	Approximately 500 non-SNM materials samples and 500 non-SNM component samples stored in library.
Fabrication of Metallic and Ceramic Items	Fabricate stainless steel and beryllium components for about 80 pits per year.	Fabricated two development pits from existing components.	No development pits fabricated.	No development pits fabricated.	No development pits fabricated.	No development pits fabricated.
	Fabricate up to 200 tritium reservoirs per year.	Total of 36 reservoirs fabricated.	Less than 200 reservoirs fabricated.	Less than 25 reservoirs fabricated.	Less than 25 reservoirs fabricated.	Less than 25 reservoirs fabricated.
	Fabricate components for up to 50 secondaries per year.	Evaluated less than 50 components. Fabricated 10 secondaries.	Fabricated components for less than 50 secondaries.	Fabricated components for less than 50 secondaries.	Fabricated components for less than 50 secondaries.	Fabricated components for less than 50 secondaries.
	Fabricate nonnuclear components for research and development: about 100 major hydrotests and 50 joint test assemblies per year.	Fabricated components for less than 100 major hydrotests and for less than 50 joint test assemblies.	Fabricated components for less than 100 major hydrotests and for less than 50 joint test assemblies.	Fabricated components for less than 100 major hydrotests and for less than 50 joint test assemblies.	Fabricated components for less than 100 major hydrotests and for less than 50 joint test assemblies.	Fabricated components for less than 100 major hydrotests and for less than 50 joint test assemblies.

Table 2.5.2-1. Sigma Complex (TA-03)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
	Fabricate beryllium targets.	None produced.	None produced.	None produced.	Provided material for the production of Inertial Confinement Fusion targets but did not fabricate any targets.	Provided material for the production of Inertial Confinement Fusion targets but did not fabricate any targets.
	Fabricate targets and other components for accelerator production of tritium research.	One radio-frequency cavity produced.	Three radio-frequency cavities were produced.	Seven radio-frequency cavities were polished. None were produced.	Two radio-frequency cavities were polished. None were produced.	Six radio-frequency cavities were polished. None were produced.
	Fabricate test storage containers for nuclear materials stabilization.	None produced.	None produced.	None produced.	Produced 50 containers.	Produced 50 containers.
	Fabricate nonnuclear (stainless steel and beryllium) components for up to 20 pit rebuilds per year.	None produced.	Fabricated nonnuclear (stainless steel and beryllium) components for up to 20 pit rebuilds per year.	Less than 10 stainless steel and no beryllium components produced.	Less than 10 stainless steel and no beryllium components produced.	Less than 10 stainless steel and no beryllium components produced.

[a] Includes Sigma Building renovation and modifications for Beryllium Technology Facility.
[b] The SWEIS indicated that this activity would also be accomplished at TFF.

Table 2.5.3-1. Sigma Complex (TA-03)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 OPERATIONS
Radioactive Air Emissions: [a]							
Americium-241	Ci/yr	Not projected	9.30E-09	Not Detected	Not Measured [b]	Not Measured	Not Measured
Uranium-234	Ci/yr	6.60E-5	1.30E-09	1.2E-06	Not Measured [b]	Not Measured	Not Measured
Uranium-235	Ci/yr	Not projected	Not Detected	4.5E-08	Not Measured [b]	Not Measured	Not Measured
Uranium-238	Ci/yr	1.80E-3	6.20E-09	1.3E-08	Not Measured [b]	Not Measured	Not Measured
Thorium-230	Ci/yr	Not projected	Not Measured	6.4E-09	Not Measured [b]	Not Measured	Not Measured
NPDES Discharge:							
Total Discharges	MGY	7.3	12.7	5.77	3.9	0.05	2.0040
03A–022	MGY	4.4	12.7	5.77	3.9 [c]	0.05	2.0040
03A–024	MGY	2.9	No discharge	No discharge	0	0	0
Wastes:							
Chemical	kg/yr	10,000	22,489	3,208	3,672	1,265	32,397 [d]
LLW	m^3/yr	960	3	61	52	0.5	202
MLLW	m^3/yr	4	0	0.3	0	1.3	0
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	284 [e] 101 [e]	110 [e]	101 [e]	99 [e]	94 [e]	105 [e]

[a] During 1999, only emissions from TA-03-35 were measured using stack sampling. Potential emissions from other Sigma facilities were sufficiently small that measurement systems were not necessary to meet regulatory or facility requirements.

[b] Stack monitoring at Sigma was discontinued early in 2000. This decision was made because the potential emissions from the monitored stack were sufficiently low that stack monitoring was no longer warranted for compliance with U.S. Environmental Protection Agency (EPA) or DOE regulations. Therefore, no emissions from monitoring data are available.

[c] This outfall flowed all four quarters during CY 2000.

[d] A significant difference in the amount of chemical waste generated from that projected in the SWEIS is due to structure rehabilitation and disposal of equipment and other material debris resulting from bringing the Press Building back on-line.

[e] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for 1998 through 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.6 Materials Science Laboratory (TA-03)

The MSL Key Facility is a single laboratory building (3-1698) containing 27 labs, 60 offices, 21 materials research areas, and support rooms. The building, a two-story structure with approximately 55,000 square feet of floor space, was first opened in November 1993. Activities are all related to research and development of materials science. In 1998, 1999, and 2000, this Key Facility was categorized as a Low Hazard nonnuclear facility. In September 2001, MSL was placed on the Radiological Facility List (LANL 2001c) and remained on the list in 2002 (LANL 2002b).

2.6.1 Construction and Modifications at the Materials Science Laboratory

Projected: The SWEIS identified that completion of the top floor of the MSL was planned and was included in an environmental assessment (DOE 1991), but was not funded.

Actual: To date, the completion of the top floor of the MSL remains unscheduled and unfunded.

Table 2.6.1-1 indicates the construction and modifications that were planned and have not occurred at the MSL.

Table 2.6.1-1. MSL Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Completion of top floor of MSL	Unscheduled and not funded	Unscheduled and not funded	Unscheduled and not funded	Unscheduled and not funded	Unscheduled and not funded

2.6.2 Operations at the Materials Science Laboratory

The SWEIS identified four major types of experimentation at MSL: materials processing, mechanical behavior in extreme environments, advanced materials development, and materials characterization. No new capabilities have been added, and none has been deleted. In 2001, MSL conducted operations at levels approximating those projected by the SWEIS ROD.

During the 1998–2002 timeframe, the approximate total number of researchers and support staff at MSL has been fairly consistent with 105 in 1998 and 1999, 109 in 2000 and 2001, and 102 in 2002. These numbers are approximately 30 percent more than the 82 personnel projected by the SWEIS ROD.[5] (The primary measurement of activity for this facility is the number of scientists doing research.) This increase was accomplished by having researchers share offices and laboratories and reflects the high value placed on the MSL because of its quality lab space. Table 2.6.2-1 compares 1998 through 2002 operations to projections made by the SWEIS ROD.

[5] This number should not be confused with the FTE index shown in Table 2.6.3-1 (59 FTEs) as the two numbers represent different populations of individuals. The 109 total researchers represent students, temporary employees, and visiting staff from other institutions. The 59 FTEs represents only regular full-time and part-time LANL staff.

Table 2.6.2-1. MSL (TA-03)/Comparison of Operations

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Materials Processing	Maintain seven research capabilities at levels identified during preparation of the SWEIS: Wet chemistry • Thermomechanical processing • Microwave processing • Heavy equipment materials • Single crystal growth • Amorphous alloys • Powder processing Expand materials synthesis/processing to develop cold mock-up of weapons assembly and processing. Expand materials synthesis/processing to develop environmental and waste technologies.	Unlike projections, microwave processing was not performed, and materials synthesis/processing was not expanded. The other five capabilities were maintained as projected by the SWEIS ROD.	These capabilities were maintained as projected by the SWEIS ROD.	These capabilities were maintained as projected by the SWEIS ROD.	These capabilities were maintained as projected by the SWEIS ROD.	These capabilities were maintained as projected by the SWEIS ROD. Synthesis/processing of cold mock-up of weapons assembly and processing was expanded in 2002. Synthesis/processing of environmental and waste technologies was expanded in 2002.

Table 2.6.2-1. MSL (TA-03)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Mechanical Behavior in Extreme Environment	Maintain two research capabilities at levelsidentified during preparation of the SWEIS: • Mechanical testing • Fabrication and assembly Expand dynamic testing to include research and development for the aging of weapons materials. Develop a new research capability (machining technology).	Mechanical testing was maintained as projected, and dynamic testing was expanded as projected. Fabrication and assembly was not performed, however. A new research capability was developed for research into materials failure and fracture.	Mechanical testing was maintained as projected. Research into materials failure and fracture continued.	Mechanical testing was maintained as projected. Research into materials failure and fracture continued.	Items were maintained and processes improved. New capabilities development and process improvement is an ongoing effort.	These two capabilities were maintained as projected by the SWEIS ROD and additional capabilities were expanded as projected by the SWEIS ROD. Fabrication, assembly and prototype experiments were expanded in 2002. Dynamic testing for the aging of weapons materials was expanded in 2002. A new machining research capability was developed in 2002. It includes: • machining and mechanical fabrication; • physical energy measurements at cryogenic, low temperatures, high magnetic fields and high pressure; and • lab-scale fluid dynamics measurements.

Table 2.6.2-1. MSL (TA-03)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Advanced Materials Development	Maintain four research capabilities at levels identified during preparation of the SWEIS: • New materials • Synthesis and characterization • Ceramics • Superconductors	Three capabilities were maintained as projected by the SWEIS ROD. Synthesis and characterization was not performed, however.	This capability was maintained as projected by the SWEIS ROD.	This capability was maintained as projected by the SWEIS ROD.	This capability was maintained as projected by the SWEIS ROD.	This capability was maintained as projected by the SWEIS ROD. The Superconductors capability has been expanded to include: • Thin Film Deposition and • Electropolishing.
Materials Characterization	Maintain four research capabilities at levels identified during preparation of the SWEIS: • Surface science chemistry • X-ray • Optical metallography • Spectroscopy Expand corrosion characterization to develop surface modification technology. Expand electron microscopy to develop plasma source ion implantation.	As projected in the SWEIS ROD, four capabilities were maintained at 1995 levels, and corrosion characterization was expanded to develop surface modification technology. Electron microscopy was also expanded, but plasma source ion implantation was not developed.	Materials characterization continued to be maintained.	Materials characterization continued to be maintained.	These processes are expanded and improved upon on a continual basis.	These processes are expanded and improved upon on a continual basis. Optical metalography has been expanded to include ion analysis. Spectroscopy capabilities have been expanded to include the Ion Beam Materials Science Laboratory. Corrosion characterization has been expanded to develop surface modification technology. Electron microscopy has been expanded to develop plasma source ion implantation.

[a] Includes completion of the second floor of MSL.

2.6.3 Operations Data for the Materials Science Laboratory

The overall size of the MSL workforce has increased from about 57 workers in 1998 to about 61 in 2002 (regular part-time and full-time LANL employees listed in Table 2.6.3-1). Operational effects have been normal relative to SWEIS ROD projections. Generally, waste quantities have been lower than projected by the SWEIS ROD. An exception on chemical waste quantities occurred during 2000 when a lab in C-Wing was remodeled and construction and demolition debris (previously identified as industrial waste) was generated. Industrial solid waste (251 kilograms in 2001 not identified further) is nonhazardous, may be disposed in county landfills, and does not represent a threat to local environs. Radioactive air emissions continue to be negligible and therefore were not measured. Table 2.6.3-1 provides details.

Table 2.6.3-1. MSL (TA-03)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Radioactive Air Emissions	Ci/yr	Negligible	Not measured	Not measured	Not measured	Not measured	Not measured
NPDES Discharge Volume	MGY	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls
Wastes:							
Chemical	kg/yr	600	244	154	881	255	149
LLW	m^3/yr	0	0	0	0	0	0
MLLW	m^3/yr	0	0	0	0	0	0
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	82 [a] 57 [a]	57 [a]	57 [a]	59 [a]	60 [a]	61 [a]

[a] The number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CYs 2000, 2001, and 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CYs 2000, 2001, and 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

Materials Science Laboratory

2.6.4 Cerro Grande Fire Effects at the Materials Science Laboratory

Cerro Grande Fire effects on MSL and its associated operations were minimal. Programs at MSL suffered downtime and loss of productivity during the evacuation, initial damage assessment, and recovery and reentry phases. No direct damage occurred and recovery was limited to cleaning or replacement of air system filters.

2.7 Target Fabrication Facility (TA-35)

The TFF is a two-story building (35-213) housing activities related to weapons production and laser fusion research. This Key Facility is categorized as a Low Hazard nonnuclear facility. Exhaust air from process equipment is filtered prior to exhaust to the atmosphere. Sanitary wastes are piped to the LANL sewage facility at TA-46, and radioactive liquid wastes are piped to the treatment facility at TA-50.

2.7.1 Construction and Modifications at the Target Fabrication Facility

Projected: The ROD did not project any facility changes through 2005.

Actual: In 1998, process discharges from Outfall 04A-127 were rerouted to the sewage facility at TA-46, and the outfall was eliminated from the NPDES permit (DOE 1996f). There were no other significant facility additions or modifications from 1996 through 2002.

Table 2.7.1-1 indicates the construction and modifications at the TFF.

Table 2.7.1-1. TFF Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
No changes through 2005	Outfall 04A-127 eliminated with sewage rerouted to TA-46 (DOE 1996f).				

2.7.2 Operations at the Target Fabrication Facility

The SWEIS identified three capabilities for the TFF Key Facility. The primary measurement of activity for this facility is production of targets for research and testing (laser and physics testing). In the 1998–2002 timeframe, the number of targets and specialized components fabricated for testing purposes was consistently less than the 6,100 targets per year projected by the SWEIS ROD. As seen in the Table 2.7.2-1, other operations at the TFF were also below levels projected by the SWEIS ROD. The Characterization of Materials capability has been added to Table 2.7.2-1. This was a capability identified in the SWEIS for the TFF and Sigma Key Facilities but, before the 2001 Yearbook, was only listed for the Sigma Key Facility.

2.7.3 Operations Data for the Target Fabrication Facility

TFF activity levels are primarily determined by funding from fusion, energy, and other research-oriented programs, as well as funding from some defense-related programs. These programs, and hence operations at TFF, were at levels similar to those levels identified during preparation of the SWEIS and below levels projected by the SWEIS ROD. This summary is supported by the current workforce and by the 1998–2002 waste volumes, which were less than projected. Table 2.7.3-1 details operations data for 1998–2002.

Table 2.7.2-1. TFF (TA-35)/Comparison of Operations

CAPABILITY	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Precision Machining and Target Fabrication	Provide targets and specialized components for ~6,100 laser and physics tests per year, including a 20% increase over levels identified during preparation of the SWEIS for high-explosive pulsed-power target operations, and including ~100 high-energy-density physics tests.	Provided targets and specialized components for ~1,200 tests. Supported high-explosive pulsed-power tests at 1995 levels. Supported ~25 high-energy-density physics tests.	Provided targets and specialized components for ~1,200 tests. Supported high-explosive pulsed-power tests at 1995 levels. Supported ~25 high-energy-density physics tests.	Provided targets and specialized components for ~1,300 tests. Supported high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; supported ~seven high-energy-density physics tests.	Provided targets and specialized components for ~1,600 tests. Did not support high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; however, did support electrical high-energy-density hydrodynamics. Supported ~seven high-energy-density physics tests.	Provided targets and specialized components for ~1,600 tests. Did not support high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; however, did support electrical high-energy-density hydrodynamics. Supported ~18 high-energy-density physics tests.
Polymer Synthesis	Produce polymers for targets and specialized components for ~6,100 laser and physics tests per year, including a 20% increase over levels identified during preparation of the SWEIS for high-explosive pulsed-power target operations, and including ~100 high-energy-density physics tests.	Produced polymers for targets and specialized components for ~600 tests. Supported high-explosive pulsed-power tests at 1995 levels. Supported ~15 high-energy-density physics tests.	Produced polymers for targets and specialized components for ~600 tests. Supported high-explosive pulsed-power tests at 1995 levels. Supported ~20 high-energy-density physics tests.	Produced polymers for targets and specialized components for ~600 tests. Supported high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; supported ~seven high-energy-density physics tests.	Produced polymers for targets and specialized components for ~800 tests. Did not support high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; however, did support electrical high-energy-density hydrodynamics. Supported ~seven high-energy-density physics tests.	Produced polymers for targets and specialized components for ~800 tests. Did not support high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; however, did support electrical high-energy-density hydrodynamics. Supported ~18 high-energy-density physics tests.

Table 2.7.2-1. TFF (TA-35)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Chemical and Physical Vapor Deposition	Coat targets and specialized components for ~6,100 laser and physics tests per year, including a 20% increase over levels identified during preparation of the SWEIS for high-explosive pulsed-power target operations, including ~100 high-energy-density physics tests, and including support for pit rebuild operations at twice the levels identified during preparation of the SWEIS.	Coated targets and specialized components for ~600 tests. Supported high-explosive pulsed-power tests at 1995 levels. Supported ~25 high-energy-density physics tests. Provided no support for pit rebuild operations.	Coated targets and specialized components for ~600 tests. Supported high-explosive pulsed-power tests at 1995 levels. Supported ~25 high-energy-density physics tests. Provided coatings for pit rebuild operations.	Coated targets and specialized components for ~600 tests. Supported high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; supported ~seven high-energy-density physics tests. Provided coatings for pit rebuild operations.	Coated targets and specialized components for ~800 tests. Did not support high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; however, did support electrical high-energy-density hydrodynamics. Supported ~seven high-energy-density physics tests. Provided coatings for pit rebuild operations.	Coated targets and specialized components for ~800 tests. Did not support high-explosive pulsed-power tests at levels identified during preparation of the SWEIS; however, did support electrical high-energy-density hydrodynamics. Supported ~18 high-energy-density physics tests. Provided coatings for pit rebuild operations.
Characterization of Materials [a]	Analyze up to 36 tritium reservoirs per year. [a]				Less than 36 tritium reservoirs analyzed.	Less than 36 tritium reservoirs analyzed.

[a] The SWEIS indicated that this activity would be accomplished at TFF as well as the Sigma Complex. See Table 2.5.2-1.

Table 2.7.3-1. TFF (TA-35)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Radiological Air Emissions	Ci/yr	Negligible	Not measured	Not measured [a]	Not measured [b]	Not measured [b]	Not measured [b]
NPDES Discharge:							
4A-127	MGY	0	Eliminated [c]	Eliminated	Eliminated	Eliminated	Eliminated
Wastes:							
Chemical	kg/yr	3,800	2,827	594	1,062	668	904
LLW	m^3/yr	10	0	0	0	0.2	0.4
MLLW	m^3/yr	0.4	0	0	0	0	0
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	98 [d] 54 [d]	57 [d]	54 [d]	52 [d]	54 [d]	53 [d]

[a] Potential emissions during 1999 were sufficiently small that measurement systems were not necessary to meet regulatory or facility requirements.

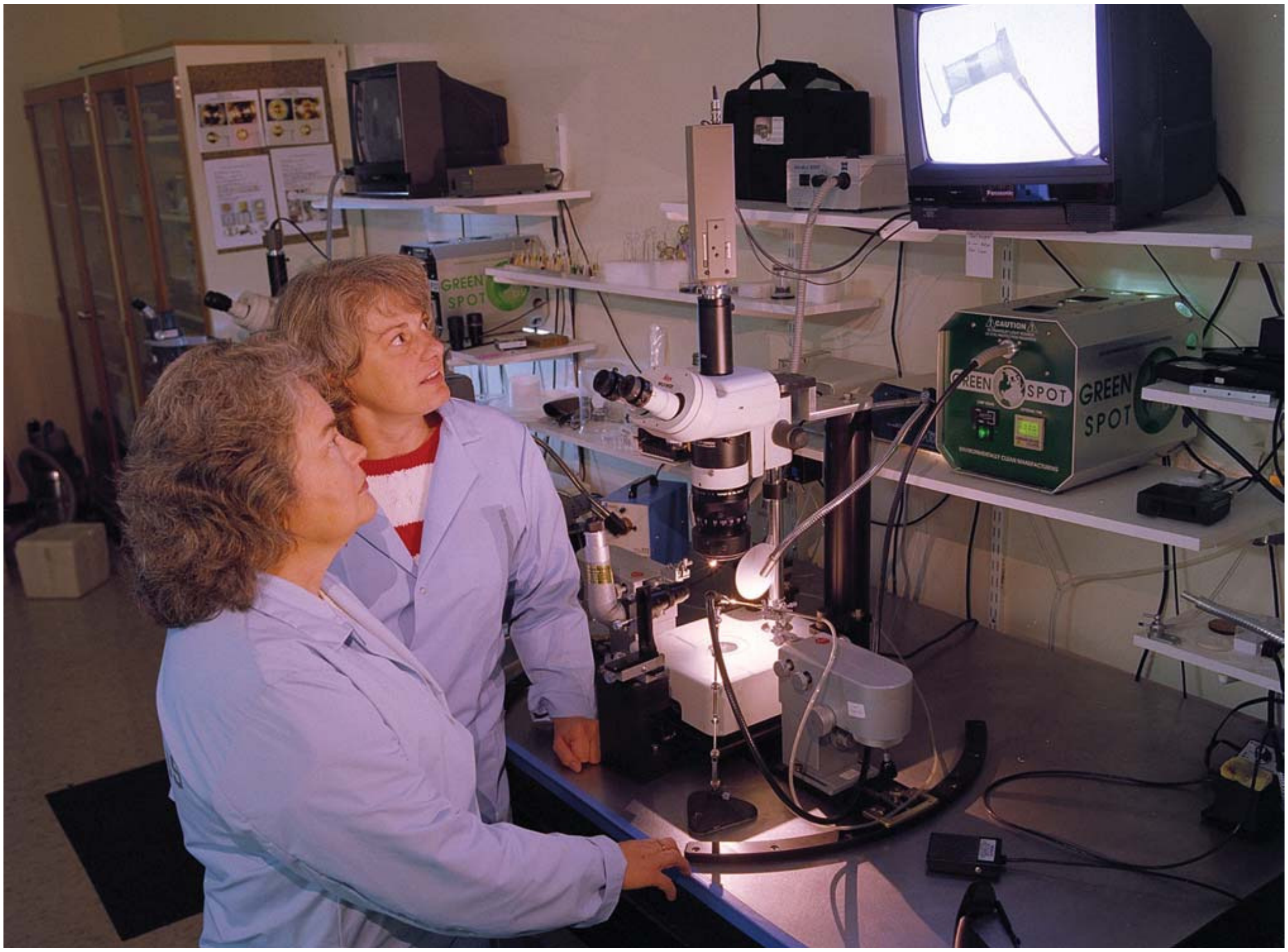
[b] The emissions continue to be sufficiently low that monitoring is not required.

[c] Outfall eliminated before 1999: 04A-127 (TA-35).

[d] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for 1998 through 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.7.4 Cerro Grande Fire Effects at the Target Fabrication Facility

Programs at TFF suffered substantial downtime and loss of productivity during the evacuation and initial damage assessment, recovery, and reentry phases. Lost time because of the fire resulted in the TFF being available only about 93 percent of the planned operational days in 2000 while the target assembly area was only available about 88 percent. No direct fire damage occurred; however, some equipment was damaged because of fluctuating power and loss of liquid nitrogen cooling. Additionally, smoke damage to work areas and air handling systems was sufficient to prevent use of the Target Assembly area. The Target Assembly Team relocated to Sandia National Laboratories for a two-week period while their work areas and air handling systems were cleaned and repaired.



Inspection of target component

2.8 Machine Shops (TA-03)

The Machine Shops Key Facility consists of two buildings, the Nonhazardous Materials Machine Shop (Building 03-39) and the Radiological Hazardous Materials Machine Shop (Building 03-102). Both buildings are located within the same exclusion area. Activities consist of machining, welding, and assembly of various materials in support of major LANL programs and projects, principally those related to weapons manufacturing. In September 2001, Building 03-102 was placed on the Radiological Facility List (LANL 2001c) and remained on the radiological facility list in 2002 (LANL 2002b).

2.8.1 Construction and Modifications at the Machine Shops

Projected: The SWEIS ROD projected no new construction or major modifications to the shops

Actual: There were two facility modifications over the three-year period 1996–1998 at Building 03-39. In the center wing of Building 03-39, Room 26 was put to use as the central weapons information center for the Information and Records Management Group of the Computing, Information, and Communications Division. Room 26 had been empty (DOE 1996g). Additionally, the waste machine coolant generated by the Building 03-39 shops was reduced in 1998 (LANL 1998d). In 1999, Building 03-39 was re-roofed by installing a single-ply membrane over the existing roof. In 2001, both Buildings 03-39 and -102 upgraded security containers to meet life safety code standards. Building 03-102 upgraded both the ventilation and electrical systems in 1998. In 2002, the Building 03-66 thermal treatment of depleted uranium parts was duplicated at Building 03-102.

Consistent with SWEIS ROD projections, there were no new construction or major modifications to the shops in 1999, 2000, 2001, or 2002. Beryllium operations conducted in Room 16 in the north wing of Building 03-39 were completely moved to Building 03-141, the Beryllium Technology Facility (part of the Sigma Key Facility). This move was started in 2000 and was, for the most part, completed in 2001. Remaining equipment and materials will be relocated prior to decontamination and decommissioning. Table 2.8.1-1 indicates the construction and modifications at the Machine Shops.

Table 2.8.1-1. Machine Shops Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
No new construction or modifications projected	Building 03-39, Room 26 became central weapons information center (DOE 1996g).				
	Upgraded and replaced ventilation system in Building 03-102 (LANL 1996a).				
	Waste machine coolant volume reduction at Building 03-39 (LANL 1998d).				
		Re-roofed Building 03-39 (LANL 1998b).			
		Electrical upgrades at Building 03-102 (LANL 1998c).			
			Beryllium equipment moved to Beryllium Tech. Facility from Building 03-39.	Beryllium equipment moved to Beryllium Tech. Facility from Building 03-39.	
				Security container fire and lighting upgrades at Buildings 03-39 and 03-102 (LANL 2001o).	
					Duplicate TA-03-66 heat treating capability at Building 03-102 (LANL 2002h).

2.8.2 Operations at the Machine Shops

As shown in Table 2.8.2-1, the SWEIS identified three capabilities at the shops. These same three capabilities continue to be maintained. No new capabilities have been added to this Key Facility. All activities during the 1998–2002 timeframe occurred at levels well below those projected by the SWEIS ROD. The workload at the Shops is directly linked to research and development and production requirements.

2.8.3 Operations Data for the Machine Shops

Since activities were well below projections by the SWEIS ROD, so too were operations data. The highest chemical waste generation was 26,474 kilograms generated in 2001, compared to a ROD projection of 474,000 kilograms per year. Table 2.8.3-1 provides details.

2.8.4 Cerro Grande Fire Effects at the Machine Shops

Cerro Grande Fire effects on the Machine Shops and associated operations were minimal. Programs at the Machine Shops suffered downtime and loss of productivity during the evacuation, initial damage assessment, and recovery and reentry phases.

Machine Shop operations

Table 2.8.2-1. Machine Shops (TA-03)/Comparison of Operations

CAPABILITY	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Fabrication of Specialty Components	Provide fabrication support for the dynamic experiments program and explosives research studies. Support up to 100 hydrodynamic tests/yr. Manufacture up to 50 joint test assembly sets/yr. Provide general laboratory fabrication support as requested.	Specialty components were fabricated at levels below those projected by the SWEIS ROD.	Specialty components were fabricated at levels below those projected by the SWEIS ROD.	Specialty components were fabricated at levels below those projected by the SWEIS ROD.	Specialty components were fabricated at levels below those projected by the SWEIS ROD.	Specialty components were fabricated at levels below those projected by the SWEIS ROD.
Fabrication Utilizing Unique Materials	Continue fabrication utilizing unique and unusual materials.	Fabrication with unique materials was conducted at levels below those projected by the SWEIS ROD.	Fabrication with unique materials was conducted at levels below those projected by the SWEIS ROD.	Fabrication with unique materials was conducted at levels below those projected by the SWEIS ROD.	Fabrication with unique materials was conducted at levels below those projected by the SWEIS ROD.	Fabrication with unique materials was conducted at levels below those projected by the SWEIS ROD.
Dimensional Inspection of Fabricated Components	Provide appropriate dimensional inspection of above fabrication activities. Undertake additional types of measurements and inspections.	Dimensional inspection was provided for the above fabrication activities. Additional types of measurements and inspections were not undertaken.	Dimensional inspection was provided for the above fabrication activities. Additional types of measurements and inspections were not undertaken.	Dimensional inspection was provided for the above fabrication activities. Additional types of measurements and inspections were not undertaken.	Dimensional inspection was provided for the above fabrication activities. Additional types of measurements and inspections were not undertaken.	Dimensional inspection was provided for the above fabrication activities. Additional types of measurements and inspections were not undertaken.

Table 2.8.3-1. Machine Shops (TA-03)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Plutonium-238	Ci/yr	Not projected [a]	2.0E-10 [a]	Not detected	Not detected	Not detected	Not detected
Plutonium-239	Ci/yr	Not projected [a]	Not detected	Not detected	Not detected	Not detected	3.9E-10 [b]
Thorium-228	Ci/yr	Not projected [a]	2.3E-9 [a]	2.5E-9 [b]	Not detected	Not detected	8.0E-10 [b]
Thorium-230	Ci/yr	Not projected [a]	6.8E-9 [a]	7.8E-10 [b]	1.2E-9 [b]	Not detected	Not detected
Thorium-232	Ci/yr	Not projected [a]	1.4E-9 [a]	5.4E-10 [b]	Not detected	Not detected	Not detected
Uranium-234	Ci/yr	Not projected [a]	1.7E-5 [a]	3.0E-7 [b]	5.3E-8 [b]	2.1E-8 [b]	8.7E-8 [b]
Uranium-235	Ci/yr	Not projected [a]	5.8E-9 [a]	1.2E-8 [b]	1.9E-9 [b]	9.9E-10 [b]	3.8E-9 [b]
Uranium-238	Ci/yr	1.50E-4	3.6E-8	1.3E-8	1.3E-9	4.5E-10	5.0E-9
NPDES Discharge	MGY	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls
Wastes:							
Chemical	kg/yr	474,000	4,399	3,955	887	26,474	2,023
LLW	m^3/yr	606	27	40.4	409	22	44
MLLW	m^3/yr	0	0.1	0.03	0.12	0.05	0
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	289 [c] 81[c]	83 [c]	81 [c]	80 [c]	91 [c]	92 [c]

[a] The SWEIS ROD did not contain projections for these radioisotopes.

[b] This radionuclide was not projected by the SWEIS ROD because it was either dosimetrically insignificant or not isotopically identified.

[c] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for 1998 through 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.9 High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, TA-28, TA-37)

The High Explosives Processing Key Facility is located in all or parts of seven technical areas. Building types consist of production and assembly facilities, analytical laboratories, explosives storage magazines, and a facility for treatment of high explosive contaminated wastewaters. Activities consist primarily of manufacture and assembly of high explosives components for nuclear weapons and for Science-Based Stockpile Stewardship Program tests and experiments. Environmental and safety tests are performed at TA-11 and TA-09 while TA-08 houses radiography activities.

As identified in the SWEIS, this Key Facility has one Category 2 nuclear building in TA-08 (8-23) (Table 2.9-1). The High Explosives Processing facilities identified as radiological are shown in Table 2.9-2.

Table 2.9-1. High Explosives Processing Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-08-0022	Radiography facility	2	2	2			
TA-08-0023	Radiography facility	2	2	2	2	2	2
TA-08-0024	Isotope Building	2					
TA-08-0070	Experimental Science	2					
TA-16-0411	Intermediate Device Assembly		2	2			

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)

Table 2.9-2. High Explosives Processing Buildings Identified as Radiological Facilities

BUILDING	DESCRIPTION	LANL 2001 [a]	LANL 2002 [b]
TA-08-0022	Radiography	Rad	Rad
TA-08-0070	Nondestructive Testing and Evaluation	Rad	Rad
TA-08-0120	Radiography		Rad
TA-11-0030	Vibration Testing	Rad	Rad
TA-16-0088	Component Storage	Rad	Rad
TA-16-0202	Laboratory		Rad
TA-16-0207	Component Testing		Rad
TA-16-0300	Component Storage	Rad	Rad
TA-16-0301	Component Storage	Rad	Rad
TA-16-0302	Component Storage/Training	Rad	Rad
TA-16-0332	Component Storage	Rad	Rad
TA-16-0410	Assembly Building	Rad	Rad
TA-16-0411	Assembly Building	Rad	Rad
TA-16-0413	Component Storage	Rad	
TA-16-0415	Component Storage	Rad	
TA-37-0010	Storage Magazine	Rad	Rad
TA-37-0014	Storage Magazine	Rad	Rad
TA-37-0016	Storage Magazine		Rad
TA-37-0022	Magazine	Rad	
TA-37-0024	Storage Magazine	Rad	Rad
TA-37-0025	Storage Magazine	Rad	Rad

[a] LANL Radiological Facility List (LANL 2001c).
[b] LANL Radiological Facility List (LANL 2002b).

Operations at this Key Facility are performed by two separate Divisions: the Dynamic Experimentation (DX) Division and the Engineering Sciences and Applications (ESA) Division. ESA performs the majority of the high explosives manufacturing and assembly work while DX assesses the parts produced by ESA.

The ESA Weapon Materials and Manufacturing group brings 99 percent of the explosives into LANL and stores it as raw material. ESA presses the raw explosives into solid shapes and machines these shapes to specifications. The completed shapes are shipped to DX for testing (detonation). The DX High Explosives Science and Technology group also creates a small quantity of high explosives during the year from basic chemistry. The DX Detonation Science and Technology group uses a small amount of the raw explosives for making detonators.

There are two major pathways for expending the explosives brought into LANL: wastes from the pressing and machining operations, which are burned, and completed shapes that are detonated as part of the testing program.

As a result, information from both Divisions must be combined to completely capture operational parameters for production of high explosives. To assist the reader, this information is presented both in separate and combined forms.

2.9.1 Construction and Modifications at High Explosives Processing

Projected: The ROD projected four facility modifications for this Key Facility. These four modifications were

- construction of the High Explosive Waste Treatment Facility (HEWTF),
- modification of 17 outfalls and their elimination from the NPDES permit,
- relocation of the Weapons Components Testing Facility, and
- the TA-16 steam plant conversion.

Actual: All four projects identified in the ROD were completed before 1999. The real-time, small-component radiography capability installed in Building TA-16-260 was completed and made fully operational in 2001. When this capability became fully operational in 2001, Buildings TA-16-220, -222, -223, -224, -225, and -226 were vacated and are presently being demolished (DOE 1997a).

Planning and modification work at TA-09 started in 1998 and has continued to allow consolidation of high explosives formulation operations previously conducted at TA-16-340 with other TA-09 high explosives operations (DOE 1999b).

Table 2.9.1-1 summarizes the construction and modification activities at the High Explosive Processing Key Facility. The additional construction and modifications described in the table address other aspects of consolidating the ongoing work and improving environmental stewardship.

High Explosives Burning Facility

Table 2.9.1-1. High Explosive Processing Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
Construction of the HEWTF	HEWTF, TA-16-1508, for treating process waters via sand filtration became fully operational in 1997.	Completed before 1999.			
Modification of 17 outfalls and their elimination from the NPDES permit	Nineteen outfalls were eliminated from the NPDES permit during 1997 and 1998. [b]	Completed before 1999.			
Relocation of the Weapons Components Testing Facility	Completed before 1999.	Completed before 1999.			
TA-16 steam plant conversion	Energy-efficient satellite steam boilers placed into service for each major TA-16 building or cluster of buildings in 1997. Gas-fired, central steam plant for TA-16 shut down.	Completed before 1999.			
	Real-time, small-component radiography capability installed in TA-16-260 in 1998 (DOE 1997a).	TA-16-260 not fully operational in 1999 (DOE 1997a).	TA-16-260 not fully operational in 2000 (DOE 1997a).	TA-16-260 completed and made fully operational in 2001. Buildings 16-220, -222, -223, -224, -225, and -226 vacated.	Decontamination and decommissioning of Buildings 16-220, -222, -223, -224, -225, and -226.
	High explosives casting and inert (mock high explosives) processing operations moved from Buildings TA-16-300 and -302 to Building TA-16-260. TA-16-300 and -302 became Joint Weapons Training Facility (DOE 1996h).				
	Old casting and storage buildings TA-16-164 and -27 and six nearby WWII-vintage machining and inspection buildings plus associated support structures removed under decontamination and decommissioning (DOE 1997b).				

Table 2.9.1-1. High Explosive Processing Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
	Planning and modification work at TA-09 to consolidate high explosive formulation operations previously conducted at TA-16-340 with other TA-09 HE operations (DOE 1999b).	Planning and modification work at TA-09 to consolidate high explosive formulation operations continued (DOE 1999b).	Planning and modification work at TA-09 to consolidate high explosive formulation operations continued (DOE 1999b). Building TA-16-340 closed during second quarter of FY 2000.	Planning and modification work at TA-09 to consolidate high explosive formulation operations continued (DOE 1999b).	
	Explosive material storage magazines at TA-28 used for PTLA support rather than high explosive processing operations.	Explosives stored at TA-28 were moved to TA-37 for storage. TA-28 remains part of High Explosive Processing Key Facility.			
	Burn operations at high-explosive-contaminated combustible trash incinerator, TA-16-1409 ceased. Draft closure plan submitted to New Mexico State.		Incinerator underwent Resource Conservation and Recovery Act (RCRA) clean-closure and was dismantled and scrapped.		
		Aboveground wastewater storage tank system placed into service at TA-09 (LANL 1998e).			
			RCRA closure activities continued for TA-16-387 flash pad [c] (ESA; LANL 1996b).		
			RCRA closure activities continued for TA-16-394 burn tray [d] (ESA; LANL 2000b).		
			ESA upgraded a burn unit improving capacity and efficiency and minimizing environmental impacts.		

Table 2.9.1-1. High Explosive Processing Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
			Cerro Grande Fire impacts: All V Site buildings except one destroyed, fire and smoke damage, underground fire in Material Disposal Area (MDA) R.		
					Consolidation of all high explosive burning operations at TA-16-388 and -399.

[a] Additional information on the impacts from the Cerro Grande Fire can be found in Section 2.9.4.
[b] Refer to Table 2.9.3-1 for information on the outfalls that were eliminated.
[c] Approximately 545 cubic meters of hazardous wastes were removed during closure of the flash pad.
[d] Approximately 114 cubic meters of hazardous wastes were removed during closure of the burn tray.

2.9.2 Operations at High Explosives Processing

The SWEIS ROD identified six capabilities for this Key Facility. No new capabilities have been added, and none has been deleted. Activity levels during 2002 continued below those projected by the SWEIS ROD. These projections were based on the possibility that LANL would take over high explosives production work being performed at Pantex Plant. DOE decided, however, to keep high explosives production at the Pantex Plant. However, the projections for high explosive processing were retained because DOE intends to keep LANL available as a back-up capability for the Pantex Plant.

As seen in Table 2.9.2-1, high explosives and plastics development and characterization operations remained below levels projected in the SWEIS. Efforts continued in 2002 to develop protocols for obtaining returned stockpile materials, develop new test methods, and procure new equipment to support requirements for science-based studies on stockpile materials.

In 2002, 9,402 pounds of high explosives and 1,531 pounds of high explosives simulant material from DX and ESA Divisions were used in the fabrication of test components. The level of high explosives usage was significantly below the ROD projection of 82,700 pounds of high explosives, while the usage of high explosives simulant was about the same as the projection of 2,910 pounds. However, the high explosive simulant results in chemical waste that is shipped offsite for disposal and does not result in environmental impacts at LANL.

In 2002, 3,170 pounds of explosive scrap were burned at the TA-16 Burn Ground. In addition, 636 pounds of explosive-contaminated combustible solid wastes were burned, 149 gallons of explosive-contaminated solvent-water solutions were burned, 4,305 pounds of explosive-contaminated metal were treated and salvaged, and 27,500 gallons of explosive-contaminated water were treated and released.

These levels were well below those projected by the SWEIS ROD. Three outfalls from High Explosives Processing remain on the NPDES permit: 03A-130, 05A-055 (the HEWTF), and 05A-097.

2.9.3 Operations Data for High Explosives Processing

The details of operations data from 1998 through 2002 are provided in Table 2.9.3-1. The NPDES discharge volume for 2002 was about 30,000 gallons, compared to a projection of more than 12 million gallons. Except for chemical wastes, waste quantities have consistently been well below projections made by the SWEIS ROD. The chemical waste projection of 13,000 kilograms was exceeded in 2000 through 2002.

2.9.4 Cerro Grande Fire Effects at High Explosives Processing

On May 7, 2000, the High Explosives Processing Key Facility Emergency Control Center was activated, TA-16 (S-Site) was evacuated, and all buildings were placed into a safe closed condition. Personnel began bulldozing a fire line around WETF. By May 12, 2000, TA-16 was on fire. On May 14, several emergency entries were made to assure that WETF was adequately maintained to keep its authorization basis active.

By May 15, management started planning for reentry, and procedures were established. On May 17, TA-16 was reentered according to procedures, and personnel started to assess buildings and perform cleanup following the fire. Care had to be taken to avoid hotspots (small fires burning in tree roots, stumps, etc.) that were a real danger to personnel walking across the land. By May 19, over 298 structures had been assessed for damage, and office buildings were reopened so people could return to work. On May 21, Management authorized employees to return to work at TA-16.

Table 2.9.2-1. High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, TA-28, and TA-37)/Comparison of Operations

CAPABILITY	SWEIS ROD[a, b]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
High Explosives Synthesis and Production	Continue synthesis research and development, produce new materials, and formulate explosives as needed. Increase production of materials for evaluation and process development. Produce material and components for directed stockpile production.	The high explosives synthesis and production operations were less than those projected by the SWEIS ROD.	The high explosives synthesis and production operations were less than those projected by the SWEIS ROD.	The high explosives synthesis and production operations were less than those projected by the SWEIS ROD.	The high explosives synthesis and production operations were less than those projected by the SWEIS ROD.	The high explosives synthesis and production operations were less than those projected by the SWEIS ROD.
High Explosives and Plastics Development and Characterization	Evaluate stockpile returns. Increase (40%) efforts in development and characterization of new plastics and high explosives for stockpile improvement. Improve predictive capabilities. Research high explosives waste treatment methods.	High explosives formulation, synthesis, production, and characterization operations were performed at levels that were less than those projected by the SWEIS ROD.	High explosives formulation, synthesis, production, and characterization operations were performed at levels that were less than those projected by the SWEIS ROD.	High explosives formulation, synthesis, production, and characterization operations were performed at levels that were less than those projected by the SWEIS ROD.	High explosives formulation, synthesis, production, and characterization operations were performed at levels that were less than those projected by the SWEIS ROD.	High explosives formulation, synthesis, production, and characterization operations were performed at levels that were less than those projected by the SWEIS ROD.
High Explosives and Plastics Fabrication	Continue traditional stockpile surveillance and process development. Supply parts to Pantex for surveillance, stockpile rebuilds, and joint test assemblies. Increase fabrication for hydrodynamic and environmental testing.	Fabricated ~950 high explosives parts in support of the weapons program, including high explosives characterization studies, subcritical experiments, hydro tests, surveillance activities, environmental weapons tests, and safety tests.	DX Division fabricated ~3,000 high explosive parts, and ESA Division fabricated ~870 high explosives parts in 1999. Therefore, ~3,870 parts were fabricated in support of the weapons program, including high explosives characterization studies, subcritical experiments, hydrotests, surveillance activities, environmental weapons tests, and safety tests.	DX Division fabricated ~2,000 high explosive parts, and ESA Division fabricated ~578 high explosives parts in 2000. Therefore, ~2,578 parts were fabricated in support of the weapons program, including high explosives characterization studies, subcritical experiments, hydrotests, surveillance activities, environmental weapons tests, and safety tests.	DX Division fabricated ~2,000 high explosive parts, and ESA Division fabricated ~578 high explosives parts in 2001. Therefore, ~2,578 parts were fabricated in support of the weapons program, including high explosives characterization studies, subcritical experiments, hydrotests, surveillance activities, environmental weapons tests, and safety tests.	DX Division fabricated ~2,000 high explosive parts, and ESA Division fabricated ~778 high explosives parts in 2002. Therefore, ~2,778 parts were fabricated in support of the weapons program, including high explosives characterization studies, subcritical experiments, hydrotests, surveillance activities, environmental weapons tests, and safety tests.

Table 2.9.2-1. High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, TA-28, and TA-37)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a, b]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Test Device Assembly	Increase test device assembly to support stockpile related hydrodynamic tests, joint test assemblies, environmental and safety tests, and increased research and development. Approximately 100 major assemblies per year.	Eleven major assemblies were provided for hydrodynamic, Nevada Test Site subcritical, and joint environmental test programs.	ESA Division provided 10 major assemblies for hydrodynamic, Nevada Test Site subcritical, and joint environmental test programs.	ESA Division provided 10 major assemblies for hydrodynamic, Nevada Test Site subcritical, and joint environmental test programs.	ESA Division provided less than 100 major assemblies for Nevada Test Site subcritical and joint environmental test programs.	ESA Division provided less than 100 major assemblies for Nevada Test Site subcritical and joint environmental test programs.
Safety and Mechanical Testing	Increase (50%) safety and environmental tests related to stockpile assurance. Improve predictive models. Approximately 15 safety and mechanical tests per year.	Fifteen stockpile related safety and mechanical tests during 1998.	DX Division performed 13 stockpile related safety and mechanical tests during 1999. ESA Division provided three revalidation and two certification assemblies during 1999.	DX Division performed 13 stockpile related safety and mechanical tests during 2000. ESA Division provided three revalidation and two certification assemblies during 2000.	DX Division performed less than 15 stockpile related safety and mechanical tests during 2001.	DX Division performed less than 15 stockpile related safety and mechanical tests during 2002.
Research, Development, and Fabrication of High-Power Detonators	Increase operations to support assigned stockpile stewardship management activities; manufacture up to 40 major product lines per year. Support DOE complex for packaging and transportation of electro-explosive devices.	High-power detonator activities resulted in the manufacture of less than 10 product lines in 1998.	High-power detonator activities by DX Division resulted in the manufacture of less than 20 product lines in 1999. In addition, ESA Division provided fourteen flux generator assemblies in 1999.	High-power detonator activities by DX Division resulted in the manufacture of less than 20 product lines in 2000. In addition, ESA Division provided 14 flux generator assemblies in 2000.	High-power detonator activities by DX Division resulted in the manufacture of less than 40 product lines in 2001.	High-power detonator activities by DX Division resulted in the manufacture of less than 40 product lines in 2002.

[a] The total amount of explosives and mock explosives used across all activities is an indicator of overall activity levels for this Key Facility. Amounts projected by the SWEIS ROD are 82,700 pounds of explosives and 2,910 pounds of mock explosives. Actual amounts used in 2002 were 9,402 pounds of high explosive and 1,531 pounds of mock high explosive.

[b] Includes construction of the HEWTF, the steam plant conversion, relocation of the Weapons Testing Facility, and outfall modifications.

Table 2.9.3-1. High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, TA-28, and TA-37)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Uranium-238	Ci/yr	9.96E-7	[a]	[a]	[a]	[a]	[a]
Uranium-235	Ci/yr	1.89E-8	[a]	[a]	[a]	[a]	[a]
Uranium-234	Ci/yr	3.71E-7	[a]	[a]	[a]	[a]	[a]
NPDES Discharge: [b]							
Number of outfalls	---	22	4	3	3	3	3
Total Discharges	MGY	12.4	17.1	0.118	0.086	0.036	0.03
02A-007 (TA-16)	MGY	7.4	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
03A-130 (TA-11) [c]	MGY	0.04	0.1	0.022	0.001	0.002	0.002
04A-070 (TA-16)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-083 (TA-16)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-092 (TA-16)	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
04A-115 (TA-08)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-157 (TA-16)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
05A-053 (TA-16)	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-054 (TA-16) [d]	MGY	3.6	6.3	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-055 (TA-16)	MGY	0.13	8.9	0.096	0.085	0.034	0.0275
05A-056 (TA-16)	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-066 (TA-09)	MGY	0.74	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-067 (TA-09)	MGY	0.33	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-068 (TA-09)	MGY	0.06	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-069 (TA-11)	MGY	0.01	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-071 (TA-16)	MGY	0.04	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-072 (TA-16)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
05A-096 (TA-11)	MGY	0.01	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
05A-097 (TA-11)	MGY	0.01	1.8	No discharge	No discharge	No discharge	0.00
06A-073 (TA-16)	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
06A-074 (TA-08)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
06A-075 (TA-08)	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
Wastes:							
Chemical [e]	kg/yr	13,000	12,237	13,329	1,032,985[f]	375,283 [g]	15,109 [h]
LLW	m^3/yr	16	6	8.3	3	1	8.69
MLLW	m^3/yr	0.2	0	0	0	0	0
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	335 [i] 96 [i]	201 [i]	96 [i]	92 [i]	107 [i]	114 [i]

[a] No stacks require monitoring; all non-point sources are measured using ambient monitoring.

Table 2.9.3-1. High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, TA-28, and TA-37)/Operations Data (continued)

[b] Outfalls eliminated before 1999: 02A-007 (TA-16), 04A-070 (TA-16), 04A-083 (TA-16), 04A-092 (TA-16), 04A-115 (TA-08), 04A-157 (TA-16), 05A-053 (TA-16), 05A-056 (TA-16), 05A-066 (TA-09), 05A-067 (TA-09), 05A-068 (TA-09), 05A-069 (TA-11), 05A-071 (TA-16), 05A-072 (TA-16), 05A-096 (TA-11), 06A-073 (TA-16), 06A-074 (TA-08), and 06A-075 (TA-08).

[c] This outfall discharged only one quarter during calendar year 1999.

[d] Outfall 05A-054 had discharges only part of the year. Process flows were routed to the HEWTF, and this outfall was then eliminated from the NPDES permit.

[e] Explanations for the chemical waste numbers that exceed the ROD projections were not given in the 1998 and 1999 Yearbooks. Research indicates that the CY 1998 volume consists of 12,236 kilograms of non-ER chemical waste and 36,364 kilograms of ER waste. The CY 2002 volume includes 2,721.55 kilograms of roll-off scrap metal for recycle that was caught up in the DOE radiological area release moratorium.

[f] During CY 2000, cleanup of MDA R generated 1,023,284 kilograms of chemical waste.

[g] During CY 2001, cleanup of MDA R generated 370,124 kilograms of chemical waste.

[h] The CY 2002 chemical waste volume is due to chemical cleanup activities.

[i] The first number shown in the “SWEIS ROD” column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the “SWEIS ROD” column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CYs 1998 through 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CY 1998 through CY 2002 information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

Impacts

There were relatively few facilities burned at High Explosives Processing. Some of the exceptions included V-Site (an historic Manhattan Project Era site) where all buildings except one were destroyed. Smoke damage was extensive and resulted in replacement of equipment, filter systems, and furnishings of buildings. Fire damaged roofs, and Material Disposal Area (MDA) R suffered an underground fire that required extensive effort to extinguish. In addition, many utility poles burned and wiring melted requiring extensive efforts to restore electrical utilities. Other damage included flooding in a high bay at TA-46, dead rodents in many buildings, destroyed HVAC systems, and miscellaneous damage to drop towers and substations.

2.10 High Explosives Testing (TA-14, TA-15, TA-36, TA-39, TA-40)

The High Explosives Testing Key Facility is located in all or parts of five technical areas, comprises about one-half (22 of 43 square miles) of the land area occupied by LANL, and has 17 associated firing sites. All firing sites are in remote locations and/or within canyons. Major buildings are located at TA-15, and include the Dual Axis Radiographic Hydrodynamic Test (DARHT) facility (Building TA-15-312), Pulsed High-Energy Radiographic Machine Emitting X-rays (PHERMEX) facility (TA-15-184), and the TA-15-306 firing site. Building types consist of preparation and assembly facilities, bunkers, analytical laboratories, explosives storage magazines, and offices. Activities consist primarily of testing high explosives components for nuclear weapons and for Science-Based Stockpile Stewardship Program tests and experiments.

In September 2001, Building TA-15-R183 was placed on the LANL Radiological Facility List (LANL 2001c) and remained on the list in 2002 (LANL 2002b).

2.10.1 Construction and Modifications at High Explosives Testing

Projected: DARHT, Building TA-15-312, was the only facility construction and modification projected by the SWEIS ROD. This facility was evaluated in a separate environmental impact statement (DOE 1995b).

Actual: Construction of DARHT began in 1994, but was interrupted for two years pending resolution of a lawsuit. The facility construction resumed in 1996 and DARHT Axis I was completed in 1999. Installation and component testing of the accelerator and its associated control and diagnostics systems began in late 1999. Construction of DARHT Axis II continued through CY 2002.

Other construction that occurred through 2001 includes the Access Control Building (TA-15-446) that became operational in 1998; the Hydrodynamic Test Operations Control Building (TA-15-484) that became operational in the spring of 1999; and the Applied Research Optics Electronics Laboratory (TA-15-494) was occupied in 2000. The Ector Multi-diagnostic Hydrotest accelerator was taken out of service, but the firing site (TA-15-306) remains active. Also, 12 outfalls were eliminated before 1999 and Outfall 06A-106 was eliminated from the NPDES permit in 1999.

During 2002, construction began on the Vessel Preparation Facility (DOE 1995b), a carpenter shop (DOE 2001b), an X-Ray calibration facility (DOE 2001b), and a warehouse (DOE 2001b) located within TA-15. The carpenter shop, x-ray calibration facility, and warehouse were replacement structures for similar operations destroyed in the Cerro Grande Fire. Additionally, a camera room (DOE 2001c) was built to support experiments at TA-36-12. The strategic planning effort also began.

Table 2.10.1-1 summarizes the construction and modifications at the High Explosives Testing Key Facility.

Table 2.10.1-1. High Explosive Testing Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
DARHT facility construction and modification	Construction of the DARHT building (TA-15-312) continued.	Construction of the DARHT building (TA-15-312) continued (DOE 1995b).	Construction of the DARHT building (TA-15-312) completed in 1999 (DOE 1995b).	Construction of the DARHT building (TA-15-312) completed in 1999 (DOE 1995b).	
	DARHT cooling tower became operational in 1998.				
		DARHT Axis I operational.			
		Installation and component testing of the accelerator and its associated control and diagnostics systems began in 1999.	Installation and component testing of the accelerator and its associated control and diagnostics systems began in 1999 and continued in 2000.	Installation and component testing of the accelerator and its associated control and diagnostics systems began in late 1999 and continued in 2001.	
					Vessel Preparation Facility constructed at TA-15 (DOE 1995b).
	Hydrodynamic Test Operations Control building (TA-15-484) constructed and became operational in spring 1999 (LANL 1996c).				
	Access Control Building (TA-15-446) became operational in 1998 (DOE 1993b).				
	Ector Multi-diagnostic Hydrotest accelerator taken out of service. (Firing site remains active).				

Table 2.10.1-1. High Explosive Testing Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
		Applied Research Optics Electronics Laboratory (TA-15-494, new office and laboratory building) and adjacent parking under construction in 1999 (LANL 1998f).	Construction of Applied Research Optics Electronics Laboratory (TA-15-494, new office building) completed in 2000 (LANL 1998f).		
	Twelve of 14 outfalls eliminated. [b]	Outfall 06A106 at TA-36 eliminated from NPDES permit in 1999.			
			Cerro Grande Fire destroyed DARHT equipment, materials, and storage structures.	Cerro Grande Fire: ~14 facilities destroyed and ~28 damaged; destroyed facilities transferred to decontaminate and decommission in 2001; tree thinning (LANL 2001p).	
				Categorical Exclusion for high explosive storage and preparation facilities at TA-36 (DOE 2001d).	
					Camera room built at TA-36-12 (DOE 2001c).
					Carpenter shop constructed at TA-15 (DOE 2001b).
					X-ray calibration facility constructed at TA-15 (DOE 2001b).
					Warehouse constructed at TA-15 (DOE 2001b).

[a] Additional information on the impacts from the Cerro Grande Fire can be found in Section 2.10.4.
[b] Refer to Table 2.10.3-1 for information on the outfalls that were eliminated.

2.10.2 Operations at High Explosives Testing

The ROD identified seven capabilities for this Key Facility. None of these has been deleted, and no new capabilities have been introduced. Levels of research were below those predicted by the SWEIS ROD. Table 2.10.2-1 identifies the operational capabilities discussed in the SWEIS and presents the 1998–2002 operational data for comparative purposes. The total amount of depleted uranium expended during testing (all capabilities) is an indicator of overall activity levels at this Key Facility. On an annual basis, the quantity of depleted uranium expended has remained well below the SWEIS projections. For example, a total of 216.67 kilograms were expended in 2002, compared to approximately 3,900 kilograms projected by the SWEIS ROD.

2.10.3 Operations Data for High Explosives Testing

The operational data presented in Table 2.10.3-1 indicate that the materials used and effects of research from 1998 through 2002 were considerably less than projections made by the SWEIS ROD. The only operational data exceptions are the chemical waste quantity in 2000 and the LLW quantity in 2001 that exceeded the SWEIS ROD projections. The chemical waste in 2000 was due to cleanup from the Cerro Grande Fire.

DARHT

Table 2.10.2-1. High Explosives Testing (TA-14, TA-15, TA-36, TA-39, and TA-40)/Comparison of Operations

CAPABILITY	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Hydrodynamic Tests	Conduct up to 100 hydrodynamic tests/yr. Develop containment technology. Conduct baseline and code development tests of weapons configuration. Depleted uranium use of 6,900 lb/yr (over all activities).	Hydrodynamic tests were conducted in 1998 at a level far below those projected in the SWEIS (See Table 2.10.3-1).	Hydrodynamic tests were conducted in 1999 at a level below those projected in the SWEIS.	Hydrodynamic tests were conducted in 2000 at a level below those projected by the SWEIS ROD.	Hydrodynamic tests were conducted in 2001 at a level below those projected by the SWEIS ROD.	Hydrodynamic tests were conducted in 2002 at a level below those projected by the SWEIS ROD.
Dynamic Experiments	Conduct dynamic experiments to study properties and enhance understanding of the basic physics of state and motion for materials used in nuclear weapons including some experiments with SNM.	Dynamic experiments were conducted at a level far below those projected in the SWEIS (See Table 2.10.3-1).	Dynamic experiments were conducted at a level far below those projected in the SWEIS.	Dynamic experiments were conducted at a level below those projected by the SWEIS ROD.	Dynamic experiments were conducted at a level below those projected by the SWEIS ROD.	Dynamic experiments were conducted at a level below those projected by the SWEIS ROD.
Explosives Research and Testing	Conduct high explosives tests to characterize explosive materials.	Explosives research and testing were conducted at a level far below those projected in the SWEIS (See Table 2.10.3-1).	Explosives research and testing were conducted at a level far below those projected in the SWEIS.	Explosives research and testing were conducted at a level below those projected by the SWEIS ROD.	Explosives research and testing were conducted at a level below those projected by the SWEIS ROD.	Explosives research and testing were conducted at a level below those projected by the SWEIS ROD.
Munitions Experiments	Continued support of Department of Defense in conventional munitions. Conduct experiments with projectiles and study other effects on munitions.	Munitions experiments were conducted at a level far below those projected in the SWEIS (See Table 2.10.3-1).	Munitions experiments were conducted at a level far below those projected in the SWEIS.	Munitions experiments were conducted at a level below those projected by the SWEIS ROD.	Munitions experiments were conducted at a level below those projected by the SWEIS ROD.	Munitions experiments were conducted at a level below those projected by the SWEIS ROD.
High-Explosives Pulsed-Power Experiments	Conduct experiments and development tests.	Experiments were conducted at a level far below those projected in the SWEIS (See Table 2.10.3-1).	Experiments were conducted at a level far below those projected.	Experiments were conducted at a level below those projected by the SWEIS ROD.	Experiments were conducted at a level below those projected by the SWEIS ROD.	Experiments were conducted at a level below those projected by the SWEIS ROD.

Table 2.10.2-1. High Explosives Testing (TA-14, TA-15, TA-36, TA-39, and TA-40)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Calibration, Development, and Maintenance Testing	Conduct tests to provide calibration data, instrumentation development, and maintenance of image processing capability.	Calibration, development, and maintenance testing were conducted at a level far below those projected in the SWEIS (See Table 2.10.3-1).	Calibration, development, and maintenance testing were conducted at a level far below those projected in the SWEIS.	Calibration, development, and maintenance testing were conducted at a level below those projected by the SWEIS ROD.	Calibration, development, and maintenance testing were conducted at a level below those projected by the SWEIS ROD.	Calibration, development, and maintenance testing were conducted at a level below those projected by the SWEIS ROD.
Other Explosives Testing	Develop advanced high explosives or weapons evaluation techniques.	Other explosives testing was conducted at a level far below explosives testing projected in the SWEIS (See Table 2.10.3-1).	Other explosives testing was conducted at a level far below explosives testing projected in the SWEIS.	Other explosives testing was conducted at a level below explosives testing projected by the SWEIS ROD.	Other explosives testing was conducted at a level below explosives testing projected by the SWEIS ROD.	Other explosives testing was conducted at a level below explosives testing projected by the SWEIS ROD.

[a] Includes completion of construction for the DARHT facility and its operation.

Table 2.10.3-1. High Explosives Testing (TA-14, TA-15, TA-36, TA-39, and TA-40)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Depleted Uranium	Ci/yr	1.5E-1 [a]	[b]	[b]	[b]	[b]	[b]
Chemical Usage: [c]							
Aluminum [d]	kg/yr	45,450	624	688	394	78	860
Beryllium	kg/yr	90	1	0.5	2	52	0
Copper [d]	kg/yr	45,630	14	41	88	24	33
Depleted Uranium	kg/yr	3,930	121	67	419	536	216
Lead	kg/yr	240	2	0.5	5	0	0
Tantalum	kg/yr	300	5	0.2	1	12	2
Tungsten	kg/yr	300	0	0	19	0	0
NPDES Discharge:							
Number of outfalls [e]	---	14	4	2	2	2	2
Total discharges	MGY	3.6	1.9	14.23	16	9	1.38
03A-028 (TA-15) [f]	MGY	2.2	0.5	2.81 [g]	5	4	0.5027
03A-185 (TA-15) [f]	MGY	0.73	1.2	11.42 [h]	11	5	0.8773
04A-101 (TA-40)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-139 (TA-15)	MGY	None	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-141 (TA-39)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-143 (TA-15)	MGY	0.018	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-156 (TA-39)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
06A-079 (TA-40) [i]	MGY	0.54	0.1	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
06A-080 (TA-40)	MGY	0.03	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
06A-081 (TA-40)	MGY	0.03	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
06A-082 (TA-40)	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
06A-099 (TA-40)	MGY	0.0	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
06A-100 (TA-40) [g]	MGY	0.04	0.1	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
06A-106 (TA-36) [j]	MGY	0.0	Eliminated 1999	Eliminated 1999	Eliminated 1999	Eliminated 1999	Eliminated 1999
06A-123 (TA-15)	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
Wastes:							
Chemical	kg/yr	35,300	444	1,015	60,437 [k]	1,337	1,285
LLW	m^3/yr	940	0	0.01	0.6	0	0
MLLW	m^3/yr	0.9	0	0	0	0	0
TRU/Mixed TRU [l]	m^3/yr	0.2	0	0	0	0	0
Number of Workers	FTEs	619 [m] 227 [m]	93 [m]	227 [m]	212 [m]	245 [m]	264 [m]

[a] The isotopic composition of depleted uranium is approximately 99.7 percent uranium-238, approximately 0.3 percent uranium-235, and approximately 0.002 percent uranium-234. Because there are no historic measurements of emissions from these sites, projections are based on estimated release fractions of the materials used in tests.

Table 2.10.3-1. High Explosives Testing (TA-14, TA-15, TA-36, TA-39, and TA-40)/Operations Data (continued)

[b] No stacks require monitoring; all non-point sources are measured using ambient monitoring. During 1999, a total of 67 kilograms of depleted uranium was expended during these activities.

[c] Usage listed for the SWEIS ROD includes projections for expanded operations at DARHT as well as the other TA-15 firing sites (the highest foreseeable level of such activities that could be supported by the LANL infrastructure). No proposals are currently before DOE to exceed the material expenditures at DARHT that are evaluated in the DARHT Environmental Impact Statement (DOE 1995b).

[d] The quantities of copper and aluminum involved in these tests are used primarily in the construction of support structures. These structures are not expended in the explosive tests, and thus, do not contribute to air emissions.

[e] Outfalls eliminated before 1999: 04A-101 (TA-40), 04A-139 (TA-15), 04A-141 (TA-39), 04A-143 (TA-15), 04A-156 (TA-39), 06A-080 (TA-40), 06A-081 (TA-40), 06A-082 (TA-40), 06A-099 (TA-40), and 06A-123 (TA-15). Consolidation and removal of outfalls has resulted in projected NPDES volumes underestimating actual discharges from the existing outfalls.

[f] The annual quantity of discharge was calculated by using the average daily flow and multiplying by 365 days in the year; this results in an overestimate of volume. A totalizing water meter has been installed on 03A-185 (TA-15), which will allow for much more accurate water usage calculations for 2002 reporting. 03A-28 (TA-15) does not yet have a totalizing water meter and the water use will continue to be averaged.

[g] This outfall discharged during three quarters of CY 1999.

[h] This outfall discharged during all four quarters of CY 1999.

[i] Outfalls 06A-079 and 06A-100 had discharges only part of 1998. Process flows were routed to the HEWTF, and these outfalls were eliminated from the NPDES permit.

[j] This outfall was originally identified with the Non-Key Facilities.

[k] The 2000 chemical waste, as indicated in the 2000 SWEIS Yearbook exceeded the ROD due to cleanup following the Cerro Grande Fire. Construction and demolition debris (previously cited as ‘industrial waste’ in the Yearbooks) accounted for 9,362 kilograms of the chemical waste, was nonhazardous, and was disposed of in regular landfills. The remainder of the chemical waste was shipped offsite to approved hazardous waste facilities.

[l] TRU waste (steel) will be generated as a result of DARHT’s Phased Containment Option (see DARHT Environmental Impact Statement [DOE 1995b]).

[m] The first number shown in the “SWEIS ROD” column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the “SWEIS ROD” column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for 1998 through 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CY 1998 through CY 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.10.4 Cerro Grande Fire Effects at High Explosives Testing

Immediate Effects

About 3,040 acres of land within the High Explosives Testing Key Facility burned during the Cerro Grande Fire. Areas most affected were TAs 14, 15, and 40 and, to a lesser extent, TAs 06, 09, 22, and 36. Fire damage was in excess of $16 million.

Fire Effects on High Explosives Testing: Firing site operations were abruptly halted, and High Explosives Testing operations were shut down for approximately four months. Restart proceeded cautiously to ensure safety and security of personnel, the public, the environment, and facilities. Safety and security requirements necessitated that operations be restarted using a graded and methodical approach. Because high explosives firing operations may only be conducted when the airspace is closed, restart of high explosives firing operations was delayed because remediation efforts included aerial reseeding of burned areas.

From the end of May 2000 through August 2001, facility operations personnel were involved in facility recovery activities (reopening more than 400 buildings and restarting operations within them). These efforts included reestablishing security and safety control of firing site perimeters and other outside work areas, walk-downs of all operations, reauthorization of hazardous operations, and daily escorting of many environmental specialists into the area. No worker injuries were reported during the fire recovery period.

The Cerro Grande Fire directly affected DARHT by costing $6.1 million for delays and additional work associated with work stoppage and then recovery. A fraction of the total amount, about $177,000, was attributed to burned and destroyed DARHT equipment, materials, and storage structures.

Fire Effects on High Explosives Processing: The Cerro Grande Fire halted high explosives processing by the High Explosives Testing Key Facility for approximately two months; one month while the Laboratory was closed and one additional month to reopen facilities and restart operations. Before the fire, detonator production was ahead of schedule and production commitments were being met. Because of the fire, work on one production line was transferred to Lawrence Livermore National Laboratory to meet testing schedules.

Continuing Effects

The Cerro Grande Fire has had a long-term effect on the high explosives testing operations. Management has limited high explosives testing at TA-40 to tests that are contained because of adjacent steep canyon walls and excess forest fuels. This self-imposed restriction has created a hardship because these firing sites are no longer available for smaller experiments requiring open-air tests. The restriction remained in place throughout 2002 and still remains in place.

Replacement structures for burned buildings were designed and construction began on two warehouses, a carpenter shop, an X-ray calibration facility, a camera room addition to a firing site, and a high explosive preparation building. Buildings that were transferred to decommissioning and decontamination went through bid document preparation, site visits, and contractor bidding process. Contracts will be awarded and work performed in 2003. Burned trees were removed and remaining forest thinned to reduce the wildland fire potential and make the forest viable and self-sustaining. Trees that were not eligible for firewood use or sale to a sawmill were burned in an air curtain destructor.

DX Division Strategic Plan for the Future

NNSA determined that an environmental assessment was required for this plan and its new structures to be constructed at TA-22, and the subsequent decommissioning and decontamination of old buildings to be replaced. The process began in 2002 with LANL internal organizations and consultants preparing the documents. The environmental assessment, DOE/EA-1447 (DOE 2002c), was started in 2002.

2.11 The Los Alamos Neutron Science Center (TA-53)

The LANSCE Key Facility lies entirely within TA-53. The facility has more than 400 buildings, including one of the largest at LANL. Building 53-3, which houses the linac, has 315,000 square feet under roof. Activities consist of neutron science and nuclear physics research, proton radiography, the development of accelerators and diagnostic instruments, and production of medical radioisotopes. [Note: Isotope production has not occurred since 1998; it will resume after commissioning of the new isotope production facility in 2003.] The majority of the LANSCE Key Facility (the User Facility) is composed of the 800-million-electron-volt linac, a Proton Storage Ring, and three major experimental areas: the Manuel Lujan Neutron Scattering Center, the Weapons Neutron Research (WNR) facility, and Experimental Area C.

Experimental Area C is the location of proton radiography experiments for the Stockpile Stewardship Program. A new experimental facility for the production of ultracold neutrons is under construction in Area B. Experimental Area A, formerly used for materials irradiation experiments and isotope production, is currently inactive; construction of a new isotope production facility was completed in 2002 and commissioning will occur in 2003. A second accelerator facility located at TA-53, Low-Energy Demonstration Accelerator (LEDA), is also inactive.

This Key Facility has three Category 3 nuclear activities (Table 2.11-1): experiments using neutron scattering by actinides in Experimental Area ER-1/ER-2, the 1L neutron production target in Building 53-7, and Area A East in Building 53-3M (LANL 2001b), which is used for passive storage of activated materials. There are no Category 2 nuclear facilities at TA-53. In September 2001, TA-53-945 and 53-954 were placed on the LANL Radiological Facility List (LANL 2001c). TA-53-945 and TA-53-954 remained on the Radiological Facility List in 2002 (LANL 2002b). Experimental Area ER-1/ER-2 is categorized as a Moderate Hazard facility. The remainder of the LANSCE User Facility is categorized as Low Hazard. DOE approved an Interim Safety Assessment Document for the LANSCE accelerator and experimental areas in May 2002. LANSCE began work on a two-year project to update and consolidate existing authorization basis documents for the User Facility.

2.11.1 Construction and Modifications at the Los Alamos Neutron Science Center

Projected: The ROD projected significant facility changes and expansion to occur at LANSCE by December 2005. These changes were the closure of two former sanitary lagoons; make LEDA operational by late 1998; enhance the Short-Pulse Spallation Source; have a one-megawatt target/blanket; construct a new 100-million-electron-volt Isotope Production Facility; have a Long-Pulse Spallation Source (LPSS), including decontamination and renovation of Area A; construct a Dynamic Experiment Lab; construct the Los Alamos International Facility for Transmutation; construct the Exotic Isotope Facility; and decontaminate and renovate Area A-East.

Actual: Table 2.11.1-1 indicates that two of the projected changes have been completed and that four have been started. In addition to these projected construction activities, a new warehouse was constructed in 1998 to store equipment and other materials formerly stored outside, a new waste treatment facility for radioactive liquids generated at LANSCE was constructed during 1999, and construction of a new cooling tower was completed in 2000. These projects received NEPA review through Categorical Exclusions LAN-98-110

(DOE 1998d), LAN-98-109 (DOE 1998e), and LAN-96-022 (DOE 1999c). The two new cooling towers (structure #53-963, 53-952) replace cooling towers 53-60, 53-62, and 53-64, which have been taken off line. The new towers discharge through Outfall 03A-048, as had their predecessors. Construction of two new instruments on Flight Paths 12 and 13 at the Lujan Center started in 2002.

Table 2.11-1. LANSCE Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-53-1L	1L Target		3	3	3	3	3
TA-53-3M	Experimental Science	3					
TA-53-A-6	Area A East		3	3	3	3	3
TA-53-ER1	Actinide scattering experiments			3	3		
TA-53-ER1/ER-2	Actinide scattering experiments		3			3	3
TA-53-P3E	Pion Scattering Experiment		3	3			
TA-53 Target 4	WNR Neutron Production target					3	

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)

The LANSCE Key Facility

Table 2.11.1-1. Los Alamos Neutron Science Center Construction and Modifications

SWEIS ROD PROJECTION	SWEIS REF.	ACTUAL CONSTRUCTION AND MODIFICATION				
		1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
Eliminate NPDES Outfall 03A-145 from the Orange Box Building	2-88	Eliminated in 1998.[b]				
Closure of two former sanitary lagoons	2-88	Sampling conducted in 1998.[c]	Remediation started in 1999.	Characterization continued; south lagoon sludge and liner removed.	Data analysis and sampling continued.	Cleanup of north lagoon as Interim Action.[d]
LEDA to become operational in late 1998	2-89	Started high-power conditioning.	Maximum power achieved.		Shutdown in December until funded.	Inactive until funded.[e]
Short-Pulse Spallation Source enhancements	2-90	Upgrades started.	Upgrades started; installation of new instruments began.	First phase of the Proton Storage Ring Upgrade completed.	Proton Storage Ring completed; instruments commissioned.	Upgrades to ion source and 1L line in progress.[f]
One-megawatt target/blanket	2-91	Not completed	Not completed	Not completed	Not completed	Not completed and not funded.
New 100-MeV Isotope Production Facility	2-92		Construction preparations began.	Construction began.	Facility completed; upgrades to beam line in progress.	Readiness Review planned for July 2003 and commissioning for October 2003.
LPSS, including decontamination and renovation of Area A	3-25	Not completed	Not completed	Not completed	Not completed	Not completed and not funded.
Dynamic Experiment Lab	3-25	Not started	Not started	Concept revised [g]	Concept revised [g]	Concept revised [g]
Los Alamos International Facility for Transmutation	3-25	Not completed	Not completed	Not completed	Not completed	Not completed and not funded.
Exotic Isotope Production Facility	3-27	Not completed	Not completed	Not completed	Not completed	Not completed and not funded.
Decontamination and renovation of Area A-East[h]	3-27	Not completed	Not completed	Not completed	Not completed	Not completed
		Outfalls 03A-146 and 03A-125 eliminated from NPDES permit.[i]				
		New warehouse erected at east end of mesa (DOE 1998d).				
			TA-53 radioactive liquid waste treatment facility constructed (DOE 1998e).			

Table 2.11.1-1. Los Alamos Neutron Science Center Construction and Modifications (continued)

SWEIS ROD PROJECTION	SWEIS REF.	ACTUAL CONSTRUCTION AND MODIFICATION				
		1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
				Cooling tower 53-963 completed and replaces tower 53-62 (DOE 1999c).		
					Cooling tower 53-952 replaces cooling towers 53-60 and 53-64.	
					ICE House constructed. [j]	
						Started construction of two new instruments on Flight Paths 12 and 13 at the Lujan Center.

[a] Additional information on the impacts of the Cerro Grande Fire can be found in Section 2.11.4.

[b] Outfall 03A-145 was associated with a small swamp cooler for the Orange Box Conference and Office Building (53-06). There was no flow from the outfall. Although there had been no flow, discharge piping from the outfall was tied to the sewage plant at TA-46.

[c] The lagoons were removed from the RCRA closure. Cleanup will be performed as a corrective action. The Environmental Restoration (ER) Project started the cleanup with some sampling in 1998.

[d] Characterization started in 1999 and continued into 2000. Cleanup at the south lagoon began in 2000 with the removal of the sludge and liner. Data analysis and sampling continued through 2001 for both lagoons and an Interim Action Plan was written for remediation of the north lagoon. Cleanup of the north lagoon was done in 2002, but only as an interim action. It is not known at this time if the cleanup will be "final" or if more cleanup is needed. A report will be prepared and submitted to the New Mexico Environment Department (NMED) in the summer of 2003. The site has not been "closed" by NMED.

[e] LEDA started high-power conditioning of the radio-frequency quadrupole power supply in November 1998. The first trickle of proton beam was produced in March 1999, and maximum power was achieved in September 1999. It has been designed for a maximum energy of 12 million electron volts, not the 40 million electron volts projected by the SWEIS ROD. LEDA was shut down in December 2001 and will remain inactive until funding is resolved. (True for 2002; note that the 2003 omnibus bill passed by Congress included funding for LEDA decontamination and decommissioning. The plan is to remove all support equipment and leave the building and the accelerator itself in place.)

[f] Part of the Short-Pulse Spallation Source upgrades have been performed. Upon completion, the project will upgrade the Proton Storage Ring and 1L line to operate at 200 microamperes at 30 hertz (vs. 70 microamperes at 20 hertz present during preparation of the SWEIS); will install a brighter ion source; and will add three neutron-scattering instruments to the Lujan Center. Through the end of 2002, the upgrades to the Proton Storage Ring had been completed, and the three instruments have been installed and commissioned in the Lujan Center. Upgrades to the ion source and 1L line are still in progress. (Note the latter upgrades have been delayed to 2004.)

[g] The Stockpile Stewardship Program is currently using Experimental Area C, Building 53-3P, for proton radiography, and the Blue Room in Building 53-07 for neutron resonance spectroscopy. The concept of combining these experiments in a new Dynamic Experiment Laboratory has been replaced by the concept to construct a $1.6 billion Advanced Hydrotest Facility, which is currently in the conceptual phase. Conceptual planning for the Advanced Hydrotest Facility is being done consistent with the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (DOE 1996b) and ROD. Before DOE decides to build and operate the Advanced Hydrotest Facility at LANL or some other site, an environmental impact statement and ROD would be prepared.

[h] Area A East is used to store the old 1L target. Both the target and residually activated materials such as the 800-million-electron-volt beam stop are why Area A East is designated as a Category 3 nuclear facility.

Table 2.11.1-1. Los Alamos Neutron Science Center Construction and Modifications (continued)

[i] Outfalls 03A-146 and 03A-125 were eliminated from the NPDES permit in 1997 and 1998, respectively. Although no flows are expected because the cooling units have been or are scheduled to be removed, discharge piping for both outfalls was tied in to the sanitary sewer instead and rerouted to the sewage treatment plant at TA-46.

[j] The "ICE House" is a new building completed in 2002. The building houses an experimental station on an existing WNR flight path and provides a new capability at WNR for single-event upset measurements.

2.11.2 Operations at the Los Alamos Neutron Science Center

The SWEIS identified seven capabilities for the LANSCE Key Facility. No new capabilities have been added, and none has been deleted. During CY 2002, LANSCE operated both accelerators and three of the five experimental areas. (Area A has been idle for more than two years; Area B has been idle for several years but a new Ultracold Neutron Facility is under construction.)

The primary indicator of activity for this facility is production of the 800-million-electron-volt LANSCE proton beam as shown in Table 2.11.2-1. These production figures are all less than the 6,400 hours at 1,250 microamps projected by the SWEIS ROD. In addition, there were no experiments conducted for transmutation of wastes. There was also no production of medical isotopes from 1999 through 2002, although construction of a new isotope production facility has been completed. Table 2.11.2-1 provides details.

The most significant accomplishment in CY 2002 for LANSCE is the successful completion of a full run cycle for the three primary experimental facilities: the WNR, the Proton Radiography area, and the Manuel Lujan Jr. Neutron Scattering Center (Lujan Center). LANSCE hosted over 780 user visits this run cycle (June 3–January 26). The facility operated at an average 86 percent availability for the Lujan Center and 88 percent for WNR, allowing the completion of just under 225 experiments for internal and external neutron scattering and neutron nuclear physics users. Construction of two new instruments at the Lujan Center began in 2002. One, IN500, will be used for inelastic neutron scattering studies. The other is NPD-gamma, which will look for violations of the weak nuclear interaction.

A hot cell in the new Isotope Production Facility at LANSCE

Table 2.11.2-1. Los Alamos Neutron Science Center (TA-53)/Comparison of Operations

CAPABILITY	SWEIS ROD[a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Accelerator Beam Delivery, Maintenance, and Development	Deliver LANSCE linac beam to Areas A, B, C, WNR facility, Manuel Lujan Center, Dynamic Experiment Facility, and new isotope production facility for 10 months/yr (6,400 hrs). Positive ion current 1,250 microampere and negative ion current of 200 microampere.	(a) In 1998, positive ion beam was produced for 1,335 hours at an average current of 740 microamps. Negative ion beam was delivered, at varying currents, to Areas A, B, C, WNR facility, and Lujan Center for up to 1,127 hours.	In 1999, H+ beam was not produced. H- beam was delivered, at maximum current of 93 microamps, to lines B and C (505 hours), WNR facility (1,993 hours), and Lujan Center (239 hours). Area A did not receive beam.	In 2000, H+ beam was not produced. H- beam was delivered as follows: (a) to the Lujan Center for 1,749 hours at an average current of 100 microamperes. (b) to WNR Target 2 for 307 hours in a "pulse on demand" mode of operation, with an average current below 1 femtoampere, (c) to WNR Target 4 for 2,024 hours at an average current of 5 microamperes, (d) through Line X to Lines B and C for 806 hours in a "pulse on demand" mode of operation, with an average current below 1 femtoampere.	In 2001, H+ beam was not produced. H- beam was delivered as follows: (a) to the Lujan Center for 2,741 hours at an average current of 55 microamperes, (b) to WNR Target 2 for 350 hours in a "pulse on demand" mode of operation, with an average current below 1 femtoampere, (c) to WNR Target 4 for 1,989 hours at an average current of 5 microamperes, (d) through Line X to Lines B and C for 465 hours in a "pulse on demand" mode of operation, with an average current below 1 femtoampere.	In 2002, H+ beam was not produced. H- beam was delivered as follows: (a) to the Lujan Center for 2,303 hours at an average current of 105 microamperes with 87% total availability (b) to WNR Target 2 for 252 hours in a "pulse on demand" mode of operation, with an average current below 1 femtoampere with 90% total availability (c) to WNR Target 4 for 2,507 hours at an average current of 3.5 microamperes with 88% total availability (d) through Line X to Lines B and C for 384 hours in a "pulse on demand" mode of operation, with an average current below 1 femtoampere with 85% total availability.

Table 2.11.2-1. Los Alamos Neutron Science Center (TA-53)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Accelerator Beam Delivery, Maintenance, and Development (cont.)	Reconfigure beam delivery and support equipment to support new facilities, upgrades, and experiments.[a]	In the fall of 1998, the upgrade to H-injectors to the Proton Storage Ring was completed.	No major upgrades to the beam delivery complex.	No major upgrades to the beam delivery complex.	No major upgrades to the beam delivery complex.	No major upgrades to the beam delivery complex. Material was received for installation of a new switchyard kicker magnet during 2003; this will allow simultaneous operations of Line D (Lujan and WNR) and Line X (Area B and C).
	Commission, operate, maintain LEDA for 10 to 15 years; operate up to approximately 6,600 hrs/yr.	In November 1998, started conditioning the radio frequency quadrupole power supply. No beam was generated in 1998.	Full power (100 milliamps and 6.7 MeV) achieved in September 1999.	Continued to operate at full power (100 milliamps and 6.7 million electron volts).	LEDA was shutdown in December 2001.	LEDA was shutdown in December 2001.
Experimental Area Support	Full-time remote handling and radioactive waste disposal capability required during Area A interior modifications and Area A-East renovation.	Full-time capability maintained. (Note: Modifications and renovations were not undertaken, however.)	Full-time capability maintained. (Note: Modifications and renovations were not undertaken, however.)	Full-time capability maintained. (Note: Modifications and renovations were not undertaken, however.)	Full-time capability maintained. (Note: Modifications and renovations were not undertaken, however.)	Full-time capability maintained. (Note: Modifications and renovations were not undertaken, however.)
	Support of experiments, facility upgrades, and modifications.	Support activities were conducted per the projections of the SWEIS ROD.	Support activities were conducted per the projections of the SWEIS ROD.	Support activities were conducted per the projections of the SWEIS ROD.	Support activities were conducted per the projections of the SWEIS ROD.	Support activities were conducted per the projections of the SWEIS ROD.
	Increased power demand for LANSCE linac and LEDA radio frequency operation.	Started conditioning the radio frequency quadrupole power supply for LEDA in November 1998.	A 700-MHz klystron was developed for use with LEDA.	No developments in 2000.	No developments in 2001.	Average beam current to the Lujan Center was increased to over 100 microamps.

Table 2.11.2-1. Los Alamos Neutron Science Center (TA-53)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Neutron Research and Technology [b]	Conduct 1,000 to 2,000 experiments/yr using Manuel Lujan Center, WNR facility, and LPSS. Establish LPSS in Area A (requires modification).	Far fewer number of experiments since the linac operated only 1,135 hours. LPSS was not constructed.	Far fewer number of experiments, since the Lujan Center was idle from February into July. LPSS was not constructed.	Fewer than 200 experiments were conducted at the Lujan Center. LPSS was not constructed.	113 experiments were conducted at the Lujan Center and 36 experiments at WNR. LPSS was not constructed.	165 experiments were conducted at the Lujan Center and 59 experiments at WNR. LPSS was not constructed.
	Conduct accelerator production of tritium target neutronics experiment for six months.	Accelerator production of tritium target neutronics experiments were begun in Experimental Area C in 1997 and were completed in 1998.				
	Construct Dynamic Experiment Laboratory adjacent to WNR Facility. Support contained weapons-related experiments: With small quantities of actinides, high explosives, and sources (up to approximately 80/yr). With nonhazardous materials and small quantities of high explosives (up to approximately 200/yr) With up to 4.5 kg high explosives and/or depleted uranium (up to approximately 60/yr) Shock wave experiments involving small amounts, up to (nominally) 50 grams plutonium.	The Dynamic Experiment Laboratory was not constructed, but weapons-related experiments were conducted: None with actinides Some with nonhazardous materials and high explosives Some with high explosives, but none with depleted uranium No shock wave experiments.	The Dynamic Experiment Laboratory was not constructed, but weapons-related experiments were conducted: None with actinides Some with nonhazardous materials and high explosives Some with high explosives, but none with depleted uranium No shock wave experiments.	The Dynamic Experiment Laboratory was not constructed, but weapons-related experiments were conducted: None with actinides Some with nonhazardous materials and high explosives Some with high explosives, but none with depleted uranium Some shock wave experiments.	The Dynamic Experiment Laboratory was not constructed, but weapons-related experiments were conducted: None with actinides Some with nonhazardous materials and high explosives Some with high explosives, but none with depleted uranium Some shock wave experiments.	The Dynamic Experiment Laboratory was not constructed, but weapons-related experiments were conducted: None with actinides Some with nonhazardous materials and high explosives Some with high explosives, but none with depleted uranium Some shock wave experiments.
	Provide support for static stockpile surveillance technology research and development.	Support was not provided for surveillance research and development.	Support was not provided for surveillance research and development.	Support was provided for surveillance research and development.	Support was provided for surveillance research and development.	Support was provided for surveillance research and development.

Table 2.11.2-1. Los Alamos Neutron Science Center (TA-53)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Accelerator Transmutation of Wastes[c]	Conduct lead target tests for two years at Area A beam stop.	No tests.	No tests.	No tests.	No tests.	No tests.
	Implement the Los Alamos International Facility for Transmutation. (Establish one-megawatt, then five-megawatt Accelerator Transmutation of Wastes target/blanket experiment areas adjacent to Area A.)	Neither the target/blanket experiment nor the Los Alamos International Facility for Transmutation was constructed.	Neither the target/blanket experiment nor the Los Alamos International Facility for Transmutation was constructed.	Neither the target/blanket experiment nor the Los Alamos International Facility for Transmutation was constructed.	Neither the target/blanket experiment nor the Los Alamos International Facility for Transmutation was constructed.	Neither the target/blanket experiment nor the Los Alamos International Facility for Transmutation was constructed.
	Conduct 5-megawatt experiments for 10 months/yr for four years using about 3 kg of actinides.	No experiments.	No experiments.	No experiments.	No experiments.	No experiments.
Subatomic Physics Research	Conduct 5 to 10 physics experiments/yr at Manuel Lujan Center, WNR facility, and LPSS.	Between 5 and 10 physics experiments were conducted in 1998.	Ultra-cold neutron experiments ran on 5 occasions in the Blue Room.	Ultra-cold neutron experiments ran on 13 days in the "B" line beam tunnel room.	Ultra-cold neutron experiments ran 10 days in the "Blue Room" (target 2).	No ultra-cold neutron experiments were run during 2002 LANSCE beam operations.
	Continue neutrino experiment through FY97.	The neutrino experiment, extended one year, concluded in September 1998.				
	Conduct proton radiography experiments, including contained experiments with high explosives.	Experiments involving contained high explosives were conducted in 1998.	Experiments involving contained high explosives were conducted on 10 days in 1999.	Experiments involving contained high explosives were conducted on 28 days in 2000.	Fewer than 40 experiments involving contained high explosives were conducted in 2001.	42 experiments involving contained high explosives were conducted in 2002.
Medical Isotope Production	Irradiate up to approximately 50 targets/yr for medical isotope production.	Production began in November 1998. Twelve targets were irradiated.	No production in 1999.	No production in 2000.	No production in 2001.	No production in 2002.
	Added production of exotic, neutron-rich, and neutron-deficient isotopes (requires modification of an existing target area).	No production in 1998.	No production in 1999.	No production in 2000.	No production in 2001.	No production in 2002.

Table 2.11.2-1. Los Alamos Neutron Science Center (TA-53)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD[a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
High-Power Microwaves and Advanced Accelerators	Conduct research and development in these areas, including microwave chemistry research for industrial and environmental applications.	Research and development were conducted.	Research and development were conducted.	Research and development were conducted.	Research and development were conducted.	Research and development were conducted.

[a] Includes the completion of proton and neutron radiography facilities, the LEDA, the isotope production facility relocation, the Short-Pulsed Spallation Source, and the LPSS.

[b] Numbers of neutron experiments represent plausible levels of activity. Bounding conditions for the consequences of operations are primarily determined by 1) length and power of beam operation and 2) maintenance and construction activities.

[c] Formerly Accelerator-Driven Transmutation Technology.

2.11.3 Operations Data for the Los Alamos Neutron Science Center

Area A remains inactive. Two outfalls at TA-53 were eliminated with completion of the cooling towers. Since both construction activities, which contribute to waste quantities, and levels of operations were less than those projected by the SWEIS ROD, operations data were also less than projected. Radioactive air emissions are a key parameter since LANSCE emissions have historically accounted for more than 95 percent of the total LANL offsite dose. However, emissions over the past three years have been smaller percentages of the total LANL offsite dose. In 2002, emissions totaled about 4,400 curies or about 70 percent of the total LANL radioactive air emissions of 6,300 curies (all values include diffuse emissions). Emissions in 2001 totaled only about 6,000 curies (including diffuse emissions), about 40 percent of total LANL radioactive air emissions. The 2000 total was also less than projections of the ROD of 8,496 curies (Garvey and Miller 1996). These small emissions can be attributed to non-use of the Area A beam stop. Waste generation and NPDES discharge volumes were well below projected quantities. Table 2.11.3-1 provides details.

2.11.4 Cerro Grande Fire Effects at the Los Alamos Neutron Science Center

LANSCE was nearly untouched by the fire; a small portion of the roof of one building was damaged. Return to operations was in accordance with the LANL-wide recovery procedure (LANL 2000a). Building 53-882 was established as a recovery command post. The TA-53 Facility Recovery Team was established and performed safety reconnaissance and condition assessment during the second week of the evacuation. (LANL was evacuated from Monday, May 8, through Sunday, May 21, 2000.) All LANSCE workers were approved to return to their workstations on Tuesday, May 23, 2000. The only impact to operations was evaluating and restoring the status of accelerator systems since site power was lost during the fire. Systems and equipment were returned to power sequentially instead of simultaneously, and this process required about a month to complete.

Removal of dried radioactive sludge and the plastic liner from a lagoon at LANSCE

Table 2.11.3-1. Los Alamos Neutron Science Center (TA-53)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Argon-41	Ci/yr	7.44E+1	1.52E+02	1.4E+01	2.9E+01	1.6E+1	2.5E+1
Arsenic-73	Ci/yr	Not projected [a]	1.26E-04	Not detected	2.2E-05	7.6E-4 [b]	Not detected
Beryllium-7	Ci/yr	Not projected [a]	1.16E-04	Not detected	Not detected	Not detected	Not detected
Bromine-76	Ci/yr	Not projected [a]	3.65E-02	2.3E-04 [b]	2.6E-04 [b]	1.4E-3 [b]	Not detected
Bromine-77	Ci/yr	Not projected [a]	3.55E-02	Not detected	Not detected	Not detected	Not detected
Bromine-82	Ci/yr	Not projected [a]	7.71E-03	6.3E-04 [b]	4.2E-03 [b]	3.4E-3 [b]	6.0E-3 [b]
Carbon-10	Ci/yr	2.65E+0	1.87E+02	4.2E-02	1.4E-01	2.5E+0	7.3E-1
Carbon-11	Ci/yr	2.96E+3	3.38E+03	2.8E+02	6.9E+02	3.4E+3	2.8E+3
Chlorine-39	Ci/yr	Not projected [a]	3.25E+0	Not detected	Not detected	Not detected	Not detected
Cobalt-60	Ci/yr	Not projected [a]	Not detected	4.0E-06 [b]	Not detected	Not detected	Not detected
Mercury-193	Ci/yr	Not projected [a]	Not detected	Not detected	8.0E-01 [b]	6.9E-1 [b]	4.4E-1 [b]
Mercury-193m	Ci/yr	Not projected [a]	Not detected	Not detected	Not detected	Not detected	4.7E-4 [b]
Mercury-195m	Ci/yr	Not projected [a]	Not detected	Not detected	2.0E-02 [b]	2.4E-2 [b]	8.0E-3 [b]
Mercury-197	Ci/yr	Not projected [a]	6.12E-03	1.6E-03 [b]	1.0E-01 [b]	3.7E-1 [b]	1.6E-1 [b]
Mercury-203	Ci/yr	Not projected [a]	Not detected	Not detected	Not detected	8.6E-3 [b]	6.2E-4 [b]
Nitrogen-13	Ci/yr	5.35E+2	1.28E+03	1.6E	2.8E+01	1.3E+2	1.2E+2
Nitrogen-16	Ci/yr	2.85E-2	1.50E+02	1.5E-02	1.7E-02	2.8E-2	4.7E-1
Oxygen-14	Ci/yr	6.61E+0	5.87E+01	1.0E-01	4.1E-01	3.4E+1	1.5E+1
Oxygen-15	Ci/yr	6.06E+2	2.66E+03	1.9E+01	9.1E+01	2.4E+3	1.5E+3
Potassium-40	Ci/yr	Not projected [a]	7.62E-05	Not detected	Not detected	Not detected	Not detected
Scandium-44M	Ci/yr	Not projected [a]	5.81E-07	Not detected	Not detected	Not detected	Not detected
Sodium-24	Ci/yr	Not projected [a]	1.82E-04	Not detected	Not detected	Not detected	Not detected
Tritium as Water	Ci/yr	Not projected [a]	3.79	2.3 [b]	2.9 [b]	6.4E+0 [b]	Not measured
Vanadium-48	Ci/yr	Not projected [a]	5.29E-06	Not detected	Not detected	Not detected	Not detected
LEDA Projections (8-yr average):							
Oxygen-19	Ci/yr	2.16E-3	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]
Sulfur-37	Ci/yr	1.81E-3	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]
Chlorine-39	Ci/yr	4.70E-4	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]
Chlorine-40	Ci/yr	2.19E-3	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]
Krypton-83m	Ci/yr	2.21E-3	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]
Others	Ci/yr	1.11E-3	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]	Not measured [c]
NPDES Discharge: [d]							
Total Discharges	MGY	81.8	53.4	37.2	30.5	20.45	24.04
03A-047	MGY	7.1	13.5	3.4	3.5	0	0
03A-048	MGY	23.4	19.1	19.7	15.6	13.05	23.25

Table 2.11.3-1. Los Alamos Neutron Science Center (TA-53)/Operations Data (continued)

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
03A-049	MGY	11.3	20.1	10.8	9.6	5.9	0.14
03A-113	MGY	39.8	0.7	3.3	1.8	1.5	0.65
03A-125	MGY	0.18	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
03A-145	MGY	0.0	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
03A-146	MGY	Not projected [e]	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
Wastes:							
Chemical	kg/yr	16,600	55,258 [f]	11,060	1,205 [g]	4,057	1,999
LLW	m^3/yr	1,085 [h]	16	70	28	0.1	0
MLLW	m^3/yr	1	0.4	0.5	4.9	0.2	0.9
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	846 [i] 560 [i]	547 [i]	560 [i]	550 [i]	505 [i]	496 [i]

a The SWEIS ROD did not contain projections for these radioisotopes.

b The radionuclide was not projected by the SWEIS ROD because it was either dosimetrically insignificant or not isotopically identified.

c Potential emissions from LEDA were sufficiently small that measurement systems were not necessary to meet regulatory or facility requirements.

d Outfalls eliminated before 1999: 03A-125 (TA-53), 03A-145 (TA-53), and 03A-146 (TA-53).

e This outfall was not listed in the SWEIS.

f Chemical waste in CY 1998 was generated as a result the legacy material action project.

g About one-half of this waste (590 kilograms) was construction and demolition debris (previously identified as industrial solid waste in the Yearbook; nonhazardous) and may be disposed of in regular landfills.

h LLW volumes include decommissioning and renovation of Experimental Area A (Building 53-03M) due to the LPSS project.

i The first number shown in the “SWEIS ROD” column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the “SWEIS ROD” column is the index number representing CY1999 (the year the SWEIS ROD was published). The number of employees for 1998 through 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CY 1998 through CY 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.12 Bioscience Facilities (TA-43, TA-3, TA-16, TA-35, and TA-46) (Previously Health Research Laboratory [TA-43])

The Bioscience Key Facility definition includes the main HRL facility (Buildings 43-1, -37, -45, and -20) plus support located at TA-35-85, -2 and -254, TA-03-562 and -1698, and TA-46-158/161, -217, -218, -80, -24, and -31. Additionally, Bioscience has small operations located at TA-16. Operations at TA-43, TA-35-85 and -02, and TA-46-158/161 have chemical, laser, and limited radiological activities that maintain hazardous materials inventory and generate hazardous chemical wastes and very small amounts of LLW. Activities at TA-03-562, -03-1698, and TA-16 have relatively minor impacts because of low numbers of personnel and limited quantities of materials. Bioscience activities at TA-03-1698, the MSL, are accounted for with potential impacts of that Key Facility and are not double-counted here. The new Biosafety Level (BSL) 3 facility, TA-03-1076, located near the MSL, is a Bioscience Division facility and will not be included in the potential impacts analysis of the MSL Key Facility. Bioscience research capabilities focus on the study of intact cells (BSL-1 and -2), cellular components (RNA, DNA, and proteins), instrument analysis (laser and mass spectroscopy), and cellular systems (repair, growth, and response to stressors). All Bioscience activities are classed as Low Hazard nonnuclear in all buildings within this Key Facility; there are no Moderate Hazard nonnuclear facilities or nuclear facilities (LANL 2002a). TA-43-1 is now on the Radiological Facilities list (LANL 2002b).

The Bioscience Key Facility is a consolidation of bioscience functions and capabilities that represent the dynamic nature of the Yearbook, responding to the growth and decline of research and development across LANL.

2.12.1 Construction and Modifications at the Bioscience Facilities

Projected: Outfall 03A-040 exists, but is used only for the discharge of storm waters from the roofs and parking lots. It is likely to be eliminated from the NPDES permit.

Actual: A two-story, 4,500-square-foot wing was dedicated and opened at Building 43-01 in June 1997. The wing has laboratories and offices on both the first and second floors and is primarily used for cytometry research. Although this facility modification was not forecast by the ROD, a NEPA review was conducted, resulting in a Categorical Exclusion for the expansion project (LANL 1995).

Construction of the BSL-3 facility

In addition to the new wing, process waters from cooling of a laser were routed in 1998 to the County sewage treatment facility in Bayo Canyon. As a result, there were no discharges from Outfall 03A-040 in 1998. This outfall was eliminated from the NPDES permit on January 11, 1999. The animal colony was downsized substantially in 1996 and 1997 and eliminated entirely in 1999. Research activities involving radioactive materials were moved into the space previously occupied by the animal colony. In 1999, the volume of radioactive work at HRL had significantly diminished from previous years. This was attributed to technological advances and new methods, such as the use of laser-based instrumentation and chemiluminescense, which do not require the use of radioactive materials. For instance, DNA sequencing predominantly uses laser analysis of fluorescent dyes hooked onto DNA bases instead of radioactive techniques. During 2000, 2001, and 2002, the volume of work with radioactive materials continued to diminish.

In 2000, 2001, and 2002, buildings within TA-43 continued to have interior remodeling and rearranging to accommodate new and existing work. In 2000, the principal change in TA-43-1 resulted from relocation of radionuclide materials handling activities from the first floor north wing to the basement. In 2002, only minor interior changes to accommodate operational changes have occurred.

Growth in the Structural Genomics capability in 2000 resulted in the remodeling of over 1,000 square feet of laboratory and office space at LANL. Bioscience relocated two aspects of Genomics work from TA-43-1 to TA-35-85 to alleviate crowding and allow work to expand. Sequencing instruments were relocated to an undeveloped area of about 800 square feet within Building TA-35-85 that was modified to accept this work. In addition to instruments from TA-43-1, sequencing instruments from the University of New Mexico were also added to TA-35-85. This project is an international collaboration that provides bioscience resources at LANL to scientists all over the world. In 2002, Bioscience has continued the development of TA-35-85. This is a key effort for Bioscience Division. In 2002, the southwest corner of TA-35-85 was remodeled to accommodate Division needs. Phase 1 is now complete. Bioscience Division is planning to continue expansions at TA-35 as Nonproliferation and International Security work is relocated to new buildings.

The addition of Computational Biology to Bioscience in 1999 required remodeling of TA-43-45 to accommodate the growth. This capability requires computing workstations and has affected available office space at TA-43-1. This is a growth capability and will continue to require additional office space. This capability does not generate wastes nor use hazardous materials.

The HRL facility has BSL-1 and BSL-2 work, which includes limited work with infectious microbes and low-toxicity biotoxins, as defined by the Centers for Disease Control and Prevention (CDC). All biosafety activities are regulated by the CDC National Institutes of Health, LANL's Institutional Biosafety Committee, and the Institutional Biosafety Officer. BSL-2 work is expanding as part of LANL's growing Chemical and Biological Nonproliferation Program.

Biosafety Level 3 Facility: During 2002, Bioscience began construction of a BSL-3 facility (LANL 2000c); this activity has progressed substantially. The new BSL-3 facility is specifically designed to safely handle and store infectious organisms. It will enable Los Alamos scientists to fully commit to the national security mission of LANL and to contribute new technological solutions to the global threat of emerging infectious diseases. It will be the first BSL-3 facility in the DOE complex.

Description: The BSL-3 building will be a 3,202-square-foot, stand-alone containment facility that will be located remotely from the Los Alamos townsite, on the canyon west of Diamond Drive and south of Sigma Road. The building near the MSL at the intersection of Diamond Drive and Pajarito Road will contain two laboratory spaces at the BSL-3 level, a larger BSL-2 laboratory area, offices, and related storage and changing rooms. The mechanical system will accommodate directional airflow and negative pressure from the areas of lesser to greater risk, plus door interlocks and high-efficiency particulate air (HEPA) filtration.

Because of the building's small size and the small quantities of samples studied, there is no expected increase in quantities of sewage, solid wastes, or chemical wastes, nor should there be increased demand for utilities. NEPA coverage for this project was provided by the Environmental Assessment for the Proposed Construction and Operation of a BSL-3 Facility at LANL (DOE 2002d) dated February 26, 2002, and a Finding of No Significant Impact (FONSI).

Status: Title II Design of the building occurred from February through September 2002. Construction began October 2002 and is more than 40 percent finished. The building is scheduled for completion in October 2003. Overlapping construction are rigorous readiness assessment activities with a projected completion date of February 2004 after which operations are expected to commence.

The construction and modification activities for the Bioscience Facilities are summarized in Table 2.12.1-1.

Table 2.12.1-1. Construction and Modifications at the Bioscience Facilities

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Outfall 03A-040 exists	Discharge redirected to Los Alamos County sewage treatment plant in 1998.	Outfall eliminated from NPDES permit in 1999.			
	Two-story, 4,500-square-foot wing added to Building 43-01 in 1997.				
	Animal colony downsized in 1996 and 1997.	Animal colony eliminated and research activities with radioactive materials moved into space.			
		Radioactive material work decreased.	Radioactive material work decreased.	Radioactive material work decreased.	Radioactive material work decreased.
			Interior remodeling within TA-43 buildings.	Interior remodeling within TA-43 buildings.	Interior remodeling within TA-43 buildings.
			Genomics work moved from TA-43-1 to TA-35-85 and expanded.		Southwest corner of TA-35-85 remodeled.
		Remodeling of TA-43-45 to accommodate Computational Biology.			
					BSL-3 facility construction began (LANL 2000c).

2.12.2 Operations at the Bioscience Facilities

The SWEIS identified eight capabilities for the HRL (now called the Bioscience Facilities). In 1998, Neurobiology research was moved out of the Bioscience Facility and into space controlled by the Physics Division, the Physics Building at TA-03 (Building TA-03-40). Potential impacts of this capability are accounted for with the Non-Key Facilities.

In 1998, levels of research were greater than they were in 1995 for all capabilities, and two areas of research exceeded ROD projections. The primary reasons for this growth include the human genome project, the study of environmental effects, and research into structural cell biology.

In 1999, creation of Bioscience Division led to definitional changes in the existing capabilities. As part of the establishment of the Bioscience Division, three of the capabilities were renamed, two were combined at a higher level, and one was further defined into two operations as shown below:

- Genomic Studies was renamed Genomics
- Environmental Effects was renamed Environmental Biology
- Structural Cell Biology was renamed Structural Biology
- Cell Biology and DNA Damage and Repair were combined to form Molecular Cell Biology
- Cytometry was further defined as operations in Measurement Science and operations in Diagnostics and Medical Applications.

The Bioscience Division developed three other operations in 1999 (Biologically Inspired Materials and Chemistry, Computational Biology, and Molecular Synthesis). Impacts from these three functions were previously captured in the Non-Key Facilities portion of LANL. The In-Vivo Monitoring facility and capability continues to be located in TA-43, HRL-1 and continues at the previously reported level.

Following these changes, Bioscience Division still has eight broad research capabilities:

1) Biologically Inspired Materials and Chemistry
2) Computational Biology
3) Environmental Biology
4) Genomics
5) Measurement Science and Diagnostics
6) Molecular and Cell Biology
7) Molecular Synthesis
8) Structural Biology

The same set of capabilities still exist, but some have become more visible as research and development in a particular area grows, and some have become less visible as research and development in another area declines. This simply reflects the dynamic nature of a research laboratory.

Growth in Bioscience has resulted in addition of new personnel and expanded operations. While there have been increases in volumes of chemicals used and generation of chemical wastes, Bioscience continues to decommission unfunded work. BSL-2 work is expanding to include use of a non-pathogenic strain of anthrasis–delta Ames, low-toxicity biotoxins (defined by CDC), and DNA from other infectious microbes. The Institutional Biosafety Committee reviews all of this work. In addition, work with DNA from a subset of organisms (select agents) requiring registration with the CDC continues. BSL-2 work does not generate any infectious wastes. Expansion of sequencing efforts was most noticeable but does not generate new wastes or increased volumes of regulated wastes. Upgrades and remodeling have generated minimal construction debris as laboratory areas were cleaned out and equipment was replaced or upgraded. This trend in modernization is expected to continue through 2003. TA-43-1 is at capacity for both office and laboratory activities, and future Bioscience expansion is expected to occur at TA-35-85 and TA-46-158. Bioscience is pursuing a new building at LANL that will consolidate its work and remove activities from TA-43.

Table 2.12.2-1 compares 1998–2002 operations to those predicted by the SWEIS ROD. The table includes the number of FTEs per capability to measure activity levels compared to the SWEIS ROD. These FTEs are not measured the same as the index shown in Table 2.12.3-1 and these numbers cannot be directly compared. All but two of the existing capabilities have activity levels greater than those projected by the SWEIS ROD.

2.12.3 Operations Data for the Bioscience Facilities

Table 2.12.3-1 presents the operations data as measured by radioactive air emissions, NPDES discharges, generated waste volumes, and number of workers. The generation of most waste (chemical, administrative, and MLLW) has decreased from historical levels and was smaller than projections.

2.12.4 Cerro Grande Fire Effects at the Bioscience Facilities

Cerro Grande Fire effects on Bioscience facilities and operations included the loss of office transportables containing computers, intellectual property, and data at TA-46. Some computers and data were lost in homes burned by the fire. Overall, Bioscience, along with other programs at LANL, suffered downtime and loss of productivity during the evacuation and initial damage assessment, recovery, and reentry phases. Smoke damage occurred in several buildings at TA-43 and TA-46-158/161 requiring cleaning or replacement of an air handling system and many replacement air filters. The smoke damaged laser optics requiring their replacement at TA-46-158, -161, and TA-03-1698.

A training exercise, using ROB (Reagentless Optical Biosensor) to test environmental samples

Table 2.12.2-1. Bioscience Facilities/Comparison of Operations

CAPABILITIES	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Biologically Inspired Materials and Chemistry	Not in SWEIS ROD.	Not in SWEIS ROD. This operation was developed in 1999.	Not in SWEIS ROD. This operation was developed in 1999.	Not in SWEIS ROD. This operation was developed in 1999.	Not in SWEIS ROD. This operation was developed in 1999.	In 2002, 17 FTEs were associated with Biologically Inspired Materials and Chemistry.
Computational Biology	Not in SWEIS ROD.	Not in SWEIS ROD. This operation was developed in 1999.	Not in SWEIS ROD. This operation was developed in 1999.	In 2000, there were 25 FTEs, expected to grow to 35 FTEs by 2002.	In 2001, 16 FTEs were associated with Computational Biology.	In 2002, 16 FTEs were associated with Computational Biology.
Environmental Biology (formerly named Environmental Effects)	Research to characterize the extent of diversity in environmental microbes and to understand their functions and occurrences in the environment. (25 FTEs)	In 1998, activities increased about 50% above 1995 levels to 30 FTEs, and exceeded SWEIS ROD projections.	In 1999, 25 FTEs were associated with Environmental Biology. This equals the SWEIS ROD projection and is an increase of 25% over 1995 levels.	In 2000, 20 FTEs were associated with Environmental Biology.	In 2001, 27 FTEs were associated with Environmental Biology.	In 2002, 24 FTEs were associated with Environmental Biology.
Genomics (formerly named Genomic Studies)	Conduct research at current levels utilizing molecular and biochemical techniques to determine and analyze the sequences of genomes (human, microbes and animal). Develop strategies to analyze the nucleotide sequence of individual genes, especially those associated with genetic disorders, infectious disease organisms.	In 1998, activities increased about 10% above 1995 levels to 43 FTEs, but were still below SWEIS ROD projections.	In 1999, 61 FTEs were associated with Genomics. This exceeded the SWEIS ROD projection of 50 FTEs and is an increase of 56% over 1995 levels.	In 2000, 50 FTEs were associated with Genomics.	In 2001, 47 FTEs were associated with Genomics.	In 2002, 47 FTEs were associated with Genomics.

Table 2.12.2-1. Bioscience Facilities/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Measurement Science and Diagnostics (formerly named Cytometry)	Conduct research utilizing imaging and spectroscopy systems to analyze the structures and functions of subcellular systems and components. (40 FTEs)	In 1998, activities increased 10% above 1995 levels to 33 FTEs, but were below projections made by the SWEIS ROD.	In 1999, 25 FTEs were associated with Measurement Science and Diagnostics, a specialized application of cytometry, microscopy, spectroscopy, and other techniques for molecular detection and diagnosis. In 1999, 10 FTEs were associated with Medical Applications utilizing laser-based molecular analysis techniques to develop tools for clinical diagnosis of disease. The 35 total FTEs in Cytometry is below the 40 FTEs projected in the ROD.	In 2000, 30 FTEs were associated with Measurement Science and Diagnostics.	In 2001, 37 FTEs were associated with Measurement Science and Diagnostics.	In 2002, 37 FTEs were associated with Measurement Science and Diagnostics.
Molecular and Cell Biology (formerly Cell Biology and DNA Damage and Repair)	Conduct research at current levels utilizing whole cells and cellular systems, both in-vivo and in-vitro, to investigate the effects of natural and catastrophic cellular events like response to aging, harmful chemical and physical agents, and cancer.	In 1998, Cell Biology activities increased ~15% above 1995 levels to 29 FTEs, but were still below projections of 35 FTEs made by the SWEIS ROD.	In 1999, 30 FTEs were associated with Molecular Cell Biology. This is less than half of the 70 FTEs projected in the ROD. In 1995, a total of 50 FTEs were associated with Cell Biology and DNA Damage and Repair.	In 2000, 30 FTEs were associated with Molecular Cell Biology.	In 2001, 42 FTEs were associated with Molecular Cell Biology.	In 2002, 42 FTEs were associated with Molecular Cell Biology.

Table 2.12.2-1. Bioscience Facilities/Comparison of Operations (continued)

CAPABILITIES	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Molecular and Cell Biology (formerly Cell Biology and DNA Damage and Repair) (cont.)	The work includes using isolated cells to investigate DNA repair mechanisms. (35 FTEs)	DNA Damage and Repair activities increased ~30% above 1995 levels to 32 FTEs, but were still below projections of 35 FTEs made by the SWEIS ROD.				
Molecular Synthesis	Generate biometric organic materials and construct synthetic biomolecules.	This operation was developed in 1999.	This operation was developed in 1999.	In 2000, 10 FTEs were associated with this capability.	In 2001, 16 FTEs were associated with Molecular Synthesis.	In 2002, 16 FTEs were associated with Molecular Synthesis.
Structural Biology (formerly named Structural Cell Biology)	Conduct research utilizing chemical and crystallographic techniques to isolate and characterize the properties and three-dimensional shapes of DNA and protein molecules. (15 FTEs)	In 1998, activities increased 130% above 1995 levels to 23 FTEs and exceeded SWEIS ROD projections.	In 1999, 60 FTEs were associated with Structural Biology. This exceeded the SWEIS ROD projection of 15 FTEs and is an increase of 500% over 1995 levels.	In 2000, 35 FTEs were associated with Structural Biology.	In 2001, 18 FTEs were associated with Structural Biology.	In 2002, 18 FTEs were associated with Structural Biology.
In-Vivo Monitoring. This is not a Bioscience Division capability; however, it is located at TA-43-HRL-1. Therefore, it is a capability within this Key Facility and is included here.	Perform 3,000 whole-body scans per year as a service to the LANL personnel monitor-ing program, which supports operations with radioactive materials conducted elsewhere at LANL. (5 FTEs)	Conducted 1,068 whole-body scans and 1,737 other counts (detector studies, quality assurance measurements, etc.). In 1998, 5 FTEs were associated with this capability.	Conducted 1,250 whole-body scans and 1,733 other counts (detector studies, quality assurance measurements, etc.). In 1999, 3 FTEs were associated with this capability.	Conducted 1,261 whole-body scans and 718 other counts (detector studies, quality assurance measurements, etc.). In 2000, 3 FTEs were associated with this capability.	Conducted 1,083 whole-body scans and 766 other counts (detector studies, quality assurance measurements, etc.). In 2001, 2.5 FTEs were associated with this capability.	Conducted 1,639 whole-body scans and 641 other counts (detector studies, quality assurance measurements, etc.). In 2002, 3 FTEs were associated with this capability.

[a] FTEs: full-time equivalent scientists, researchers, and other staff supporting a particular research capability.

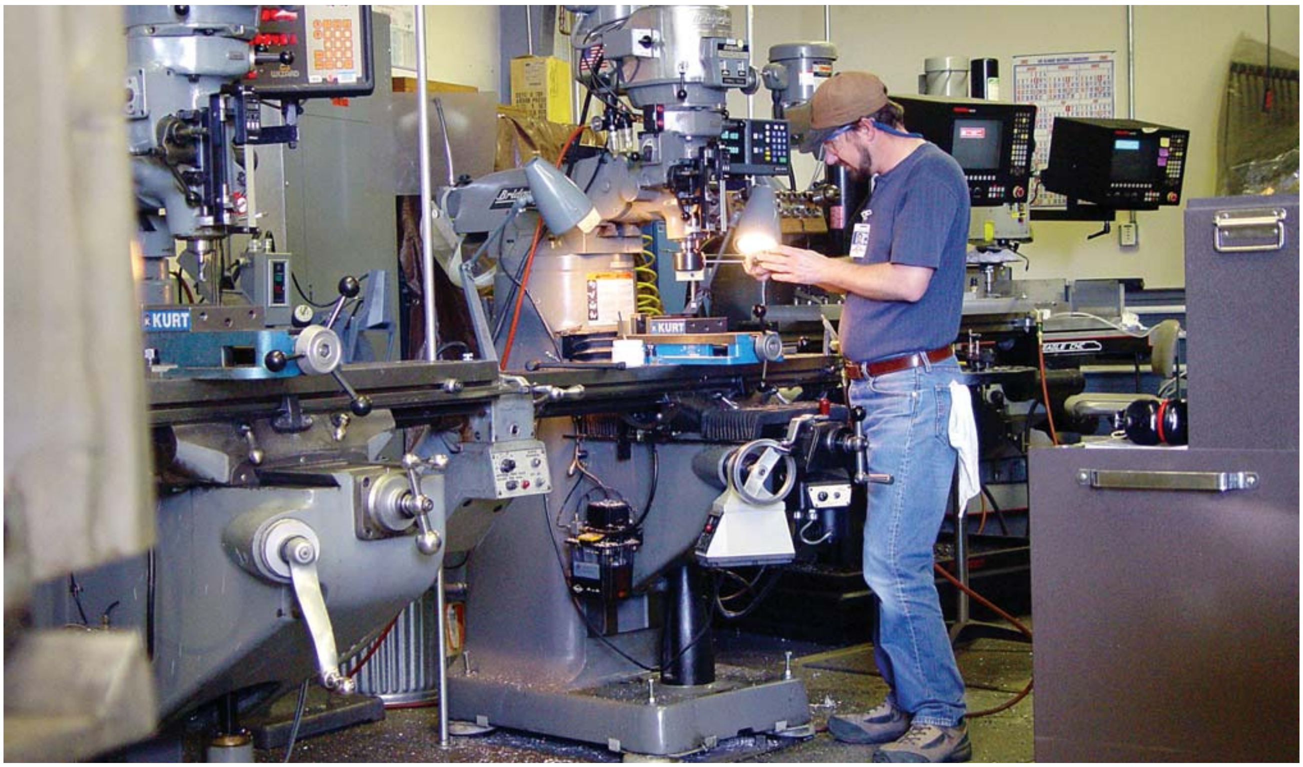
Table 2.12.3-1. Bioscience Facilities/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions	Ci/yr	Not estimated	Not measured	Not measured	Not measured	Not measured	Not measured
NPDES Discharge: [a] 03A-040	MGY	2.5 [b]	No discharge [c]	Eliminated 1999	Eliminated 1999	Eliminated 1999	Eliminated 1999
Wastes:							
Chemical	kg/yr	13,000	2,368	1,691	2,370 [d]	1,359 [d]	4,504 [d]
Biomedical Waste	kg/yr	280 [e]	<60	0	0	0	0
LLW	m^3/yr	34	7	14	0	0	0
MLLW	m^3/yr	3.4	0	0.01	0	0	0
TRU	m^3/yr	0	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	250 [f] 98 [f]	82 [f]	98 [f]	110 [f]	116 [f]	108 [f]

[a] Outfall 03A-040 consisted of one process outfall and nine storm drains.
[b] Storm water only.
[c] Process flows were routed in 1998 to Bayo Canyon sewage plant operated by the County.
[d] Represents only the Bioscience contribution. Wastes from the other buildings were insignificant and were captured in the Non-Key Facilities totals.
[e] Animal colony and the associated waste. The animal colony waste in CY 1997 was 75 kilograms. The animal colony was downsized substantially in the 1996 to 1997 period and was eliminated in 1999.
[f] The number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CYs 2000, 2001, and 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CYs 2000, 2001, and 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.13 Radiochemistry Facility (TA-48)

The Radiochemistry Key Facility includes all of TA-48 (116 acres). It is a research facility that fills three roles—research, production of medical radioisotopes, and support services to other LANL organizations, primarily through radiological and chemical analyses of samples. TA-48 contains five major research buildings: the Radiochemistry Laboratory (Building 48-1), the Isotope Separator Facility (48-8), the Diagnostic Instrumentation and Development Building (48-28), the Advanced Radiochemical Diagnostics Building (48-45), and the Analytical Facility (48-107). As shown in Table 2.13-1, the Radiochemistry Laboratory has remained a Category 3 nuclear facility (LANL 2002a). During 2003, the Radiochemistry Laboratory (TA-48-01) is expected to transition from a Hazard Category 3 nuclear facility to a radiological facility.



Machine shop at TA-48-8

2.13.1 Construction and Modifications at the Radiochemistry Facility

Projected: The SWEIS projected no facility changes through 2005.

Actual: Although no facility changes were projected in the SWEIS ROD, a few have occurred. In 1996, Building 48-01, Room 346 was converted from a storage area into a chemistry lab with fume hoods, laboratory instrumentation, and hardware such as small furnaces. The lab accommodated personnel moved from TA-21 to TA-48. The modification underwent NEPA review and received a categorical exclusion (DOE 1997c).

Another modification was the upgrade to the ventilation system and the remodeling of the chemistry lab in Building 48-01, Room 430. This modification also underwent NEPA review and received a categorical exclusion (DOE 1998f). In addition, four of the five existing outfalls were eliminated from the NPDES permit during 1997 and 1998. The elimination of the outfalls was evaluated in an environmental assessment (DOE 1996f), and subsequent Finding of No Significant Impact.

Table 2.13-1. Radiochemistry Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-48-0001	Radiochemistry and Hot Cell	3	3	3	3	3	3

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)

During 1999, only minor maintenance activities occurred and the facility's remaining outfall, 03A-045, was eliminated from the Laboratory's NPDES permit on December 6, 1999 (DOE 1996f). Only minor maintenance activities occurred during 2000 and 2001 with the exception of the refurbishment of the Diagnostic Instrumentation and Development Building (48-45; LANL 2001q, DOE 1996g) because of the Cerro Grande Fire and upgrading some of the basement ductwork in the Radiochemistry laboratory (Building 48-01).

During 2002, funds were available to do more than minor maintenance activities at the Radiochemistry Facility. In the summer of 2002, pollution prevention funds were used to replace the refrigerants in two chillers with environmentally friendly refrigerants. Additionally, Building 48-01 underwent several improvements and repairs: the HVAC was improved in part of the building; the roof was repaired; the lightning protection was upgraded; and life safety was improved. The machine shop in the basement of Building 48-01 was moved to Building 48-08. Additionally, an acid neutralization system was installed in Building 48-45. The 50-year-old Building 48-31 was removed and replaced with Building 48-210, a transportable with office space. The machine shop in the basement of Building 48-01 was moved to Building 48-08. Table 2.13.1-1 provides details.

2.13.2 Operations at the Radiochemistry Facility

The SWEIS identified ten capabilities for the Radiochemistry Key Facility. No new capabilities have been added, and none has been deleted. The primary measure of activity for this Key Facility is the number of personnel conducting research. In 2002, approximately 170 chemists and scientists were employed, far below the 250 projected by the SWEIS ROD.[6] As seen in Table 2.13.2-1, only two capabilities were active at levels projected by the SWEIS ROD: Radionuclide Transport Studies, Actinide and TRU Chemistry, and Sample Counting.

2.13.3 Operations Data for the Radiochemistry Facility

The overall level of activity at the Radiochemistry Facility has been below that projected by the SWEIS ROD. Two of the ten capabilities at this Key Facility were conducted at levels projected by the SWEIS ROD; the others were at or below activity levels identified during preparation of the SWEIS. As a result, for the most part, operations data were also below those projected by the SWEIS ROD, as shown in Table 2.13.3-1. An exception occurred during 2000 through 2002 when a large quantity of chemical wastes categorized as industrial solid wastes was generated.[7] These industrial solid wastes are nonhazardous, may be disposed in county landfills, and do not present a threat to the local environs. The quantities of TRU and MLLW generated during 2002 result from the plans to transition TA-48-1 from a nuclear facility to a radiological facility. The wastes generated were shipped to TA-54.

[6] The 170 chemists and scientists listed cannot be directly compared to the FTEs shown in Table 2.13.3-1, because the two numbers represent two different populations of individuals. The 170 chemists and scientists listed include temporary staff, students, and visiting scientists, whereas, the 124 FTEs only includes full-time and part-time regular LANL staff.

[7] In the SWEIS, the term "industrial solid waste" was used for construction debris, chemical waste, and sensitive paper records.

Table 2.13.1-1. Construction and Modifications at the Radiochemistry Facility

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Projected no facility changes through 2005		Minor maintenance: office modifications, chiller replaced, and some basement ventilation removed.	Minor maintenance activities.	Minor maintenance activities.	Minor maintenance activities.
	Building 48-01, Room 346 converted 3,500 square feet of storage space to chemistry laboratory space (DOE 1997c).			Building 48-01 Upgraded some of the basement ductwork.	Building 48-01 replaced refrigerants in two chillers with pollution prevention funds. Improved some HVAC. Repaired roof Upgraded lightning protection. Improved life safety.
	Building 48-01, Room 430. Upgraded the ventilation systems and remodeled chemistry lab (DOE 1998f).				Building 48-01 Removed machine shop from basement.
					Building 48-08 Installed machine shop from Building 48-01.
					Building 48-31 removed.
				Building 48-45 refurbished due to Cerro Grande Fire (LANL 2001q, DOE 1996g).	Building 48-45 Installed acid neutralization system.
					Building 48-210 transportable office building installed to replace TA-48-31.
	Four outfalls eliminated during 1997 and 1998: 04A-016, 04A-152, 04A-131, and 04A-153 (DOE 1996f).	Remaining outfall eliminated: 03A-045 (DOE 1996a).			

Table 2.13.2-1. Radiochemistry Facility (TA-48)/Comparison of Operations

CAPABILITY	SWEIS ROD	1998 OPERATIONS [a]	1999 OPERATIONS [b]	2000 OPERATIONS [c]	2001 OPERATIONS [c]	2002 OPERATIONS [c]
Radionuclide Transport Studies	Actinide transport, sorption, and bacterial interaction studies. Development of models for evolution of groundwater. Assessment of performance or risk of release for radionuclide sources at proposed waste disposal sites. (28 to 34 FTEs [a])	Increased level of operations, approximately twice 1995 levels. (32 FTEs)	Increased level of operations, approximately twice 1995 levels. (35 FTEs)	Increased level of operations, approximately twice levels identified during preparation of the SWEIS. (36 FTEs)	During 2001, operations continued at approximately twice the levels identified during preparation of the SWEIS. (36 FTEs)	During 2002, operations continued at approximately twice the levels identified during preparation of the SWEIS. (36 FTEs)
Environmental Remediation Support	Background contamination characterization pilot studies. Performance assessments, soil remediation research and development, and field support. (34 FTEs[a])	Decreased level of operations, approximately half 1995 levels. (9 FTEs)	Decreased level of operations, approximately half 1995 levels. (10 FTEs)	Decreased level of operations, approximately half levels identified during preparation of the SWEIS. (10 FTEs)	During 2001, operations continued at approximately half the levels identified during preparation of the SWEIS. (10 FTEs)	During 2002, operations continued at approximately half the levels identified during preparation of the SWEIS. (10 FTEs)
Ultra-Low-Level Measurements	Isotope separation and mass spectrometry. (30 FTEs [a])	Slightly increased level of operations, approximately the same as in 1995. (15 FTEs)	Level of operations, approximately the same as in 1995. (14 FTEs)	Level of operations, approximately the same as levels identified during preparation of the SWEIS. (14 FTEs)	Level of operations was approximately the same as levels identified during preparation of the SWEIS. (14 FTEs)	Level of operations was approximately the same as levels identified during preparation of the SWEIS. (14 FTEs)
Nuclear/Radiochemistry	Radiochemical operations involving quantities of alpha-, beta-, and gamma-emitting radionuclides for non-weapons and weapons work. (44 FTEs [a])	Slightly increased level of operations, approximately the same as 1995 levels. (40 FTEs)	Slightly decreased level of operations, but approximately the same as 1995 levels. (35 FTEs)	Slightly decreased level of operations, but approximately the same as levels identified during preparation of the SWEIS. (35 FTEs)	Slightly decreased level of operations, but approximately the same as levels identified during preparation of the SWEIS. (35 FTEs)	Slightly decreased level of operations, but approximately the same as levels identified during preparation of the SWEIS. (35 FTEs)
Isotope Production	Target preparation. High-level beta/gamma chemistry and target processing to recover isotopes for medical and industrial application. (15 FTEs [a])	Slightly increased level of operations, approximately the same as in 1995. (12 FTEs)	Slightly increased level of operations, approximately the same as in 1995. (11 FTEs)	Slightly increased level of operations, but approximately the same as levels identified during preparation of the SWEIS. (11 FTEs)	Slightly increased level of operations, but approximately the same as levels identified during preparation of the SWEIS. (11 FTEs)	Slightly increased level of operations, but approximately the same as levels identified during preparation of the SWEIS. (11 FTEs)

Table 2.13.2-1. Radiochemistry Facility (TA-48)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD	1998 OPERATIONS [a]	1999 OPERATIONS [b]	2000 OPERATIONS [c]	2001 OPERATIONS [c]	2002 OPERATIONS [c]
Actinide/TRU Chemistry	Radiochemical operations involving significant quantities of alpha-emitting radionuclides. (12 FTEs [a])	Increased operations, approximately twice 1995 levels. (14 FTEs)	Increased operations, approximately twice 1995 levels. (13 FTEs)	Increased operations, approximately twice levels identified during preparation of the SWEIS. (14 FTEs)	Increased operations, approximately twice levels identified during preparation of the SWEIS. (14 FTEs)	Significant decrease in quantities of alpha-emitting radionuclides used in operations. (14 FTEs)
Data Analysis	Re-examination of archive data and measurement of nuclear process parameters of interest to weapons radiochemists. (10 FTEs [a])	Slight increase from 1995 to six FTEs, but less than projected by the SWEIS ROD.	Slight increase from 1995 to six FTEs, but less than projected by the SWEIS ROD.	Slight increase from levels identified during preparation of the SWEIS to six FTEs, but less than projected by the SWEIS ROD.	Slight increase from levels identified during preparation of the SWEIS to six FTEs, but less than projected by the SWEIS ROD.	Slight increase from levels identified during preparation of the SWEIS to six FTEs, but less than projected by the SWEIS ROD.
Inorganic Chemistry	Synthesis, catalysis, actinide chemistry: Chemical synthesis of new organo-metallic complexes Structural and reactivity analysis, organic product analysis, and reactivity and mechanistic studies Synthesis of new ligands for radiopharmaceuticals Environmental technology development: Ligand design and synthesis for selective extraction of metals Soil washing Membrane separator development Ultrafiltration (49 FTEs [a]—total for both activities)	Slight decrease from levels in 1995 to 32 FTEs, below projections of the SWEIS ROD.	Same level of activity as in 1995 (35 FTEs), but below projections of the SWEIS ROD.	Same level of activity (35 FTEs) as levels identified during preparation of the SWEIS, but below projections of the SWEIS ROD.	Same level of activity (35 FTEs) as levels identified during preparation of the SWEIS, but below projections of the SWEIS ROD.	Same level of activity (35 FTEs) as levels identified during preparation of the SWEIS, but below projections of the SWEIS ROD.

Table 2.13.2-1. Radiochemistry Facility (TA-48)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD	1998 OPERATIONS [a]	1999 OPERATIONS [b]	2000 OPERATIONS [c]	2001 OPERATIONS [c]	2002 OPERATIONS [c]
Structural Analysis	Synthesis and structural analysis of actinide complexes at current levels. X-ray diffraction analysis of powders and single crystals at current levels. (22 FTEs [a])	Decreased level of operations from 1995, and about 1/3 of those projected by the SWEIS ROD. (6 FTEs)	Decreased level of operations from 1995, and about 1/3 of those projected by the SWEIS ROD. (8 FTEs)	Decreased level of operations from levels identified during preparation of the SWEIS, and about one-third of those projected by the SWEIS ROD. (7 FTEs)	Decreased level of operations from levels identified during preparation of the SWEIS, and about one-third of those projected by the SWEIS ROD. (7 FTEs)	Decreased level of operations from levels identified during preparation of the SWEIS, and about one-third of those projected by the SWEIS ROD. (7 FTEs)
Sample Counting	Measurement of the quantity of radioactivity in samples using alpha-, beta-, and gamma-ray counting systems. (5 FTEs [a])	Approximately the same as SWEIS ROD. (6 FTEs)	Approximately the same as SWEIS ROD. (6 FTEs)	Approximately the same as projected by the SWEIS ROD. (6 FTEs)	During 2001, slight increase in the number of samples projected by the SWEIS ROD. (6 FTEs)	During 2002, slight increase in the number of samples projected by the SWEIS ROD. (6 FTEs)

[a] FTEs: full-time-equivalent scientists, researchers, and other staff supporting a particular research capability.

[b] Projections in the ROD were made as increments to the current level of operations as expressed by the "No Action" alternative for the current (1995) year. Thus, 1999 operations must use increments from 1995 operational levels for comparison.

[c] FTEs: full-time-equivalent. It is imperative that these FTE numbers are not confused with the FTEs identified in Table 2.13.3-1. Two different populations of individuals are represented. The FTEs in this table include students, visitors, and temporary staff. The FTEs in Table 2.13.3-1 only include full-time and part-time regular LANL staff.

Table 2.13.3-1. Radiochemistry Facility (TA-48)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Mixed Fission Products	Ci/yr	1.4E-4	None detected	Not reported [a]	Not reported [a]	Not reported [a]	Not reported
Plutonium-238	Ci/yr	Not Projected [b]	None detected	None detected [c]	None detected [c]	None detected [c]	2.3E-10
Plutonium-239	Ci/yr	1.1E-5	None detected	None detected [c]	None detected [c]	None detected [c]	1.5E-9
Uranium-234	Ci/yr	Not Projected [b]	1.35E-7	None detected [c]	None detected [c]	None detected [c]	Not detected
Uranium-235	Ci/yr	4.4E-7	5.00E-9	None detected [c]	None detected [c]	None detected [c]	Not detected
Mixed Activation Products	Ci/yr	3.1E-6	None detected	Not reported [a]	Not reported [a]	Not reported [a]	Not reported
Uranium-238	Ci/yr	Not Projected [d]	None detected	6.0E-10	None detected [c]	None detected [c]	Not detected
Arsenic-72	Ci/yr	1.1E-4	None detected	None detected [c]	None detected [c]	None detected [c]	Not detected
Arsenic-73	Ci/yr	1.9E-4	None detected	1.8E-5	4.4E-5	4.2E-5	2.3E-3
Arsenic-74	Ci/yr	4.0E-5	9.46E-7	4.5E-5	2.8E-5	1.1E-5	1.2E-3
Beryllium-7	Ci/yr	1.5E-5	None detected	None detected [c]	None detected [c]	None detected [c]	Not detected
Bromine-77	Ci/yr	8.5E-4	8.68E-5	1.2E-5	2.8E-5	None detected [c]	Not detected
Germanium-68	Ci/yr	1.7E-5	None detected	1.7E-3	8.1E-3	1.1E-3	3.4E-3
Gallium-68	Ci/yr	1.7E-5	None detected	1.7E-3	8.1E-3	1.1E-3	3.4E-3
Rubidium-86	Ci/yr	2.8E-7	None detected	None detected [c]	None detected [c]	None detected [c]	Not detected
Selenium-75	Ci/yr	3.4E-4	2.41E-5	3.5E-4	1.4E-4	None detected [c]	3.8E-7
Silicon-32	Ci/yr	Not Projected [e]	Not measured	5.1E-6	Not measured	Not measured	Not measured
NPDES Discharge: [f]							
Total Discharges	MGY	4.1	No Discharge	No Discharge	No Discharge	No discharge	No discharge
03A-045	MGY	0.87	No Discharge	Eliminated 1999 [g]	Eliminated - 1999	Eliminated 1999	Eliminated 1999
04A-016	MGY	None	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-131	MGY	None	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
04A-152	MGY	None	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-153	MGY	3.2	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
Wastes:							
Chemical	kg/yr	3,300	1,990	1,513	12,461 [h]	17,725 [i]	186,135 [j]
LLW	m^3/yr	270	89	44	57	55	34
MLLW	m^3/yr	3.8	0.3	0.6	1.6	2.8	2.2
TRU [k]	m^3/yr	0	0.2	0	0	0	0
MixedTRU [k]	m^3/yr	0	0	0	0	0	0
Number of Workers	FTEs	248 [l] 128 [l]	129 [l]	128 [l]	124 [l]	122 [l]	110 [l]

[a] Although stack sampling systems were in place to measure these emissions, any emissions were sufficiently small to be below the detection capabilities of the sampling systems.

[b] Emission categories of 'mixed fission products' and 'mixed activation products' are no longer used. Instead, where fission or activation products are measured, they are reported as specific radionuclides, e.g., Cesium-137 or Cobalt-60.

Table 2.13.3-1. Radiochemistry Facility (TA-48)/Operations Data (continued)

[c] The SWEIS ROD did not contain projections for this radioisotope.
[d] The radionuclide was not projected in the ROD because it was either dosimetrically insignificant or not isotopically identified.
[e] The Silicon-32 emissions were not expected. There was a slight process problem that resulted in these emissions. The dose from these emissions was not significant.
[f] Outfalls eliminated before 1999: 04A-016 (TA-48), 04A-131 (TA-48), 04A-152 (TA-48), and 04A-153 (TA-48).
[g] This outfall was eliminated from the NPDES permit on December 6, 1999.
[h] Approximately 10,959 kilograms of this chemical waste represents construction and demolition debris (previously identified in the Yearbook as industrial solid waste) resulting from cleanup following the Cerro Grande Fire. The construction and demolition debris is nonhazardous and is disposedin regular county landfills.
[i] Approximately 8,861 kilograms of this waste was generated during chemical cleanouts of TA-48-01 during 2001.
[j] The CY 2002 chemical waste volume includes 182,891.52 kilograms of contaminated soil from a construction project outside TA-48-1. The contamination was from a leaky pipe uncovered during excavation of trenches for new utilities.
[k] TRU waste was projected to be returned to the generating facility.
[l] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CY 1998 through CY 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not a ppropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.13.4 Cerro Grande Fire Effects at the Radiochemistry Facility

Six structures were affected by the Cerro Grande Fire. As summarized in Table 2.13.4-1, five suffered only minor effects; activities in these buildings were not affected. Building 48-45, the Advanced Radiochemical Diagnostics Building, however, suffered severe ash, dirt, and soot contamination.

Table 2.13.4-1. Fire-Damaged Structures at TA-48

NO.	STRUCTURE	DAMAGE
48-26	Office building	Replace filters; cleaned
48-33	Office trailer	Replace filters; cleaned
48-45	Advanced Radiological Diagnostics	Damaged
48-56	Office trailer	Roof damage
48-57	Office trailer	Roof damage
48-203	Office trailer	North skirt melted; insulation damaged

The only way to return Building 48-45 to service was to gut its interior. Nearly everything was removed (ceiling tiles, piping, instrumentation, etc.) and disposed as waste. Since this is a laboratory used for sensitive environmental analyses (and hence maintained apart from other TA-48 lab buildings, which host radiological activities), wastes from this cleanup activity were construction and demolition debris (previously indicated in the yearbooks as industrial solid wastes). They were shipped direct from TA-48 to a municipal landfill. The cleanup began in 2000 and continued into 2001.

2.14 Radioactive Liquid Waste Treatment Facility (TA-50)

The RLWTF is located at TA-50 and consists of the treatment facility (Building 50-1), support buildings, and liquid and chemical storage tanks. The primary activity is treatment of radioactive liquid wastes generated at other LANL facilities. The facility also houses analytical laboratories to support waste treatment operations.

As shown in Table 2.14-1, this Key Facility consists of the following structures: the RLWTF itself (Building 50-01), the tank farm and pumping station (50-2), the acid and caustic solution tank farm (50-66), and a 100,000-gallon influent holding tank (50-90). The RWTF is presently considered a single Hazarad Category 3 facility. It is anticipated that it will become a Hazard Category 2 facility upon approval of the submitted Documented Safety Analysis. The Documented Safety Analysis was submitted for review by DOE in the second quarter of FY 2003. The SWEIS identified only the RLWTF main building as a nuclear facility and gave it a ranking of Category 2. There are no other nuclear facilities and no Moderate Hazard nonnuclear buildings within this Key Facility (LANL 2002a).

Initial treatment of radioactive liquid waste by chemical precipitation

Table 2.14-1. Radioactive Liquid Waste Treatment Facility Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-50-0001	Main Treatment Plant	2	3	3	3	3	3
TA-50-0002	LLW Tank Farm		3	3	3	3	3
TA-50-0066	Acid and Caustic Tank Farm		3	3	3	3	3
TA-50-0090	Holding Tank		3	3	3	3	3

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)

2.14.1 Construction and Modifications at the Radioactive Liquid Waste Treatment Facility

Projected: The SWEIS ROD projected three modifications to the RLWTF Key Facility: upgrade the tank farm, install a new UF/RO process, and install nitrate reduction equipment.

Actual: The three modifications to the RLWTF Key Facility projected by the SWEIS ROD were completed. The tank farm was upgraded in 1998. Four aboveground storage tanks were installed in 1997. Upon installation of the aboveground tanks, use of the influent underground storage tanks was to have stopped. However, both the aboveground and all but two of the underground storage tanks are in use. One underground tank was removed from service and is being used as a secondary containment vessel instead. The second underground tank was used to hold sludge generated by the treatment process. This sludge is now held in a metal tank with secondary containment. Sludge has been removed from the underground tanks. This tank is being decommissioned. The new UF/RO process was installed in 1998 and became operational March 22, 1999. Nitrate reduction equipment was installed in 1998 and became operational on March 15, 1999. Unlike the SWEIS description, however, the treatment was by chemical reduction, not biological process. The process treated only small batches of high-nitrate radioactive liquid waste. There have been zero violations of the State of New Mexico discharge agreement for nitrate-nitrogen (10 milligrams per liter) from March through August 2003. And despite a longer break-in for the UF/RO equipment, the RLWTF effluent has been below DOE's guidelines for radioactivity beginning December 10, 1999 and continuing through August 2003.

Facility personnel also installed an electrodialysis reversal unit in 1999 and an evaporator in 2000. Both units process the waste stream from the reverse osmosis unit. They received NEPA coverage through Categorical Exclusions #7428, approved 02/23/99 (DOE 1999d), and #7737, approved 10/29/99 (DOE 1999e). The SWEIS ROD projected neither of these modifications. Additionally, the RLWTF installed ion exchange resins in March 2002 for the removal of perchlorate from the facility effluent water.

Decontamination operations were relocated during 2000 from Building 50-01 to TA-54. Except for the lead decontamination trailer, decontamination operations were moved to the west end of TA-54. Radioactive liquid wastes generated during decontamination operations are collected in two holding tanks at TA-54, which are trucked to the RLWTF at TA-50. The lead decontamination trailer, formerly located between Buildings 50-83 and 50-02, was sent to Area G and decommissioned. The quantity of lead that needed decontamination had become so small that maintaining this operation was no longer cost effective. Building 50-83, the fabrication shop at the RLWTF, has been moved to TA-54 in anticipation of the funding to construct an influent tank farm facility and new pump house.

During 2001, the cross-country transfer line, dedicated to the transfer of radioactive liquid wastes from the TA-21 tritium facilities to the TA-50 RLWTF, was taken out of service, flushed, drained, and capped. For environmental protection, the pipeline was removed from service; it was a single-walled pipe for its entire length (~two miles). Reduction of radioactive liquid waste volumes generated at the TA-21 facilities enabled the line to be taken out of service; the smaller volumes can now be transported from TA-21 to TA-50 or TA-53 by truck. In 2002, the cross-country transfer line was mostly removed as part of land transfer.

Also during 2001, nitrate reduction equipment was removed from service. Source evaluation had shown that more than 70 percent of the nitrates in the LANL radioactive liquid waste were found in less than 1 percent of the waste volume. These low-volume, high-nitrate liquid wastes are now segregated by waste generators and shipped to commercial hazardous waste treatment facilities. Table 2.14.1-1 provides details.

Table 2.14.1-1. Radioactive Liquid Waste Treatment Facility Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
Replace influent underground storage tanks	Tank farm upgraded by replacing two of three underground storage tanks with four aboveground steel tanks in 1997.				
Install a UF/RO process	Process installed in 1998.	Process became operational in 1999.			
		Installed an electrodialysis reversal unit and began construction of an evaporator to support UF/RO process (DOE 1999d, DOE 1999e).			
					Installation of ion exchange process to remove perchlorate from the RLWTF effluent.
Install nitrate reduction equipment	Equipment installed in 1998.	Equipment became operational in 1999.		Nitrate reduction equipment was removed from service.	
			Decontamination operations relocated from Building TA-50-01 to TA-54.		
			Lead decontamination trailer sent to Area G for decommissioning.		
				Cross-country transfer line between TA-21 and TA-50 RLWTF taken out of service.	
					Begin use of metal tank with secondary containment for holding process sludge.

[a] Additional information on the impacts of the Cerro Grande Fire can be found in Section 2.14.4.

2.14.2 Operations at the Radioactive Liquid Waste Treatment Facility

The SWEIS identified five capabilities for the RLWTF Key Facility. The primary measurement of activity for this facility is the volume of radioactive liquid processed through the main treatment equipment. From 1998 through 2002, all discharge volumes have been less than the projected discharge volume of 35 million liters per year in the SWEIS ROD. In 1998, this volume was 23 million liters of treated radioactive waste discharged to Mortandad Canyon. This is 12 million liters less than the discharge volume of 35 million liters projected by the ROD. In 1999, the discharged volume of treated radioactive waste was 20 million liters, 15 million liters less than projected by the ROD. In 2000, the discharged volume of treated radioactive waste was 19 million liters, 16 million liters less than projected by the ROD. In 2001, the discharged volume of treated radioactive waste was 14 million liters, 21 million liters less than projected by the ROD. In 2002, the RLWTF treated 11.5 million liters of radioactive liquid waste prior to discharging into Mortandad Canyon.

Two factors have contributed to reduced waste volumes. Source reduction efforts re-routed two significant waste streams, nonradioactive discharge waters from a cooling tower at TA-21 and a boiler at TA-48, to the LANL sewage plant during the summer of 2001. Internal recycling also reduced radioactive liquid waste volumes. During 2001 and 2002, process waters were used instead of tap water for the dissolution of chemicals needed in the treatment process. This recycle eliminated approximately two million liters per year of fresh water use. Process waters, instead of tap water, were also used for filter backwash operations. This modification reduced waste volumes by 200,000 liters in 2001 and by 500,000 liters in 2002.

In 2002, a perchlorate removal system was added to the main treatment plant at TA-50. Ion exchange resin columns were installed and placed in service on March 26, 2002, to remove perchlorates from all the RLWTF effluent. To date, the resins have effectively removed perchlorates to less than the 4 parts per billion detection limit in all waters discharged since installation. These actions were taken despite the fact that there are no EPA or New Mexico discharge standards for perchlorate. This project received NEPA review through Categorical Exclusion #8632 (DOE 2002e).

As seen in Table 2.14.2-1, operations at the RLWTF during the 1998–2002 timeframe were below levels projected by the SWEIS ROD.

One of the radioactive liquid waste operators prepares to start the reverse osmosis unit

Table 2.14.2-1. Radioactive Liquid Waste Treatment Facility (TA-50)/Comparison of Operations

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Waste Characterization	Support, certify, and audit generator characterization programs.	As projected.	As projected.	As projected.	As projected.	As projected.
Packaging, Labeling	Maintain waste acceptance criteria for radioactive liquid waste treatment facilities.	As projected.	As projected.	As projected.	As projected.	As projected.
Waste Transport, Receipt, and Acceptance	Collect radioactive liquid waste from generators and transport to TA-50.	As projected.	As projected.	As projected.	As projected.	As projected.
Radioactive Liquid Waste Pretreatment	Pretreat 900,000 liters per year of radioactive liquid waste at TA-21.	Pretreated 370,000 liters at TA-21.	Pretreated 45,000 liters at TA-21.	Pretreated 45,000 liters at TA-21.	Pretreated 457,000 liters at TA-21.	Pretreated 36,700 liters at TA-21.
	Pretreat 80,000 liters per year of radioactive liquid waste from TA-55 in Room 60.	Pretreated 39,000 liters in Room 60.	Pretreated less than 80,000 liters in Room 60.	Pretreated 9,000 liters in Room 60.	Pretreated 22,000 liters in Room 60.	Pretreated 35,400 liters in Room 60.
	Solidify, characterize, and package 3 m^3 per year of TRU waste sludge in Room 60.	No TRU waste sludge was treated; solidification was conducted in Room 60 (5 m^3 in 1997; 5 m^3 in 1999).	Solidified 5 m^3 of TRU waste in Room 60.	Solidified 5 m^3 of TRU waste sludge in Room 60.	No TRU waste sludge was solidified in Room 60.	No TRU waste sludge was solidified in Room 60.
Radioactive Liquid Waste Treatment	Install UF/RO equipment in 1997. Install equipment for nitrate reduction in 1999.	UF/RO equipment installed in 1998. Nitrate reduction equipment installed in 1998.	UF/RO equipment operational in March 1999. Nitrate reduction equipment operational in March 1999.	UF/RO equipment operational in March 1999. Nitrate reduction equipment operational in March 1999.	UF/RO equipment installed in 1998 and subsequently removed in 2001. Nitrate reduction equipment installed in 1998 and subsequently removed in 2001.	UF/RO equipment installed in 1998. Nitrate reduction equipment installed in 1998 and subsequently removed in 2001.
	Treat 35 million liters per year of radioactive liquid waste.	Treated 23 million liters of radioactive liquid waste.	Treated 20 million liters of radioactive liquid waste.	Treated 19 million liters of radioactive liquid waste.	Treated 14 million liters of radioactive liquid waste.	Treated 11.5 million liters of radioactive liquid waste.
	De-water, characterize, and package 10 m^3 per year of LLW sludge.	De-watered 28 m^3 of LLW sludge.	De-watered 37 m^3 of LLW sludge.	De-watered 48 m^3 of LLW sludge.	De-watered 60 m^3 of LLW sludge.	Produced 52 m^3 of de-watered LLW sludge.
	Solidify, characterize, and package 32 m^3 per year of TRU waste sludge.	No TRU waste sludge was solidified.	No TRU waste sludge was solidified.	No TRU waste sludge was solidified.	Solidified 5 m^3 of TRU waste sludge.	No TRU waste sludge was solidified.

Table 2.14.2-1. Radioactive Liquid Waste Treatment Facility (TA-50)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
						Installation of ion exchange resin columns to remove perchlorates from all the RLWTF effluent.
Decontamination Operations	Decontaminate LANL personnel respirators for reuse (~700 per month).	Decontaminated 500 personnel respirators per month.	Decontaminated 425 personnel respirators per month.	Decontaminated 450 personnel respirators per month.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.
	Decontaminate air-proportional probes for reuse (~300 per month).	Decontaminated 250 faces and 200 bodies per month.	Decontaminated 93 faces and 94 bodies per month.	Decontaminated about 125 air-proportional probes per month.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.
	Decontaminate vehicles and portable instruments for reuse (as required).	Decontaminated two vehicles in 1998 and eight portable instruments per month.	Decontaminated 26 drill bits, 12 augers, four collars, and six portable instruments per month.	Decontaminated six portable instruments per month. No large-item decontamination was performed.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.
	Decontaminate precious metals for resale (acid bath).	Decontamination of precious metals started in 1998 via decon of platinum from TRU waste to LLW.	Decontaminated platinum from TRU waste to LLW.	No activity.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.
	Decontaminate scrap metals for resale (sandblast).	Decontaminated 11 m^3 of scrap metals.	Decontaminated no scrap metals	Decontaminated 386 ft^3 of metal and 58 ft^3 of circuit boards for recycle.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.
	Decontaminate 200 m^3 of lead for reuse (grit blast).	Decontaminated one m^3 of lead.	Decontaminated 2.3 m^3 of lead.	Decontaminated 0.15 m^3 of lead.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.	No activity.[b] Decontamination operations were relocated during 2000 from Building 50-01 to TA-54.

[a] Includes installation of UF/RO and nitrate reduction processes in Building 50-01 and installation of aboveground tanks for the collection of influent radioactive liquid waste.

[b] Decontamination operations are reported as part of the Solid Radioactive and Chemical Waste Key Facility.

2.14.3 Operations Data for the Radioactive Liquid Waste Treatment Facility

In 1998, liquid effluent from the RLWTF did not meet DOE's discharge criteria for water quality. In order to improve effluent quality, the treatment process was upgraded in 1999 to include UF/RO equipment. These process modifications have contributed to improved effluent quality. Calendar year 2002 marked the third consecutive year that there were zero violations of the State of New Mexico discharge agreement for nitrates, zero violations of NPDES permit limits, and zero exceedances of the DOE discharge standards for radioactive liquid wastes. Annual average nitrate-nitrogen discharges were reduced from 360 milligrams per liter in 1993 to less than 10 milligrams per liter in 2000 and remained at the less-than-10-milligram-level through 2002. Similarly, annual average radioactive discharges were reduced from greater than 250 picocuries alpha activity per liter during the period 1993–1999 to 13 picocuries per liter in 2000, 18 picocuries per liter in 2001, and 15 picocuries per liter in 2002.

The SWEIS ROD did not project the quality of effluent, only quantity. This and other consequences of operation were less than projected in the SWEIS ROD. Radioactive air emissions continued to be negligible (less than one microcurie); NPDES discharge volume was 2.9 million gallons, compared to a projected 9.3 million gallons; the quantity of LLW sludge was higher than projected in part due to the removal of sludge from the concrete sludge storage tank in WM-2. Table 2.14.3-1 provides details.

2.14.4 Cerro Grande Fire Effects at the Radioactive Liquid Waste Treatment Facility

The RLWTF was one of the very few facilities that operated during the Cerro Grande Fire. Operations were mandatory because readioactive liquid wastes continued to be generated at a rate of approximately 6,000 to 7,000 gallons per day during the two weeks that LANL was closed because of the fire (McClenahan 2000). These flows would be expected from cooling systems and experiments that required cooling during the stand-down. Subsequent to the wildfire, radioactive liquid waste generation continued below typical rates because other LANL facilities required time to resume normal levels of operations.

An analytical laboratory at the RLWTF

Table 2.14.3-1. Radioactive Liquid Waste Treatment Facility (TA-50)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Radioactive Air Emissions:							
Americium-241	Ci/yr	Negligible	6.5E-09	1.3E-07	Not detected	Not detected	1.3E-08
Plutonium-238	Ci/yr	Negligible	1.4E-08	3.4E-08	9.8E-09	3.8E-08	1.6E-08
Plutonium-239	Ci/yr	Negligible	Not detected	1.8E-08	Not detected	4.5E-09	3.1E-08
Thorium-230	Ci/yr	Negligible	7.7E-08	3.7E-08	5.3E-08	Not detected	Not detected
Uranium-234	Ci/yr	Negligible	1.8E-07	Not detected [a]	Not detected	Not detected	Not detected
Uranium-238	Ci/yr	Not projected	Not detected	Not detected	Not detected	Not detected	2.5E-08
NPDES Discharge:							
051	MGY	9.3	6.1	5.3	4.9	3.6	2.9
Wastes: [b]							
Chemical	kg/yr	2,200	384	201	384 [c]	68,792 [d]	1,143
LLW	m^3/yr	160	132	175	132	517 [e]	193
MLLW [f]	m^3/yr	0	1.3	3.2	2.5	2.6	3.7
TRU	m^3/yr	30	1	0	16.1	0.4	1.9
Mixed TRU	m^3/yr	0	1.4	4.8	0	4.4	0.2
Number of Workers	FTEs	110 [g] 62 [g]	55 [g]	62 [g]	58 [g]	47 [g]	54 [g]

[a] Although stack sampling systems were in place to measure these emissions, any emissions were sufficiently small to be below the detection capabilities of the sampling system.

[b] Secondary wastes are generated during the treatment of radioactive liquid waste and as a result of decontamination operations performed at this Key Facility until CY 2000. Examples include decontamination acid bath solutions and rinse waters, high-efficiency particulate air filters, personnel protective clothing and equipment, and sludges from the pretreatment and main radioactive liquid waste treatment processes.

[c] Approximately 127 kilograms of the chemical wastes are construction and demolition debris (previously identified in the yearbook as industrial solid wastes) resulting from cleanup following the Cerro Grande Fire. Construction and demolition debris is nonhazardous, may be disposed of in county landfills, and does not represent a threat to local environs.

[d] Approximately 68,584 kilograms of the chemical waste were generated as a result of replacement of storage tanks and some associated plumbing at TA-50. The waste consisted of soil piles and asphalt associated with the pad the old tanks were sitting on.

[e] To comply with the water quality standard of 20 picocuries, wastewater from tritium experiments is occasionally sent to the Evaporation Basins at TA-53. During CY 2001, approximately 380 cubic meters of water were transferred to TA-53.

[f] RCRA-listed hazardous chemicals were not projected to be used in RLWTF, and secondary mixed wastes were therefore not projected to be generated.

[g] The first number shown in the “SWEIS ROD” column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the “SWEIS ROD” column is the index number representing CY1999 (the year the SWEIS ROD was published). The number of employees for CY 1998 through CY 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for 1998 through 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.15 Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)

The Solid Radioactive and Chemical Waste Key Facilities are located at TA-50 and TA-54. Activities are all related to the management (packaging, characterization, receipt, transport, storage, and disposal) of radioactive and chemical wastes generated at other LANL facilities.

It is important to note that LANL's waste management operation captures and tracks data for waste streams (whether or not they go through the Solid Radioactive and Chemical Waste Facilities), regardless of their points of generation or disposal. This includes information on the waste generating process; quantity; chemical and physical characteristics of the waste; regulatory status of the waste; applicable treatment and disposal standards; and the final disposition of the waste. The data are ultimately used to assess operational efficiency, help ensure environmental protection, and demonstrate regulatory compliance.

There are three Category 3 nuclear buildings within this Key Facility: the Radioactive Materials Research Operations and Demonstration (RAMROD) Facility (Building 50-37); the Waste Characterization, Reduction, and Repackaging (WCRR) facility (Building 50-69), and the Radioactive Assay and Nondestructive Test Facility (RANT; Building 54-38). In addition, there are also several Category 2 nuclear facilities/operations; the LLW disposal cells, shafts, and trenches and fabric domes and buildings within Area G; the Transuranic Waste Inspection Project (TWISP) for the retrieval of TRU wastes, including storage domes 226 and 229–232; and outdoor operations at the WCRR facility. In addition to the nuclear facilities, has a radiological facility. The Decontamination and Volume Reduction System (DVRS), TA-54-412, was added to the radiological facility list in 2002 (LANL 2002b).

As shown in Table 2.15-1, the SWEIS recognized 19 structures as having Category 2 nuclear classification (Area G was recognized as a whole and then individual buildings and structures were also recognized). RAMROD was only a potential nuclear facility in the SWEIS, but subsequently was characterized by DOE. The WCRR facility was identified as a Category 2 in the SWEIS, but because of inventories and the newer guidelines, it was downgraded to a Category 3. Area G has remained a Category 2 facility when taken as a whole.

2.15.1 Construction and Modifications at the Solid Radioactive and Chemical Waste Facilities

Projected: The SWEIS ROD projected two construction activities for this Key Facility: the construction of four additional fabric domes for the storage of TRU wastes retrieved from earth-covered pads and the expansion of Area G.

Actual: Only one of the two construction activities projected by the SWEIS ROD has been completed. The construction of four additional fabric domes for the storage of TRU wastes retrieved from earth-covered pads was completed in 1998. Although expansion of Area G has not yet begun, the possibility exists for initiation of radioactive and mixed waste storage and disposal operations in Zone 4 within the next one to two years. Planning for the new facility previously intended for construction over Pad 4 to house high-activity drums was stopped after Title I design.

Construction of the DVRS began in 1999 and was completed in 2002. This is a high-bay metal building with 13,000 square feet under roof. The DVRS is designed to segregate, decontaminate, and volume-reduce fiberglass-reinforced plywood crates of TRU waste retrieved from the TWISP storage pads. A major fraction of the resulting segregated wastes is anticipated to be decontaminated to LLW, which will both (a) allow these wastes to be disposed of at Area G and (b) decrease the volume of wastes that must be shipped to WIPP for disposal. DVRS (TA-54-412) is now on the Radiological Facilities list (DOE 2002b). Although construction of the DVRS was not projected by the SWEIS ROD, NEPA coverage was provided through an environmental assessment (DOE 1999f) and subsequent Finding of No Significant Impact in June 1999.

Table 2.15-1. Solid Radioactive and Chemical Waste Buildings with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-50-0037	RAMROD		2	2	2	2	3
TA-50-0069	WCRR Facility Building	2	3	3	3	3	3
TA-50-0069 Outside	Nondestructive Analysis Mobile Activities			2	2	2	2
TA-50-0069 Outside [f]	Drum Storage			2	2	2	
TA-54-Area G	LLW Storage/Disposal	2	2	2	2	2	2
TA-54	TWISP		2	2	2	2	2
TA-54-0002 [g]	TRU Storage Building		3	3	3		2
TA-54-0033	TRU Drum Preparation	2		2		2	2
TA-54-0038	Radioassay and Nondestructive Testing Facility	2	3	3	3	3	3
TA-54-0048	TRU Storage Dome	2	3	3	3		2
TA-54-0049	TRU Storage Dome	2	3	3	3		2
TA-54-0144	Shed						
TA-54-0145	Shed	2		2			
TA-54-0146	Shed	2		2			
TA-54-0153	TRU Storage Dome	2	3	3	3		2
TA-54-0177	Shed	2		2			
TA-54-0224	Mixed Waste Storage Dome						2
TA-54-0226	TRU Storage Dome	2		2			
TA-54-0229	Tension Support Dome	2		2			
TA-54-0230	Tension Support Dome	2		2			
TA-54-0231	Tension Support Dome	2		2			
TA-54-0232	Tension Support Dome	2		2			2
TA-54-0283	Tension Support Dome	2		2			2
TA-54-0375	TRU Storage Dome	2		2			
TA-54-Pad2	Storage Pad	2		2		2	2
TA-54-Pad3	Storage Pad	2		2			2
TA-54-Pad4	TRU Storage	2		2			2
TA-54 Pit 2	TRU Waste Storage Dome				2		

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)
[f] In the most recent nuclear facility lists (LANL 2001b) and (LANL 2002a), "Drum Storage" includes drum staging/storage pad and waste container temperature equilibration activities outside TA-50-69.
[g] This includes LLW (including mixed waste) storage and disposal in domes, pits, shafts, and trenches. TRU waste storage in domes and shafts (does not include TWISP). TRU legacy waste in pits and shafts. Low-level disposal of asbestos in pits and shafts. Operations building: TRU waste storage.

In addition, decontamination operations were relocated during 2000 from the RLWTF, Building 50-01, to TA-54. Except for the lead decontamination trailer, activities were moved to Building 54-1009 at the west end of TA-54. Building 54-1014, an office trailer, has also become part of the operations.

Radioactive liquid wastes will be collected in two holding tanks (1,000 gallons each) adjacent to 54-1009; they will be trucked to the RLWTF at TA-50. In addition, two transportainers have been installed. One will become a 90-day storage area for management of hazardous and mixed radioactive waste; the other will be used for storage of supplies. The lead decontamination trailer was removed from service. The trailer is currently stored inside Area G and will be decommissioned.

To control storm water runoff from TA-54, check dams were installed during 2000 at Area G and a sediment basin constructed in the canyon below Area G. NEPA review of this action was provided through a Categorical Exclusion, #7489 (DOE 1999g).

The Off-Site Source Recovery (OSR) Project recovers and manages unwanted radioactive sealed sources and other radioactive material that

- present a risk to public health and safety,
- present a potential loss of control by a U.S. Nuclear Regulatory Commission (NRC) or agreement state licensee, or
- are excess and unwanted and are a DOE responsibility under Public Law 99-240 or are DOE-owned.

The project is sponsored by DOE's Office of Technical Program Integration and the Albuquerque Operations Office Waste Management Division that operates from LANL. It focuses on the problem of sources and devices held under NRC or agreement state licenses for which there is no disposal option. The project was reorganized in 1999 to more aggressively recover and manage the estimated 18,000 sealed-source devices that will become excess and unwanted over the next decade. This reorganization combined three activities, the Radioactive Source Recovery Program, the Off-Site Waste Program, and the Pu-239/Be Neutron Source Project. Approximately 2,020 sources were collected for storage at TA-54 during CY 2002. Eventually, these sources will be shipped to WIPP for final disposition. The OSR Project received NEPA coverage under an environmental assessment and subsequent Finding of No Significant Impact (DOE 1995c), #6279 (DOE 1996i), #7405 (DOE 1999h), and #7570 (DOE 1999i), the 1999 SWEIS (DOE 1999a), and a Supplement Analysis to the 1999 SWEIS (DOE 2000d).

In 2002 LANL submitted a request for Change During Interim Status (CDIS) to the NMED. The CDIS asked for permission to combine two previously RCRA-regulated units (Pad 2 and Pad 4) into a single RCRA-regulated storage unit (Pad 10). The CDIS was approved by NMED, but no construction has begun to date.

Also, in 2002, LANL submitted a closure plan for three RCRA-regulated storage units at TA-50. These units were TA-50, Building 1, room 59, TA-50-114, and TA-50-37. The first two units are located at the RLWTF and the third is at RAMROD. Although the closure plan has not yet been approved, closure activities have been completed at the two units at RLWTF. To date there has been no work conducted towards closure of the final unit at RAMROD (TA-50-37). Table 2.15.1-1 provides details.

2.15.2 Operations at the Solid Radioactive and Chemical Waste Facilities

The SWEIS identified eight capabilities for this Key Facility. One capability, Decontamination Operations, was transferred in 2000 from the RLWTF Key Facility. Therefore, there are now nine capabilities at the Solid Radioactive and Chemical Waste Facilities because one has been added, and none has been deleted. The primary measurements of activity for this facility are volumes of newly generated chemical, low-level, and TRU wastes to be managed and volumes of legacy TRU waste and MLLW in storage. A comparison of CY 2002 to projections made by the SWEIS ROD can be summarized as follows:

Chemical wastes: Approximately 2,250 metric tons of chemical waste were generated at LANL during CY 2002. Of this, approximately 2,057 metric tons were shipped directly offsite for treatment and/or disposal and approximately 194 metric tons were shipped for offsite treatment and/or disposal from the Solid Radioactive and Chemical Waste Facility. These compare to an average quantity of 3,250 metric tons per year projected by the SWEIS ROD.

LLW: In 2002, approximately 7,000 cubic meters were placed into disposal cells and shafts at Area G, compared to an average volume of 12,230 cubic meters per year projected by the SWEIS ROD. This LLW volume is an increase from the last year of operations but is consistent with the three years prior. No new disposal cells were constructed, and disposal operations did not expand into either Zone 4 or Zone 6 at TA-54. Operations could expand into Zone 4 within the next one to two years.

MLLW: In 2002, 20 cubic meters of MLLW were generated and delivered to TA-54, compared to an average volume of 632 cubic meters per year projected by the SWEIS ROD. This is well under the projections in the SWEIS ROD.

TRU wastes: There were two shipments of legacy TRU waste to WIPP during 2002, and the entire quantity of newly generated TRU wastes (206 cubic meters) was added to storage.

In summary, chemical and radioactive waste management activities were at levels below those projected by the SWEIS ROD and also below levels of 1998 and 1999 operations at this Key Facility. These and other operational details appear in Table 2.15.2-1.

2.15.3 Operations Data for the Solid Radioactive and Chemical Waste Facilities

Levels of activity in 2002 were less than projected by the SWEIS ROD and so were air emissions and most secondary wastes. Table 2.15.3-1 provides details.

2.15.4 Cerro Grande Fire Effects at the Solid Radioactive and Chemical Waste Facility

The Solid Radioactive and Chemical Waste Key Facility was inaccessible for routine operations for two weeks during the wildfire. The impact continued upon re-opening of the Laboratory since the facility was returned to normal operations in phases only upon completion of a series of condition assessment steps. Construction was delayed about five weeks, and routine operations took about four weeks to return to normal levels. A significant fraction of the facility's heavy earthmoving equipment was used for the wildfire and was not available for some time. The wildfire also impacted operations later in the year because fire-related debris was shipped to Area G for storage and/or disposal.

Loading shipping casks

Truck shipment to WIPP

Table 2.15.1-1. Solid Radioactive and Chemical Waste Facilities Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Four additional fabric domes for storage of retrieved TRU waste	Domes 54-231, 54-232, and 54-375 constructed. Dome 54-226 usage changed from retrieval to storage for TWISP.	Dome 54-375 completed.			
Area G expansion for waste storage	Not yet needed.	Not yet needed.	Not yet needed.	Not yet needed.	Not yet needed.
	Automated and enclosed drum washers installed in Drum Preparation Facility, Building 54-33.				
	Modular containment for size reduction removed from Building 54-33.				
	Small compactor removed from Compactor Facility, Building 54-281.				
	Maintenance Shop, Building 54-02, converted into a counting laboratory for "Green is Clean."				
		Construction of DVRS began (DOE 1999f).			
			Decontamination operations relocated from TA-50-01 to TA-54.		
			Lead decontamination trailer from TA-50 removed from service and awaiting decommissioning at Area G.		
			Check dams installed at Area G for storm water runoff control (DOE 1999g).		
					Storage of sources recovered from OSR Project.
					Plan submitted to close three RCRA regulated storage units at TA-50.

Table 2.15.2-1. Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)/Comparison of Operations

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Waste Characterization, Packaging, and Labeling	Support, certify, and audit generator characterization programs.	As projected.	As projected.	As projected.	As projected.	As projected.
	Maintain waste acceptance criteria for LANL waste management facilities.	As projected.	As projected.	As projected.	As projected.	As projected.
	Characterize 760 m^3 of legacy MLLW.	Characterized 136 m^3 of legacy MLLW in 1998.	Characterized 83 m^3 of legacy MLLW.	Characterized 11 m^3 of legacy MLLW.	Characterized 59 m^3 of legacy MLLW.	Characterized 42 m^3 of legacy MLLW.
	Characterize 9,010 m^3 of legacy TRU waste.	Characterized 21 m^3 of TRU waste during 1996-1998.	Characterized 6.25 m^3 of legacy TRU waste in 1999.	No TRU waste was fully characterized in 2000.	Characterized 83 m^3 of TRU waste in 2001.	Characterized 14.4 m^3 of TRU waste in 2001.
	Verify characterization data at the RANT Facility for unopened containers of LLW and TRU waste.	Verified characterization data at RANT Facility for TRU wastes, but not for LLW.	Verified characterization data at RANT Facility for TRU wastes, but not for LLW.	Verified characterization data at RANT Facility for TRU wastes, but not for LLW.	Verified characterization data at RANT Facility for TRU wastes, but not for LLW.	Verified characterization data at RANT Facility for TRU wastes, but not for LLW.
	Maintain waste acceptance criteria for offsite treatment, storage, and disposal facilities.	As projected.	As projected.	As projected.	As projected.	As projected.
	Over-pack and bulk waste as required.	As projected.	As projected.	As projected.	As projected.	As projected.
	Perform coring and visual inspection of a percentage of TRU waste packages.	Two drums were cored and inspected.	Six drums were cored and inspected in 1999.	Coring operations were suspended until homogenous analytical capabilities are added to the RAMROD Facility.	Coring operations were suspended until homogenous analytical capabilities are added to the RAMROD Facility.	Performed visual inspection of 13 m^3 of TRU waste packages. No coring was performed in 2002.
	Ventilate 16,700 drums of TRU waste retrieved during TWISP.	Ventilated 4,816 drums during 1996-1998.	Ventilated 8,426 drums as of December 1999.	Ventilated 622 drums during 2000 reaching a total of 9,048 as of December 2000.	Ventilated 7,085 drums during 2001 reaching a total of 16,133 as of December 2001.	Ventilated 766 drums during 2002.
	Maintain current version of WIPP waste acceptance criteria and liaison with WIPP operations.	As projected.	As projected.	As projected.	As projected.	As projected.

Table 2.15.2-1. Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Compaction	Compact up to 25,400 m^3 of LLW.	94 m^3 of LLW was compacted into 35 m^3.	280 m^3 of LLW was compacted into 77 m^3.	353 m^3 of LLW was compacted into 84 m^3.	483 m^3 of LLW was compacted into 108 m^3.	Approximately 271 m^3 of LLW was compacted into 63 m^3.
Size Reduction	Size reduce 2,900 m^3 of TRU waste at WCRRF and the Drum Preparation Facility.	Size reduction was not performed in 1998.	Size reduction was not performed in 1999.	As proof-of-principle testing for the Decontamination and Volume Reduction System Facility, 100 m^3 of TRU waste were processed and reduced to 60 m^3.	As proof-of-principle testing for the Decontamination and Volume Reduction System Facility, 40 m^3 of waste were recharacterized and disposed of as LLW at TA-54, Area G.	Approximately 32 m^3 of TRU waste were processed through the DVRS. Over 85% was characterized as LLW and disposed of at TA-54, Area G.
Waste Transport, Receipt, and Acceptance	Collect chemical and mixed wastes from LANL generators and transport to TA-54.	Collected and transported chemical and mixed wastes.	Collected and transported chemical and mixed wastes.	Collected and transported chemical and mixed wastes.	Collected and transported chemical and mixed wastes.	Collected and transported chemical and mixed wastes.
	Begin shipments to WIPP in 1999.	No shipments to WIPP.	Shipments to WIPP began 3/26/1999.	Shipments to WIPP began 3/26/1999.	Shipments to WIPP began 3/26/1999.	Shipments to WIPP began 3/26/1999.
	Over the next 10 years, ship 32,000 metric tons of chemical wastes and 3,640 m^3 of MLLW for offsite land disposal restrictions, treatment, and disposal.	1,767 metric tons of chemical waste and 136 m^3 of MLLW were shipped for offsite treatment and disposal.	882 metric tons of chemical waste and 96 m^3 of MLLW were shipped for offsite treatment and disposal.	450 metric tons of chemical waste and 11 m^3 of MLLW were shipped for offsite treatment and disposal.	504 metric tons of chemical waste and 46 m^3 of MLLW were shipped for offsite treatment and disposal.	Approximately 194 metric tons of chemical waste and ~42 m^3 of MLLW were shipped for offsite treatment and disposal.
	Over the next 10 years, ship no LLW for offsite disposal.	No LLW was shipped for offsite disposal.	No LLW was shipped for offsite disposal.	No LLW was shipped for offsite disposal.	No LLW was shipped for offsite disposal.	No LLW was shipped for offsite disposal.
	Over the next 10 years, ship 9,010 m^3 of legacy TRU waste to WIPP.	No legacy TRU waste was shipped to WIPP.	6.25 m^3 of legacy TRU waste were shipped in 1999.	No legacy TRU waste was shipped in 2000.	8 shipments of legacy TRU waste were shipped in 2001.	2 shipments of legacy TRU waste were shipped in 2002.
	Over the next 10 years, ship 5,460 m^3 of operational and environmental restoration TRU waste to WIPP.	No operational or environmental restoration TRU wastes were shipped to WIPP.	No operational or environmental restoration TRU wastes were shipped to WIPP.	No operational or environmental restoration TRU wastes were shipped to WIPP.	No operational or environmental restoration TRU wastes were shipped to WIPP.	No operational or environmental restoration TRU wastes were shipped to WIPP.

Table 2.15.2-1. Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Waste Transport, Receipt, and Acceptance (cont.)	Over the next 10 years, ship no environmental restoration soils for offsite solidification and disposal.	No environmental restoration soils were shipped for offsite solidification and disposal.	No environmental restoration soils were shipped for offsite solidification and disposal in 1999.	No environmental restoration soils were shipped for offsite solidification and disposal in 2000. [b]	No environmental restoration soils were shipped for offsite solidification and disposal in 2001. [b]	No environmental restoration soils were shipped for offsite solidification and disposal in 2002. [b]
	Annually receive, on average, 5 m^3 of LLW and TRU waste from offsite locations in 5 to 10 shipments.	There were no LLW or TRU waste receipts from offsite locations.	There were no LLW or TRU waste receipts from offsite locations.	There were no LLW or TRU waste receipts from offsite locations.	There were no LLW or TRU waste receipts from offsite locations.	There were no LLW or TRU waste receipts from offsite locations.
Waste Storage	Stage chemical and mixed wastes before shipment for offsite treatment, storage, and disposal.	Chemical and mixed wastes were staged before shipment.	Chemical and mixed wastes were staged before shipment.	Chemical and mixed wastes were staged before shipment.	Chemical and mixed wastes were staged before shipment.	Chemical and mixed wastes were staged before shipment.
	Store legacy TRU waste and MLLW.	Legacy TRU waste and MLLW stored.	Legacy TRU waste and MLLW stored.	Legacy TRU waste and MLLW stored.	Legacy TRU waste and MLLW stored.	Legacy TRU waste and MLLW stored.
	Store LLW uranium chips until sufficient quantities have accumulated for stabilization.	LLW uranium chips are no longer generated.	LANL still generates this waste; however, TA-54 no longer accepts it for storage. The generator is required to process this waste to make it acceptable for disposal at TA-54.	Two drums of uranium chips in storage at Area G.	There are no drums of uranium chips in storage awaiting stabilization.	There are no drums of uranium chips in storage awaiting stabilization.
Waste Retrieval	Begin retrieval operations in 1997.	Retrieval begun in 1997.	Retrieval begun in 1997.	Retrieval begun in 1997.	Retrieval begun in 1997.	Retrieval begun in 1997.
	Retrieve 4,700 m^3 of TRU waste from Pads 1, 2, 4 by 2004.	Retrieved 1,951 m^3 through 1998 (Pad 1).	Retrieved 2,195 m^3 in 1999. Retrieved 4,146 m^3 total through Dec. 1999.	Retrieved 169 m^3 in 2000. Retrieved 4,315 m^3 total through Dec. 2000.	Retrieved 1,463 m^3 in 2001. Retrieved 4,700 m^3 total through Dec. 2001.	Retrieval activities were completed in 2001. No retrieval occurred in 2002.
Other Waste Processing	Demonstrate treatment (e.g., electrochemical) of MLLW liquids.	No activity.	No activity.	No activity.	No activity.	No activity.
	Land farm oil-contaminated soils at Area J.	No oil-contaminated soils were land-farmed.	No oil-contaminated soils were land-farmed.	No oil-contaminated soils were land-farmed.	Area J is undergoing closure.	Closure of Area J is now complete.

Table 2.15.2-1. Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Other Waste Processing (cont.)	Stabilize 870 m^3 of uranium chips.	No uranium chips were stabilized. Waste stream was treated by generator prior to transfer to Area G.	No uranium chips were stabilized in 1999.	No uranium chips were stabilized.	8.3 m^3 of uranium chips and turnings were stabilized at TA-3, Building 39.	7.2 m^3 of uranium chips and turnings were staged for processing.
	Provide special-case treatment for 1,030 m^3 of TRU waste.	None.	None.	None.	None.	None.
	Solidify 2,850 m^3 of MLLW (environmental restoration soils) for disposal at Area G.	No environmental restoration soils were solidified	No environmental restoration soils were solidified	No environmental restoration soils were solidified.	No environmental restoration soils were solidified.	No environmental restoration soils were solidified.
Disposal	Over next 10 years, dispose of 420 m^3 of LLW in shafts at Area G.	5 m^3 of LLW were disposed of in shafts at Area G.	23 m^3 of LLW were disposed of in shafts at Area G.	13 m^3 of LLW were disposed of in shafts at Area G.	9 m^3 of LLW were disposed of in shafts at Area G.	Approximately 8.5 m^3 of LLW were disposed of in shafts at Area G.
	Over next 10 years, dispose of 115,000 m^3 of LLW in disposal cells at Area G. (Requires expansion of onsite LLW disposal operations beyond existing Area G footprint.)	1,807 m^3 of LLW was disposed of in cells. Area G was not expanded.	1,320 m^3 of LLW was disposed of in cells. Area G was not expanded.	4,441 m^3 of LLW was disposed of in cells. Area G was not expanded.	1,808 m^3 of LLW was disposed of in cells. Area G was not expanded.	Approximately 7,000 m^3 of LLW was disposed of in cells. Area G was not expanded.
	Over next 10 years, dispose 100 m^3 per year administratively controlled industrial solid wastes, but refers to personnel information or contracts in pits at Area J.[c]	55 m^3 solid wastes disposed of in pits at Area J.	4,003 m^3 solid wastes disposed of in pits at Area J [d].	5,839 m^3 solid wastes disposed of in pits at Area J.	Area J is undergoing closure.	Closure of Area J is now complete.
	Over next 10 years, dispose non-radioactive classified wastes in shafts at Area J.	One cubic meter of classified solid wastes disposed of in shafts at Area J.	0.28 m^3 of classified solid wastes disposed of in shafts at Area J.	0.79 m^3 of classified solid wastes disposed of in shafts at Area J.	Area J is undergoing closure.	Closure of Area J is now complete.
Decontamination Operations [e]	Decontaminate LANL personnel respirators for reuse (~700/month).	See Table 2.14.2-1.	See Table 2.14.2-1.	See Table 2.14.2-1.	Decontaminated 450 personnel respirators per month at TA-54-1009.	Decontaminated 500 personnel respirators per month at TA-54-1009.
	Decontaminate air-proportional probes for reuse (~300/month).	See Table 2.14.2-1.	See Table 2.14.2-1.	See Table 2.14.2-1.	Decontaminated 125 faces and 120 bodies per month at TA-54-1009.	Decontaminated 70 faces and 70 bodies per month at TA-54-1009.

Table 2.15.2-1. Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)/Comparison of Operations (continued)

CAPABILITY	SWEIS ROD [a]	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
	Decontaminate vehicles and portable instruments for reuse (as required).	See Table 2.14.2-1.	See Table 2.14.2-1.	See Table 2.14.2-1.	Decontaminated five portable instruments per month at TA-54-1009. No large-item decontamination was performed.	Decontaminated six portable instruments per month at TA-54-1009. No large-item decontamination was performed
	Decontaminate precious metals for resale (acid bath).	See Table 2.14.2-1.	See Table 2.14.2-1.	See Table 2.14.2-1.	No activity. [f]	No activity. [f]
	Decontaminate scrap metals for resale (sandblast).	See Table 2.14.2-1.	See Table 2.14.2-1.	See Table 2.14.2-1.	No activity. [f]	No activity. [f]
	Decontaminate 200 m^3 of lead for reuse (grit blast).	See Table 2.14.2-1.	See Table 2.14.2-1.	See Table 2.14.2-1.	No activity. [f]	No activity. [f]

[a] Includes the construction of four new storage domes for the TWISP.

[b] The ER Project usually ships soils removed in remediation of a potential release site (PRS) directly to an offsite disposal facility. These wastes do not typically require processing at TA-54 and do not go through the TA-54 operations for shipment.

[c] In the SWEIS, the term "industrial solid waste" was used for construction debris, chemical waste, and sensitive paper records.

[d] This volume exceeds projections because of excavation of MDA-P by the ER Project.

[e] The Decontamination Operations capability was identified with the RLWTF Key Facility in the SWEIS. Activities prior to 2000 are reported in Section 2.14.2 of the Yearbook. In 2000, this capability was relocated to TA-54 and the Solid Radioactive and Chemical Waste Facility.

[f] Although there has been no activity in 2001 and 2002, this decontamination operation is now part of the Solid Radioactive and Chemical Waste Facility Capabilities

Table 2.15.3-1. Solid Radioactive and Chemical Waste Facilities (TA-54 and TA-50)/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Radioactive Air Emissions: [a]							
Tritium	Ci/yr	6.09E+1	[a]	[a]	[a]	[a]	[a]
Americium-241	Ci/yr	6.60E-7	[a]	[a]	[a]	5.8E-11	7.5E-10
Plutonium-238	Ci/yr	4.80E-6	1.3E-09	9.9E-11	[a]	3.6E-11	5.0E-10
Plutonium-239	Ci/yr	6.80E-7	[a]	[a]	[a]	2.7E-10	1.3E-09
Uranium-234	Ci/yr	8.00E-6	1.14E-08	1.7E-08	[a]	[a]	2.4E-10
Uranium-235	Ci/yr	4.10E-7	[a]	[a]	[a]	[a]	Not detected
Uranium-238	Ci/yr	4.00E-6	[a]	2.3E-09	[a]	[a]	Not detected
Thorium-230	Ci/yr	Not projected	3.10E-10	Not detected	Not detected	Not detected	Not detected
NPDES Discharge	MGY	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls	No outfalls
Wastes: [b]							
Chemical	kg/yr	920	327	30	806	449	863
LLW	m^3/yr	174	15	21	13	14	35
MLLW	m^3/yr	4	0	0	0	0	0
TRU	m^3/yr	27	20.9	39.9	27.1	9.7	29.5
Mixed TRU	m^3/yr	0	0	0	7.8	13.1	15.1
Number of Workers	FTEs	225 [c] 65 [c]	60 [c]	65 [c]	64 [c]	60 [c]	63 [c]

[a] Data indicate no measured emissions at WCRR facility and the RAMROD facility at TA-50. No stacks require monitoring at TA-54. All non-point sources at TA-50 and TA-54 are measured using ambient monitoring.

[b] Secondary wastes are generated during the treatment, storage, and disposal of chemical and radioactive wastes. Examples include repackaging wastes from the visual inspection of TRU waste, HEPA filters, personnel protective clothing and equipment, and process wastes from size reduction and compaction.

[c] The number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for CYs 2000, 2001, and 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CYs 2000, 2001, and 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.16 Non-Key Facilities

The balance, and majority, of LANL buildings are referred to in the SWEIS as Non-Key Facilities. Non-Key Facilities house operations that do not have potential to cause significant environmental impacts. These buildings and structures are located in 30 of LANL's 49 technical areas and comprise approximately 14,224 of LANL's estimated 26,480 acres. As expressed in Section 2.16.2 below, activities in the Non-Key Facilities encompass seven of the eight LANL direct-funded activities (DOE 1999a, page 2-2).

As shown in Table 2.16-1, the SWEIS identified six buildings within the Non-Key Facilities with nuclear hazard classifications. The High-Pressure Tritium Facility (Building TA-33-86), classified in 2001 as a Category 2 nuclear facility, was removed from the Nuclear Facility List in March 2002 and downgraded to a radiological facility. The decontamination and decommissioning of the formerly used tritium facility, TA-33-86, the High-Pressure Tritium Laboratory, was completed in 2002 and is now demolished. At the present time, there are no Category 2 or Category 3 nuclear facilities among the Non-Key Facilities (LANL 2002a).

Table 2.16-1. Non-Key Facilities with Nuclear Hazard Classification

BUILDING	DESCRIPTION	SWEIS ROD	DOE 1998 [a]	DOE 2000 [b]	LANL 2001 [c]	LANL 2001 [d]	LANL 2002 [e]
TA-03-0040	Physics Building	3					
TA-03-0065	Source Storage	2					
TA-03-0130	Calibration Building	3					
TA-33-0086	Former Tritium Research	3	2	2	2	2	
TA-35-0002	Non-American National Standards Institute Uranium Sources	3	3				
TA-35-0027	Safeguard Assay and Research	3	3				

[a] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 1998a)
[b] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (DOE 2000a)
[c] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001a)
[d] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2001b)
[e] DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2002a)

Additionally, several Non-Key Facilities were identified as radiological facilities in 2001 (LANL 2001c) and 2002 (LANL 2002b). These include the Omega West Reactor, Building 2-1; the Cryogenics Building B, 3-34; the Physics Building (HP), 3-40; the Lab Building, 21-5; Nuclear Safeguards Research, 35-2; Nuclear Safeguards Lab, 35-27; and the Underground Vault, 41-1. Table 2.16-2 lists all of the Non-Key Facilities identified as radiological in CY 2001 and CY 2002.

Table 2.16-2. Non-Key Facilities with Radiological Hazard Classification

BUILDING	DESCRIPTION	LANL 2001 [a]	LANL 2002 [b]
TA-02-1	Omega Reactor	RAD	RAD
TA-03-16	Ion Exchange	---	RAD
TA-03-34	Cryogenics Bldg. B	RAD	RAD
TA-03-40	Physics Bldg. (HP)	RAD	RAD
TA-03-169	Warehouse	---	RAD
TA-03-1819	Experiment Mat'l Lab	---	RAD
TA-21-5	Lab Bldg	RAD	RAD
TA-21-150	Molecular Chemical	RAD	---
TA-33-86	High Pressure Tritium	---	RAD
TA-35-2	Nuclear Safeguards Research	RAD	RAD
TA-35-27	Nuclear Safeguards Lab	RAD	RAD
TA-36-1	Laboratory and offices	---	RAD
TA-36-214	Central HP Calibration Facility	---	RAD
TA-41-1	Underground Vault	RAD	RAD
TA-41-4	Laboratory	RAD	---

[a] LANL Radiological Facility List (LANL 2001c)
[b] LANL Radiological Facility List (LANL 2002b)

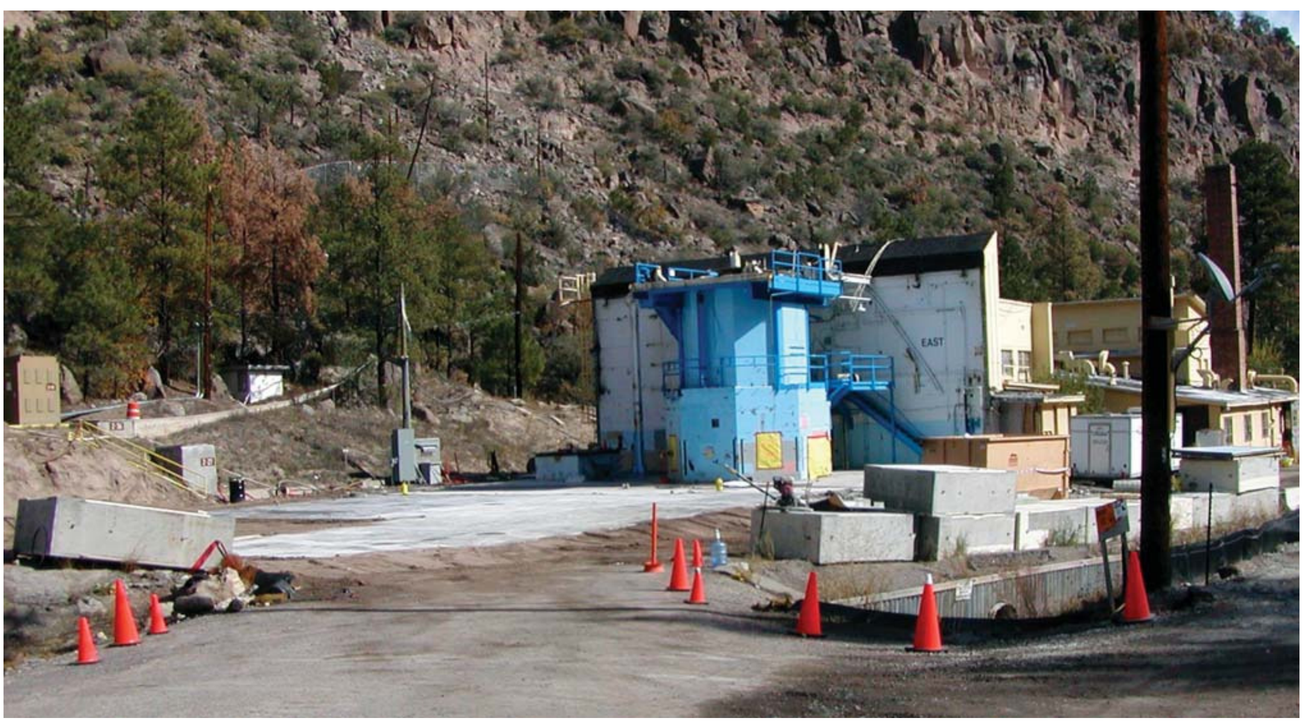
2.16.1 Construction and Modifications at the Non-Key Facilities

Projected: The SWEIS addressed the impacts of the proposed transfer of the DP Road Tract to the County of Los Alamos (DOE 1997d) and the proposed Lease of Land for the Development of a Research Park (DOE 1997e) that were being finalized in 1999. Although the SWEIS did not identify any other "firm" projected construction and modification projects for the Non-Key Facilities, there was a section, Section 1.6.3.1 of Volume I, recognizing "Emerging Actions at LANL." This section identified studies addressing the renovation of the infrastructure at TA-03, the Nonproliferation and International Security Center (NISC), and electrical power supply and reliability. The section also indicated that NEPA analysis would occur as these and other studies developed into projects. Also, at the time of SWEIS publication, the impacts of the electric power demand and water usage for the proposed Strategic Computing Complex (SCC) were factored into the alternatives analyzed and DOE was preparing an Environmental Impact Statement for the Conveyance and Transfer of Certain Land Tracts at LANL.

Actual: Some activity has occurred on each of the projected activities identified in the SWEIS. Table 2.16.1-1 summarizes the actual construction and modifications at the Non-Key Facilities and the text that follows presents additional detail.

In 2002, NEPA coverage for disposition of the Omega West Facility was provided by the *Environmental Assessment of the Proposed Disposition of the Omega West Facility* (DOE 2002f) and a Finding of No Significant Impact. Demolition activities began in July 2002. At TA-61, Buildings 24, 25, and 26 have been completely demolished. TA-02-1, the Omega West Reactor, is 60 percent demolished. TA-41-30 and the front of TA-41-4 were demolished from August through October 2002. Approximately 60 percent of the demolition project is complete with an estimated completion date of September 2003.

The SWEIS ROD had projected just one major construction project (Atlas) for the Non-Key Facilities. In contrast, however, LANL plans for the next 10 years call for the construction or modification of many buildings due to programmatic requirements and replacement of damaged or destroyed facilities following the Cerro Grande Fire (LANL 2001r). Major projects are discussed in the following paragraphs.



Blue structure—Omega West Reactor housing

Table 2.16.1-1. Non-Key Facilities Construction and Modifications

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
Land Transfer –DP Road Tract	Under study environmental assessment prepared.	Under study.	Under study.	Under study.	Under study, see Chapter 5.
Research Park	Environmental assessment prepared (DOE 1997d).	Construction started in 1999.	Began construction of first building at Los Alamos Research Park.	Construction of first building completed in March 2001; occupancy began in June 2001.	Most of first building leased.
Renovate TA-03 infrastructure					
NISC	Environmental assessment prepared (DOE 1999j).	Building design began in 1999.	Design continued.	Construction began at TA-03 in March 2001.	Construction continued.
Electrical power supply and reliability					
SCC	Environmental assessment prepared for SCC at TA-03 (DOE 1998g).	Began construction of SCC in 1999.	Construction continued.	Construction completed; occupancy began in December 2001.	Occupancy completed.
Atlas Facility	Atlas Facility designed and began construction in 1996-1998 at TA-35 (DOE 1996j).	Construction continued in 1999.	Construction completed and major capacitor banks tested.	Readiness for operations in July 2001 and first experiments in September 2001; environmental assessment for relocating to Nevada Test Site (DOE 2001e).	Atlas physically moved to Nevada Test Site by end of December 2002.
	Ten of 28 outfalls eliminated from NPDES permit during 1997-1998.	Thirteen outfalls eliminated from NPDES permit; 9 of 13 transferred to Los Alamos County (Sandoval 2000).	Outfall 03A-199 added to permit for future Laboratory Data Communications Center.		
		Funding approved for Central Health Physics Calibration Laboratory at TA-36.			
			High-Pressure Tritium Facility (TA-33-86) in safe shutdown mode.	High-Pressure Tritium Facility (TA-33-86) in safe shutdown mode.	High-Pressure Tritium Facility (TA-33-86) underwent decontamination, decommissioning, and demolition (DOE 1998h).

Table 2.16.1-1. Non-Key Facilities Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
			Cerro Grande Fire impacted 86 structures or buildings, damaged 31 structures or buildings, and destroyed 10 structures or buildings.		
				Environmental assessment and design prepared for Emergency Operations Center (DOE 2001f).	Construction started.
				Environmental assessment prepared for Multichannel Communications Project (DOE 2001f).	Design and acquisition in process.
					Environmental assessment for Omega West Reactor Facility; demolition activities began in July 2002 (DOE 2002f).
				Security Systems Group (S-3) Security Systems Support Facility at TA-03: NEPA categorical exclusion issued (DOE 2001g).	Design and construction began.
					Decision Applications Division Office Building at TA-03.NEPA categorical exclusion issued and construction began (DOE 2002g).
				LANL Medical Facility at TA-03: NEPA categorical exclusion issued (DOE 2001h).	Design and construction began.
				Chemistry Division Office Building at TA-46: NEPA categorical exclusion issued (DOE 2001i).	Construction began and was completed; occupancy granted in November 2002.

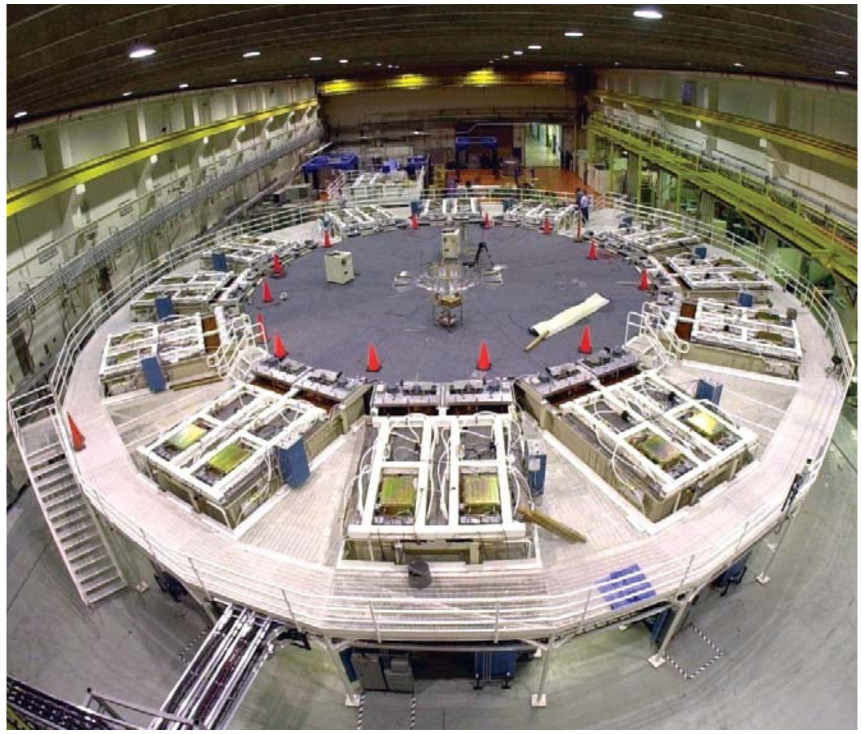
Table 2.16.1-1. Non-Key Facilities Construction and Modifications (continued)

SWEIS ROD PROJECTION	ACTUAL CONSTRUCTION AND MODIFICATION				
	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK [a]	2001 YEARBOOK	2002 YEARBOOK
				MST Office Building at TA-03: NEPA categorical exclusion issued (DOE 2001j).	Construction began.
				TA-72 Live Fire Shoot House: NEPA categorical exclusion issued (DOE 2001d).	Construction began.
					Security Truck Inspection Station: NEPA categorical exclusion issued, constructed, and operational (DOE 2002h).
					TA-41-30 and front of TA-41-4 demolished.

[a] Additional information on the impacts of the Cerro Grande Fire can be found in Section 2.16.4.

a) Atlas

Description: Atlas was constructed in parts of five buildings at TA-35 (35-124, 125, 126, 294, and 301). Atlas is being used for research and development in the fields of physics, chemistry, fusion, and materials science that will contribute to predictive capability for the aging and performance of primary and secondary components of nuclear weapons. The heart of the Atlas facility is a pulsed-power capacitor bank that will deliver a large amount of electrical and magnetic energy to a centimeter-scale target in less than ten microseconds. Each experiment will require extensive preparation of the experimental assembly and diagnostic instrumentation.



The completed Atlas facility

The facility will require up to 5 megawatt hours of electrical energy annually (less than one percent of total LANL consumption); will have a peak electrical demand of 4 megawatts for about one minute per week; and will employ about 15 people. This facility has its own NEPA coverage provided by Appendix K of the *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (DOE 1996j).

Status: Construction was completed in September 2000. Major testing of the capacitor banks (level of current) was successfully completed in December 2000. Critical Decision 4 (authorization to commence operation) was received from DOE in March 2001. An Independent Verification Panel process was completed to assure readiness for operations in July 2001, and the first experiments were performed in September 2001.

Status: During 2002, a new building was constructed at the Nevada Test Site to accommodate the relocation of Atlas. The relocation of Atlas to Nevada Test Site had its own NEPA coverage in the form of an environmental assessment and Finding of No Significant Impact issued 06/05/2001 (DOE 2001e). Atlas was physically moved out of LANL at the end of December 2002. All of the equipment is currently located at the Nevada Test Site. The formal property transfer of Atlas from LANL to Bechtel/Nevada is in progress and is expected to be completed in March or April 2003. The schedule for reassembly and recommissioning of Atlas estimates that this capability should be operational in Nevada by October 2003. LANL personnel will continue to be involved in experimentation activities at the Nevada Test Site.

b) Los Alamos Research Park

Description: As described in the environmental assessment (DOE 1997e), the Los Alamos Commerce and Development Corporation will develop a maximum of 44 acres into a Research Park located along West Jemez Road, across from Otowi Building and the Wellness Center, and along West Road, in the vicinity of the ice rink. According to the Research Park Master Plan, up to five buildings and two parking structures may be constructed, with a total floor space of 300,000 square feet and parking for 1,400 cars. If five buildings were to be constructed, the Research Park would consume an estimated 1.3 megawatts peak electric demand, 4,250 megawatt-hours of electricity, 39 billion BTU of natural gas, and 17 million gallons of water annually. This consumption would represent approximate increases of 1 percent, 5 percent, 4 percent, and 18 percent in these utilities, respectively. The Park could also provide up to 1,500 new jobs and would increase traffic by up to 3,000 vehicle trips per day. Development would convert 30 undeveloped acres to office and light industrial use. This area, less than 0.25 percent of the vegetated landscape at LANL, currently provides a buffer for residential areas. This project has its own NEPA coverage provided by the Environmental Assessment for the Lease of Land for the Development of a Research Park at Los Alamos National Laboratory (DOE 1997e) along with a Finding of No Significant Impact.

Status: Construction of the first building in the Research Park began in February of 2000 and was completed in March of 2001. Occupancy of the building began in June 2001. In March of 2003, with the exception of a few single office suites, the entire first building is leased. LANL's operations at the Research Park are based on partnerships between industry collaborators and various Laboratory groups. These groups stand to benefit from industry-related research and, by their joint activities, help foster economic development in Los Alamos County.

c) Strategic Computing Complex (renamed Nicholas C. Metropolis Center for Modeling and Simulation)

Description: The SCC houses one of the world's fastest supercomputers. It is a three-story structure with 267,000 square feet under roof. About 300 designers, computer scientists, code developers, and university and industrial scientists occupy the building. The building was connected to existing sewer, water, and natural gas lines, but required a new 115/13.8-kilovolt substation transformer at the TA-03 power plant. Three cooling towers were constructed, expandable to six if needed.

The SCC will require an estimated 63 million gallons of cooling water per year. This water is proposed to come from treated waters from the sewage facility, which total more than 100 million gallons annually. The SCC is projected to have a maximum electricity load requirement of seven megawatts, or about 10 percent of total LANL demand. This amount of cooling water and electricity is what is anticipated when the facility has all of the computers installed that it was designed to accommodate. That will probably take several years. When the "Q" machine is completely installed, it will fill about half of the computer room. Another computer will probably be installed a few years later.

The Nonproliferation and International Security Center (left) and the Strategic Computing Complex

This project had its NEPA coverage provided by the Environmental Assessment for the Proposed Strategic Computing Complex, Los Alamos National Laboratory, Los Alamos, New Mexico (DOE 1998g). This proposal was an allowable interim action, and the NEPA review proceeded separately from the SWEIS. Based on the environmental assessment, DOE issued a Finding of No Significant Impact in December 1998.

Status: Construction of this new building got underway in 1999 and continued on schedule through 2000 and 2001. At the end of 2001, construction was complete and items on the final punch list were being addressed. Occupancy began in December 2001 and was completed in 2002.

d) Nonproliferation and International Security Center

Description: The NISC is a four-story building plus basement of 164,000 square feet with a capacity to house 465 people. It is being constructed adjacent to the new SCC within TA-03. The building will have laboratories, a machine shop for fabrication of satellite parts, a high-bay fabrication area, an area for the safe handling of sealed radioactive sources, and offices. Building heating and cooling will be by closed-loop water systems.

Because all occupants are to be relocated from other LANL buildings, there is no expected increase in quantities of sewage, solid wastes, or chemical wastes, nor should there be increased demand for utilities. To accommodate both the SCC and NISC, nearby parking lots are to be expanded to accommodate an additional 800 to 900 vehicles.

Status: NEPA review for the NISC project was provided by the Environmental Assessment for the Nonproliferation and International Security Center (DOE 1999j) and a Finding of No Significant Impact. Design of the building began in 1999 and continued through 2000. Construction started in March 2001, and the building was enclosed in May of 2002. Interior work is progressing. Occupancy began in March 2003.

e) Emergency Operations Center

Description: The Cerro Grande Fire demonstrated several inadequacies within the current Emergency Operations Center and Multi-Channel Communications capabilities. The fire showed that the Emergency Operations Center has outlived its useful life. Further research showed that upgrading it would be neither economical nor practical, and the decision was made to have a new Emergency Operations Center designed and built.

Status: During CY 2001, the conceptual design was completed and the final design was initiated. Also during 2001, an environmental assessment (DOE 2001f) was prepared to address both the Emergency Operations Center and the Multi-Channel Communications. With the current schedule, the Emergency Operations Center is expected to be operational by September 30, 2003.

f) Multi-Channel Communications Project

Description: The Multi-Channel Communications Project addresses communication vulnerabilities made evident in the Cerro Grande Fire. The new communications and information systems will provide flexibility to communicate between the LANL Emergency Operations Center and external entities to respond to future emergencies with the most up to date information. The conceptual design was received in 2001 and procurement of long lead items was initiated. Also during 2001, an environmental assessment (DOE 2001f) was prepared to address both the Emergency Operations Center and the Multi-Channel Communications.

Equipment for the Radio Upgrade to increase the number of channels to 15 has been received and will be installed during CY 2003 at the Communications, Computing, and Networking site on Pajarito Mountain. The Multi-band Radio System, which allows the Emergency Operations Center to communicate with outside agencies, was received, programmed, is functional and will be installed in the Emergency Operations Center.

Exterior and interior views of the Mobile Communications Van

The Mobile Communications Van was received; its radios have been programmed and it has been formally placed into service by Emergency Management and Response.

The Media Interface System and Emergency Alert System equipment were procured and set up by the Public Affairs Office. This equipment will be moved into the new Emergency Operations Center building for use by Emergency Operations Center and Public Affairs personnel. LANL now has the capability to produce press releases directly and transmit to local television stations as well as generate emergency banners.

The Portable Monitoring System, which will provide emergency response personnel remote monitoring capability, was ordered as well as the associated chemical and radiological sensors. Chemical sensors were received and tested. The robot will be delivered mid FY 2003 and will be transferred to Emergency Management and Response personnel after acceptance testing.

The contract was awarded for procurement and installation of Electronic Message Signs, Video Surveillance, and Video Database Interface equipment. This system will give the Emergency Operations Center the capability to view and remotely record video of LANL property and emergency response and to inform and direct traffic through the use of electronic message signs. Excavation permits were reviewed and approved for electronic sign installation. Approval was obtained from the Meteorology and Air Quality

Group to use existing meteorological towers to mount CCTV equipment and approval was given by DOE-Albuquerque to utilize wireless communications to transmit real-time video to the Emergency Operations Center. All CCTV equipment and electronic signs will be field-installed mid FY 2003 and monitoring and programming equipment will be installed in the Emergency Operations Center.

The Data Mirror task demonstrated the feasibility of MaxResponder emergency response software on a Predator ruggedized laptop. Laptops were ordered for installation in LANL and Los Alamos County emergency vehicles. Databases were identified for inclusion in the Data Mirror system at the Emergency Operations Center. The clustered, high-availability server system was procured and installed in the Central Computing Facility (CCF) for database population. Full database population and user interfaces will occur in FY 03 and computing equipment will be moved to the Emergency Operations Center.

Status: The Multi-Channel Communications Project received CD-3 in May of 2002 and was 48 percent complete as of the end of January 2003. The project is progressing on the anticipated schedule and is 14. percent under budget. It is estimated that final equipment installations will be complete by October 1, 2003.

g) S-3 Security Systems Support Facility (S-3 Facility)

Description: The mission of the Security Systems group (S-3) is to design, install, and maintain physical security systems in order to provide detection and deterrence of security violations. S-3 also designs, implements and maintains the software systems that protect nuclear material and control intrusion detection. S-3 provides access control systems, access area training, fire protection integration, and interior and perimeter intrusion detection systems.

The S-3 Facility project (TA-03-1409) is located on the south side of TA-03, along Pajarito Road, immediately west of the existing Security Division Complex. The new S-3 Facility will be a two-story building with parking for approximately 95 vehicles. This project consolidates the S-3 organization into a single facility designed to meet the long-term needs of the group's activities. S-3 is currently occupying space in six transportable buildings, and buildings SM-30 and SM-142. The primary mission of this project is to improve efficiency by consolidating personnel and activities to meet increasing LANL demands for physical security systems, as well as the increase in facility revitalization and reinvestment.

This project utilizes the design/build approach and has two distinct phases: 1) project development and procurement and 2) execution of the design/build contract. The building is to be designed to LANL technical standards and all other applicable codes and standards. The design-build contract will include complete and operational building systems (i.e., electrical, HVAC, potable water, sanitary sewer, fire protection, telephone, computer/communication systems, and furniture). The project accommodates physical security systems design; fabrication; maintenance; operations; data control; testing of security components; logistical support, to include receiving/warehousing; light electrical laboratory and machine shop operations; and supporting administration. The size of the completed facility will be 20,400 square feet, accommodating over 63 employees.

Status: NEPA categorical exclusion #8612 was issued by NNSA/DOE on December 04, 2001 (DOE 2001g). Design of the building began in 2002. The contract was awarded in June 2002 and construction started in July 2002. The building is currently enclosed and interior work is progressing. Construction for this facility is scheduled to be complete in May 2003 with occupancy scheduled for June 2003.

h) Decision Applications Division Office Building

Description: The Decision Applications Division Office Building project will provide replacement office space for this division. The Design/Build contractor will provide a two-story, 24,813-square-foot building that will house 100 Decision Applications Division personnel. This project will allow the division

Decision Applications Division Office Building under construction

to consolidate functions and employees within close physical proximity and allow for two "temporary" structures to be excessed and decommissioned and demolished the following fiscal year.

The project milestones are as follows: NEPA Categorical Exclusion #8595 was issued by NNSA/DOE on February 22, 2002 (DOE 2002g); the contract was awarded in May 2002; the design was completed in September 2002; construction started in September 2002 and is projected to be substantially complete in June 2003; occupancy is expected to begin in November 2003.

Status: Construction is underway and progressing rapidly. The building footings and concrete placement for the elevator are complete, and fire protection and water lines have been installed. The project is poised to complete the foundation and begin structural steel erection in April 2003. The project is approximately four weeks ahead of schedule with a small positive cost variance of $54,000. It is expected that the project will hold on to the positive variances and finish ahead of schedule.

i) LANL Medical Facility

Description: Employee health is monitored to assure the effectiveness of site health and safety programs and hazard control plans in protecting employees. The Occupational Medicine Program provides the DOE with operational assurance that regulatory requirements are being met, that employees are fit (both physically and psychologically) to perform work at LANL, and that mission activities are not harming our workers. The new facility will consolidate functions from three sites (TA-53, TA-63, and TA-03) and will support Occupational Medicine functions to include human reliability, medical survey and certification evaluations, illness/injury management, and epidemiology.

This project will construct an approximately 20,000-square-foot structure employing a pre-engineered building with interior design to specifically support DOE/NNSA and LANL requirements for occupational medicine certification, monitoring, intervention, and quality control. The building will house 60 medical staff personnel and support approximately 2,500 patients per month. The project replaces existing non-permanent facilities that have exceeded their life expectancy and are rapidly deteriorating to the point that their condition is currently impacting delivery of medical programs.

Status: The project received NEPA coverage through Categorical Exclusion #8398, approved May 30, 2001 (DOE 2001h). The design/build subcontract was awarded in September 2002. Construction start was in October 2002. Work in 2002 was limited to preparation of the temporary parking lot that involved excavation for site preparation and leveling, removal of asphalt from the building site, and placement of the millings in the temporary lot. Most of the effort in CY 2002 was focused on developing the design. Construction activities for site demolition and preparation, foundation, and underground utilities are continuing. The baseline schedule projects that construction will be complete in September 2003 with operational status by January 2004.

j) Chemistry Division Office Building (Chemistry Technical Support Building)

Description: As a result of the Cerro Grande Fire, over 200 employees were displaced due to the fact that their office trailers were destroyed or severely damaged by fire. As such, the housing of LANL employees in fire-susceptible trailers is a demonstrated vulnerability. Damage to permanent structures in the same areas during the Cerro Grande Fire was much less severe and limited mostly to smoke damage and damage due to electrical fluctuations. The new Chemistry Technical Support Building was built to house displaced scientists and technicians from burned buildings within TA-46. To provide permanent office space for displaced employees and to further decrease the present number of office trailers at LANL, this permanent office building has been constructed at TA-46, one of the sites to suffer the greatest loss of building space. The new two-story, 18,000-square-foot office building is located outside the fence at TA-46. This General Plant Project will provide vital support for surrounding LANL Buildings 30, 31, and 154. The new building is office space only. No hazardous or radiological materials will be involved in the project.

Status: The project received its own NEPA coverage by Categorical Exclusion # 8044 issued February 28, 2001 (DOE 2001i). Construction began in August 2002 and was completed in November 2002. Occupancy was granted in November 2002.

Chemistry Technical Support Building

k) Materials Science and Technology Office Building

Description: This project is consistent with LANL's long-range vision to group materials science activities together in the southeast quadrant of TA-03. The new Materials Science and Technology Office Building project location is west of the Sigma Complex security fence. The MSL and the other permanent buildings comprising the materials science complex are all located adjacent to the site proposed for this new office building and a common circulation pattern for that area will be implemented.

This General Plant Project will replace 17 trailers located to the east of 03-1819 and 03-2002 with a multistory office building. This modern, sustainable facility will dramatically reduce operational costs compared to those associated with the "temporary" structures. The project will provide the Materials Science and Technology Division with a new office building to house approximately 80 staff currently working in a cluster of "temporary" trailers and transportable structures in the materials science complex in TA-03. The installation of numerous "temporary" structures has proven inefficient over the years because of the high operational costs in addition to the fact that these facilities do not provide an effective work environment. Consequently, these facilities are detrimental to recruitment and retention of personnel.

Status: The project received its own NEPA coverage by Categorical Exclusion # 8618 issued December 07, 2001 (DOE 2001j). Construction of the new office building began in November 2002. The estimated completion date is September 2003. Occupancy is scheduled to begin in October 2003.

l) TA-72 Live Fire Shoot House

Description: PTLA currently provides security support for LANL and its environs. Their mission requires PTLA support to be trained to a high state of security readiness and to be able to respond to any emergency situation relative to the security of LANL. The purpose of the newly constructed Live Fire Shoot House is to provide an environment of the safe and realistic conduct of advanced tactical training for the PTLA. In addition, this General Plant Project enables LANL security officers to satisfy all DOE requirements for training and Live Fire Shoot House qualifications. Prior to construction of the Live Fire Shoot House in 2002, all training activities were conducted at the firing ranges at TA-72 with the exception of the Live Fire Shoot House training and qualifications that were conducted at offsite facilities. This consolidation of PTLA training activities into one location will result in a substantial cost savings for the PTLA training program, a more efficient use of personnel, and a more effective means of complying with DOE and LANL training requirements.

Live Fire Shoot House

The Live Fire Shoot House facility is an entirely lead-free structure installed on a reinforced concrete pad at TA-72. The facility consists of ballistic-resistant, steel-walled 60-foot by 76-foot modular structure. The entire house and concrete pad are covered with a steel-framed roof structure, similar to a metal building but open on four sides, to protect the facility from the weather and to permit training in inclement weather. Exterior and interior walls consist of 4-foot-wide by 12-foot-high modular panels. These walls are designed to contain the bullets and fragmentation from multiple impacts. Bullet traps are placed in the Live Fire Shoot House as the primary impact target for rounds fired. These traps are constructed of armor steel that cannot be penetrated by handgun rounds and can withstand 5.56-mm, full-metal jacket rounds.

The Live Fire Shoot House has an elevated observation control platform which is essentially a catwalk constructed over a portion of the house to allow instructor monitoring and evaluation of the training. This catwalk is accessed by a set of stairs adjacent to the exterior of the house. The stairway was built to Occupational Safety and Health Administration safety specification; the stairs and the elevated observation control platform have appropriate guardrails.

NEPA review for this project was provided under ESH-ID 97-0130 Shooting House/Concrete Pad and ESH-ID 98-0168 Live Fire Shoot House. NEPA coverage for the project was finally provided by Categorical Exclusion # 7245 issued on 03/16/2000 (DOE 2000e).

Status: Construction of the new Live Fire Shoot House began in November 2002 and was completed in January 2003. The facility became operational in March 2003.

m) Security Truck Inspection Post

Description: In an emergency response to the events that occurred on 9-11, security at LANL has been enhanced to protect our valuable assets—our personnel, property, and projects. One such security upgrade was the installation of the Truck Inspection Post (Post 10) on East Jemez Road just west of State Road 4. The purpose of this post is to screen all large vehicles coming into LANL to ensure they have the proper authority to be on DOE property. This post was initially established on the upper end of East Jemez Road near the Transit Mix Plant as an immediate response to 9-11. The permanent location of the post is now on the lower end of East Jemez Road.

When a truck stops at this post, the drivers are checked for identification and transportation invoices to ensure their destination is, and should be, LANL. At this post, if the paperwork is in order, the truck is issued a one-time pass that will permit access through other LANL SECON Posts between the Truck Inspection Post and the truck's destination.

Trucks that show up at SECON Posts at LANL without this pass or a valid DOE Standard or LANL-issued badge are turned around and sent back to the Truck Inspection Post. If the drivers can provide the necessary credentials, the truck is then issued a pass that authorizes its passage through SECON Posts to the destination LANL facilities.

Status: The project received its own NEPA coverage by Categorical Exclusion # 8726 issued March 11, 2002 (DOE 2002h). The permanent Truck Inspection Post was installed in March 2002 and became operational in April 2002.

n) NPDES Outfall Project

During 1997 and 1998, 10 of 28 outfalls from the Non-Key Facilities were eliminated from the NPDES permit. Waters from eight of these have been routed to the sewage plant at TA-46; discharges from the other two were eliminated. During 1999, 13 outfalls from Non-Key Facilities were eliminated from the NPDES permit. Responsibility for nine of the 13 was transferred to Los Alamos County when the County assumed ownership of water supply wells, pumping stations, storage tanks, and piping. Discharges from the remaining four outfalls were eliminated when the source activities were eliminated and were associated with water supply wells that were removed from service. Coupled with the 10 outfalls deleted during 1997 and 1998, a total of 24 of 27 outfalls from the Non-Key Facilities have been eliminated. Although Outfall 13S is still listed as an outfall, 13S serves the sanitary wastewater treatment plant at TA-46. Instead of discharging to Mortandad Canyon, however, treated waters are pumped to TA-03 for re-use and ultimate discharge through Outfall 001 into Sandia Canyon. This transfer has resulted in projected NPDES volumes underestimating actual discharges from the existing outfall. In 2000, a new outfall, Outfall 03A-199, was added to the NPDES permit. Although there was no discharge in 2000, 2001, or 2002, Outfall 03A-199 is to accommodate the future Laboratory Data Communications Center. Currently, there are a total of 21 permitted outfalls at LANL; five of these are in Non-Key Facilities. The SWEIS ROD projected a total of 55 LANL outfalls, 22 at Non-Key Facilities.

Outfall sampling

2.16.2 Operations at the Non-Key Facilities

Non-Key Facilities are host to seven of the eight categories of activities at LANL (DOE 1999a, pp. 2-2 through 2-9) as shown in Table 2.16.2-1. The eighth category, environmental restoration, is discussed in Section 2.17. During the 1998–2002 timeframe, no new capabilities were added to the Non-Key Facilities and none of the eight was deleted.

Table 2.16.2-1. Operations at the Non-Key Facilities

CAPABILITY	EXAMPLES
1. Theory, modeling, and high-performance computing.	Modeling of atmospheric and oceanic currents. Theoretical research in areas such as plasma and beam physics, fluid dynamics, and superconducting materials.
2. Experimental science and engineering.	Experiments in nuclear and particle physics, astrophysics, chemistry, and accelerator technology. Also includes laser and pulsed-power experiments (e.g., Atlas).
3. Advanced and nuclear materials research and development and applications	Research and development into physical and chemical behavior in a variety of environments; development of measurement and evaluation technologies.
4. Waste management	Management of municipal solid wastes. Sewage treatment. Recycle programs.
5. Infrastructure and central services	Human resources activities. Management of utilities (natural gas, water, electricity). Public interface.
6. Maintenance and refurbishment	Painting and repair of buildings. Maintenance of roads and parking lots. Erecting and demolishing support structures.
7. Management of environmental, ecological, and cultural resources	Research into, assessment of, and management of plants, animals, cultural artifacts, and environmental media (groundwater, air, surface waters).

In 1998, workforce size increased appreciably for the Non-Key Facilities and accounted for almost all of the 1,415 new workers at LANL since 1995. This increase is due to the fact that activities at the Non-Key Facilities consist largely of research and development, services, and administration. The increase in research and development reflected the ebb and flow that is typical of funds and interest in research. Increased research required more scientists, more support services, and a higher level of administration.

The LANL workforce increased by 404 employees during 1999. This brought the total workforce up to 12,412 employees, or 1,061 more employees than were anticipated under the ROD. Approximately 27 percent of these new employees were either JCNNM (17 percent) or PTLA (10 percent). This reflects the new construction going on at LANL and the increased efforts in security upgrades as LANL moves forward with its assignments for Stockpile Stewardship and Management. Approximately 40 percent of these new employees were regular (full-time and part-time) UC employees, of which about 40 percent were assigned to the Non-Key Facilities.

The 12,015 employees at the end of CY 2000 are 664 more employees than SWEIS ROD projections of 11,351. The 12,380 employees at the end of CY 2001 are 1,029 more employees than SWEIS ROD projections of 11,351. The 13,524 employees that comprise the total LANL-affiliated workforce at the end of CY 2002 are 2,173 more employees than the SWEIS ROD projection of 11,351. SWEIS ROD projections were based on 10,593 employees identified for the index year (employment as of March 1996). About 60 percent of this increase is in the Non-Key Facilities as a result of increases in research and development, services, and administration.

The 5,243 employees in the Non-Key Facilities at the end of CY 2002 reflect an increase of 427 employees over the 4,816 employees reported in the 2001 SWEIS Yearbook (LANL 2002i).

2.16.3 Operations Data for the Non-Key Facilities

Even though the Non-Key Facilities occupy more than half of LANL and employ more than half the workforce, activities in these facilities generally contribute less than 20 percent of most operational effects. For example, the 534 cubic meters of LLW constituted only 7 percent of the LANL total LLW volume in 2002. Also in 2002, the Non-Key Facilities generated approximately 56 percent of the total LANL chemical waste. Table 2.16.3-1 presents details of the operations data from 1998–2002.

Radioactive air emissions from stacks at the Non-Key Facilities (290 curies in 2002) were less than a third of the SWEIS ROD projections. The radioactive air emissions of 1,000 curies in 2001 were slightly above SWEIS ROD projections. This represents off gassing from inactive facilities and their cleanup activities and represents less than 5 percent of the 21,700 curies projected by the SWEIS ROD.

The combined flows of the sanitary waste treatment plant and the TA-03 steam plant account for about 77 percent of the total discharge from Non-Key Facilities and about 73 percent of all water discharged by LANL. Section 3.2 has more detail. Operations data are summarized in Table 2.16.3-1.

2.16.4 Cerro Grande Fire Effects at the Non-Key Facilities

The Non-Key Facilities received significant fire damage. The Cerro Grande Fire impacted 86 structures or buildings, damaged 31 structures or buildings, and destroyed 10 structures or buildings. Like the rest of LANL, operations were shut down during the emergency, and these programs suffered lost work time. Access was restricted in several of the more severely burned areas at LANL, and employees who occupied the damaged or destroyed structures had to be housed in new locations. In addition, the fire destroyed data, work-in-progress, and work production at many locations, delaying some of the programs.

Table 2.16.3-1. Non-Key Facilities/Operations Data

PARAMETER	UNITS	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Radioactive Air Emissions: [a]							
Tritium	Ci/yr	9.1E+2	5.66E+2	9.5E+2	1.15E+3	1.0E+3	2.9E+2
Plutonium	Ci/yr	3.3E-6	None measured	None measured [b]	None measured [b]	None measured [b]	None measured [b]
Uranium	Ci/yr	1.8E-4	None measured	None measured [b]	None measured [b]	None measured [b]	None measured [b]
NPDES Discharge:							
Total Discharges	MGY	142	95	232	192	99.01	130.827
001 (TA-03)	MGY	114			170	98.75	101.3200
013S (TA-03)	MGY	[c]	[c]	[c]	[c]	[c]	[c]
03A-027 (TA-03)	MGY	5.8			8.7	0.13	6.6070
03A-160 (TA-35)	MGY	5.1			14	0.13	22.9000
03A-199 (TA-03)	MGY	---	0 [d]	0 [d]	0 [d]	0 [d]	0 [d]
03A-042 (TA-46)	MGY	5.30	No discharge	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
04A-118 (TA-54)	MGY	1.10	No discharge	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-166 (TA-05)	MGY	0.01	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
03A-038 (TA-33)	MGY	5.80	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-171 (National Forest)	MGY	0.00	No discharge	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-172 (National Forest)	MGY	0.00	No discharge	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-173 (National Forest)	MGY	0.00	No discharge	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-174 (National Forest)	MGY	0.00	No discharge	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
04A-175 (National Forest)	MGY	0.00	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-176 (National Forest)	MGY	0.66	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-177 (National Forest)	MGY	0.06	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
03A-034 (TA-21)	MGY	0.26	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
03A-035 (TA-21)	MGY	0.04	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-182 (TA-21)	MGY	0.00	Active	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
04A-186 (TA-21)	MGY	0.18	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
06A-132 (TA-35)	MGY	5.80	No discharge	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
03A-025 (TA-03)	MGY	0.18	Active	Eliminated 1998	Eliminated 1998	Eliminated 1998	Eliminated 1998
04A-164 (TA-18)	MGY	0.01	No discharge	No observation	Eliminated 1999	Eliminated 1999	Eliminated 1999
06A-106 (TA-36) [e]	MGY	0.58	No discharge	Eliminated 1999	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-161 (TA-72)	MGY	1.00	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
03A-148 (TA-03)	MGY	6.30	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-094 (TA-03)	MGY	5.30	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997	Eliminated 1997
04A-163 (TA-72)	MGY	6.20	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999
04A-165 (TA-72)	MGY	2.00	Active	Active	Eliminated 1999	Eliminated 1999	Eliminated 1999

Table 2.16.3-1. Non-Key Facilities/Operations Data (continued)

PARAMETER	UNITS	SWEIS ROD	1998 YEARBOOK	1999 YEARBOOK	2000 YEARBOOK	2001 YEARBOOK	2002 YEARBOOK
Wastes:							
Chemical	kg/yr	651,000	1,506,392	765,395	367,768	1,254,680 [f]	334,348
LLW	m^3/yr	520	386	350	2,781 [g]	569	534
MLLW	m^3/yr	30	55.4 [h]	2.5	10.1	9.4	8.7
TRU	m^3/yr	0	0	0	2.7	24.8	36.8
Mixed TRU	m^3/yr	0	0	15	63	0	0.21
Number of Workers	FTEs	6,579 [i] 4,601 [i]	4,547 [i]	4,601 [i]	4,501 [i]	4,816 [i]	5,243 [i]

[a] Stack emissions from previously active facilities (TA-33 and TA-41); these were not projected as continuing emissions in the future. Does not include non-point sources.

[b] Most of the stacks in the Non-Key Facilities are not sampled for radioactive airborne emissions because the potential emissions from these stacks are sufficiently small that measurement systems are not necessary to meet regulatory or facility requirements.

[c] Outfall 013 is from the TA-46 sewage plant. Instead of discharging to Mortandad Canyon, however, treated waters are pumped to TA-3 for re-use and ultimate discharge through Outfall 001 into Sandia Canyon. This transfer of water has resulted in projected NPDES volumes underestimating actual discharges from the exiting outfall.

[d] New Outfall 03A-199 was permitted by the EPA on 2/1/2001 for the future Laboratory Data Communications Center. It had no discharge during 2000, 2001, or 2002.

[e] Outfall 03A-106 was incorrectly associated with the Non-Key Facilities in the SWEIS. Starting with the 2002 Yearbook, Outfall 03A-106 is accounted for with High Explosives Testing.

[f] Approximately 73,449 kilograms of the chemical wastes are construction and demolition debris (previously indicated in the Yearbooks as industrial solid wastes) resulting from cleanup following the Cerro Grande Fire. The construction and demolition debris is nonhazardous, may be disposed of in county landfills, and does not represent a threat to local environs.

[g] The CY 2000 LLW was generated from D & D activities and from soil and sediment removal from Mortandad and Los Alamos Canyons.

[h] The CY 1998 MLLW was generated as a result of soil and asphalt removal from MDA-L construction activities.

[i] The first number shown in the "SWEIS ROD" column is the actual employee count representing CY 1999 (the year the SWEIS ROD was published). The second number shown in the "SWEIS ROD" column is the index number representing CY 1999 (the year the SWEIS ROD was published). The number of employees for 1998 through 2002 operations cannot be directly compared to numbers projected by the SWEIS ROD. The employee numbers projected by the SWEIS ROD represent total workforce size and include PTLA, JCNNM, and other subcontractor personnel. The number of employees for CY 1998 through CY 2002 operations is routinely collected information and represents only UC employees (regular full-time and part-time). Because the two sets of numbers (SWEIS ROD versus the new index) do not represent the same entity, a direct comparison to numbers projected by the SWEIS ROD (see Section 3.6, Socioeconomics) is not appropriate. However, because this index is going to be used in each subsequent Yearbook, selecting CY 1999 as the base year establishes an index that can be compared over the ten-year window represented by the SWEIS ROD.

2.17 Environmental Restoration Project

The ER Project may generate a significant amount of waste during cleanup activities; therefore, the project is included as a section of Chapter 2. The SWEIS ROD forecast that the ER Project would contribute 60 percent of the chemical wastes, 35 percent of the LLW, and 75 percent of the MLLW generated at LANL over the 10 years from 1996–2005. The ER Project will also affect land resources in and around LANL.

The DOE established the ER Project in 1989 to characterize and remediate over 2,100 PRSs known, or suspected, to be contaminated from historical operations. Many of the sites remain under DOE control; however, some have been transferred to Los Alamos County or to private ownership (at various locations within the Los Alamos town site). Remediation and cleanup efforts are regulated by and coordinated with the NMED and/or DOE.

In 2002, ER Project activities included drafting and finalizing several characterization and remediation reports for NMED, conducting characterization and remediation field work on numerous sites, and formally tracking all work performed.

Some cleanups included

- Interim Action at the TA-53 north impoundment, which included the removal of 5,000 cubic yards of contaminated material;
- removal of 1,500 cubic feet of contaminated soil at the TA-16-260 outfall; and
- source removals at TA-21 and TA-54.

Continued field investigations included

- drilling and installation of five groundwater monitoring wells (R-14, R-16, R-20, R-23, and R-32);
- sampling at PRS 03-052(a)-00;
- four rounds of well sampling and two rounds of biota sampling to monitor natural attenuation and to support the ER Project's collaboration with San Ildefonso Pueblo; and
- completion of sediment, alluvial groundwater, and surface water sampling in Los Alamos/Pueblo Canyon.

2.17.1 Operations of the Environmental Restoration Project

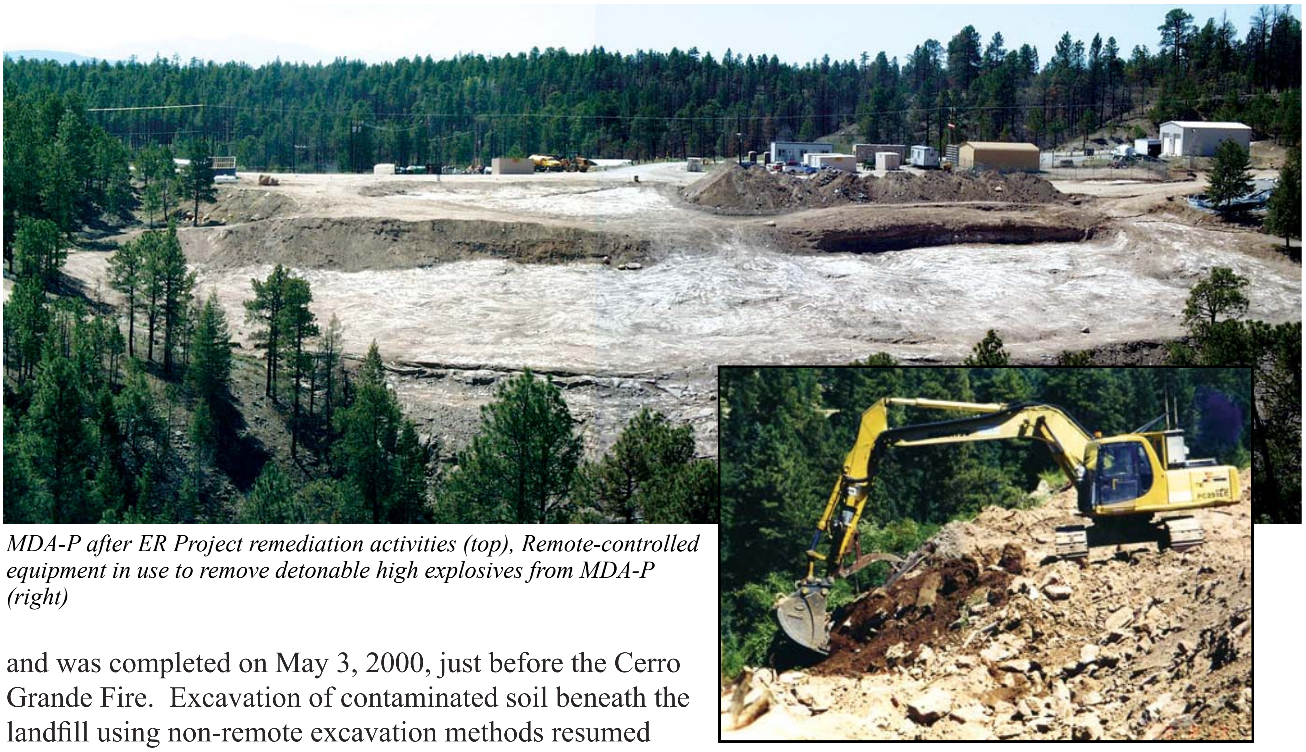
The ER Project originally identified 2,124 PRSs, consisting of 1,099 PRSs administered by NMED and 1,025 PRSs administered by DOE. By the end of 2002, only 833 discrete PRSs remain. Approximately 694 units have been approved for no further action (NFA)[8], 139 units have been removed from the Laboratory's Hazardous Waste Facility Permit, and 48 units proposed for NFA in previous permit modification requests are pending approval by NMED.

Of the 139 total PRSs removed from the permit, no sites were removed in 2002. Additionally, in 2002, one new PRS was identified and nine additional PRSs were proposed to the NMED for NFA.

Completion of MDA-P

The completion of remediation activities at MDA-P was a major accomplishment for the ER Project. MDA-P is located at TA-16 on the south rim of Cañon de Valle on the western edge of LANL. The MDA-P Landfill began receiving waste from the S-Site Burning Grounds in 1950. Debris from World War II–era buildings was also disposed of at MDA-P. Operation of the landfill was suspended in 1984. ER Project personnel began the closure process at the landfill in 1997. The presence of detonable high explosives in the landfill required the use of a robotic excavator. Remote excavation of the landfill began in February 1999

[8] NFA means that the site is considered "clean" for its intended purpose. An industrial site would not be cleaned up to the same level as a residential site.



MDA-P after ER Project remediation activities (top), Remote-controlled equipment in use to remove detonable high explosives from MDA-P (right)

and was completed on May 3, 2000, just before the Cerro Grande Fire. Excavation of contaminated soil beneath the landfill using non-remote excavation methods resumed after the fire and was completed in March 2001. Phase II confirmatory sampling and geophysics measurements began in June 2001. During Phase II sampling, additional contamination was found, which was excavated and shipped off-site for disposal. All waste disposal was completed at MDA-P in February 2002. Phase II confirmation sampling was also completed in the spring of 2002. More than 52,500 cubic yards of soil and debris were excavated from MDA-P. Waste material included hazardous and industrial waste and recycled material. Waste types and amounts generated included

- 387 pounds of detonable high explosive,
- 820 cubic yards of hazardous waste with residual levels of radioactive contamination,
- 6,600 pounds of barium nitrate,
- 2,605 pounds of asbestos,
- 200 pounds of mixed waste,
- 235 cubic feet of LLW, and
- 888 containers that underwent hazardous categorization characterization.

TA-53 North Impoundment

Three lagoons at TA-53 were constructed in 1969 to collect excess sanitary, radioactive, and industrial wastewater. The wastewater came from various LANSCE activities as well as septic tank sludge from other LANL activities. The lagoons operated until 1998, when the southern lagoon was replaced by a new liquid wastewater treatment facility at TA-53. The southern lagoon was remediated by the ER Project in 2000, and the two northern lagoons were remediated in 2002.

The two northern lagoons were 210 feet long, 210 feet wide, and 6 feet deep, and each could store 1.6 million gallons. The lagoons worked via evaporation. The radioactive wastewater was first pumped into storage tanks to allow short-lived radioisotopes to decay away and then was pumped into the lagoons to evaporate.

The sludge and water in the lagoons and surrounding area were sampled and analyzed in four separate sampling events. The DOE conducted the first in 1988, then LANL conducted several in 1991/1992, 1994/1995, and 1999/2000. The contaminants of potential concern found included cobalt-60, cesium-134, strontium-90, sodium-22, and tritium. Other inorganic and organic chemicals identified were lead, mercury, and polychlorinated biphenyls.

Approximately 5,000 cubic yards of contaminated material (sludge and clay liner) from the two northern lagoons were removed in 2002. The sludge and clay liners contained radioisotopes (e.g., cobalt-60 and cesium-134) and carcinogens (Aroclor-1260) at levels exceeding the target levels of 15 millirem per year for dose and 10^{-5} risk. One hundred and fifty-nine waste bins were filled with northeast lagoon waste and 230 waste bins from the northwest lagoon. Approximately 90 cubic yards of soil were removed from the lagoons outfall area located on the eastern side. Miscellaneous debris, from a previous interim action, filled another three waste bins.

Lagoon remediation efforts almost completed at LANSCE

Source Removals

A voluntary corrective action (VCA) was performed at the Burn Ground North as part of the MDA-P closure activities during FY 2002. VCAs were also completed at areas of concern (AOCs) 21-030 and C-21-015, and at solid waste management unit (SWMU) 54-007(a). Additionally, approximately 1,500 cubic feet of contaminated soil was removed and site restoration was completed at the TA-16-260 outfall. All contaminated soils were removed and disposed of in accordance with applicable EPA, NMED, DOE, and LANL requirements. VCA completion reports were prepared for AOCs 51-001 and 54-007(d), SWMU 54-007(c)-99, and the Los Alamos Area Office Land Transfer Tract (which included PRSs 0-003, 0-012, and 0-030(i)) and submitted to the appropriate administrative authority (NMED for Hazardous and Solid Waste Amendment [HSWA] PRSs, and DOE for non-HSWA PRSs) with a recommendation for NFA. NMED concurred with the recommendation for NFA at the Los Alamos Area Office Land Transfer Tract for the two HSWA PRSs, based on a review of the VCA completion report. DOE also concurred with the recommendation for NFA for the one non-HSWA PRS.

Continued Field Investigations

The ER Project continued investigations in several areas during FY 2002, including the following:

- completed four rounds of well sampling and two rounds of biota sampling to monitor natural attenuation and to support the ER Project's collaboration with San Ildefonso Pueblo,
- completed the drilling and installation of one monitoring well, R-13. Additionally, the ER Project completed the report on hydrologic tests at characterization wells R-9i, R-13, R-19, R-22 and R-31;

completed geochemistry reports on R-15, R-9/9i, R-19, and R-12; and produced well completion reports for R-22 and R-7,

- completed well installation and hydrological testing at well CdV-R-37-2,
- completed sediment, alluvial, and surface water field investigations in Los Alamos/Pueblo Canyon,
- completed accelerated sampling at PRS 03-052(a)-00, and
- completed geophysical investigations at PRS 03-010(a).

2.17.2 Operations Data for the Environmental Restoration Project

Waste quantities generated from FY 1998 through FY 2002 are shown in Table 2.17.2-1. The ER Project generated 1,047 kilograms of chemical waste (including the categories RCRA, Toxic Substances Control Act [TSCA], and New Mexico Special Waste) in FY 2002—all below the projections made by the SWEIS ROD.

Table 2.17.2-1. Environmental Restoration Project/Operations Data

WASTE TYPE	UNITS	SWEIS ROD	YEARBOOK				
			1998	1999	2000	2001	2002
Chemical [a]	kg/yr	2,000,000	143,913	14,629,792 [b]	26,185,341 [c]	25,815,571 [c]	1,132,780
LLW	m^3/yr	4,260	744	286	226	621	5,484
MLLW	m^3/yr	548	9.2	1.25	577 [d]	28.86	0
TRU	m^3/yr	11	0	0	0	0	0
Mixed TRU	m^3/yr	0	0	0	0	0.2	0

[a] The chemical waste volume includes the categories of RCRA, TSCA, and New Mexico Special Waste.
[b] The chemical waste volume is higher than that projected in the SWEIS ROD because of extensive amounts of soil disposed of by the cleanup of MDA P.
[c] The chemical waste volume includes industrial solid waste and other chemical waste generated during the recovery efforts from the Cerro Grande Fire.
[d] The MLLW volume includes 574.5 cubic meters of MLLW generated as a result of emergency cleanups following the Cerro Grande Fire.

2.17.3 Cerro Grande Fire Effects on the ER Project

From 2000

The major concern following the Cerro Grande Fire was the threat of erosion at burned over PRSs and the movement of contaminants downstream. The ER Project began an assessment of the 600 PRSs within the burn area to accomplish the following:

- **Evaluate and stabilize sites touched by fire.** The PRS Assessment Team determined that over 300 PRSs were touched by fire. Assessments for these PRSs were completed by May 23, 2000, and, as shown in Table 2.17.3-1, erosion control measures (called best management practices) were needed for 91 of the 300 PRSs. These best management practice installations were completed on July 15, 2000, and included contour raking, placement of water barriers (straw wattles), diversion of stream channels, and other measures to divert surface water from the PRS.

Table 2.17.3-1. Evaluated and Stabilized PRSs following the Cerro Grande Fire

NO. OF PRSs	PRS LOCATIONS	START DATE	COMPLETION DATE
10	TA-11	5/21/00	5/24/00
29	TA-06, 09, 14, 15, 22, 36, 40, 49	6/14/00	7/15/00
34	TA-16, 46, 15, (R-44)	5/29/00	7/15/00
18	TA-04, 05, 42, 48	6/27/00	7/15/00

- **Conduct baseline sampling to characterize post-fire, pre-flood conditions (i.e., before monsoon season rains) in fire-impacted watersheds.** The Contaminant Transport Team completed a Baseline Characterization Sampling Plan on June 24, 2000. Pre-flood fieldwork, including collection of sediment, surface water, and alluvial groundwater samples, was completed on July 14, 2000. Post-flood fieldwork was carried out in August and September of 2000, as necessary.

- **Evaluate, stabilize, or remove sites subject to flooding.** The Accelerated Actions Team identified 77 PRSs in fire-impacted canyons that were potentially vulnerable to post-fire flooding. The majority of these sites were in Los Alamos Canyon (TA-2 and TA-41) and Pajarito Canyon (TA-18 and TA-27) and included outfalls, storm drains, septic systems, and other structures (including those associated with the Omega West Reactor at TA-2). Few of the sites assessed actually required corrective actions except for several in TA-2 where excavation, soil removal, and site restoration activities were completed during July and August 2000.

In addition, one flood-impacted sediment deposition area and five fire-impacted sites were identified that required corrective actions to remove debris or contaminated soils. ER Project personnel completed accelerated actions at the following sites:

- Los Alamos Canyon, “Garden Plot”: excavation of 765 cubic meters of low-level radioactively contaminated soil, waste removal, and site restoration,
- TA-16, MDA-R: excavation and waste removal,
- TA-15, R-44 firing site surface disposal area: debris removal,
- TA-36 surface disposal area: debris removal,
- TA-40 surface disposal area: debris removal, and
- TA-16 “silver” outfall: removal of contaminated soil and stabilization of drainage channel.

MDA-R

MDA-R (a 2.25-acre site) is located in TA-16, north of TA-16-260 (high explosives machining building) and south of Cañon de Valle. It lies on level terrain with a moderate-to-steep slope to the north, dropping off 80 feet into the canyon. MDA-R ignited during the Cerro Grande Fire and continued to burn for over two weeks.

Historically, MDA-R was a burn ground and waste disposal site for S-Site’s weapons experiments from the mid-1940s until the early 1950s, probably 1951. Initially, waste materials were burned in an open field at MDA-R; later, three U-shaped bermed pits (75 feet by 75 feet) were constructed for burning. High explosives scrap was collected, broken up, and burned in these pits. When the 260 Line was constructed, the berms and the surface soil at MDA-R were graded northward into Cañon de Valle. A 1992 inspection of MDA-R revealed the presence of oil cans, glass vials, metal structures, and coaxial cables below MDA-R on the south side of the canyon.

During the week of May 15, 2000, LANL personnel observed that MDA-R was smoldering, noting that tree roots, tree trunks, railroad ties, and cabling were burning. Over the next two weeks, emergency personnel attempted to extinguish the fire; first with fire-suppression foam, and later with water. However, the site continued to burn beneath the surface. Ultimately, it was decided that the fire could only be extinguished by excavation of the burning material. Using a remote excavator (a remotely controlled, fully functioning back hoe with mounted television survey cameras), burning material was uncovered and extinguished using a low-pressure water stream from a fire hose. The remote excavator was required because of the possibility that unexploded high explosives were present in MDA-R. The last embers in MDA-R were extinguished on August 31, 2000.

MDA-R was prioritized for accelerated corrective action because of concerns that erosion might lead to contaminant migration. Wastes removed from the site included approximately 1,960 cubic yards of soil, 175 pounds of barium nitrate pieces, and 300 pounds of friable asbestos. Erosion control activities included stabilization of spoils piles, stabilization of canyon slopes, and redirection of a small drainage arroyo that previously conducted surface water runoff through the landfill. For more information regarding this activity see the ER Project's *Project Completion Report for the Accelerated Action at TA-16, MDA-R* (LANL 2001s).

Los Alamos Canyon Cleanup

In late June 2000, a cleanup of contaminated sediment was conducted in Los Alamos Canyon following the Cerro Grande Fire to address the potential for these sediments to be eroded and transported during possible large floods resulting from high-intensity summer precipitation. The sediments removed were situated within three discrete areas immediately below the confluence with DP Canyon. The contamination within these sediments consisted primarily of cesium-137 with lesser amounts of strontium-90, amercium-241, and plutonium. The contamination, at the remediation site and elsewhere in Los Alamos Canyon, is related predominantly to releases of effluent from Building 21-35 and 21-257 at TA-21 during the years 1952 to 1985. The location of the discharges is currently known as PRS 21-011(k). The contaminated sediments at the remediation site were deposited by floods that occurred during the early period of releases from PRS 21-011(k) (Katzman 2000).

The cleanup activity was triggered by several factors:

- the area of contaminated sediments was relatively susceptible to flooding and erosion under the hydrologic conditions caused by the fire,
- the contaminant concentrations in the remediation were significantly higher than surrounding sediments, and
- the area was easily accessible by heavy equipment necessary to remove the sediment.

A total of 720 cubic yards of material was removed from three discrete sub-areas within the remediation site. The waste was transported to TA-54, Area G, for disposal as LLW. Following remediation, this site was restored by back filling the excavation with clean fill material brought in from the Los Alamos County landfill. The area was then covered with jute matting and reseeded (Katzman 2000).

From 2001

One year has passed since the Cerro Grande Fire impacted the Los Alamos townsite and the Laboratory. Massive fire rehabilitation and flood mitigation efforts have been ongoing and will continue for several years until areas prone to erosion are stabilized. The Cerro Grande Fire put nearly 100 of the ER Project's PRSs at increased risk of contaminant release and/or transport, by virtue of either being directly burned, or vulnerable to increased surface water runoff or erosion. Since the fire, these sites have had controls installed and continue to be inspected and maintained as part of the Laboratory's overall storm water program. For an update on the current status of the PRSs impacted by the Cerro Grande Fire go to http://lib-www.lanl.gov/pubs/laur01-4122.htm.

2.18 References

Department of Energy, 1991. "Environmental Assessment for the Materials Science Laboratory," DOE/EA-0493, and Finding of No Significant Impact. Los Alamos, NM.

Department of Energy, 1992a. "Nuclear Safety Analysis Report," DOE Order 5480.23, Washington, D.C.

Department of Energy, 1992b. "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Report," DOE Standard DOE-STD-1027-92, Washington, D.C.

Department of Energy, 1993a. "Nonnuclear Consolidation Environmental Assessment, Nuclear Weapons Complex Reconfiguration Program," DOE/EA-0792, Washington, D.C.

Department of Energy, 1993b. "DOE Categorical Exclusion," LAN-94-001, Albuquerque, NM (11/19/93).

Department of Energy, 1995a. "Environmental Assessment for Relocation of Neutron Tube Target Loading Operations," DOE/EA-1131, and Finding of No Significant Impact. Los Alamos, NM.

Department of Energy, 1995b. "Dual-Axis Radiographic Hydrodynamic Test Facility Final Environmental Impact Statement," DOE/EIS-0228, Albuquerque, NM.

Department of Energy, 1995c. "Environmental Assessment for Radioactive Source Recovery Program," DOE/EA-1059, and Finding of No Significant Impact, 12/21/1995, Los Alamos, NM.

Department of Energy, 1996a. "Categorical Exclusion for Manufacturing Technical Support Facility (MTSF)," LAN-96-022, Accession Number 8248, Los Alamos, NM.

Department of Energy, 1996b. "Categorical Exclusion for NMT Protect Combustible Materials," LAN-96-012, Accession Number 8608, Los Alamos, NM.

Department of Energy, 1996c. "Categorical Exclusion for TA-55 Fire Protection Yard Main Replacement," LAN-96-012, Accession Number 8532, Los Alamos, NM.

Department of Energy, 1996d. "Categorical Exclusion for FRIT (crushed glass) Transfer System," LAN-96-022, Accession Number 8521, Los Alamos, NM.

Department of Energy, 1996e. "Categorical Exclusion for NMT Fire Safe Storage Building," LAN-96-012, Accession Number 8304, Los Alamos, NM.

Department of Energy, 1996f. "Environmental Assessment for Effluent Reduction," DOE/EA-1156, and Finding of No Significant Impact. Los Alamos, NM (09/11/96).

Department of Energy, 1996g. "Support Structures at LANL, FY96-98," LAN-96-022, (01/18/96), Los Alamos, NM.

Department of Energy, 1996h. "Mock Explosive Production Move to Building TA-16-260," LAN-98-038, Los Alamos, NM (05/20/96).

Department of Energy, 1996i. "Categorical Exclusion for Destruction of Pu-239 Be Neutron Sources," LAN-96-103, Accession Number 6279, Los Alamos, NM, 06/10/1996.

Department of Energy, 1996j. "Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management," Appendix K, "Atlas Facility Project-Specific Analysis," DOE/EIS-0236, Washington, D.C.

Department of Energy, 1997a. "Relocation of Radiography at TA-16," LAN-97-036, Los Alamos, NM.

Department of Energy, 1997b. "Decontamination and Decommissioning of 28 'S Site' Properties at TA-16," LAN-95-099A, Los Alamos, NM.

Department of Energy, 1997c. "Refurbishment of TA-48, Building 1," LAN-97-041, Los Alamos, NM (10/07/97).

Department of Energy, 1997d. "Environmental Assessment for the Transfer of the DP Road Tract to the County of Los Alamos," DOE/EA-1184, Los Alamos, NM.

Department of Energy, 1997e. "Environmental Assessment for the Lease of Land for the Development of a Research Park at Los Alamos National Laboratory," DOE/EA-1212, Los Alamos, NM.

Department of Energy, 1998a. "DOE List of Los Alamos National Laboratory Nuclear Facilities," DOE Albuquerque Operations Office Memorandum, Albuquerque, NM.

Department of Energy, 1998b. "Categorical Exclusion for Re-Roof TA-16-205 (WETF)," Accession Number 7364 (12/15/1998), Los Alamos, NM.

Department of Energy, 1998c. "Categorical Exclusion for WETF Modular Office Building," LAN-96-022, Accession Number 7027 (03/11/1998), Los Alamos, NM.

Department of Energy, 1998d. "Categorical Exclusion for TA-53 Storage Building," LAN-98-110, Accession No. 7199, Los Alamos, NM.

Department of Energy, 1998e. "Categorical Exclusion for TA-53 Radioactive Waste Treatment System," LAN-98-109, Accession No. 7175, Los Alamos, NM.

Department of Energy, 1998f. "Installation of Hoods and Gloveboxes at TA-48-1, Room 430," LAN-98-111, Los Alamos, NM (09/30/98).

Department of Energy, 1998g. "Environmental Assessment for the Proposed Strategic Computing Complex, Los Alamos National Laboratory, Los Alamos, New Mexico," DOE/EA-1250, Los Alamos, NM.

Department of Energy, 1998h. "Categorical Exclusion for D&D of TA-33-86," LAN-96-008, Accession Numbers 6111 (11/13/1995) and 7165 (11/20/1998), Los Alamos, NM.

Department of Energy, 1999a. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," DOE/EIS-0238, Albuquerque, NM.

Department of Energy, 1999b. "HE Formulation Relocation from TA-16-340 to TA-9-39 & Bldg. 45," LAN-99-042a, Los Alamos, NM.

Department of Energy, 1999c. "Categorical Exclusion for TA-53 Cooling Tower," LAN-96-022, Accession No. 7583, Los Alamos, NM.

Department of Energy, 1999d. “Categorical Exclusion for Electrodialysis Reversal,” LAN-99-025, Accession Number 7428 (02/23/1999), Los Alamos, NM.

Department of Energy, 1999e. “Categorical Exclusion Volume Reducing Evaporator (TA-50/248),” LAN-99-025, Accession Number 7737 (10/29/1999), Los Alamos, NM.

Department of Energy, 1999f. “Decontamination and Volume Reduction System for Transuranic Waste at Los Alamos National Laboratory,” DOE/EA-1269, Accession Number 6946, Los Alamos, NM.

Department of Energy,1999g. “Categorical Exclusion for Installation of Sediment Basin and Check Dams,” LAN-99-035, Accession Number 7489, Los Alamos, NM, 03/25/1999.

Department of Energy, 1999h. “Categorical Exclusion for Changes to Radioactive Source Recovery Program,” LAN-99-049, Accession Number 7405, Los Alamos, NM, 02/04/1999.

Department of Energy, 1999i. “Categorical Exclusion for Radioactive Source Storage at LANL,” LAN-99-049 Rev. 1, Accession Number 7570, Los Alamos, NM, 05/24/1999.

Department of Energy, 1999j. “Environmental Assessment for Nonproliferation and International Security Center,” DOE/EA-1247, Los Alamos, NM.

Department of Energy, 2000a. “DOE List of Los Alamos National Laboratory Nuclear Facilities,” DOE Los Alamos Area Office and Los Alamos National Laboratory, Los Alamos, NM.

Department of Energy, 2000b. “Categorical Exclusion for TSTA Cooling Tower Demolition,” LAN-98-052, Accession Number 7952 (04/24/2000), Los Alamos, NM.

Department of Energy, 2000c. “Special Environmental Analysis for Actions Taken in Response to the Cerro Grande Fire at Los Alamos National Laboratory, Los Alamos, NM,” DOE/SEA-03, Los Alamos, NM.

Department of Energy, 2000d. Supplement Analysis to the Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Modification of Management Methods for Certain Unwanted Radioactive Sealed Sources at Operation of Los Alamos National Laboratory, August 2000, Los Alamos, NM.

Department of Energy, 2000e. “Categorical Exclusion for the Live-Fire Shoot House,” LAN-97-112, Accession Number 7245, Los Alamos, NM.

Department of Energy, 2001a. “Categorical Exclusion for Control and Instrumentation Cables at TA-18,” LAN-96-010, Accession Number 8433, (09/25/2001), Los Alamos, NM.

Department of Energy, 2001b. “Categorical Exclusion for Task #41, Replacement Work,” LAN-96-022, Accession Number 8437, Los Alamos, NM.

Department of Energy, 2001c. “Categorical Exclusion for CGRP, Task #41, Addition to TA-36-12, KAPPA,” LAN-96-012, Accession Number 8439, Los Alamos, NM.

Department of Energy, 2001d. “Categorical Exclusion for TA-36 HE Storage and Prep Facilities,” LAN-96-010, Accession Number 8435, Los Alamos, NM.

Department of Energy, 2001e. “Environmental Assessment for Atlas Relocation and Operation at the Nevada Test Site, Los Alamos, New Mexico,” DOE/EA-1381, Los Alamos, NM.

Department of Energy, 2001f. "Environmental Assessment for the Emergency Operations Center and Multi-Channel Communications Project," DOE/EA-1376, Los Alamos, NM.

Department of Energy, 2001g. "Categorical Exclusion for the S-3 Security Systems Facility," LAN-96-022, Accession Number 8612, Los Alamos, NM.

Department of Energy, 2001h. "Categorical Exclusion for the ESH-2 Medical Clinic," LAN-96-022, Accession Number 8398, Los Alamos, NM.

Department of Energy, 2001i. "Categorical Exclusion for the Chemistry Technical Support Building," LAN-96-011, CXAmend., Accession Numbers 8044 and 8227, Los Alamos, NM.

Department of Energy, 2001j. "Categorical Exclusion for the MST Office Building," LAN-96-022, Accession Numbers 8618, Los Alamos, NM.

Department of Energy, 2002a. "Safety Evaluation Report, Los Alamos National Laboratory Transportation Safety Document (TSD) Technical Safety Requirements (TSRs), LANL BUS-SA-002,R0," DOE National Nuclear Security Administration, Albuquerque Operations Office, Los Alamos Site Operations, Los Alamos, NM.

Department of Energy, 2002b. "Final Environmental Impact Statement for the Proposed Relocation of Technical Area 18 Capabilities and Materials at the Los Alamos National Laboratory," DOE/EIS-319, Los Alamos, NM.

Department of Energy, 2002c. "Environmental Assessment for the Proposed Consolidation of Certain Experimental Dynamic Activities at the Two-Mile Mesa Complex," DOE/EA-1447 draft, Los Alamos, NM.

Department of Energy, 2002d. "Environmental Assessment for the Proposed Construction and Operation of a Biosafety Level 3 Facility at Los Alamos National Laboratory, Los Alamos, NM," DOE/EA-1364, Accession Number 8250, Los Alamos, NM.

Department of Energy, 2002e. "Categorical Exclusion for Ion Exchange Removal of Perchlorates," LAN 96-012, Accession Number 8632, Los Alamos, New Mexico.

Department of Energy, 2002f. "Environmental Assessment of the Proposed Disposition of the Omega West Facility at Los Alamos National Laboratory, Los Alamos, New Mexico," DOE/EA-1410, Los Alamos, NM.

Department of Energy, 2002g. "Categorical Exclusion for the D Division Office Building (DDOB)," LAN-96-011, CXAmend., Accession Number 8595, Los Alamos, NM.

Department of Energy, 2002h. "Categorical Exclusion for the Truck Security Inspection Station," LAN-96-022, Accession Number 8726, Los Alamos, NM.

Federal Register, 2001. "Nuclear Safety Management," U.S. Department of Energy, 10 CFR 830, Vol. 66, No. 7, Washington, D.C.

Garvey, D., and S. Miller, 1996. "LANSCE Radiological Air Emissions Data Development for the SWEIS–REVISED," ESH-17:96-517, Los Alamos, NM.

Katzman, 2000. Personal communication from Danny Katzman to Kenneth Rea, Los Alamos, NM.

Los Alamos National Laboratory, 1995. "NEPA Review of Biophysics Lab Addition," Accession No. 6101, Los Alamos, NM (12/07/95).

Los Alamos National Laboratory, 1996a. "Ventilation System SM-102," ESH-ID-96-0207, Los Alamos, NM.

Los Alamos National Laboratory, 1996b. "NEPA Categorical Exclusion for Flash Pad Propane Burners," Accession No. 6265, Los Alamos, NM (8/9/96).

Los Alamos National Laboratory, 1996c. "NEPA Categorical Exclusion for Hydrodynamic Testing Operations Center," Accession No. 6128, Los Alamos, NM (03/26/96).

Los Alamos National Laboratory, 1998a. "NEPA Categorical Exclusion for Facilities Improvement Technical Support (FITS) Building," LAN-97-013A, Los Alamos, NM.

Los Alamos National Laboratory, 1998b. "Re-roof at TA-03-39," ESH-ID-98-0188, Los Alamos, NM.

Los Alamos National Laboratory, 1998c. "Electrical Upgrades at TA-03-102," ESH-ID-98-0199, Los Alamos, NM.

Los Alamos National Laboratory, 1998d. "Waste Machine Coolant Volume Reduction," ESH-ID-98-0064, Los Alamos, NM.

Los Alamos National Laboratory, 1998e. "NEPA Categorical Exclusion for HE Wastewater Collection System Repairs, TA-9-21," LAN-96-012, Los Alamos, NM (10/6/98).

Los Alamos National Laboratory, 1998f. "NEPA Categorical Exclusion for the Applied Research, Optics, and Electronics (AROE) Laboratory," LAN-98-101, Los Alamos, NM (10/3/98).

Los Alamos National Laboratory, 2000a. "Facility Recovery Process," FRC-001, R.3, Los Alamos, NM.

Los Alamos National Laboratory, 2000b. "NEPA Categorical Exclusion for TA-16-394 Oil/Solvent Burn Tray Exclosure," Accession No. 7922, Los Alamos, NM (6/28/00).

Los Alamos National Laboratory, 2000c. "Biosafety Level 3 Facility," ESH-ID-00-0362, Los Alamos, NM.

Los Alamos National Laboratory, 2001a. "DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities," Facility and Waste Operations Division, Office of Authorization Basis, FWO-OAB 401, Rev. 1, Los Alamos, NM.

Los Alamos National Laboratory, 2001b. "DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities," Facility and Waste Operations Division, Office of Authorization Basis, FWO-OAB 401, Rev. 2, Los Alamos, NM.

Los Alamos National Laboratory, 2001c. "Los Alamos National Laboratory Radiological Facility List," Facility and Waste Operations Division, Office of Authorization Basis, FWO-OAB 403, Rev. 0, Los Alamos, NM.

Los Alamos National Laboratory, 2001d. "NMT FY01 Office Buildings," ESH-ID 01-0005, Los Alamos, NM.

Los Alamos National Laboratory, 2001e. “NMT Protect Combustible Materials,” ESH-ID 01-0238, Los Alamos, NM.

Los Alamos National Laboratory, 2001f. “TA-55 Fire Protect Yard Main Replacement,” ESH-ID 01-0202, Los Alamos, NM.

Los Alamos National Laboratory, 2001g. “FRIT Transfer System,” ESH-ID 01-0193, Los Alamos, NM.

Los Alamos National Laboratory, 2001h. “NMT Fire Safe Storage Building,” ESH-ID 01-0053, Los Alamos, NM.

Los Alamos National Laboratory, 2001i. “TA-55 Radiography/Interim,” ESH-ID 01-0258, Los Alamos, NM.

Los Alamos National Laboratory, 2001j. “TA-55 Radiography (complements ESH-ID 01-0258,” ESH-ID 01-0259, Los Alamos, NM.

Los Alamos National Laboratory, 2001k. “CMR Replacement Project Preconceptual Design,” ESH-ID 01-0194, Los Alamos, NM.

Los Alamos National Laboratory, 2001l. “TA-18 Relocation Project Office Building,” ESH-ID 01-0058, Los Alamos, NM.

Los Alamos National Laboratory, 2001m. “TA-18 Relocation Project CATIII/IV at TA-55,” ESH-ID 01-0055, Los Alamos, NM.

Los Alamos National Laboratory, 2001n. “TA-18 Relocation Project CAT-1 Piece,” ESH-ID 01-0030, Los Alamos, NM.

Los Alamos National Laboratory, 2001o. “TA-03-39 and -102 Security Container Fire and Lighting Upgrades,” ESH-ID-01-0044, Los Alamos, NM.

Los Alamos National Laboratory, 2001p. “Wildfire Hazard Reduction Project Plan,” LA-UR-01-2017, Los Alamos, NM.

Los Alamos National Laboratory, 2001q. “Refurbishment of Building 48-45 from Cerro Grande Fire,” ESH-ID-01-0141, Los Alamos, NM.

Los Alamos National Laboratory, 2001r. “Comprehensive Site Plan 2001,” Chapter VIII, “Projects,” LA-UR-01-01838, Los Alamos, NM

Los Alamos National Laboratory, 2001s. “Project Completion Report for the Accelerated Action at TA-16, MDA-R,” LA-UR-01-522, Los Alamos, NM.

Los Alamos National Laboratory, 2002a. “DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities,” Performance Surety Division, Office of Authorization Basis, FWO-OAB 401, Rev. 3, Los Alamos, NM.

Los Alamos National Laboratory, 2002b. “Los Alamos National Laboratory Radiological Facility List,” Performance Surety Division, Office of Authorization Basis, PS-OAB-403, Rev. 1, Los Alamos, NM.

Los Alamos National Laboratory, 2002c. “Los Alamos National Laboratory Transportation Safety Document,” Business Operations Division, Materials Management Group, BUS4-SA-002, R0, Los Alamos, NM.

Los Alamos National Laboratory, 2002d. “FITS Parking Lot,” ESH-ID 02-0125, Los Alamos, NM.

Los Alamos National Laboratory, 2002e. “TA-55 New Parking Lot,” ESH-ID 02-0075, Los Alamos, NM.

Los Alamos National Laboratory, 2002f. “Temporary Parking,” ESH-ID 02-0170, Los Alamos, NM.

Los Alamos National Laboratory, 2002g. “CMR Replacement Geotechnical Investigation,” ESH-ID 02-0185, Los Alamos, NM.

Los Alamos National Laboratory, 2002h. “TA-03-102 Heat Treating,” ESH-ID-02-0010, Los Alamos, NM.

McClenahan, R.L., 2000. “RLWTF Influent Flows,” memo to R.A. Alexander of FWO-WFM, Los Alamos, NM.

Sandoval,T., 2000. Email from Tina M. Sandoval to Chris Del Signore, Los Alamos, NM (04/07/00).

Steele, C. M., 2002. “Transmittal of Approval of the Safety Evaluation Report (SER) for the Los Alamos National Laboratory (LANL) Transportation Safety Document (TSD) and Technical Safety Requirements (TSRs),” DOE National Nuclear Security Administration, Albuquerque Operations Office, Los Alamos Site Operations, SABT/RCJ.02.013: SABM Steele, Los Alamos, NM.

Squirrel

3.0 Site-Wide 2002 Operations Data

The Yearbook's role is to provide data that could be used to develop an impact analysis. However, in two cases, worker dose and dose from radioactive air emissions, the Yearbook specifically addresses impacts as well. In this chapter, the Yearbook summarizes operational data at the site-wide level. These impact assessments are routinely undertaken by LANL, using standard methodologies that duplicate those used in the SWEIS; hence, they have been included to provide the base for future trend analysis.

Chapter 3 compares actual operating data to projected effects for about half of the parameters discussed in the SWEIS, including effluent, workforce, regional, and long-term environmental effects. Some of the parameters used for comparison were derived from information contained in both the main text and appendices of the SWEIS. Many parameters cannot be compared because data are not routinely collected. In these cases, projections made by the SWEIS ROD (DOE 1999) resulted only from expenditure of considerable special effort, and such extra costs were avoided when preparing the Yearbook.

3.1 Air Emissions

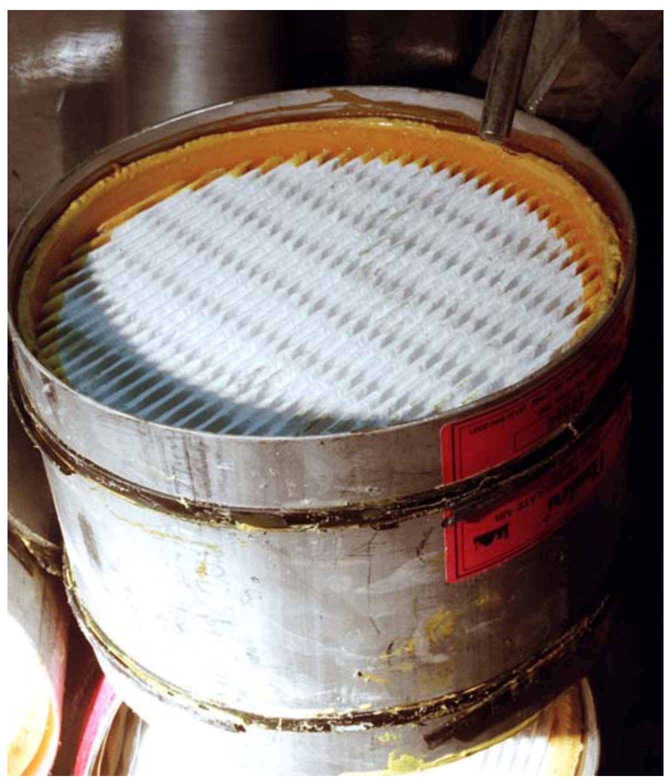
3.1.1 Radioactive Air Emissions

Radioactive airborne emissions from point sources (i.e., stacks) during 2002 totaled approximately 6,150 curies, 30 percent of the 10-year average of 21,700 curies projected by the ROD. These low emissions result from operations at the Key Facilities not being performed at projected levels and from the conservative nature of the emissions calculations performed for the SWEIS.

As in 1999, 2000, and 2001, the two largest contributors to radioactive air emissions were tritium from the Tritium Facilities (both Key and Non-Key) and activation products from LANSCE. Stack emissions from the Tritium Key Facilities were about 1,500 curies and from other facilities were about 360 curies. Tritium emissions from the Non-Key Facilities were dominated, as in 1999–2001, by cleanup activities at TA-33 and TA-41.

Emissions of activation products from LANSCE were increased over 2000 levels. The total point source emissions were approximately 4,300 curies. The Area A beam stop did not operate after 1998 and operations in Line D resulted in the majority of emissions.

Non-point sources of radioactive air emissions are present at LANSCE, Area G, TA-18, and other locations around the Laboratory. Non-point emissions, however, are generally small compared to stack emissions. For example, non-point air emissions from LANSCE were less than 150 curies. Additional detail about radioactive air emissions is provided in the Laboratory's annual compliance report to the EPA on June 30, 2003, and in the 2002 Environmental Surveillance Report (LANL, in preparation).



HEPA filter

Table 3.1.1-1 summarizes the radioactive air emissions data reported in the 1998–2002 Yearbooks.

Maximum offsite dose will continue to be relatively small for 2002. The final 2002 dose is estimated to be approximately 1.6 millirem, with the final dose being reported to the EPA by June 30, 2003.

Table 3.1.1-2 presents the dose estimates and the actual doses.

Table 3.1.1-1. Radioactive Air Emissions

EMISSION CATEGORY	SWEIS ROD	1998	1999	2000	2001	2002
Point Sources % of 10-year average	21,700 Ci/year 21,700 Ci/year	8,690 Ci <50	1,900 Ci <10	3,100 Ci 15	15,400 Ci 70	6,150 Ci 30
Select Stack Emissions: Tritium Key Facilities Non-Key Tritium Facilities	 2,000 Ci/year 910 Ci/year	 710 Ci [b]	 650 Ci 950 Ci	 1,200 Ci 1,150 Ci	 8,400 Ci [a] 1,000 Ci	 1,500 Ci 360 Ci
Point Source – LANSCE	16,800 Ci/year — estimated 10-year average	7,875 Ci	300 Ci	700 Ci	<6,000 Ci	<4,300 Ci
Non-point Source – LANSCE	---	<500 Ci	<20 Ci	<150 Ci	<160 Ci	<150 Ci

[a] This includes a puff release of 7,600 curies of tritium gas (HT or T2) that occurred in January 2001.
[b] Data for the Non-Key Tritium Facilities were not included in the 1998 Yearbook.

Table 3.1.1-2. Maximum Offsite Dose Estimates (millirem)

MAXIMUM OFFSITE DOSE	SWEIS ROD	1998	1999	2000	2001	2002
Estimate	5.44	1.72	0.32	0.65	1.9	1.6
Actual	---	1.72	0.32	0.65	1.84	1.69

Recording data at an AIRNET Station

3.1.2 Non-Radioactive Air Emissions

3.1.2.1 Emissions of Criteria Pollutants

Criteria pollutants include nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter. LANL, in comparison to industrial sources and power plants, is a relatively small source of these non-radioactive air pollutants. As such, the Laboratory is required to estimate emissions, rather than perform actual stack sampling. As Table 3.1.2.1-1 illustrates, all 2002 emissions of criteria pollutants are within the estimated emissions presented in the SWEIS ROD, with the exception of particulate matter. These increased emissions are attributable primarily to the operation of three air curtain destructors. These air curtain destructors are used to burn wood and slash from fire mitigation activities around the Laboratory. These operations emitted a total of 12.2 tons of particulate matter during 2002.

Table 3.1.2.1-1. Emissions of Criteria Pollutants

POLLUTANTS	UNITS	SWEIS ROD	1998 OPERATIONS	1999 OPERATIONS	2000 OPERATIONS	2001 OPERATIONS	2002 OPERATIONS
Carbon monoxide	Tons/ year	58	17.9	32	26	29.08	28.1
Nitrogen oxides	Tons/ year	201	68	88	80	93.8	64.7
Particulate matter	Tons/ year	11	3.0	4.5	3.8	5.5	15.5 [a]
Sulfur oxides	Tons/ year	0.98	0.29	0.55	4.0 [b]	0.82	1.3 [c]

[a] The increased emissions of particulate matter are primarily due to the operation of three air curtain destructors to burn wood and slash from fire mitigation activities around the Laboratory.
[b] The higher emissions of sulfur oxides (SO_x) are due to the main steam plant burning fuel oil during the Cerro Grande Fire.
[c] The increased emissions of SO_x are due to operation of the three air curtain destructors to burn wood and slash from fire mitigation activities around the Laboratory.

Approximately two-thirds of the most significant criteria pollutant, nitrogen oxides (NO_x), results from the TA-3 steam plant. In late 2000, LANL received a permit from the NMED to install flue gas recirculation equipment on the steam plant boilers to reduce emissions of NO_x. This equipment became operational in 2002, and initial source tests indicated a reduction in NO_x of approximately 70 percent.

SO_x emissions for 2002 result from the operation of three air curtain destructors to burn wood and slash from fire mitigation activities. Total emissions for 2002 from these units were one ton of SO_x.

Criteria pollutant emissions from LANL's fuel burning equipment are reported in the annual Emissions Inventory Report as required by the New Mexico Administrative Code, Title 20, Chapter 2, Part 73 (20.2.73 NMAC). The report provides emission estimates for the steam plants, nonexempt boilers, the asphalt plant, and the water pump. The water pump which was a large source NO_X emissions, was transferred to Los Alamos County in November 2001. In addition, emissions from the paper shredder, rock crusher, degreasers, and permitted beryllium machining operations are reported. For more information, refer to LANL's 1999 and 2000 Emissions Inventory Report (LANL 2000a, 2001a).

3.1.2.2 Chemical Usage and Emissions

The 1999 edition of the Yearbook proposed to report chemical usage and calculated emissions for Key Facilities obtained from the Laboratory's Automated Chemical Inventory System. (Note: In 2002 the Laboratory transitioned to the new EX3 chemical inventory system and no longer uses the Automated Chemical Inventory System.) The quantities presented in this approach represent all chemicals procured or brought on site in the respective calendar year. This methodology is identical to that used by the Laboratory for reporting under Section 313 of the Emergency Planning Community Right-To-Know Act (42 USC) and for reporting regulated air pollutants estimated from research and development operations in the annual Emissions Inventory Report (LANL 2000a, 2001a).

Air emissions shown in Tables A-1 through A-14 of Appendix A are divided into emissions by Key Facility. Emission estimates (expressed as kilograms per year) were performed in the same manner as those reported in the 1999, 2000, and 2001 Yearbooks (LANL 2000b, 2001b, 2002a, respectively). First, usage of listed chemicals was summed by facility. It was then estimated that 35 percent of the chemical used was released to the atmosphere. Emission estimates for some metals, however, were based on an emission factor of less than one percent. This is appropriate because these metal emissions are assumed to result from cutting or melting activities. Fuels such as propane and acetylene were assumed to be completely combusted; therefore, no emissions are reported.

Information on total volatile organic compounds and hazardous air pollutants estimated from research and development operations is shown in Table 3.1.2.2-1. Projections by the SWEIS ROD for volatile organic compounds and hazardous air pollutants were expressed as concentrations rather than emissions; direct comparisons cannot be made, and, therefore, projections from the SWEIS ROD are not presented. The volatile organic compound emissions reported from research and development activities reflect quantities procured in each calendar year. The hazardous air pollutant emissions reported from research and development activities generally reflect quantities procured in each calendar year. In a few cases, however, procurement values and operational processes were further evaluated so that actual air emissions could be reported instead of procurement quantities. As for particulate matter emissions, operation of the air curtain destructors resulted in increases of volatile organic compounds and hazardous air pollutants emissions during 2002. The air curtain destructors accounted for 22.9 and 2.1 tons of volatile organic compounds and hazardous air pollutants, respectively.

Table 3.1.2.2-1. Emissions of Volatile Organic Compounds and Hazardous Air Pollutants from Chemical Use

POLLUTANT	EMISSIONS (TONS/YEAR)			
	1999	2000	2001	2002
Hazardous Air Pollutants	13.6	6.5	7.4	7.74
Volatile Organic Compounds	20	10.7	18.6	14.9

3.2 Liquid Effluents

LANL discharges wastewater via 21 outfalls operating under its NPDES permit. Based on discharge monitoring reports, as reported by LANL's Water Quality and Hydrology Group and on operational records when available, effluent flow through NPDES outfalls totaled an estimated 178.18 million gallons in CY 2002. This is an approximate increase of 54.15 million gallons over CY 2001 (124.04 million gallons). This volume of discharge is below the SWEIS ROD projection of 278.0 million gallons.

With implementation of the new NPDES permit on February 1, 2001, Water Quality and Hydrology is collecting and reporting actual flows that are being recorded by flow totalizers at most outfalls. At outfalls without totalizers, the flow is calculated based on instantaneous flow. Historically, instantaneous flow was measured during field visits as required in the NPDES permit. These measurements were then extrapolated over a 24-hour day/seven-day week. Details on all NPDES noncompliance results are provided in the 2002 Environmental Surveillance Report (LANL, in preparation).

Key Facilities accounted for approximately 47 million gallons of the CY 2002 total. Comparison between the projected and actual number of outfalls by watershed can be found in Table 3.2-1. (Relevant details on the

Table 3.2-1. NPDES Permitted Outfalls by Watershed

WATERSHED	NUMBER OF OUTFALLS IDENTIFIED IN SWEIS	NUMBER OF OUTFALLS PROJECTED TO HAVE A DISCHARGE (SWEIS ROD)	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 1998	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 1999	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 2000	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 2001	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 2002	NUMBER OF PERMITTED OUTFALLS AS OF DECEMBER 31, 2002
Ancho	2	0	0	0	0	0	0	0
Cañada del Buey [a]	4	4	4	3	1	1	1	1
Chaquehui	1	0	0	0	0	0	0	0
Guaje [b]	7	7	7	6	0	0	0	0
Los Alamos	12	8	9	7	5	5	5	5
Mortandad	12	7	9	6	5	5	5	5
Pajarito [c]	17	11	13	2	0	0	0	0
Pueblo	1	1	1	1	0	0	0	0
Sandia [d]	10	7	8	6	4	4	5	5
Water [e]	21	10	15	5	5	5	5	5
Totals	87	55	66	36	20	20	21	21

[a] Includes Outfall 13S from the Sanitary Wastewater Systems Consolidation, which is registered as a discharge to Cañada del Buey or Sandia. The discharge is actually piped to TA-03 and ultimately discharged to Sandia Canyon via Outfall 001.
[b] Includes 04A-176 discharge to Rendija Canyon, a tributary to Guaje Canyon.
[c] Includes 06A-106 discharge to Three-Mile Canyon, a tributary to Pajarito Canyon.
[d] The number of outfalls increased during CY 2001 with the addition of the new Outfall 03A-199 (permit issued 2/1/2001).
[e] Includes 05A-055 discharge to Cañon de Valle, a tributary to Water Canyon.

NPDES permitted outfalls, including which watershed each outfall discharges to, are provided in Appendix D.) In Table 3.2-2, the number of gallons of discharge per watershed projected by the SWEIS is compared to the actual discharge per calendar year. Tables 3.2-3 and 3.2-4 compare the projected and actual number of outfalls by facility and the volume of discharge per facility projected by the SWEIS is compared to the actual discharge per calendar year.

Table 3.2-2. Discharges to Watersheds from NPDES Permitted Outfalls (Millions of Gallons)

WATERSHED	PROJECTED DISCHARGE (SWEIS ROD)	DISCHARGE 1998	DISCHARGE 1999	DISCHARGE 2000	DISCHARGE 2001	DISCHARGE 2002
Cañada del Buey	6.4	0	2.6	0	0	0
Guaje	0.7	1.2	1.7	0	0	0
Los Alamos	44.8	69.7	45.2	37.4	19.34	36.79
Mortandad	37.4	51.4	39.3	31.6	4.21	31.40
Pajarito	2.6	2.8	0	0	0	0
Pueblo	1.0	0.7	0.9	0	0	0
Sandia	170.8	67.1	213.2	180.2	100.38	108.58
Water	14.2	18.7	14.3	16.2	0.102	1.41
Totals	278.0	212.0	317.2	265.4	124.04	178.18

Of the 21 outfalls listed in the NPDES permit only 17 discharged during 2002, as was the case in 2001. Table 3.2-4 compares NPDES discharges by facility. The Non-Key Facilities showed a difference of about 11.3 million gallons between CY 2002 discharges and SWEIS ROD projections (130.83 million gallons versus 142.1 million gallons, respectively). For the Non-Key Facilities, discharge from Outfall 001 at the TA-03 power plant of 8.29 million gallons was higher than the 2001 discharge of 3.97 million gallons. Approximately 93 million gallons of the discharge from Outfall 001 at the power plant was attributable to treated sanitary effluent piped from Outfall 13S at TA-46 to TA-03 to be available as "makeup water" in the cooling towers. The combined flow of the sanitary waste treatment plant and the TA-3 steam plant account for about 77 percent of the total discharge from Non-Key Facilities and about 57 percent of all water discharged by the Laboratory.

For Key Facilities, LANSCE discharged approximately 24 million gallons for 2002, about 4 million gallons more than in 2001, accounting for about 51 percent of the total discharge from all Key Facilities (see Table 3.2-4). This percentage has decreased from the almost 82 percent in 2001 because other Key Facilities experienced an increase in discharge in 2002. The only Key Facilities to have decreased discharge in 2002 were the High Explosives Processing Facility and the RLWTF.

LANL has three principal wastewater treatment facilities—the sewage plant (Sanitary Wastewater System) at TA-46, the RLWTF at TA-50, and the HEWTF at TA-16. As discussed above, the sewage treatment plant at TA-46 processed about 93 million gallons of treated wastewater and sewage during 2002, all of which was pumped to the TA-3 power plant after treatment to provide makeup water for the cooling towers or to be discharged directly into Sandia Canyon via Outfall 001.

Table 3.2-3. NPDES Permitted Outfalls by Facility

FACILITY	NUMBER OF OUTFALLS IDENTIFIED IN SWEIS	NUMBER OF OUTFALLS PROJECTED TO HAVE A DISCHARGE (SWEIS ROD)	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 1998	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 1999	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 2000	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 2001	NUMBER OF PERMITTED OUTFALLS AS OF JANUARY 1, 2002	NUMBER OF PERMITTED OUTFALLS AS OF DECEMBER 31, 2002
Plutonium Complex	1	1	1	1	1	1	1	1
Tritium Facility	5	2	3	2	2	2	2	2
CMR Building	1	1	1	1	1	1	1	1
Sigma Complex	2	2	2	2	2	2	2	2
High Explosives Processing	22	11	16	3	3	3	3	3
High Explosives Testing [a]	15	7	10	3	2	2	2	2
LANSCE	6	5	6	4	4	4	4	4
HRL	1	1	1	1	0	0	0	0
Radiochemistry Facility	5	2	3	1	0	0	0	0
RLWTF	1	1	1	1	1	1	1	1
Pajarito Site	0	0	0	0	0	0	0	0
MSL	0	0	0	0	0	0	0	0
TFF	1	0	0	0	0	0	0	0
Machine Shops	0	0	0	0	0	0	0	0
Waste Management Operations	0	0	0	0	0	0	0	0
Non-Key Facilities [a, b]	27	22	22	17	4	4	5	5
Totals	87	55	66	36	20	20	21	21

[a] Outfall 03A-106 was incorrectly associated with a Non-Key Facility in the SWEIS. Starting with the 2002 Yearbook, Outfall 03A-106 is accounted for with High Explosives Testing.

[b] The number of outfalls increased during CY 2001 with the addition of the new Outfall 03A-199 (permit issued 2/1/2001). Please note that earlier Yearbooks incorrectly indicated that this outfall was added to the NPDES Permit in 2000.

Table 3.2-4. Discharges from NPDES Permitted Outfalls by Facility (Millions of Gallons)

FACILITY	PROJECTED DISCHARGE (SWEIS ROD)	DISCHARGE (1998)	DISCHARGE (1999)	DISCHARGE (2000)	DISCHARGE (2001)	DISCHARGE (2002)
Plutonium Complex	14.0	8.5	8.6	6.5	0.4053	2.82
Tritium Facility	0.3	13.7	9	8.6	0.3932	13.4
CMR Building	0.5	3.1	4.5	2.3	0.0209	0.76
Sigma Complex	7.3	12.7	5.9	3.9	0.0555	2.00
High Explosives Processing	12.4	17.1	0.2	0.1	0.036	0.03
High Explosives Testing	3.6	1.8	14.3	16.1	0.006638	1.38
LANSCE	81.8	53.4	37.2	30.5	20.45	24.04
HRL	2.5	0.0	0	0	0	0
Radiochemistry Facility	4.1	0.0	0	0	0	0
RLWTF	9.3	6.1	5.3	4.9	3.6	2.92
Pajarito Site	0	0	0	0	0	0
MSL	0	0	0	0	0	0
TFF	0	0	0	0	0	0
Machine Shops	0	0	0	0	0	0
Waste Management Operations	0	0	0	0	0	0
Non-Key Facilities	142.1	95.2	232	192.5	99.01	130.83
Totals	278.0	212.0	317.2	265.4	124.04	178.18

The RLWTF, Building 50-01, Outfall 051, discharges into Mortandad Canyon. During 2002, about 2.9 million gallons of treated radioactive liquid effluent, about 0.7 million gallons less than 2001, were released to Mortandad Canyon from the RLWTF, compared to 9.3 million gallons projected by the SWEIS ROD. The TA-16 HEWTF discharged about 0.0275 million gallons compared to 12.4 projected by the SWEIS ROD.

Treated wastewater released from LANL's NPDES outfalls rarely leaves the site. However, the NPDES permit program also regulates storm water discharges from certain activities. During CY 2002, LANL operated about 75 stream-monitoring and partial-record storm water-monitoring stations located in 17 watersheds. Data gathered from these stations show that surface water, including storm water, occasionally flows off of DOE property. Flow measurements and water quality data for surface water are detailed in LANL's annual reports, Environmental Surveillance at Los Alamos (an example is LANL 2001c) and Surface Water Data at Los Alamos National Laboratory (an example is LANL 2000c).

Overview of the NPDES Outfalls History

The number of outfalls listed in the NPDES permit had decreased from 88 at the end of 1996 to 66 at the end of 1997. Even more substantial reductions occurred during 1998, and the number of permitted outfalls had decreased to just 36 by the end of December 1998. Most of the reductions during both 1997 and 1998 were from the High Explosives Processing Key Facility (six eliminated in 1997, and 13 eliminated in 1998) and High Explosives Testing Key Facility (five eliminated in 1997, and seven eliminated in 1998). Outfall reductions for both High Explosives Key Facilities largely resulted from redirecting some flows, such as cooling tower discharge waters, to the sewage plant at TA-46, and from the routing of high explosives contaminated flows through the HEWTF, which has but a single outfall. The HEWTF began treatment operations in 1997.

At the end of 1999, the number of outfalls listed in the NPDES permit had decreased by 16. Three of the 16 outfalls eliminated during 1999, Outfalls 03A-040, 03A-045, and 06A-106, were associated with the HRL, Radiochemistry Laboratory, and High Explosives Testing Key Facilities, respectively; and, each was

Stabilization measures below the deleted TA-16 Building 260 Outfall

eliminated after cessation of source activities and processes or redirecting flows to other outfalls, primarily to the sanitary system. Most of the reductions (9 of the 16) during 1999 were the result of transferring the water supply system from the DOE to Los Alamos County. Those outfalls were removed from LANL's NPDES permit and added to the Los Alamos County NPDES permit application. Four other water supply wells were taken out of production, their pumping equipment removed, and their outfalls eliminated.

This major modification project, elimination and/or rerouting of NPDES outfalls, was completed in 1999, bringing the total number of permitted outfalls down from the 55 identified by the SWEIS ROD to 20. During 2000, Outfall 03A-199, which will serve the TA-3-1837 cooling towers, was included in the new NPDES permit issued by EPA on December 29, 2000; however, the effective date of the permit was February 1, 2001. This brings the total number of permitted outfalls up to 21. This new outfall (03A-199) will discharge to an unnamed tributary of Sandia Canyon and will be included in future totals for the Non-Key Facilities. It has yet to discharge. While the volume of water discharged by the Laboratory in CY 2000 was reduced overall, the largest apparent reductions were primarily attributed to fewer outfalls being reported under the Laboratory's NPDES permit coupled with more accurate record keeping.

3.3 Solid Radioactive and Chemical Wastes

Because of the complex array of facilities and operations, LANL generates a wide variety of waste types including solids, liquids, semi-solids, and contained gases. These waste streams are variously regulated as solid, hazardous, low-level radioactive, TRU, or wastewater by a host of State and Federal regulations. The institutional requirements relating to waste management at LANL are located in a series of documents that are part of the Laboratory Implementation Requirements. These requirements specify how all process wastes and contaminated environmental media generated at LANL are managed. Wastes are managed from planning for waste generation for each new project through final disposal or permanent storage of those wastes. This ensures that LANL meets all requirements including DOE Orders, Federal and State regulations, and LANL permits.

LANL's waste management operation captures and tracks data for waste streams, regardless of their points of generation or disposal. This includes information on the waste generating process; quantity; chemical and physical characteristics of the waste; regulatory status of the waste; applicable treatment and disposal standards; and the final disposition of the waste. The data are ultimately used to assess operational efficiency, help ensure environmental protection, and demonstrate regulatory compliance.

LANL generates radioactive and chemical wastes as a result of research, production, maintenance, construction, and environmental restoration activities as shown in Table 3.3-1. Waste generators are assigned to one of three categories—Key Facilities, Non-Key Facilities, and the ER Project. Waste types are defined by differing regulatory requirements. No distinction has been made between routine wastes, those generated from ongoing operations, and non-routine wastes such as those generated from the decontamination and decommissioning of buildings.

Table 3.3-1 presents a summary of the wastes quantities generated from 1998 through 2002. As shown in Table 3.3-1, quantities of wastes in 2002 were appreciably below projections.

In general, waste quantities from operations at the Key Facilities were below ROD projections for nearly all waste types, reflecting normal levels of operations at the Key Facilities. Waste minimization efforts put forth by the Environmental Stewardship Office are beginning to show a LANL-wide trend in overall waste reduction across most categories. There have been improvements made in various facility processes to try and minimize waste generation. Additionally, other processes are substituting non-hazardous chemicals for commonly used hazardous chemicals in an effort to improve effluent quality.

Table 3.3-1. LANL Waste Types and Generation

WASTE TYPE	UNITS	SWEIS ROD PROJECTION	1998	1999	2000	2001	2002
Chemical	10^3 kg/yr	3,250	1,771	15,441 [a]	27,674 [b]	27,583 [c]	602
LLW	m^3/yr	12,200	1,837	1,678	4,229	2,597	7,310
MLLW	m^3/yr	632	71.4	20.65	598.23	58.23	20.54
TRU	m^3/yr	333	108.1	143.2	124.8	117.0	119.1
Mixed TRU	m^3/yr	115	34	87.2	88.6	48.1	87.01

[a] Clean-up efforts of the ER Project accounted for the large waste volumes, almost 95% of the total. Most of the 14.5 million kilograms of chemical waste generated by the ER Project resulted from remediation of PRSs at TA-16, particularly MDA-P. MDA-P was exhumed as part of a clean-closure under the RCRA.

[b] Clean-up efforts of the ER Project accounted for the large waste volumes. The continuing clean-up of MDA-P, remediation of PRS 3-0569(c) at the upper end of Sandia Canyon in TA-03, and the accelerated clean-up of MDA-R due to the Cerro Grande Fire, were responsible for most of the chemical waste generation.

[c] The continuing clean-up efforts at MDA-P and PRS 3-056(c) accounted for most of the ER Project generated waste in 2001.

3.3.1 Construction and Demolition Debris (Previously Identified in Yearbooks as Industrial Solid Wastes)

As projected by the SWEIS ROD, chemical waste includes not only construction and demolition debris, but also all other nonradioactive wastes passing through the Solid Radioactive and Chemical Waste Facility. In addition, construction and demolition debris is a component of those chemical wastes that in most cases are sent directly to offsite disposal facilities. For CY 2002, construction and demolition debris was 17 percent of the total chemical waste generated and consisted primarily of asbestos and construction debris from decontamination and decommissioning projects. Construction and demolition debris is disposed of in solid waste landfills under regulations promulgated pursuant to Subtitle D of RCRA. (Note: Hazardous wastes are regulated pursuant to Subtitle C of RCRA.)

3.3.2 Chemical Wastes

Chemical waste generation in 2002 was slightly more than one-half of the waste volumes projected by the SWEIS ROD. Table 3.3.2-1 summarizes chemical waste generation from 1998 through 2002.

ER Project wastes accounted for 66 percent of the total chemical wastes generated. The ER projects that contributed to the waste generated were the removal of contaminated soil at the TA-16-260 outfall and the completion of the cleanup of MDA-P.

Table 3.3.2-1. Chemical Waste Generators and Quantities

WASTE GENERATOR	UNITS	SWEIS ROD PROJECTION	1998	1999	2000	2001	2002
Key Facilities	10^3 kg/yr	600	120	49	1,121	513	267
Non-Key Facilities	10^3 kg/yr	650	1,506 [a]	765	368	1,255 [b]	334
ER Project	10^3 kg/yr	2,000	144	14,630 [c]	26,185 [d]	25,816 [e]	1,133
LANL	10^3 kg/yr	3,250	1,771	15,441	27,674	27,583	1,734

[a] At the Non-Key Facilities in 1998, chemical waste quantities exceeded projections because of a LANL-wide campaign to identify and dispose of chemicals no longer used or needed.

[b] At the Non-Key Facilities in 2001, the increased activity from new construction generated a higher quantity of chemical waste.

[c] Clean-up efforts of the ER Project accounted for the large waste volumes, almost 95% of the total. Most of the 14.5 million kilograms of chemical waste generated by the ER Project resulted from remediation of PRSs at TA-16, particularly MDA-P. MDA-P was exhumed as part of a clean-closure under the RCRA.

[d] Clean-up efforts of the ER Project accounted for the large waste volumes. The continuing clean-up of MDA-P, remediation of PRS 3-056(c) at the upper end of Sandia Canyon in TA-03, and the accelerated clean-up of MDA-R due to the Cerro Grande Fire, were responsible for most of the chemical waste generation.

[e] The continuing clean-up efforts at MDA-P and PRS 3-056(c) accounted for most of the ER Project generated waste in 2001.

Radiological worker in respirator and personal protective equipment

3.3.3 Low-Level Radioactive Wastes

Table 3.3.3-1 summarizes LLW generation from 1998 through 2002. LLW generation in 2002 was less than 60 percent of waste volumes projected by the SWEIS ROD. During 2002, Key Facilities produced less than one-sixth the volume of LLW projected in the SWEIS ROD.

Significant differences occurred at the CMR Building (389 cubic meters versus 1,820 cubic meters per year projected by the SWEIS ROD), the Sigma Complex (960 cubic meters projected versus 202 actual), and High Explosives Testing (940 cubic meters projected versus 0 actual). In addition, LANSCE generated lower volumes than projected (1,085 cubic meters projected versus 0 actual) because decommissioning and renovation of Experimental Area A did not occur. Normal to low workloads accounted for lower waste volumes at the other Key Facilities. LLW generation at Non-Key Facilities slightly exceeded the SWEIS ROD. This is explained by heightened activities and new construction at Non-Key Facilities.

Table 3.3.3-1. LLW Generators and Quantities

WASTE GENERATOR	UNITS	SWEIS ROD PROJECTION	1998	1999	2000	2001	2002
Key Facilities	m^3/yr	7,450	707	1,042	1,222	1,407	1,292
Non-Key Facilities	m^3/yr	520	386	350	2,781 [a]	569 [a]	534 [a]
ER Project	m^3/yr	4,260	744	286	226	621	5,484
LANL	m^3/yr	12,230	1,837	1,678	4,229	2,597	7,310

[a] LLW generation at the Non-Key Facilities slightly exceeds the SWEIS ROD due to heightened activities and new construction.

3.3.4 Mixed Low-Level Radioactive Wastes

Generation in 2002 approximated one-thirtieth of the MLLW volumes projected by the SWEIS ROD. Table 3.3.4-1 examines these wastes by generator categories from 1998 through 2002. With the exception of 2000, the ER Project has generated much less MLLW than had been projected.

Table 3.3.4-1. MLLW Generators and Quantities

WASTE GENERATOR	UNITS	SWEIS ROD PROJECTION	1998	1999	2000	2001	2002
Key Facilities	m^3/yr	54	7	17	11	20	12
Non-Key Facilities	m^3/yr	30	55	3	10	9	9
ER Project	m^3/yr	548	9	1	577 [a]	29	0
LANL	m^3/yr	632	71	21	598	58	21

[a] Almost all of the MLLW generated in 2000 resulted from the remediation of MDA-P.

3.3.5 Transuranic Wastes

Generation in 2002 approximated one-third of the TRU waste volumes projected by the SWEIS ROD. As projected in the ROD, TRU wastes are expected to be generated almost exclusively in four facilities (the Plutonium Facility Complex, the CMR Building, the RLWTF, and the Solid Radioactive and Chemical Waste Facility). TRU waste generated at the Non-Key Facilities during 2000, 2001, and 2002 all resulted from the OSR Project. Because this waste comes from shipping and receiving, it is attributed to that location as the point of generation. Table 3.3.5-1 examines TRU wastes by generator categories from 1998 through 2002.

The ER Project did not produce any TRU wastes in 2002.

High bay in the RANT facility with a waste shipment for WIPP

Waste shipment desitined for WIPP

Table 3.3.5-1. Transuranic Waste Generators and Quantities

WASTE GENERATOR	UNITS	SWEIS ROD PROJECTION	1998	1999	2000	2001	2002
Key Facilities	m^3/yr	322	108	143	122	92	82
Non-Key Facilities	m^3/yr	0	0	0	3	25	37
ER Project	m^3/yr	11	0	0	0	0	0
LANL	m^3/yr	333	108	143	125	117	119

3.3.6 Mixed Transuranic Wastes

Generation in 2002 was less than one-third the mixed TRU waste volumes projected by the SWEIS ROD. As projected, mixed TRU wastes are expected to be generated at only two facilities–the Plutonium Facility Complex and the CMR Building. Table 3.3.6-1 examines these wastes by generator categories from 1998 through 2002.

Both the Plutonium Facility Complex (30 cubic meters actual versus 102 cubic meters per year projected by the SWEIS ROD) and the CMR Building (13 cubic meters projected versus one actual) produced less mixed TRU waste than projected because full-scale production of war reserve pits had not begun.

Table 3.3.6-1. Mixed Transuranic Waste Generators and Quantities

WASTE GENERATOR	UNITS	SWEIS ROD PROJECTION	1998	1999	2000	2001	2002
Key Facilities	m^3/yr	115	34	72	26	48	87
Non-Key Facilities	m^3/yr	0	0	15	63	0	0
ER Project	m^3/yr	0	0	0	0	0	0
LANL	m^3/yr	115	34	87	89	48	87

3.4 Utilities

Ownership and distribution of utility services continue to be split between NNSA and Los Alamos County. NNSA owns and distributes most utility services to LANL facilities, and the County provides these services to the communities of White Rock and Los Alamos. Routine data collection for both gas and electricity are done on a fiscal year basis, and keeping with the Yearbook goal of using routinely collected data, this information is presented by fiscal year. Water data, however, are routinely collected and summarized by calendar year.

3.4.1 Gas

There was a change in ownership to the DOE Natural Gas Transmission Line in August 1999. DOE sold 130 miles of gas pipeline and metering stations to the Public Service Company of New Mexico (PNM). This gas pipeline traverses the area from Kutz Canyon Processing Plant south of Bloomfield, New Mexico, to Los Alamos. Approximately 4 miles of the gas pipeline are within LANL. Table 3.4.1-1 presents gas usage by LANL for FY 1991 through FY 2002. Approximately 84 percent of the gas used by LANL was used for heating (both steam and hot air). The remainder was used for electrical production. LANL electrical generation is used to fill the difference between peak loads and the electric import capability.

As shown in Table 3.4.1-1, total gas consumption for FY 2002 was less than projected by the SWEIS ROD. During FY 2002, less natural gas was used for heating because of the drought and warmer than normal weather pattern, and there was less electric generation at the TA-03 power plant as compared to FY 2001. Table 3.4.1-2 illustrates steam production from FY 1996 through FY 2002.

Table 3.4.1-1. Gas Consumption (decatherms[a]) at LANL/Fiscal Years 1991-2002

FISCAL YEAR	SWEIS ROD	TOTAL LANL CONSUMPTION	TOTAL USED FOR ELECTRIC PRODUCTION	TOTAL USED FOR HEAT PRODUCTION	TOTAL STEAM PRODUCTION
1991	1,840,000	1,480,789	64,891	1,415,898	803,168
1992	1,840,000	1,833,318	447,427	1,385,891	744,300
1993	1,840,000	1,843,936	411,822	1,432,113	1,192,803
1994	1,840,000	1,682,180	242,792	1,439,388	1,094,812
1995	1,840,000	1,520,358	111,908	1,408,450	967,587
1996	1,840,000	1,358,505	11,405	1,347,100	Table 3.4.1-2
1997	1,840,000	1,444,385	96,091	1,348,294	Table 3.4.1-2
1998	1,840,000	1,362,070	128,480	1,233,590	Table 3.4.1-2
1999	1,840,000	1,428,568	241,490	1,187,078	Table 3.4.1-2
2000	1,840,000	1,427,914	352,126	1,075,788	Table 3.4.1-2
2001	1,840,000	1,492,635	273,312	1,219,323	Table 3.4.1-2
2002	1,840,000	1,325,639	212,976	1,112,663	Table 3.4.1-2

[a] A decatherm is equivalent to 1,000 to 1,100 cubic feet of natural gas.

Table 3.4.1-2. Steam Production at LANL/Fiscal Years 1996-2002

FISCAL YEAR	TA-3 STEAM PRODUCTION (klb [a])	TA-21 STEAM PRODUCTION (klb)	TOTAL STEAM PRODUCTION (klb)
1996	451,363	54,033	701,792
1997	413,684	50,382	464,066
1998	377,883	37,359	415,242
1999	576,548 [b]	29,468	606,016
2000	634,758 [b]	27,840	662,598
2001	531,763 [b]	29,195	560,958
2002	478,007 [b]	26,206	504,213

[a] klb: Thousands of pounds

[b] TA-03 steam production has two components: that used for electric production (167,767 klb in 2002) and that used for heat (310,240 klb in 2002).

3.4.2 Electricity

LANL is supplied with electrical power through a partnership arrangement with Los Alamos County, known as the Los Alamos Power Pool, which was established in 1985. The NNSA and Los Alamos County have entered into a 10-year contract known as the Electric Coordination Agreement whereby each entity's electric resources are consolidated or pooled. Recent changes (as of August 1, 2002) in transmission agreements with PNM have resulted in the removal of contractual restraints on Power Pool resources import capability. Import capacity is now limited only by the physical capability (thermal rating) of the transmission lines that is approximately 110 to 120 megawatts from a number of hydroelectric, coal, and natural gas power generators throughout the western United States. Onsite electric generating capability for the Power Pool is limited by the existing TA-03 steam and electric power plant, which is capable of producing up to 20 megawatts of electric power that is shared by the Pool under contractual arrangement.

The ability to accept additional power into the Los Alamos Power Pool grid is limited by the regional electric import capability of the existing northern New Mexico power transmission system. In recent years, the population growth in northern New Mexico, together with expanded industrial and commercial usage, has greatly increased power demands on the northern New Mexico regional power system. Several proposals for bringing additional power into the region have been considered. Power line corridor locations remain under consideration, but it is uncertain when any new regional power lines would be constructed and become serviceable.

Power Plant Complex

In CY 2002, an environmental assessment (DOE 2002a), "Environmental Assessment for Installation and Operation of Combustion Turbine Generators at Los Alamos National Laboratory, Los Alamos, New Mexico," (DOE/EA-1430) was written to analyze the effects of increasing the TA-03 steam and electric power plant generating capability by an additional 40 megawatts of power in the near future. Based on this environmental assessment, DOE issued a Finding of No Significant Impact in December 2002. Installation of the first combustion turbine generator at the TA-03 power plant is scheduled to occur during the FY 2003 to FY 2004 time frame.

Table 3.4.2-1 shows peak demand and Table 3.4.2-2 shows annual use of electricity from FY 1991 through FY 2002. LANL's electrical energy use remains below projections in the SWEIS ROD. The ROD projected peak demand to be 113,000 kilowatts (with 63,000 kilowatts being used by LANSCE and about 50,000 kilowatts being used by the rest of the Laboratory). In addition, the ROD projected annual use to be 782,000 megawatt hours with 437,000 megawatt hours being used by LANSCE and about 345,000 megawatt

Table 3.4.2-1. Electric Peak Coincident Demand/Fiscal Years 1991-2002

CATEGORY	LANL BASE	LANSCE	LANL TOTAL	COUNTY TOTAL	POOL TOTAL
SWEIS ROD	50,000[a]	63,000	113,000	Not projected	Not projected
FY 1991	43,452	32,325	75,777	11,471	84,248
FY 1992	39,637	33,707	73,344	12,426	85,770
FY1993	40,845	26,689	67,534	12,836	80,370
FY 1994	38,354	27,617	65,971	11,381	77,352
FY 1995	41,736	24,066	65,802	14,122	79,924
FY 1996	41,799	20,799	62,598	13,160	75,758
FY 1997	37,807	24,846	62,653	13,661	76,314
FY 1998	39,064	24,773	63,837	13,268	77,105
FY 1999	49,509	24,510	74,019	14,399	82,885
FY 2000	48,225	24,594	72,819	15,176	80,623
FY 2001	50,146	21,517	71,663	14,583	85,461
FY 2002	45,809	20,938	66,747	16,653	83,400

[a] All figures in kilowatts.

Table 3.4.2-2. Electric Consumption/Fiscal Years 1991-2002

CATEGORY	LANL BASE	LANSCE	LANL TOTAL	COUNTY	POOL TOTAL
SWEIS ROD	345,000[a]	437,000	782,000	Not projected	Not projected
FY 1991	282,994	89,219	372,213	86,873	459,086
FY 1992	279,208	102,579	381,787	87,709	469,496
FY 1993	277,005	89,889	366,894	89,826	456,720
FY 1994	272,518	79,950	352,468	92,065	444,533
FY 1995	276,292	95,853	372,145	93,546	465,691
FY 1996	277,829	90,956	368,785	93,985	462,770
FY 1997	258,841	138,844	397,715	96,271	493,986
FY 1998	262,570	64,735	327,305	97,600	424,905
FY 1999	255,562	113,759	369,321	106,547	475,868
FY 2000	263,970	117,183	381,153	112,216	493,369
FY 2001	294,169	80,974	375,143	116,043	491,186
FY 2002	299,422	94,966	394,398	121,013	515,401

[a] All figures in megawatt-hours.

hours being used by the rest of LANL. Actual use has fallen below these values, and the projected periods of brownouts have not occurred. However, on a regional basis, failures in the PNM system have caused blackouts in northern New Mexico and elsewhere.

In the third quarter of CY 2002, LANL completed construction of the new Western Technical Area (WTA) 115/13.8-kV substation at TA-06. The main power transformer for WTA, rated at up to 50 mega volt amperes, was delivered in 2001. WTA will provide LANL and the Los Alamos town site with redundancy in bulk power transformation facilities to guard against losses of either the Eastern Technical Area Substation or the TA-03 Substation (DOE 2000).

Operations at several of the large LANL loads changed during 2002. Notably the SCC operations increased to about 3 megawatts of load in 2002. Additional computing facilities are to be added to SCC in 2003, resulting in the addition of another 1 to 2 megawatts of load.

LANSCE operations were extended in operating time in 2002 due to extended programmatic operations and an increase of direct operating funds. This represented no significant increase in the total peak demand of loading on the LANL power system in 2002, but did result in an increase of 13,992 megawatt hours (a 17 percent increase) in LANSCE energy consumption over 2001. It is expected that operating funds will be restored in future years such that the LANSCE operations will be restored to the level of prior years operations at high power levels.

LEDA funding was curtailed in 2001 resulting in the loss of 2 to 4 megawatts of load. This situation continued through 2002. LEDA will continue in mothballed maintenance mode until a new sponsor is secured, hopefully as early as 2004.

The National High Magnetic Field Laboratory remained out of operation during 2002. The 60-Tesla super conducting magnet that failed in 2000 is in redesign and reconstruction and should be operational again by 2003. This represents a temporary reduction of approximately 2 megawatts load in 2002.

The DARHT facility began commissioning operations of its first axis in 2001. The load level is about 2 megawatts for the first axis. The second axis became operational in 2002, representing an additional 2 megawatts of new load to LANL.

Mitigation of the damage to LANL utilities from the Cerro Grande Fire was for the most part completed in 2002. Tree trimming clearance for the power line corridors will take many more years to bring areas up to the desired LANL standard.

3.4.3 Water

Before September 8, 1998, DOE supplied all potable water for LANL, Bandelier National Monument, and Los Alamos County, including the towns of Los Alamos and White Rock. This water was obtained from DOE's groundwater right to withdraw 5,541.3 acre-feet per year or about 1,806 million gallons of water per year from the main aquifer. On September 8, 1998, DOE leased these water rights to Los Alamos County. This lease also included DOE's contractual annual right obtained in 1976 to 1,200 acre-feet per year of San Juan-Chama Transmountain Diversion Project water. The lease agreement was effective for three years until September 8, 2001, although the County could exercise an option to buy sooner than three years. In September 2001, DOE officially turned over the water production system to Los Alamos County. LANL is now considered a customer to Los Alamos County. Los Alamos County is continuing to pursue the use of San Juan-Chama water as a means of maintaining those water rights. Los Alamos County is also proceeding with an engineering study and will have more information after that is complete.

LANL is in the process of installing additional water meters and a Supervisory Control and Data Acquisition/Equipment Surveillance System on the distribution system to keep track of water usage and to determine the specific water use for various applications. Data are being accumulated to establish a basis for conserving water. LANL continues to maintain the distribution system by replacing portions of the over-50-year-old system as problems arise. In remote areas, LANL is trying to automate the monitoring of the system to be more responsive during emergencies such as the Cerro Grande Fire.

Table 3.4.3-1 shows water consumption in thousands of gallons from CY 1992 through CY 2002. LANL consumed about 325 million gallons during CY 2002. Under the expanded alternative, water use for LANL was projected to be 759 million gallons per year. Actual use by LANL in 2002 was about 434 million gallons less than the projected consumption and about 217 million gallons less than the 542 million gallons per year under the agreement with the County. The calculated NPDES discharge of 178 million gallons (Table 3.2-2) was about 55 percent of the total LANL usage of 324 million gallons.

Table 3.4.3-1. Water Consumption (thousands of gallons) for Calendar Years 1992-2002

CATEGORY	LANL	LOS ALAMOS COUNTY	TOTAL
SWEIS ROD	759,000	Not Projected	Not Applicable
CY 1992	547,535	982,132	1,529,667
CY 1993	467,880	999,863	1,467,743
CY 1994	524,791	913,430	1,438,221
CY 1995	337,188	1,022,126	1,359,314
CY 1996	340,481	1,035,244	1,375,725
CY 1997	488,252	800,019	1,288,271
CY 1998	461,350	Not Available [a]	Not Available [a]
CY 1999	453,094	Not Available [a]	Not Applicable
CY 2000	441,000	Not Available [a]	Not Available [a]
CY 2001	393,123	Not Available [a]	Not Applicable
CY 2002	324,514	Not Available [a]	Not Available [a]

[a] On September 8, 1998, Los Alamos County acquired the water supply system and LANL no longer collects this information.

The County now bills LANL for water, and all future water use records maintained by LANL will be based on those billings. The distribution system used to supply water to LANL facilities now consists of a series of reservoir storage tanks, pipelines, and fire pumps. The LANL distribution system is gravity fed with pumps for high-demand fire situations at limited locations.

3.5 Worker Safety

Working conditions at LANL have remained essentially the same as those identified in the SWEIS. DARHT and Atlas—major construction activities—were reflected in the SWEIS analysis, and several other major facilities are also under construction for which separate NEPA documentation was prepared. More than half the workforce remains routinely engaged in activities that are typical of office and computing industries. Much of the remainder of the workforce is engaged in light industrial and bench-scale research activities. Approximately one-tenth of the general workforce at LANL continues to be engaged in production, services, maintenance, and research and development within Nuclear and Moderate Hazard facilities.

3.5.1 Accidents and Injuries

Table 3.5.1-1 summarizes occupational injury and illness rates from CY 1996 through CY 2002. Occupational injury and illness rates for workers at LANL during CY 2002 continue to be small as shown in Table 3.5.1-1. These rates correlate to 260 reportable injuries and illnesses during the year, or less than 51 percent of the 507 cases projected by the SWEIS ROD.

Table 3.5.1-1. Total Recordable and Lost Workday Case Rates at LANL

CALENDAR YEAR	UC WORKERS ONLY		LANL (ALL WORKERS)	
	TRI [a]	LWC [b]	TRI	LWC
1996	4.53	2.88	5.88	3.86
1997	4.41	2.66	5.55	3.45
1998	2.90	1.30	3.35	1.77
1999	2.37	1.24	2.52	1.37
2000	1.53	0.62	1.97	0.94
2001	1.62	0.55	1.96	0.91
2002	2.16	1.24	2.39	1.46

[a] TRI: Total recordable incident rate, number per 200,000 hours worked.
[b] LWC: Lost workday cases, number of cases per 200,000 hours worked.

3.5.2 Ionizing Radiation and Worker Exposures

Occupational radiation exposures for workers at LANL from CY 1998 through CY 2002 are summarized in Table 3.5.2-1. The collective Total Effective Dose Equivalent, or collective TEDE, for the LANL workforce during 2002 was 164 person-rem, considerably lower than the workforce dose of 704 person-rem projected for the ROD.

Thermoluminiscent dosimeter

Table 3.5.2-1. Radiological Exposure to LANL Workers

PARAMETER	UNITS	SWEIS ROD	VALUE FOR 1998	VALUE FOR 1999	VALUE FOR 2000	VALUE FOR 2001	VALUE FOR 2002
Collective TEDE (external + internal)	person-rem	704	161	131	196	113	164
Number of workers with non-zero dose	number	3,548	1,839	1,427	1,316	1,332	1,696
Average non-zero dose:							
• external + internal radiation exposure	millirem	Not projected	87.4	92	149	85	96
• external radiation exposure only	millirem	Not projected	Not projected	90	65	83	95

These reported doses in Table 3.5.2-1 for 2002 could change with time. Estimates of committed effective dose equivalent in many cases are based on several years of bioassay results, and as new results are obtained the dose estimates may be modified accordingly.

Of the 164 person-rem collective TEDE reported for 2002, external radiation and tritium exposure accounted for 160 person-rem. The remaining 4 person-rem are from internal exposure.

The five highest individual doses in CY 2002 were 2.214, 1.897, 1.813, 1.644, and 1.619 rem. These doses are well below the 5 rem/year legal limit. The 2.214 rem dose was approved in advance to be above the 2 rem/year performance goal by the ALARA [as low as reasonably achievable] Steering Committee in accordance with LANL procedures. Table 3.5.2-2 summarizes the highest individual dose data for CY 1998 through CY 2002. This is the first time that the information for CY 1998 and CY 1999 has appeared in a yearbook. Also, the data for CY 2000 and CY 2001 have been expanded.

Table 3.5.2-2. Highest Individual Doses from External Radiation to LANL Workers (rem)

CY 1998 [a]	CY 1999 [a]	CY 2000 [b]	CY 2001 [c]	CY 2002
1.846	1.910	1.048	1.284	2.214
1.804	1.866	1.013	1.225	1.897
1.581	1.783	0.905	1.123	1.813
1.536	1.755	0.828	1.002	1.644
1.523	1.749	0.815	0.934	1.619

[a] Data for CY 1998 and CY 1999 have been added this year.

[b] The CY 2000 data for only the two highest doses appeared in previous yearbooks. The TEDEs for these individuals are elevated due to a single unplanned incident at TA-55 in March 2000, as discussed in the SWEIS Yearbook-2000. This was an accidental exposure and so outside the SWEIS ROD projection.

[c] During CY 2001, four individual doses were greater than 1 rem, but less than 2 rem.

Comparison with the SWEIS Baseline. The collective TEDE for CY 2002 is 79 percent of the 208 person-rem of 1993–1995 used as the baseline in the ROD. Several factors were responsible for this, the more important of which include the following:

Work and Workload. Changes in workload and types of work from 1993–1995 have resulted in a decreased collective TEDE. The SWEIS used the 1993–1995 time frame as its base. Of special importance is that the radionuclide power source for the Cassini spacecraft was being constructed at TA-55 during the baseline time period. This project incurred higher neutron exposure for the workers. After the project was completed in the 1995–1996 time frame, the LANL collective TEDE was reduced.

ALARA Program. Improvements from the ALARA program, such as the continuing addition of shielding at LANL workplaces, have also resulted in lower worker exposures and consequently a reduced collective TEDE for the Laboratory.

Improved Personnel Dosimeter. An improved personnel dosimeter was introduced on a Laboratory-wide basis in April 1998. The dosimeter's increased accuracy in measuring the external neutron dose removed some conservatism that had been previously used in estimating the dose, which resulted in lower reported doses. (The actual dose did not change, but the ability to measure it accurately improved.)

Comparison with the Projected TEDE in the ROD. In addition to being less than the collective TEDE levels in 1993–1995, the collective TEDE for 2002 is less than the TEDE projected in the ROD. The implementation of war reserve pit manufacture, which was approved in the ROD, has not become fully operational at LANL. This contributed to lower doses than projected. The collective dose may increase once the pit manufacture program is fully implemented.

Collective TEDEs for Key Facilities. In general, collective TEDEs by Key Facility or technical area are difficult to determine because these data are collected at the group level, and members of many groups and/or organizations receive doses at several locations. The fraction of a group's collective TEDE coming from a specific Key Facility or technical area can only be estimated. For example, personnel from the Health Physics Operations group and JCNNM are distributed over the entire Laboratory, and these two organizations account for a significant fraction of the total LANL collective TEDE. Nevertheless, the group working at TA-18 is well defined, and the 2002 collective TEDE for the Pajarito Site Key Facility is 1.4 person-rem.

Many of the groups working at TA-55 have been reorganized to include workers at other facilities. However, approximately 95 percent of the collective TEDE that these groups incur is estimated to come from operations at TA-55. The total collective TEDE for these groups in CY 2002, plus the estimated collective TEDE for the health physics personnel and JCNNM personnel working at TA-55, is 108 person-rem, which is 66 percent of the total Laboratory TEDE of 164 person-rem.

3.6 Socioeconomics

The LANL-affiliated workforce continues to include UC employees and subcontractors. Table 3.6-1 summarizes the workforce data from CY 1996 through CY 2002. As shown in Table 3.6-1, the number of employees has exceeded SWEIS ROD projections. The 13,524 employees at the end of CY 2002 are 2,173 more employees than SWEIS ROD projections of 11,351. SWEIS ROD projections were based on 10,593 employees identified for the index year (employment as of March 1996). The 13,524 total employees at the end of CY 2002 reflect an increase of 1,144 employees over the 12,380 employees reported in the 2001 Yearbook (LANL 2002a).

Table 3.6-1. LANL-Affiliated Workforce

CATEGORY	UC EMPLOYEES	TECHNICAL CONTRACTOR	NON-TECHNICAL CONTRACTOR	JCNNM	PTLA	TOTAL
SWEIS ROD [a]	8,740	795	Not projected [b]	1,362	454	11,351
CY 1996	8,256	877	269	1,358	395	11,155
CY 1997	8,503	911	328	1,330	424	11,496
CY 1998	8,945	950	271	1,393	449	12,008
CY 1999	9,185	1,064	214	1,461	488	12,412
CY 2000	8,861	1,010	200	1,430	514	12,015
CY 2001	9,179	1,024	197	1,487	493	12,380
CY 2002	9,923	1,149	204	1,658	590	13,524

[a] Total number of employees was presented in the SWEIS, the breakdown had to be calculated based on the percentage distribution shown in the SWEIS for the base year.

[b] Data were not presented for non-technical contractors or consultants.

These employees have had a positive economic impact on northern New Mexico. Through 1998, DOE published a report each fiscal year regarding the economic impact of LANL on north-central New Mexico as well as the State of New Mexico (Lansford et al. 1997, 1998, 1999). The findings of these reports indicate that LANL's activities resulted in a total increase in economic activity in New Mexico of about $3.2 billion in 1996, $3.9 billion in 1997, and $3.8 billion in 1998. The publication of this report was discontinued after FY 1998 due to funding deficiencies. However, based on number of employees and payroll, it is expected that LANL's 2002 economic contribution was similar to the three years analyzed for DOE.

The residential distribution of UC employees reflects the housing market dynamics of three counties. As seen in Table 3.6-2, 88 percent of the UC employees continued to reside in the three counties of Los Alamos, Rio Arriba, and Santa Fe.

Table 3.6-2. County of Residence for UC Employees [a]

CALENDAR YEAR	LOS ALAMOS	RIO ARRIBA	SANTA FE	OTHER NM	TOTAL NM	OUTSIDE NM	TOTAL
SWEIS ROD [b]	4,279	1,762	1,678	671	8,390	350	8,740
CY 1996	4,539	1,274	1,524	422	7,759	497	8,256
CY 1997	4,666	1,323	1,599	436	8,024	479	8,503
CY 1998	4,831	1,454	1,688	469	8,442	503	8,945
CY 1999	4,833	1,523	1,805	529	8,690	495	9,185
CY 2000	4,663	1,509	1,778	510	8,460	401	8,861
CY 2001	4,669	1,615	1,828	571	8,683	496	9,179
CY 2002	4,909	1,733	2,065	659	9,366	557	9,923

[a] Includes both Regular and Temporary employees, including students who may not be at LANL for much of the year.
[b] Total number of employees was presented in the SWEIS, the breakdown had to be calculated based on the percentage distribution shown in the SWEIS for the base year.

Science outreach

Table 3.6-3. UC Employee[a] Index for Key Facilities

KEY FACILITY	SWEIS ROD	CY 1996	CY 1997	CY 1998	REFERENCE YEAR 1999 [b]	CY 1999	CY 2000	CY 2001	CY 2001
Plutonium Complex	1,111	463	478	526	589	589	572	635	689
Tritium Facilities	123	37	33	31	28	28	24	25	20
CMR	367	206	207	218	204	204	190	192	201
Pajarito Site	95	57	60	65	70	70	73	73	78
Sigma Complex	284	96	104	110	101	101	99	94	105
MSL	82	50	55	57	57	57	59	60	61
Target Fabrication	98	55	55	57	54	54	52	54	53
Machine Shops	289	73	77	83	81	81	80	91	92
High Explosives Testing	619	85	90	93	227	227	212	245	264
High Explosives Processing	335	184	197	201	96	96	92	107	114
LANSCE	846	494	523	547	560	560	550	505	496
Biosciences	250	78	77	82	98	98	110	116	108
Radiochemistry Laboratory	248	113	125	129	128	128	124	122	110
Waste Management – Radioactive Liquid Waste	110	47	48	55	62	62	58	47	54
Waste Management – Radioactive Solid and Chemical Waste	225	40	46	60	65	65	64	60	63
Rest of LANL	6,579	4,144	4,325	4,547	4,601	4,601	4,501	4,816	5,243
Total Employees	11,661	6,222	6,500	6,861	7,021	7,021	6,860	7,242	7,751

[a] Includes full-time and part-time regular employees; it does not include students who may be at the Laboratory for much of the year nor does it include special programs personnel. A similar index does not exist in the SWEIS, which used a very time-intensive method to calculate this index.

[b] CY 1999 was selected as the reference year for this index because it represents the year the SWEIS ROD was published.

LANL records contain the technical area and building number of each employee's office. This information does not necessarily indicate where the employee actually performs his or her work; but rather, indicates where this employee gets mail and officially reports to duty. However, for purposes of tracking the dynamics of changes in employment across Key Facilities, this information provides a useful index. Table 3.6-3 identifies UC employees by Key Facility based on the facility definitions contained in the SWEIS. The employee numbers contained in the category "Rest of LANL," were calculated by subtracting the Key Facility numbers from the calendar year total.

The numbers in Table 3.6-3 cannot be directly compared to numbers in the SWEIS. The employee numbers for Key Facilities in the SWEIS represent total workforce, and include PTLA, JCNNM, and other subcontractor personnel. The new index (shown in Table 3.6-3) is based on routinely collected information and only represents full-time and part-time regular UC employees. It does not include employees on leave of absence, students (high school, cooperative, undergraduate, or graduate), or employees from special programs (i.e., limited-term or long-term visiting staff, post-doctorate, etc.). Because the two sets of numbers do not represent the same entity, a comparison to numbers in the SWEIS is not appropriate. This new index will be used throughout the lifetime of the Yearbook; hence, future comparisons and trending will be possible. CY 1999 was selected as the reference year for this index because it represents the year the SWEIS ROD was published.

3.7 Land Resources

Land resources were examined in 1996–1998 during the development of the SWEIS. From then until CY 2002, the land resources (i.e., undeveloped and developed lands) available for use at LANL remained constant. In CY 2002, approximately 2,209 acres of land were transferred to private ownership under Public Law 105-119.

3.7.1 Land Resources—CY 1998

From 1996 through 1998, land resources at LANL and the surrounding areas remained essentially unchanged. The ROD had not been signed, and major land breaking construction projects were not undertaken. All of the construction projects that were undertaken were done within existing facilities. The SWEIS projected a habitat reduction of 41 acres under the Expanded Alternative due to the expansion of Area G. However, in 1998, LANL was still operating under the No Action Alternative, and this expansion was not undertaken. During 1998, the only major construction project outside of existing facilities at LANL was DARHT. The actual habitat loss and ground breaking activities associated with DARHT happened during construction start-up in 1992 and 1993 when the land was cleared of vegetation and the "footprint" of this facility was established.

3.7.2 Land Resources—CY 1999

In 1999, the SCC, NISC, and Los Alamos Research Park (known in 1999 as the Industrial Research Park) major construction projects started. Each of these projects had their own NEPA documentation. The SCC and NISC construction occurred on previously disturbed land containing parking lots or other structures. Only the Research Park was greenfield construction and expected to result in a loss of 30 acres. All other construction was done within existing facilities. The projected Area G expansion did not occur.

3.7.3 Land Resources—CY 2000

During 2000, land resources were impacted by the Cerro Grande Fire, which burnt across approximately 7,500 acres or 27 percent of the Laboratory's land. Of the 332 structures affected by the fire, 236 were impacted, 68 damaged, and 28 destroyed (ruined beyond economic repair). Fire mitigation work such as flood retention facilities modified less than 50 acres of undeveloped land.

A number of projects continued to move forward, such as the SCC, the NISC, several General Plant Projects, and the related but non-Laboratory Los Alamos Research Park. Most of these projects are on previously developed or disturbed land (LANL 2000b). However, the Research Park occupies about 44 acres of previously undeveloped land along West Jemez Road.

TA-03 (left) and future site of Los Alamos Research Park (tree-covered area to the right)

The Los Alamos Research Park

Also during 2000, LANL's new Comprehensive Site Plan (CSP2000, LANL 2000d) was completed. CSP2000 is LANL's guide for land development. The CSP2000 geographic information system identified approximately 18,500 acres or two-thirds of LANL's land resources as undesirable for development due to physical and operational constraints. Of the remaining 9,300 acres (about one-third of the Laboratory's land) over 5,500 acres have been developed, leaving about 4,000 acres as undeveloped. The majority of this undeveloped land is located in TAs 58, 70, 71, and 74. Because of the remote locations and adjacent land uses of TAs 70, 71, and 74, they are not considered prime developable lands for Laboratory activities.

The ER Project is unique from a land use standpoint. Rather than using land for development, the project cleans up legacy wastes and makes land available for future use. Through these efforts, several large tracts of land will be made available for use by the Laboratory, Los Alamos County, or other adjacent landowners. For example, under Public Law 105-119, the DOE was directed to convey to Los Alamos County and transfer to the Department of Interior, in trust for the Pueblo of San Ildefonso, lands not required to meet the national security mission of DOE. Several tracts of land were identified for conveyance or transfer, and pending cleanup by the ER Project, will be made available for future use.

3.7.4 Land Resources—CY 2001

CY 2001 was similar to the previous calendar years: the land acreage remained constant; the ongoing construction projects from CY 2000 continued; and the mitigation efforts and repairs from the Cerro Grande Fire of 2000 continued.

3.7.5 Land Resources—CY 2002

CY 2002 marks the first land transfers under Public Law 105-119. LANL began CY 2002 with 27,863 acres[1] of land and ended the calendar year with approximately 25,654 acres. Table 3.7.5-1 shows that, although the land resources at LANL are distributed over 10 usage categories, all of the transferred land came from the reserve land category. Table 3.7.5-2 provides a summary of the land parcels transferred and to whom they were transferred.

Because of the land transfers, the distance to some site boundaries has decreased and a preliminary assessment of the impact of the boundary changes on the accident analyses in the SWEIS has been performed. The full assessment is in Appendix E and the conclusions of the assessment are stated below.

[1] Previously, the SWEIS Yearbooks have listed Laboratory acreage at 27,816 acres. The acreage numbers being used here are from the TYCSP (LANL 2001d). The boundary survey will determine the correct number.

Table 3.7.5-1. Site-wide Land Use

LAND USE CATEGORY	ACREAGE IN CY 2002	
	BEGINNING OF CY	END OF CY
Service/Support	140	140
Experimental Science	514	514
High Explosives Research and Development	1,310	1,310
High Explosives Testing	7,096	7,096
Nuclear Materials Research and Development	374	374
Physical/Technical Support	336	336
Public/Corporate Interface	31	31
Theoretical/Computational	2	2
Waste Management	186	186
Reserve	17,874	~15,665
Total	27,863	~25,654

Table 3.7.5-2. Land Transfers during CY 2002

DESIGNATOR	DESCRIPTION	RECIPIENT	TRANSFER DATE	ACREAGE
A-1	Manhattan Monument	Los Alamos County	October 31, 2002	0.07
A-12	LAAO-1 (East)	Los Alamos County	October 31, 2002	4.51
A-17	TA-74-1 (West)	Los Alamos County	October 31, 2002	5.52
A-19	White Rock-1	Los Alamos County	October 31, 2002	76.33
A-2	Site 22	Los Alamos County	October 31, 2002	0.17
A-3	Airport-1 (East)	Los Alamos County	October 31, 2002	9.44
A-6	Airport-4 (West)	Los Alamos County	October 31, 2002	4.18
A-9	DP Road-2 (North) (Tank Farm)	Los Alamos County	October 31, 2002	14.94
B-1	White Rock-2	Pueblo of San Ildefonso	October 31, 2002	14.94
B-2	TA-74-3 (North) (Includes B-4)	Pueblo of San Ildefonso	October 31, 2002	2,089.88
Total				2,209.29

The basic conclusion of the assessment is that the decrease in distances between assumed accident locations and previously analyzed receptor locations will have little or no impact on estimated doses in the SWEIS. On this basis there appears to be no need to revise accident analyses in the SWEIS because of land transfers from the DOE to public entities.

The conclusion is based on a review of several facilities and postulated accidents, especially risk-dominant accidents in the SWEIS. Very few or minimal changes in predicted effects are expected to occur. One exception, a hydrogen cyanide accident at the Sigma Facility, has been noted. The SWEIS still serves the purpose of characterizing LANL operations, differentiating among alternatives, and presenting a baseline that is suitable for tiering and bounding of potential accidents at LANL.

A recommendation in the conclusion is that site boundary changes be considered in future NEPA reviews as appropriate.

Tract of land identified for conveyance and transfer in Pueblo Canyon

3.8 Groundwater

Groundwater occurs in three settings beneath the Pajarito Plateau: alluvium, intermediate saturated zones, and the regional aquifer. The major source of recharge to the regional aquifer is precipitation within the Sierra de los Valles. However, alluvial groundwater on the Pajarito Plateau is a source of recharge to underlying intermediate saturated zones and to the regional aquifer.

Water levels have been measured in wells tapping the regional aquifer since the late 1940s when the first exploratory wells were drilled by the US Geological Survey (McLin et al. 1998). The annual production and use of water increased from 231 million gallons in 1947 to a peak of 1,732 million gallons in 1976. Water use has declined since 1976 to 1,286 million gallons in 1997 (McLin et al. 1997, 1998). Trends in water levels in the wells reflect a plateau-wide decline in regional aquifer water levels in response to municipal water production. The decline is gradual and does not exceed 1 to 2 feet per year for most production wells (McLin et al. 1998). When pumping stops in the production wells, the static water level returns in about 6 to 12 months. Hence, these long-term declines are not currently viewed as a threat to the water supply system (McLin et al. 1998).

Sampling and analysis of water from water supply wells indicate that water in the regional aquifer beneath the Pajarito Plateau is generally of high quality and meets or exceeds all applicable water supply standards. There have been 19 characterization wells (Figure 3-1 and Table 3.8-1) installed in the regional aquifer over the past four years and each of the wells has been sampled on a quarterly basis. Data such as these are

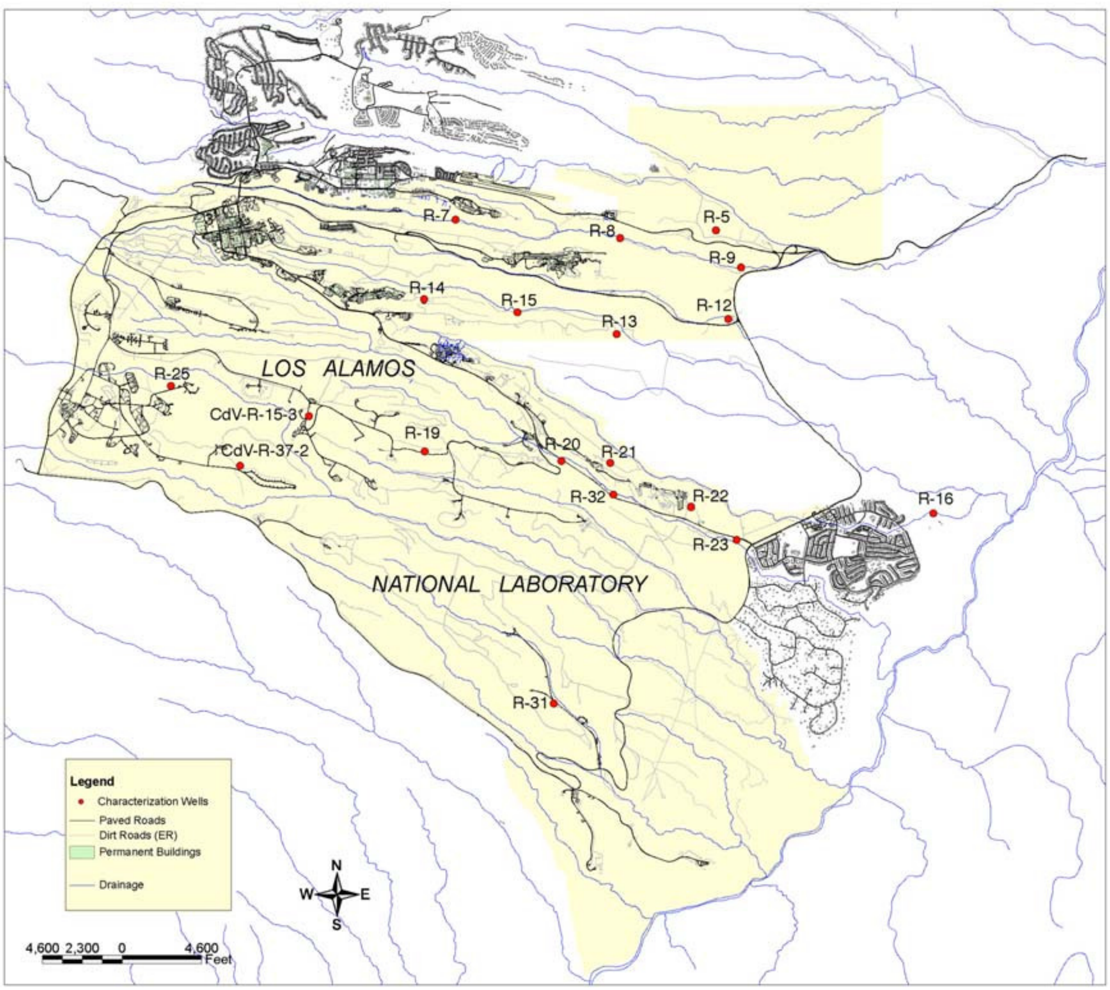


Figure 3-1. Location of the groundwater characterization wells.

Table 3.8-1. Groundwater Characterization Wells

WELL	LOCATION	DATE DRILLED	TOTAL DEPTH (FEET)	PURPOSE/FINDINGS
R-5	Pueblo Canyon	May 2001	902	Investigate regional aquifer, intermediate perched groundwater zones, and intercalated unsaturated zones in the northeast part of LANL. No contaminants in regional aquifer.
R-7	Los Alamos Canyon	January 2001	1,097	Investigate regional aquifer, intermediate perched groundwater zones, and intercalated unsaturated zones in the north-central part of LANL. No contaminants in regional aquifer.
R-8	Los Alamos Canyon	January 2002	860	Determine regional aquifer quality down gradient of releases in Los Alamos and DP Canyons. Tritium in regional aquifer indicating a component of water less than 60 years old.
R-9, R-9i	Los Alamos Canyon	September 1999	771	Determine regional aquifer quality at the Laboratory boundary down gradient of releases in Los Alamos and DP Canyons. Tritium in perched zones and regional aquifers indicating a component of water less than 60 years old.
R-12	Sandia Canyon	January 2000	886	Determine regional aquifer quality at the Laboratory boundary down gradient of releases in Sandia Canyon. Tritium in perched zones and regional aquifers indicating a component of water less than 60 years old.
R-13	Mortandad Canyon	October 2001	1,133	Examine water quality at the Laboratory boundary down gradient of releases within the Mortandad Canyon. No contaminants detected in the regional aquifer.
R-14	Ten Site Canyon	July 2002	1,325	Examine water quality near the discharge point for the RLWTF (TA-50). No contaminants detected in the regional aquifer.
R-15	Mortandad Canyon	September 1999	1,107	Examine water quality down-gradient from the discharge point for the RLWTF (TA-50). Contaminants detected in the regional aquifer are tritium, nitrate, and perchlorate. None are above drinking water standards.
R-16	Cañada del Buey	August 2002	1,287	Measure water levels and vertical gradients in regional aquifer in the discharge area. No contaminants detected in regional aquifer.
R-19	Mesa south of Three-Mile Canyon	March 2000	1,903	Determine regional aquifer quality at the Laboratory boundary down gradient of potential releases in upper Pajarito Canyon. No contaminants detected in perched or regional aquifer.
R-20	Pajarito Canyon	August 2002	1,365	Sentry well for water supply well PM-2. Regional aquifer water quality upgradient of TA-54. No contaminants detected in the regional aquifer.
R-21	Cañada del Buey	November 2002	995	Evaluate and monitor hydrologic and geochemical conditions near MDA-L. No contaminants detected in the regional aquifer.
R-22	Mesita del Buey above Pajarito Canyon	October 2000	1,489	Regional water quality and water level down gradient of TA-54. Tritium in regional aquifer indicating a component of water less than 60 years old.

Table 3.8-1. Groundwater Characterization Wells (continued)

WELL	LOCATION	DATE DRILLED	TOTAL DEPTH (FEET)	PURPOSE/FINDINGS
R-23	Pajarito Canyon	September 2002	930	Regional water quality and water level near TA-54. No contaminants detected in the regional aquifer.
R-25	Mesa south of Cañon de Valle	February 1999	1,942	Regional water quality and water level near MDA-P and other potential release sites in TA-16. High explosives and solvents in upper saturated zone and regional aquifer. Tritium in upper saturated zone and regional aquifer indicating a component of water less than 60 years old.
R-31	Ancho Canyon	February 2000	1,103	Regional water quality and water level near burning/open detonation sites. No contaminants detected in the regional aquifer.
R-32	Pajarito Canyon	August 2002	1,008	Regional water quality and water level near TA-54. No contaminants detected in the regional aquifer.
CdV-R-15-3	Cañon de Valle	April 2000	1,722	Determine extent of high explosives in perched zones down gradient of TA-16. No contaminants detected in the perched or regional aquifers.
CdV-R-37-2	Mesa north of Water Canyon	August 2001	1,664	Determine extent of high explosives in perched zones down gradient of TA-16. No contaminants detected in the regional aquifer.

captured in the Laboratory's annual groundwater status report. The most recent status report covers FY 2002 (Nylander et al. 2003).

Highlights of the regional aquifer water chemistry from these characterization wells are as follows:

• Natural groundwater ranges from calcium-sodium bicarbonate composition (Sierra de los Valles) to sodium-calcium bicarbonate composition (White Rock Canyon springs) (Longmire 2002a, b; Blake et al. 1995; LANL 2001). Silica is the second most abundant solute found in surface water and groundwater because of reactions between soluble silica glass in the rock and water. Trace metals, including barium, strontium, and uranium, vary within the different saturated zones (alluvial, intermediate, and regional aquifer) depending on how long the water has been in contact with the host rock (Nylander et al., 2003). Older groundwater within the regional aquifer tends to have higher concentrations of trace elements.

• Dissolved organic carbon, in the form of humic and fulvic acids, is present in groundwater in concentrations typically less than 3 milligrams carbon per liter. These acids occur as anions and can complex with calcium and magnesium. Higher concentrations of dissolved organic carbon occur in alluvial groundwater where runoff through grasslands and forests takes place. Shortly after the Cerro Grande Fire, increased concentrations of total organic carbon were observed in surface water and alluvial groundwater within Pueblo Canyon, Los Alamos Canyon, Pajarito Canyon, and other watersheds. Since 2002, concentrations of total organic carbon have decreased in surface water, but remain elevated in alluvial and perched-intermediate groundwater. Total organic carbon provides an excellent tracer for tracking movement of recent water (post Cerro Grande Fire) in the subsurface.

• Groundwater impacted by LANL-derived effluent is characterized by elevated concentrations of major ions (calcium, magnesium, potassium, sodium, chloride, bicarbonate, nitrate, and sulfate); trace solutes (for example, molybdenum, perchlorate, barium, boron, and uranium); high explosive compounds and other volatile organic compounds; and radionuclides (tritium, americium-241, cesium-137, plutonium isotopes, strontium-90, and uranium isotopes) (Longmire 2002a, b, c, d; LANL 2001c).

• With regard to interconnection between alluvial groundwater, intermediate saturated zones, and the regional aquifer, contaminant source terms correlate reasonably well with chemical data for mobile solutes collected at down gradient characterization wells (Longmire 2002a, LANL 2001c). Non-adsorbing contaminants (perchlorate, nitrate, RDX, and TNT) are the most mobile and travel the greatest distances along groundwater-flow paths. Concentrations of some of these chemicals in groundwater have been observed above established maximum contaminant levels and recommended health and action levels in wells (LANL 2001c, Broxton et al. 2002):

- MCOBT-4.4: intermediate saturated zone, nitrate, perchlorate
- R-25: intermediate saturated zone, high explosives (RDX)
- Alluvial wells: alluvial aquifer, actinides, metals, and fission products (Los Alamos Canyon, Pueblo Canyon, and Mortandad Canyon)

Drilling auger and crew

Cleaning the drilling residues from a regional aquifer well

Perchlorate and RDX are persistent chemicals, which are resistant to reductive breakdown to non-toxic forms in the environment.

Work underway as part of the Hydrogeologic Characterization Program, and described in the Hydrogeologic Workplan (Barr 2001), provided new information on the regional aquifer and details of the hydrogeologic conditions. By the end of 2002, six additional characterization wells were complete. The characterization wells were drilled using air rotary in the vadose zone and rotary with stiff foam or bentonite mud in the saturated zone. Casing advance with fluid assist methods, used in drilling previous characterization wells, was employed only when swelling clays were encountered in the boreholes. Geologic core was collected in the upper vadose zone in each well, and geologic cuttings were collected at defined intervals during the drilling operations and described to record the stratigraphy encountered. Geophysical logging was conducted in each well to enhance the understanding of the stratigraphy and rock characteristics. The six completed characterization wells include R-8 (Los Alamos Canyon); R-20, R-23, and R-32 (Pajarito Canyon); R-16 near the Rio Grande in White Rock; and R-13 (Mortandad Canyon). R-21 in Cañada del Buey near TA-54 was started early in FY 2003. Table 3.8-1 summarizes details on the 19 characterization wells completed by the Laboratory.

R-8 is located in Los Alamos Canyon near the confluence of Los Alamos Canyon and DP Canyon. The primary purpose of the well is to determine regional aquifer water quality down-gradient of releases in Los Alamos and DP Canyons. It also serves as a sentry well for PM-2. Significant difficulties were encountered in drilling the R-8 bore hole, so the well was constructed in a second bore hole drilled 62 ft due east of the original location. Drilling of the R-8 bore hole took place between January 9 and January 27, 2002. Well construction and development were completed on February 14, 2002. Westbay sampling equipment was installed between February 21 and February 24, 2002. The R-8 well is completed with two screened intervals in the regional aquifer: one straddling the water table at a depth of 705 to 755 feet and one at a depth of 821 to

828 ft. One sample of water from the bore hole was collected from a depth of 822 ft. Tritium with activity of 15 picocuries per liter was detected in the bore hole water sample.

Well R-14 is located within the Mortandad Canyon watershed in Ten Site Canyon, east of the former radioactive liquid waste and septic treatment facilities at TA-35. Drilling started on June 2, 2002, and was completed on July 2, 2002. The regional aquifer water level is at 1,180 feet in the high-gamma Puye Formation. Well construction and development were conducted and Westbay sampling equipment was installed to complete the well with two screened intervals in the regional aquifer: one near the water table at a depth of 1,200 feet and one in a productive zone at a depth of 1,286 feet.

R-16 is located above the Rio Grande in Overlook Park in the town of White Rock. Drilling started on August 16, 2002, and was completed on September 13, 2002. Based on the 3-D geologic model, the static water level for the regional aquifer was anticipated to be at 783 feet. There was indication of water influx at 867 feet, drilling was stopped and the water level was measured. The water level rose to 621 feet, much higher than expected. There were clay-rich zones in the Santa Fe Group, so one possible explanation for the rise in water level is that the clay zones act as confining zones. Similar artesian conditions were also encountered in Los Alamos Canyon (R-9). Well construction, development, and installation of Westbay sampling equipment completed the well with three screened intervals in the regional aquifer:

- Screen 1: 863–871 feet
- Screen 2: 1,015–1,022 feet
- Screen 3: 1,237–1,244 feet

R-20 is located in Pajarito Canyon, east of TA-18 on the south side of Pajarito Road. Drilling started on August 4, 2002, and was completed on September 19, 2002. No perched water was encountered in R-20. The static water level in the regional aquifer is at 872 feet. The well was constructed with three screened intervals, the deeper screens were put in to coincide with screened interval in PM-2:

- Screen 1: 904–912 feet
- Screen 2: 1,147–1,154 feet
- Screen 3: 1,328–1,336 feet

Well R-23 was drilled in Pajarito Canyon, just west of the NM 4/Pajarito Road intersection, on the south side of Pajarito Road. Drilling started on August 17, 2002, and was completed on October 3, 2002. The regional water table in R-23 was encountered at 817 feet, higher than predicted by the 3-D geologic model (892 feet). Based on geophysical logging, perched water may be present. The well was constructed with one screened interval, from 816 to 873 feet, at the top of the regional aquifer water table.

Well R-32 is located in Pajarito Canyon, south of TA-54, on the north side of Pajarito Road. Drilling started on July 13, 2002, and was completed on August 7, 2002. The regional water table in R-32 was originally encountered at 865 feet, the depth predicted by the 3-D Geologic Model. However, the water level rose to 715 feet. The well was constructed with three screened intervals, one at the top of water table and two deeper to measure pressure gradients:

- Screen 1: 867–874 feet
- Screen 2: 930–933 feet
- Screen 3: 970–977 feet

3.9 Cultural Resources

LANL has a large and diverse number of historic properties. Approximately 85 percent of DOE land in Los Alamos County has been surveyed for prehistoric and historic cultural resources. Over 1,800 prehistoric sites have been recorded (Table 3.9-1). More than 85 percent of these archeological sites date from the 14th and 15th centuries. Most of the sites are found in the piñon-juniper vegetation zone, with 80 percent lying between 5,800 and 7,100 feet in elevation. Almost three-quarters of all sites are found on mesa tops.

Table 3.9-1. Acreage Surveyed, Prehistoric Cultural Resource Sites Recorded, and Cultural Resource Sites Eligible for the National Register of Historic Places at LANL FY 2002 [a]

FISCAL YEAR	TOTAL ACREAGE SURVEYED	TOTAL ACREAGE SYSTEMATICALLY SURVEYED TO DATE	TOTAL PREHISTORIC CULTURAL RESOURCE SITES RECORDED TO DATE[b] (CUMULATIVE)	TOTAL NUMBER OF ELIGIBLE AND POTENTIALLY ELIGIBLE NRHP SITES	NUMBER OF NOTIFICATIONS TO INDIAN TRIBES [c]
LANL SWEIS ROD	Not reported	Not Reported	1,295[d]	1,092	23
1998	1,920	17,937	1,369	1,304	10
1999	1,074	19,011	1,392	1,321	13
2000	119	19,428	1,459	1,386	6
2001	4,112	19,790	1,424[d]	1,297[d]	2
2002	2,686	22,476	1,835	1,699	6

[a] Source: The Secretary of Interior's Report to Congress on Federal Archaeological Activities. Information on LANL provided by DOE/Los Alamos Site Office and LANL Cultural Resources Management Team (CRMT).

[b] In the 1999 and 2000 Yearbooks, this column, then titled 'Total Archaeological Sites Recorded to Date,' included Historic Period cultural resources (A.D. 1600 to present), including buildings. In order to conform to the way cultural properties were discussed in the SWEIS, historic period properties were removed beginning with the 2001 SWEIS Yearbook. Historic sites are now documented in a separate table (3.9-2).

[c] As part of the SWEIS preparation, 23 tribes were consulted in a single notification. Subsequent years, however, show the number of separate projects for which tribal notifications were issued; the number of tribes notified is not indicated.

[d] As part of ongoing work to field verify sites recorded 20 to 25 years ago, LANL's CRMT has identified sites that have been recorded more than once and have multiple Laboratory of Anthropology (LA) site numbers. Therefore, the total number of recorded archaeological sites is less than indicated in FY 2000. This effort will continue over the next several years and more sites with duplicate records will probably be identified.

LANL continues to evaluate buildings and structures from the Manhattan Project and the early Cold War period (1943–1963) for eligibility to the Natural Register of Historic Places (NRHP). Within LANL's limited access boundaries, there are ancestral villages, shrines, petroglyphs, sacred springs, trails, and traditional use areas that could be identified by Pueblo and Athabascan communities as traditional cultural properties.

The SWEIS ROD lists 2,319 historic (A.D. 1600 to the present) cultural resource sites, including sites dating from the Historic Pueblo, US Territorial, Statehood, Homestead, Manhattan Project, and Cold War Periods (Table 3.9-2). To date LANL has identified no sites associated with the Spanish Colonial or Mexican Periods. Many of the 2,319 potential historic cultural resources are temporary and modular properties, sheds, and utility features associated with the Manhattan Project and Cold War Periods. Since the SWEIS ROD was issued, these types of properties have been removed from the count of historic properties because they are exempt from review under the terms of the Programmatic Agreement (MOU DE-GM32-00AL77152) between the DOE Los Alamos Area Office, the New Mexico State Historic Preservation Office, and the Advisory Council on Historic Preservation. Additionally, the CRMT has evaluated many Manhattan Project and Early Cold War properties (A.D. 1942–1963) and those properties built after 1963 that potentially have historical

Table 3.9-2. Historic Period Cultural Resource Properties at LANL[a]

FISCAL YEAR	POTENTIAL PROPERTIES[b]	PROPERTIES RECORDED[c]	ELIGIBLE AND POTENTIALLY ELIGIBLE PROPERTIES	NON-ELIGIBLE PROPERTIES	EVALUATED BUILDINGS DEMOLISHED
LANL SWEIS ROD	2,319	164	98	Not Reported	Not Reported
1998	Not Reported	181	136	45	Not Reported
1999	Not Reported	240	170	70	Not Reported
2000	Not Reported	246	173	73	Not Reported
2001	733	259	186	73	33
2002	753	301	218	83	42

[a] Source: The Secretary of Interior's Report to Congress on Federal Archaeological Activities. Information on LANL provided by DOE/Los Alamos Site Office and LANL CRMT. Numbers given represent cumulative total properties identified, evaluated, or demolished by the end of the given fiscal year.

[b] This number includes historic sites that have not been evaluated, and therefore, may be potentially NRHP-eligible. In addition, beginning with the 2002 Yearbook, historic properties that are exempt from review under the terms of the Programmatic Agreement were removed from these totals, substantially reducing the number of potential historic period cultural resources.

[c] This represents both eligible and non-eligible sites.

significance, reducing the total number of potential historic cultural resource sites to 753. Most buildings built after 1963 are being evaluated on a case-by-case basis as projects arise that have the potential to impact the properties. Therefore, additional buildings may be added to the list of historic properties in the future.

LANL has recorded 139 historic sites. All have been given unique New Mexico LA site numbers. Some of the 139 are experimental areas and artifact scatters dating from the Manhattan Project and early Cold War Periods. The majority, 126 sites, are structures or artifact scatters associated with the Historic Pueblo, US Territorial, Statehood, or Homestead Periods. Of these 139 sites 96 have been declared eligible for the NRHP. LANL's Manhattan Project and early Cold War Period buildings account for the remaining 614 of the 753 historic period properties. At this time the New Mexico State Historic Preservation Division (NMSHPD) does not assign LA numbers to LANL buildings. Of these historic buildings, 162 have been evaluated for eligibility and inclusion on the NRHP. Forty of these evaluated buildings have been declared not eligible for the NRHP; the remaining 122 are NRHP-eligible.

The CRMT has documented 30 of the NRHP-eligible buildings in accordance with the terms of official Memorandums of Agreement between the DOE and the NMSHPD. They have subsequently been decontaminated, decommissioned, and demolished through the Decontamination and Decommissioning Program. Twelve of the 40 non-eligible buildings have also been demolished through this program.

3.9.1 Compliance Overview

Section 106 of the National Historic Preservation Act, Public Law 89-665, implemented by 36 Code of Federal Regulations Part 800 (36 CFR 800), requires Federal agencies to evaluate the impact of proposed actions on historic properties. Federal agencies must also consult with the State Historic Preservation Officer and/or the Advisory Council on Historic Preservation about possible adverse effects to NRHP-eligible resources.

During FY 2002 (October 2001 through September 2002), the CRMT evaluated 1,124 Laboratory proposed actions and conducted two new field surveys to identify cultural resources. DOE sent 11 survey results to the SHPO for concurrence in findings of effects and determinations of eligibility for the NRHP of cultural resources located during the survey.

The American Indian Religious Freedom Act of 1978 (Public Law 95-341) stipulates that it is Federal policy to protect and preserve the right of American Indians to practice their traditional religions. Tribal groups must receive notification of possible alteration of traditional and sacred places. The Governors of San Ildefonso, Santa Clara, Cochiti, and Jemez Pueblos and the President of the Mescalero Apache Tribe received copies of six reports to identify any traditional cultural properties that a proposed action could affect. CRMT identified adverse effects to three historic buildings that were decommissioned and decontaminated in 2002. Historic building documentation and interpretation were conducted to resolve the adverse effects.

The Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601) states that if burials or cultural objects are inadvertently disturbed by Federal activities, work must stop in that location for 30 days, and the closest lineal descendant must be consulted for disposition of the remains. No discoveries of burials or cultural objects occurred in FY 2002. The Archaeological Resources Protection Act of 1979 (Public Law 96-95) provides protection of cultural resources and sets penalties for their damage or removal from Federal land without a permit. No violations of this Act were recorded on DOE land in FY 2002.

3.9.2 Compliance Activities

Nake'muu. During FY 2002, as part of the DARHT MAP (LANL 1995), the CRMT continued a long-term monitoring program at the ancestral pueblo of Nake'muu to assess the impact of LANL mission activities on cultural resources. Nake'muu is the only pueblo at the Laboratory that still contains its original standing walls. It dates from circa A.D. 1200 to 1325 and contains 55 rooms with walls standing up to six feet high. FY 2002 witnessed the lowest loss rate for chinking stones (0.5%) and masonry blocks (0.2%) during the five-year monitoring period. The fact that this was an extreme drought year would support the contention that natural processes have a great effect on the deterioration rate of the site. During the five-year monitoring program Nake'muu has experienced a 5.8 percent loss of chinking stones and 2.7 percent loss of masonry blocks. During FY 2002 the post-Cerro Grande Fire Pueblo Site Condition Assessment Team also visited Nake'muu. Trees that could potentially fall and damage the standing wall architecture were marked for future removal during 2003.

Members of the San Ildefonso Pueblo visiting the Nake' muu ruins

Traditional Cultural Properties Comprehensive Plan. During FY 2002, the CRMT continued to assist DOE in implementing the Traditional Cultural Properties Comprehensive Plan (LANL 2000e). This included a formal meeting with the four Accord Pueblos (Cochiti, Jemez, San Ildefonso, Santa Clara) and a separate formal meeting with the Hopi Tribe. In addition, two individual working meetings were held with representatives from San Ildefonso Pueblo. A plan has been developed with San Ildefonso Pueblo to prioritize their issues, beginning with consideration of TA-03 and previously identified traditional cultural properties in Rendija Canyon.

Shards found on the Pajarito Plateau

Land Conveyance and Transfer. *The Programmatic Agreement Among the United States Department of Energy, the Advisory Council on Historic Preservation, the New Mexico State Historic Preservation Officer, and the Incorporated County of Los Alamos, New Mexico, Concerning the Conveyance of Certain Parcels of Land to Los Alamos County, New Mexico* was signed in May 2002 (DOE 2002b). In September 2002, the TA-74 North tract was transferred to the Pueblo of San Ildefonso. Excavations at the Airport East and White Rock tracts began in June 2002 and were completed in March 2003. Those tracts are now available to the County of Los Alamos for development. In the 2003 archeological field season, the Airport Central tract is scheduled for excavation and historic building documentation will be completed at the DOE/NNSA Los Alamos Site Office building, the Laboratory Archives, and the classified incinerator.

Cerro Grande Fire Recovery. During 2002, the CRMT finished its archaeological assessment of more than 500 sites and historic buildings and structures that were potentially impacted by the May 2000 Cerro Grande Fire. The report of this assessment will be made available to the general public through the Ecology Group and LANL's Library Without Walls web sites. The CRMT also continued to assist the Cerro Grande Rehabilitation Project in support of a contract with the Pueblos of San Ildefonso and Santa Clara to provide specific recommendations for rehabilitative treatments at approximately 118 archaeological sites most heavily impacted by the fire. The Cerro Grande Rehabilitation Project and the Pueblo of San Ildefonso will implement these treatments during 2003.

3.9.3 Integrated Cultural Resources Management Plan

The Integrated Cultural Resources Management Plan will provide a set of guidelines for managing and protecting cultural resources, in accordance with requirements of the National Historic Preservation Act, the Archaeological Resources Protection Act, and the American Indian Religious Freedom Act and in the context of UC/LANL's mission.

The *Comprehensive Plan for Consideration of Traditional Cultural Properties and Sacred Sites at Los Alamos National Laboratory, New Mexico* (LANL 2000e), issued August 2000, presents a framework for collaborating with Native American Tribal organizations and other ethnic groups in identifying traditional cultural properties and sacred sites. The ICRMP will provide high-level guidance for implementation of this Comprehensive Plan.

Status:

The Integrated Cultural Resources Management Plan is due to be complete in 2004 and it will be updated every five years after issuance.

Relationship to Other Plans:

The Biological Resources Management Plan (particularly the Threatened and Endangered Species Habitat Management Plan [LANL 1998]) may limit access to certain cultural resource sites. Erosion control under the water plans will have a potential impact on cultural resource sites.

Demolished Buildings

Table 3.9.3-1 indicates the extent of historic building documentation and demolition to date.

Table 3.9.3-1. Historic Building Documentation and Demolition Numbers

FISCAL YEAR	NUMBER OF BUILDINGS FOR WHICH REQUIRED DOCUMENTATION WAS COMPLETED	NUMBER OF BUILDINGS ACTUALLY DEMOLISHED IN FISCAL YEAR[a]
Pre 1995	1	Unknown
1995	21	Unknown
1996	0	Unknown
1997	0	Unknown
1998	5	Unknown
1999	5	Unknown
2000	0	Unknown
2001	7	Unknown
2002	31	0
TOTAL	42	42

[a] Although buildings were demolished in the years before 2002, the CRMT did not monitor the dates when the building demolitions actually occurred, but the total is 42.

2002 Land Transferred

Nine cultural resources sites were excavated in whole or in part in the White Rock and Airport tracts. Sites transferred to San Ildefonso Pueblo did not require data recovery since the cultural properties are protected by the same Federal laws that apply to DOE.

White Rock Tract. A total of 11 sites were transferred to San Ildefonso Pueblo and Los Alamos County. Eight of these sites had data recovery including all seven County sites and the County portion of a site straddling the boundary between the County and San Ildefonso Pueblo.

Airport Tract. One site was excavated and transferred to Los Alamos County.

TA-74 Tract. Forty-nine sites were transferred to San Ildefonso Pueblo.

3.10 Ecological Resources

LANL is located in a region of diverse landform, elevation, and climate—features that contribute to producing diversified plant and animal communities. Plant communities range from urban and suburban areas to grasslands, wetlands, shrub lands, woodlands, and mountain forest. These plant communities provide habitat for a variety of animal life.

The SWEIS ROD projected no significant adverse impacts to biological resources, ecological processes, or biodiversity (including threatened and endangered species). Data collected for 2001 support this projection. These data will be reported in the 2001 Environmental Surveillance Report (LANL 2002b).

Probably the greatest natural resources management issue for LANL in 2002 was the continuing recovery and response to the Cerro Grande Fire of May 2000. The wildfire fuels reduction program has treated several thousand acres of forest and woodland and will continue to operate through 2003. Burned area rehabilitation and monitoring efforts are ongoing. Vegetation and wildlife monitoring efforts are evaluating the effects of the fire and the thinning activities. LANL personnel are developing a biological resources management plan that will define management objectives and actions for sustainable stewardship of our natural resources.

3.10.1 Threatened and Endangered Species Habitat Management Plan

LANL's Threatened and Endangered Species Habitat Management Plan (LANL 1998) received US Fish and Wildlife Service concurrence on February 12, 1999. The plan is used in project reviews and to provide guidelines to project managers for assessing and reducing potential impacts to federally listed threatened and endangered species, including the Mexican spotted owl, southwestern willow flycatcher, and bald eagle. The Threatened and Endangered Species Habitat Management Plan was incorporated into the NEPA, Cultural, and Biological Laboratory Implementation Requirement (LIR) document developed during 1999. The LIR program provides training to LANL personnel on the proper implementation of the Threatened and Endangered Species Habitat Management Plan as part of a LIR training program.

In 2002, LANL continued to assess the effects of the Cerro Grande Fire on threatened or endangered species. As reported in the 2001 Yearbook (LANL 2002a), there is no evidence that the fire caused a long-term change to the overall number of federally listed threatened or endangered species inhabiting the region. LANL's species of greatest concern, the Mexican spotted owl, resumed normal breeding activities in 2001 and 2002. Some State-listed species, including the Jemez Mountains salamander, have undoubtedly been less fortunate.

LANL continues to operate under the original Threatened and Endangered Species Habitat Management Plan guidelines. Work is continuing on a habitat model of Mexican spotted owls in the Jemez Mountains. A recently completed post-fire land cover map will provide more current information on habitat types. The results of these projects will refine the model of Mexican spotted owl habitat requirements and will be used to modify the Threatened and Endangered Species Habitat Management Plan and to reflect post-fire habitat changes.

LANL expanded the migratory bird monitoring program in 2002. The expanded monitoring program will provide better data on the distribution and abundance of migratory species on LANL property. It will also allow LANL staff to better manage these habitats and to meet obligations under the Migratory Bird Treaty Act (16 USC 703-711).

In late 2002, bark beetle infestations killed large numbers of ponderosa pine and piñon pine throughout the Southwest, including LANL property. In some stands, over 90 percent of the pines have died. At this time the ecological consequences of this event can only be postulated, but with the enhanced monitoring capability, LANL staff will be better able to evaluate effects on sensitive species in subsequent years.

In 2002, the LANL staff continued several contaminant studies and risk assessment studies of threatened and endangered species inhabiting Laboratory lands. These studies include potential impacts from the Cerro Grande Fire and involve assessing organic chemical contamination in the food chain for selected endangered species and monitoring polychlorinated biphenyls and organochlorine pesticides in fish of the Rio Grande.

3.10.2 Biological Assessments

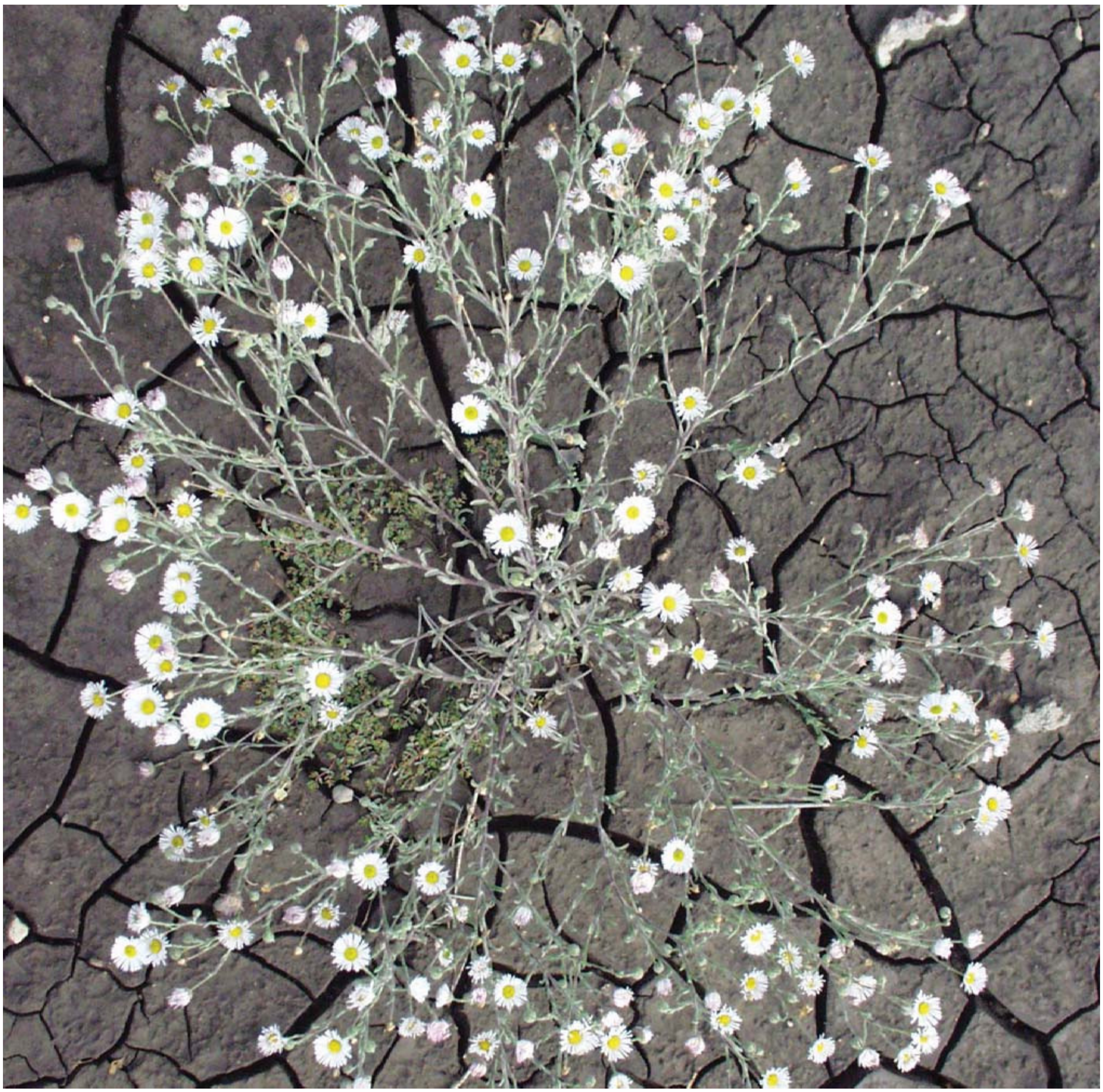
The Laboratory reviews proposed activities and projects for potential impact on biological resources including Federal- or State-listed threatened or endangered species. These reviews evaluate and record the amount of development or disturbance at proposed construction sites, the amount of disturbance within designated core and buffer habitat, the potential impact to wetlands or floodplains in the project area, and whether habitat evaluations or species-specific surveys are needed (Table 3.10.2-1).

Table 3.10.2-1. Biological Resources Reviews

TIME FRAME	TOTAL PROJECT REVIEWS	NUMBER OF HABITAT SURVEYS REQUIRED	NUMBER OF PROJECTS MODIFIED TO MEET HMP [a] GUIDELINES	UNDEVELOPED BUFFER AREAS AFFECTED (ACRES)	UNDEVELOPED CORE HABITAT AFFECTED (ACRES)
10/01/1999 – 12/31/2000	~505	60	45	12	3.6
01/01/2001 – 12/31/2002	~2,000	475	260	63	5.7

[a] HMP = LANL's Threatened and Endangered Species Habitat Management Plan (LANL 1998).

During 2002, LANL completed three biological compliance packages for projects requiring an Endangered Species Act biological assessment (BA). The compliance package includes the BA, a wetlands and floodplains assessment, a migratory birds assessment, and an assessment of state-listed species of interest. Compliance packages were written in support of the original Security Bypass Road Project (LANL 2002c; subsequently replaced by the Access Control and Traffic Improvement Project), the Los Alamos Canyon Gas Line Project (LANL 2002d), and the Pajarito Gas Line Project (LANL 2001e). The US Fish and Wildlife Service concurred in determinations that all four projects may affect, but are not likely to adversely affect, the Mexican spotted owl and the bald eagle and will have no effect on other threatened or endangered species. In addition to the compliance packages, LANL produced four independent floodplains/wetlands assessments: for the TA 18-22 Bypass Road Project, the Disposition of the Cerro Grande Fire Flood and Sediment Retention Structure Project, the installation of a multiple permeable reactive barrier in Mortandad Canyon, and the Access Control and Traffic Improvement Project.



Fleabane Daisy

3.11 References

20.2.73 NMAC. New Mexico Administrative Code, Title 20 "Environmental Protection," Chapter 2 "Air Quality (Statewide)," Part 73 "Notice of Intent and Emissions Inventory Requirements."

36 CFR 800. Protection of Historic and Cultural Properties.

American Indian Religious Freedom Act of 1978. 42 USC 1996 and 1996a.

Archaeological Resources Protection Act of 1979. 16 USC 470aa–mm.

Barr, A., 2001. "Hydrogeologic Workplan," Los Alamos National Laboratory report LA-UR-01-6511, Los Alamos, NM.

Blake, W.D., F. Goff, A.I. Adams, and D. Counce, May 1995. "Environmental Geochemistry for Surface and Subsurface Waters in the Pajarito Plateau and Outlying Areas, New Mexico," Los Alamos National Laboratory report LA-12912-MS, Los Alamos, NM.

Broxton, D., R. Warren, P. Longmire, R. Gilkeson, S. Johnson, D. Rogers, W. Stone, B. Newman, M. Everett, D. Vaniman, S. McLin, J. Skalski, and D. Larssen, March 2002. "Characterization Well R-25 Completion Report," Los Alamos National Laboratory report LA-13909-MS, Los Alamos, NM.

Department of Energy, 1999. "Record of Decision: SWEIS in the State of New Mexico," 64 FR 50797, Washington, D.C.

Department of Energy, 2000. "Environmental Assessment for Electrical Power System Upgrades at Los Alamos National Laboratory, Los Alamos, New Mexico," DOE/EA-1247, and Finding of No Significant Impact. Los Alamos, NM.

Department of Energy, 2002a. "Environmental Assessment for Installation and Operation of Combustion Turbine Generators at Los Alamos National Laboratory, Los Alamos, New Mexico," DOE/EA-1430, and Finding of No Significant Impact. Los Alamos, NM.

Department of Energy, 2002b. "Programmatic Agreement Among the United States Department of Energy, the Advisory Council on Historic Preservation, the New Mexico State Historic Preservation Officer, and the Incorporated County of Los Alamos, New Mexico, Concerning the Conveyance of Certain Parcels of Land to Los Alamos County, New Mexico," signed 5/22/02.

Emergency Planning Community Right-to-Know Act. 42 USC 116 et seq.

Endangered Species Act. 16 USC et seq.

Lansford, R., L. Adcock, S. Ben-David, and J. Temple, 1997. "The Economic Impact of Los Alamos National Laboratory on North-Central New Mexico and the State of New Mexico Fiscal Year 1996," New Mexico State University; prepared for the US Department of Energy.

Lansford, R., L. Adcock, S. Ben-David, and J. Temple, 1998. "The Economic Impact of Los Alamos National Laboratory on North-Central New Mexico and the State of New Mexico Fiscal Year 1997," New Mexico State University; prepared for the US Department of Energy.

Lansford, R., L. Adcock, S. Ben-David, and J. Temple, 1999. "The Economic Impact of Los Alamos National Laboratory on North-Central New Mexico and the State of New Mexico Fiscal Year 1998," New Mexico State University; prepared for the US Department of Energy.

Longmire, P., September 2002a. "Characterization Well R-22 Geochemistry Report," Los Alamos National Laboratory report LA-13986-MS, Los Alamos, New Mexico.

Longmire, P., March 2002b. "Characterization Well R-15 Geochemistry Report," Los Alamos National Laboratory report LA-13896-MS, Los Alamos, New Mexico.

Longmire, P., June 2002c. "Characterization Well R-12 Geochemistry Report," Los Alamos National Laboratory Report LA-13952-MS, Los Alamos, New Mexico.

Longmire, P., April 2002d. "Characterization Wells R-9 and R-9i Geochemistry Report," Los Alamos National Laboratory report LA-13927-MS, Los Alamos, NM.

Los Alamos National Laboratory, 1995. "Biological and Floodplain/Wetland Assessment for the Dual-Axis Radiographic Hydrodynamics Test Facility (DARHT)," Los Alamos National Laboratory report LA-UR-95-647, Los Alamos, NM.

Los Alamos National Laboratory, 1998. "Threatened and Endangered Species Habitat Management Plan," Los Alamos National Laboratory report LA-CP-98-96, Los Alamos, NM.

Los Alamos National Laboratory, 2000a. "Emissions Inventory Report Summary, Reporting Requirements for the New Mexico Administrative Code, Title 20, Chapter 2, Part 73 for Calendar Year 1999," Los Alamos National Laboratory report LA-13728-PR, Los Alamos, NM.

Los Alamos National Laboratory, 2000b. "SWEIS Yearbook–1999," Los Alamos National Laboratory report LA-UR-00-5520, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?LA-UR-00-5520.htm).

Los Alamos National Laboratory, 2000c. "Surface Water Data at Los Alamos National Laboratory: 2000 Water Year," Los Alamos National Laboratory report LA-13814-PR, Los Alamos, NM.

Los Alamos National Laboratory 2000d. "Comprehensive Site Plan 2000, Technical Site Information Document," Los Alamos National Laboratory report LA-UR-99-6704, Los Alamos, NM.

Los Alamos National Laboratory, 2000e. "A Comprehensive Plan for the Consideration of Traditional Cultural Properties and Sacred Sites at Los Alamos National Laboratory, New Mexico," Los Alamos National Laboratory document LA-UR-00-2400, Los Alamos, NM.

Los Alamos National Laboratory, 2001a. "Emissions Inventory Report Summary, Reporting Requirements for the New Mexico Administrative Code, Title 20, Chapter 2, Part 73 for Calendar Year 2000," Los Alamos National Laboratory report LA-13850-PR, Los Alamos, NM.

Los Alamos National Laboratory, 2001b. "SWEIS Yearbook—2000," Los Alamos National Laboratory report LA-UR-01-2965, Los Alamos, NM. (http://lib-www.lanl.gov/la-pubs/00818189.pdf)

Los Alamos National Laboratory, 2001c. "Environmental Surveillance at Los Alamos During 2000," Los Alamos National Laboratory report LA-13979-ENV, Los Alamos, NM.

Los Alamos National Laboratory, 2001d. "FY01 Ten Year Comprehensive Site Plan," Los Alamos National Laboratory document LA-CP-01-374, Los Alamos, NM.

Los Alamos National Laboratory, 2001e. "Biological Assessment: The Potential Effects of the Pajarito Gas Line Construction on Federally Listed Threatened and Endangered Species," Los Alamos National Laboratory report LA-UR-00-4739, Los Alamos, NM.

Los Alamos National Laboratory 2002a. "SWEIS Yearbook—2001," Los Alamos National Laboratory report LA-UR-02-3143, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?00818857.pdf).

Los Alamos National Laboratory, 2002b. "Environmental Surveillance at Los Alamos during 2001," Los Alamos National Laboratory report LA-13979-ENV, Los Alamos, NM.

Los Alamos National Laboratory, 2002c. "Biological Assessment: The Potential Effects of the Bypass Road Construction on Federally Listed Threatened, Endangered, and Sensitive Species," Los Alamos National Laboratory report LA-CP-02-324, Los Alamos, NM.

Los Alamos National Laboratory, 2002d. "Biological Assessment: The Potential Effects of the Los Alamos Canyon Gas Line Construction on Federally Listed Threatened, Endangered, and Sensitive Species," Los Alamos National Laboratory report LA-UR-02-914. Los Alamos, NM.

Los Alamos National Laboratory, in preparation. "Environmental Surveillance at Los Alamos during 2002," Los Alamos National Laboratory report in preparation, Los Alamos, NM.

Migratory Bird Treaty Act. 16 USC 703–711.

McLin, S.G., W.D. Purtymun, M.N. Maes, and P.A. Longmire, 1997. "Water Supply at Los Alamos during 1996," Los Alamos National Laboratory report LA-13371-PR, Los Alamos, NM.

McLin, S.G., W.D. Purtymun, and M.N. Maes, 1998. "Water Supply at Los Alamos during 1997," Los Alamos National Laboratory report LA-13548-PR, Los Alamos, NM.

National Historic Preservation Act. 16 USC 470 et seq.

Native American Graves Protection and Repatriation Act of 1990. 25 USC 3001 et seq.

Nylander, C.L., K.A. Bitner, G. Cole, E.H. Keating, S. Kinkead, P. Longmire, B. Robinson, D.B. Rogers, and D. Vaniman, 2003. "Groundwater Annual Status Report for Fiscal Year 2002," Los Alamos National Laboratory report LA-UR-03-0244, Los Alamos, NM.

National Environmental Policy Act of 1969. 42 USC 4321 et seq.

Resource Conservation and Recovery Act of 1976. 42 USC 6901 et seq.

Wetland in Mortandad Canyon

4.0 Trend Analysis

Beginning in 1999 the Yearbook included a new chapter that examined trends by comparing actual LANL operating conditions to SWEIS ROD projections. Where the 1999 Yearbook was restricted to waste data, subsequent Yearbooks also included land use and utilities information. Additional information has been added in this edition of the Yearbook so that SWEIS ROD projections can be applied to a wider range of data. Many of these comparisons are qualitative due to the nature of the data collected. The purpose of these additional comparisons is to allow a more comprehensive review of the SWEIS projections compared to actual LANL operating parameters over the years in which data were available, usually about five years.

In preparing this chapter, it became obvious that not all data collected lend themselves to this type of analysis. First, some data consist mostly of estimates (i.e., historical NPDES outfall flows) where variations between years may be nothing more than an artifact of the methodology used to make estimates. These data did not depict environmental risk, and any evaluation between years would be meaningless. Second, some data were so far below SWEIS ROD projections (i.e., air quality and high explosive production), that even significant increases in measured quantities would not cause LANL to exceed the risks evaluated in the SWEIS, and such a comparison would have served no practical purpose for the development of a SWEIS in the future. Finally, some data did not represent site impacts, were inherently variable, and did not represent utilization of onsite natural resources (i.e., ER Project exhumed material shipped offsite).

The data conducive to numerical analysis represent real numbers of two distinct types. First, data that demonstrate cumulative effects across years where summed quantities could approach or exceed SWEIS ROD projections or regulatory limits or create negative environmental impacts (e.g., waste disposed at LANL). Or, second, data that represent, on an annual basis, measured quantities that approach limits established by agreement and/or regulation (i.e., gas, electric, and water consumption). Specific factors that influenced the numerical values are found in previous Yearbooks and in Chapter 3 of this Yearbook. Where quantitative comparisons are not appropriate, this chapter attempts to summarize the relationship of LANL's operations to the SWEIS projections qualitatively.

4.1 Air Emissions

Air emissions continue to be within regulatory limits. LANL continues to be in compliance with air quality standards and the region continues to be an attainment area for air quality under the Clean Air Act.

4.1.1 Radioactive Air Emissions

The SWEIS projected annual radioactive stack emissions for LANL at 21,700 curies per year. Since 1998 LANL's radioactive stack emissions have not exceeded 15,400 curies in a single year (see Table 3.1.1-1). LANSCE, the largest contributor to LANL radioactive stack emissions, has consistently emitted fewer curies of radioactive material than was projected by the SWEIS. Consequently LANL is still operating within the parameters that the SWEIS analyzed (Figure 4-1). This is likely due to the conservative nature of the SWEIS projections and to a lower level of operations than was considered in the SWEIS.

Tritium emissions are the largest contributor to LANL's overall radioactive emissions (see Table 3.1.1-1). Tritium emissions from Key Facilities have, with one exception (2001), also been within the projections of the SWEIS. The single exception was a one-time release of 7,600 curies. The effect of this single release has been to raise the average annual emissions of tritium to about 25 percent above the SWEIS projections. If this single event is deducted from the tritium emissions for 2001, tritium emissions from Key Facilities are less than half what the SWEIS projected (Figure 4-2). The SWEIS parameter for tritium emissions from the Non-Key Facilities is 910 curies per year based on the index year of 1994 (SWEIS Table 3.6.1-31). The average annual emissions of tritium from Non-Key Facilities has exceeded that value slightly in three of the four years for which data were reported; however, the average annual tritium emissions from Non-Key Facilities is below the SWEIS parameter.

The SWEIS projected the maximum offsite dose to a member of the public at 5.44 millirem per year. In the period from 1998 to 2002, the actual dose has been lower than projected (see Table 3.1.1-2) and has not approached the EPA dose standard of 10 millirem per year (Figure 4-3).

4.1.2 Nonradioactive Air Emissions

The Los Alamos area continues to be an attainment area for criteria air pollutants under the Clean Air Act. With few exceptions, annual emissions of criteria air pollutants from LANL operations from 1998 to 2002 remained within SWEIS projections for all four categories (carbon monoxide [Figure 4-4], NO_x [Figure 4-5], particulate matter [Figure 4-6], and SO_x [Figure 4-7]) (see Table 3.1.2.1-1). During the Cerro Grande Fire in 2000, the steam plant burned fuel oil, significantly increasing the emissions of SO_x. This event is not typical of LANL operations. In 2002, the use of air curtain destructors to dispose of trees thinned as part of the Cerro Grande Rehabilitation Project resulted in higher than projected quantities of particulates and SO_x. Emissions of these two pollutants will remain higher than SWEIS projections while extensive tree thinning continues in 2003. At the conclusion of the large-scale tree thinning, the emissions levels should drop to levels more in line with SWEIS projections. Nitrogen oxide emissions have decreased during CY 2002 due to the installation of flue gas recirculation equipment and to the transfer of the water pump to Los Alamos County. However, it is expected that there will an increase in NO_x emissions in 2004 or 2005 when the TA-03 Power Plant begins operation of the new combustion turbine generator.

Since the SWEIS reported chemical emissions (volatile organic compounds and hazardous air pollutants) as concentrations, the data cannot be directly compared to data reported in the Yearbook. Total emissions of volatile organic compounds and hazardous air pollutants (see Table 3.1.2.2-1) show considerable variation over the last four years (Figure 4-8). Use of the air curtain destructors accounted for substantial increases in both volatile organic compounds and hazardous air pollutants in 2002. As the Cerro Grande Rehabilitation Project completes tree thinning and removal, emissions of volatile organic compounds and hazardous air pollutants should return to lower levels more typical of pre-fire conditions.

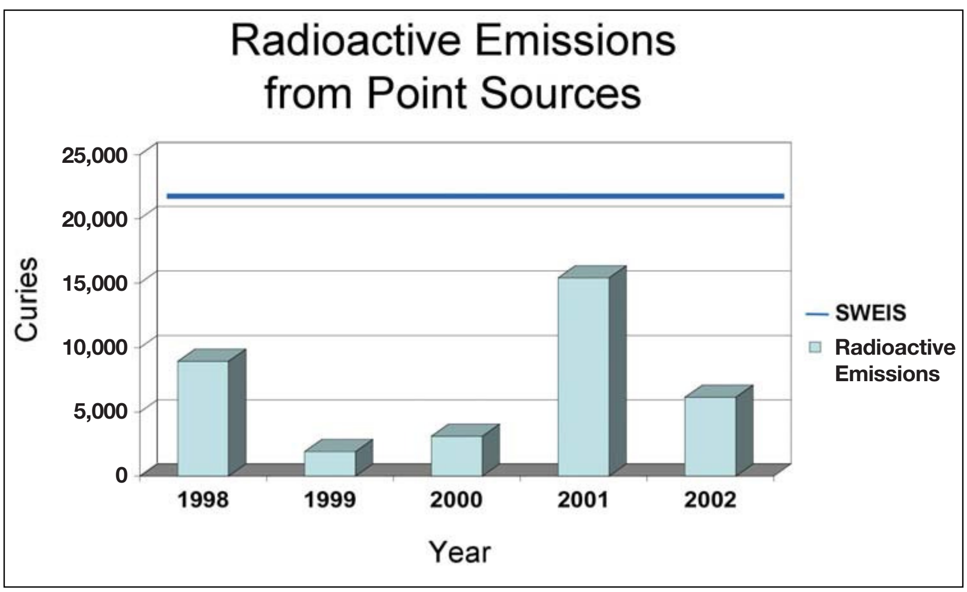


Figure 4-1. Total radioactive emissions from point sources.

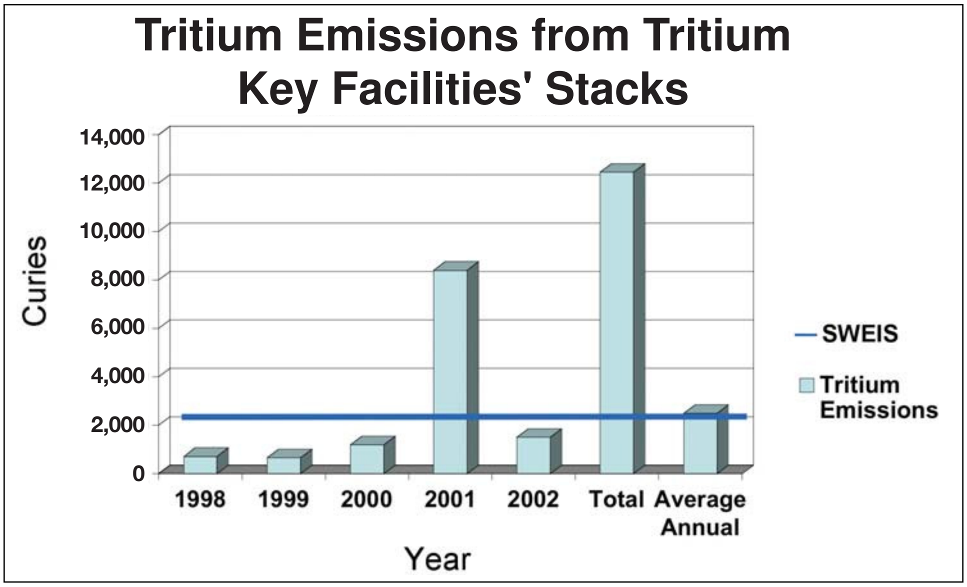


Figure 4-2. Tritium Emissions from Tritium Key Facilities' Stacks.

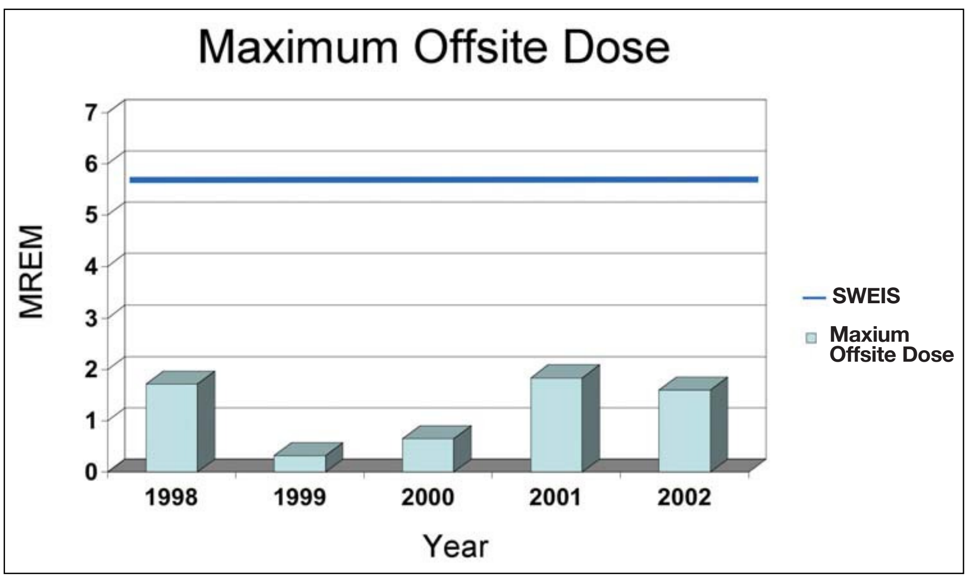


Figure 4-3. Maximun offsite dose.

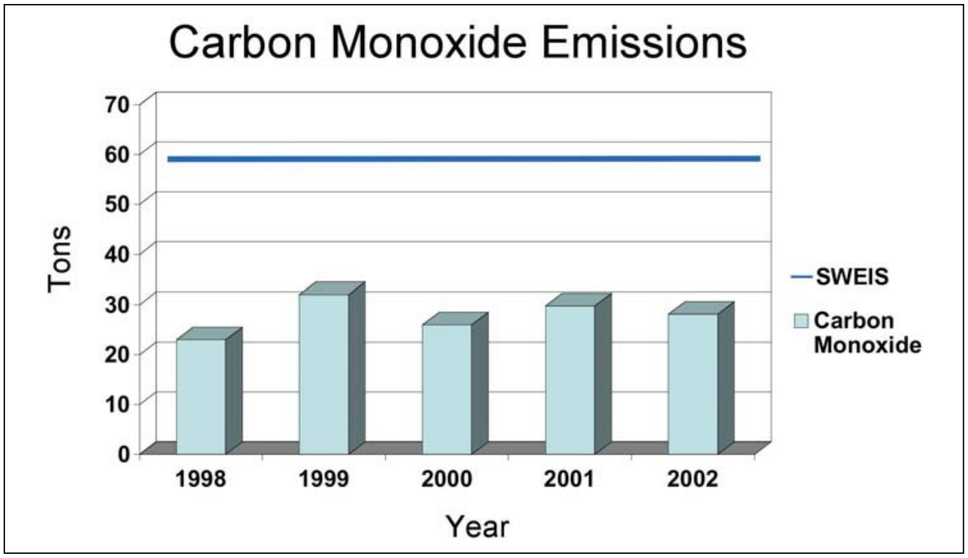


Figure 4-4. Carbon monoxide emissions.

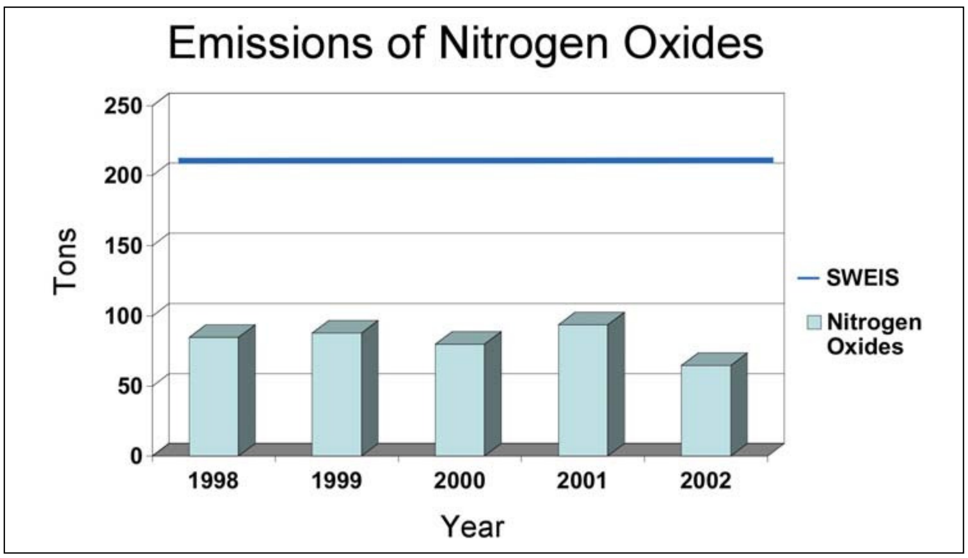


Figure 4-5. Emissions of nitrogen oxides.

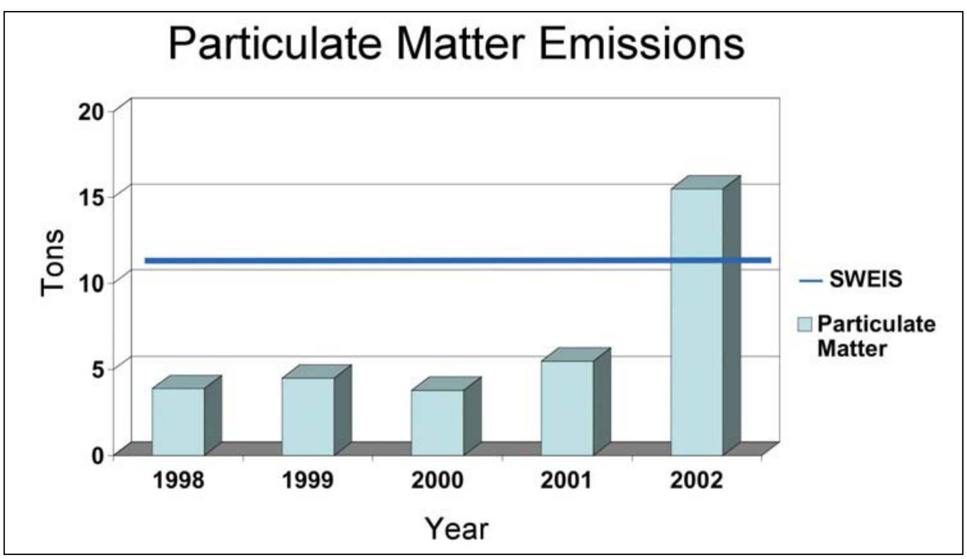


Figure 4-6. Particulate matter emissions.

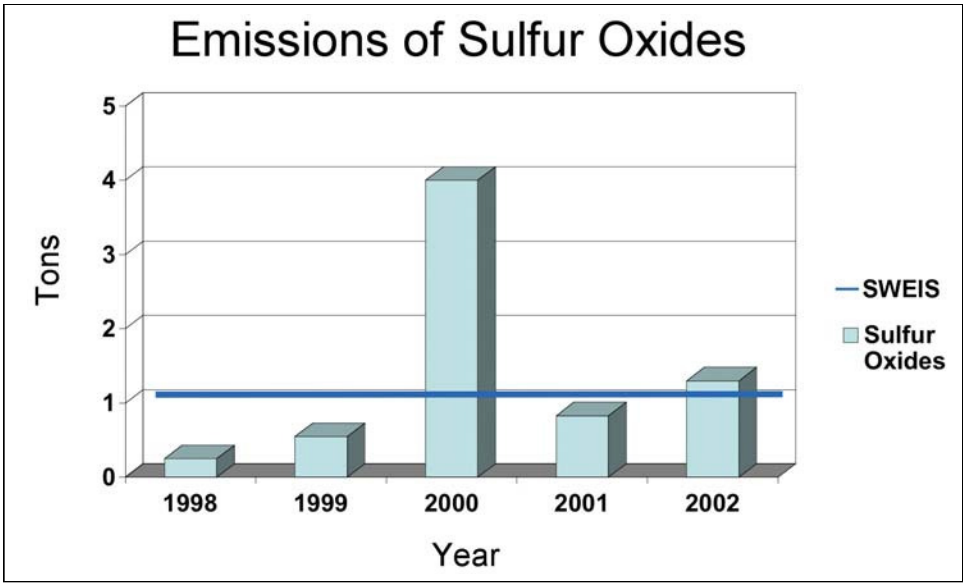


Figure 4-7. Emissions of sulfur oxides.

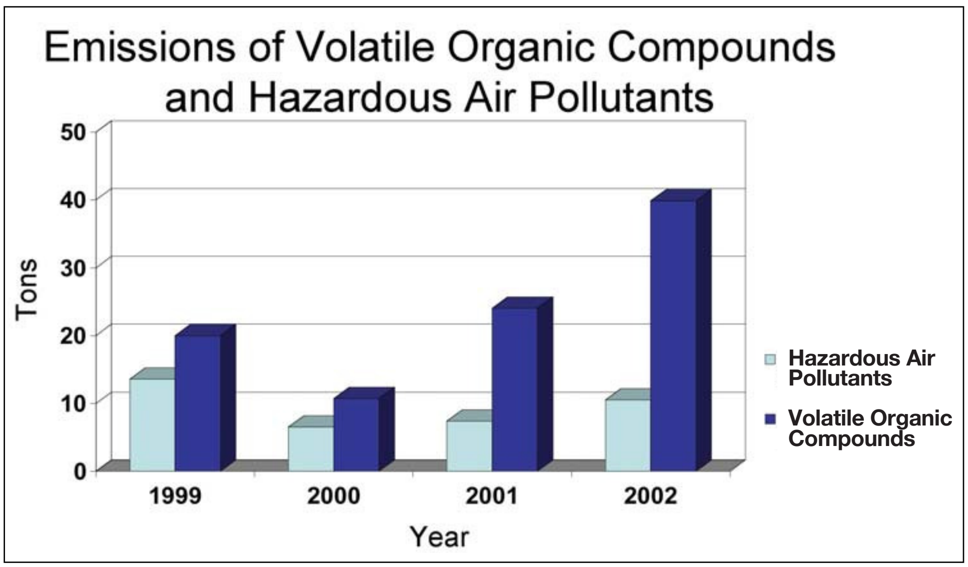


Figure 4-8. Emissions of volatile organic compounds and hazardous air pollutants.

4.2 Surface Water Quality

The number of permitted outfalls at LANL has decreased from 88 at the end of 1996 to 21 in 2002 (Appendix D). As a result of these closures, there has been an overall 44 percent decrease in flow over 1999 levels. Currently flow is about 64 percent of the level projected by the SWEIS. There was considerable uncertainty in both the SWEIS estimates and in the pre-2001 annual outfall volume estimates, when LANL began to measure rather than estimate flows. All of the watersheds at LANL, however, have had a decline in outfall volume to some degree since 1999, in part due to outfall closures. Discharges into Mortandad Canyon have decreased about 20 percent (7.9 million gallons per year) since 1999; outfall discharges into Water Canyon have decreased about 99 percent (about 12.9 million gallons per year) since 1999; Sandia Canyon outfall discharges have decreased by about half (105 million gallons per year) since 1999; and Los Alamos Canyon discharges have declined about 19 percent (about 8.4 million gallons per year) since 1999. In some watersheds, increased runoff resulting from the Cerro Grande Fire has produced greater than normal flows despite the closure of outfalls.

Examining sediment in a streambed

The SWEIS assumed that reducing outfall volumes would result in improved surface water quality since fewer contaminants would be discharged. It also assumed that water treatment improvements at the RLWTF and at the TA-16 HEWTF would contribute to higher surface water quality. The RLWTF, the HEWTF, and LANSCE outfalls are primary contributors to the local watersheds; all have substantially reduced effluent volumes (Figure 4-9). In addition, flows from the Sanitary Wastewater Treatment Facility at TA-46 and from the power plant at TA-03 discharge substantial volumes of water that feed Sandia Canyon and the Sandia Canyon wetland.

LANL effluent discharges by facility are listed in Table 3.2-4. The RLWTF discharges into Mortandad Canyon. The RLWTF outfall discharge has decreased about 52 percent—from 6.1 million gallons in 1998 to 2.92 million gallons in 2002. The HEWTF discharges into Water Canyon; the high explosive processing facilities have reduced liquid effluent from 17.1 million gallons in 1998 to 0.03 million gallons in 2002—a decrease of about 99.8 percent. LANSCE discharges have decreased from 53.4 million gallons in 1998 to 24.04 in 2002. LANSCE discharges primarily into Sandia Canyon and Los Alamos Canyon. LANL is currently developing a treatment facility to remove dissolved and suspended solids from effluent from the TA-03 power plant and from the Sanitary Wastewater Treatment Facility. The water will then be reused in cooling towers before discharge. This treatment process and water reuse is expected to result in about a 20 percent decrease in effluent flow into Sandia Canyon.

The SWEIS identified several areas where the level of contaminants, such as nitrates (which are regulated by the NPDES) in RLWTF effluent, would be reduced. The SWEIS also projected that outfall effluent quality would be similar to the baseline conditions or would improve. LANL's Environmental Surveillance Reports

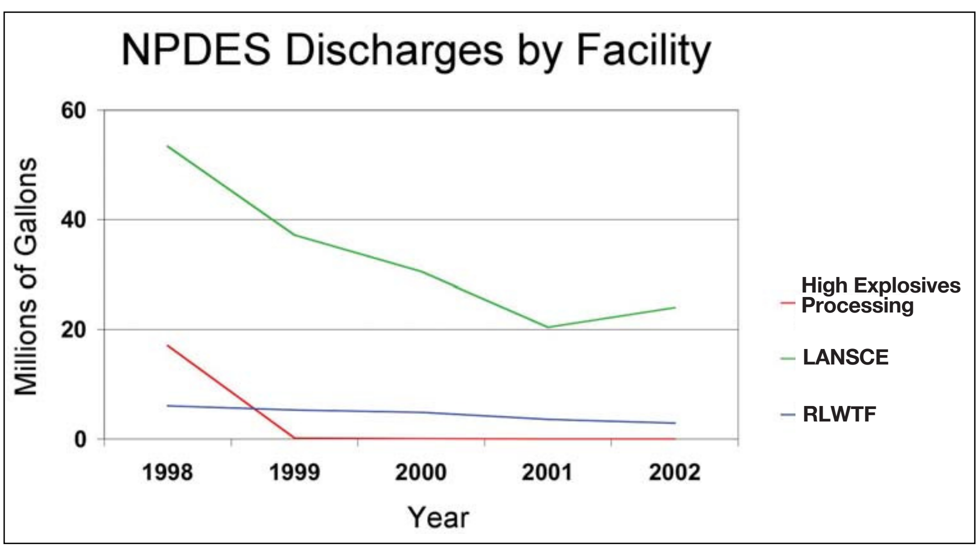


Figure 4-9. NPDES discharges by facility.

for 1998 to 2001 (LANL 1999a, 2000, 2001, and 2002a) show that outfall quality is within the parameters identified. In particular, nitrate concentrations in the RLWTF outfalls have been within NPDES limits since 1998.

4.3 Solid Radioactive and Chemical Wastes

Wastes have been generated at levels below quantities projected by the SWEIS ROD with the exception of ER Project chemical wastes. For three of the last five years, ER Project wastes (see Table 3.3.2-1) have been generated at levels at least seven times the SWEIS projection. ER Project wastes are typically shipped offsite for disposal at EPA-certified waste treatment, storage, and disposal facilities and do not impact local environs. These wastes result from exhumation of materials placed into the environment during the early history of LANL and thus differ from the newly created wastes from routine operations. Figure 4-10 compares the annual LANL chemical waste generation to the SWEIS ROD projections.

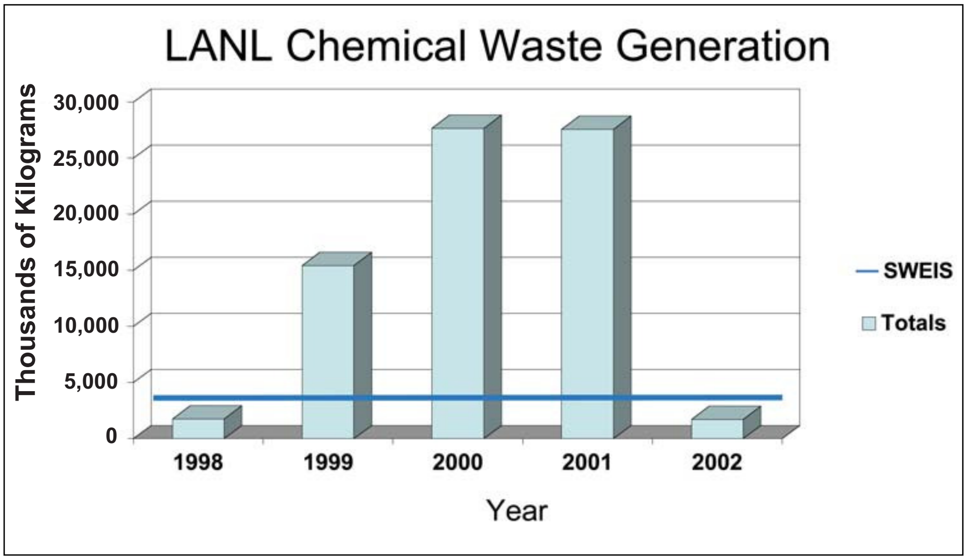


Figure 4-10. LANL chemical waste generation.

As a result of the uncertainty in ER Project waste estimates, the Yearbook presents totals for LANL waste generation both with and without the ER Project. As shown in tables in Section 3.3, except for chemical wastes, total generated amounts fall within projections made by the SWEIS ROD. This Yearbook also presents total volumes of solid sanitary waste for the first time.

Technical Area 54

Sanitary Waste

LANL sanitary waste generation and transfer of waste to the Los Alamos County Landfill has varied considerably over the last decade, with a peak (more than 14,000 tons) transferred to the landfill in 2000 that is probably due to removal of Cerro Grande Fire debris. The SWEIS estimated that LANL disposed of approximately 4,843 tons of waste at the Los Alamos County Landfill between July 1995 and June 1996 (DOE 1999). This estimate may have not been representative of LANL's sanitary waste disposal over the long term.

LANL has instituted an aggressive waste minimization and recycling program that has reduced the amount of waste disposed in sanitary landfills. LANL's Material Recovery Facility, which is used to separate recyclable items from other waste in trash dumpsters, now recovers about 40 percent of this waste for recycling. Other recycling initiatives include cardboard and paper recycling, a pilot concrete crushing operation, construction debris sorting, uncontaminated soil fill reuse, brush mulching, and metal and plastic recycling (LANL 2002b).

LANL performance goals for sanitary waste reduction are based on waste generation in 1993. LANL's total waste generation can be classified as routine and nonroutine. The waste can also be categorized as recyclable and nonrecyclable. Table 4.3-1 shows LANL sanitary waste generation for FY 2002. Compared to 1993, LANL has increased the recycled portion of sanitary waste from about 10 percent in 1993 to about 34 percent in FY 1999 and to approximately 70 percent in FY 2002.

Table 4.3-1. LANL Sanitary Waste Generation in FY 2002 (metric tons)

	ROUTINE	NONROUTINE	TOTAL
Recycled	1,425	5,938	7,363
Landfill disposal	1,822	1,388	3,210
Total	3,247	7,326	10,573

Routine sanitary waste consists mostly of food and food-contaminated waste, paper, plastic, wood, glass, styrofoam packing material, old equipment, and similar items. LANL's per capita generation of routine sanitary waste fell from 265 kilograms per person per year in 1993 to 163 kilograms per person per year in 2001, equivalent to a 39 percent decrease in routine waste generation (LANL 2002b).

Nonroutine sanitary waste is typically derived from construction and demolition projects. The Cerro Grande Rehabilitation Project also generated large quantities of nonroutine waste as a result of various cleanup activities. In general, construction and demolition waste is the largest single component of the sanitary waste stream and constitutes virtually all of the current nonroutine sanitary waste generation. Until May 1998, construction debris was used as fill to construct a land bridge between two areas of LANL; however, environmental and regulatory issues resulted in this activity being halted. Construction of new facilities and demolition of old facilities are expected to continue to produce substantial quantities of this type of waste. In FY 2002, approximately 82 percent of the uncontaminated construction and demolition waste was recycled (LANL 2002b). The portion of construction debris that is recycled is expected to remain the same or to increase in the future.

The SWEIS projected that the Los Alamos County Landfill would not reach capacity until about 2014. In 2002, NMED issued a 35-year permit for operation of the current landfill—five years of additional disposal of waste and 30 years of post-closure operation. Therefore, the existing landfill will no longer accept waste after 2007. Currently NNSA is preparing an environmental assessment of the effects of locating a new landfill within LANL boundaries. Other waste disposal alternatives may also be evaluated.

Chemical Waste

Waste projections for the ER Project by the SWEIS ROD are uncertain at best. These projections were developed in the 1996–1997 time period. Estimates were based on the then current Installation Work Plan methodology. The ER Project office kept a continuously updated database of waste projections by waste type for each PRS. Estimates were made for the amount of waste expected to be generated by that PRS for the life of the ER Project. In 1996–1997, it was assumed that the life of the ER Project would be 10 years, but the schedule now projects cleanup will extend to 2020. This demonstrates the legitimate uncertainty in waste estimates and schedules developed for the ER Project caused by changing requirements and refined waste calculations as additional data were gathered.

One task of the ER Project is to characterize sites about which little is known and to make adjustments in waste quantity estimates based on new information. In addition, even the most rigorous field investigations cannot truly determine waste quantities with a high degree of certainty until remediation has progressed considerably. Remediation can often create more or less waste, or waste that was not anticipated, based on field sampling. Moreover, the administrative authority may not approve a no further action recommendation or may require additional sampling or an alternative corrective action than the one planned. All of these factors lead to waste projections that are highly uncertain.

An example of the latter is MDA-P. The first closure plan for MDA-P was submitted to EPA, and later NMED, in the early 1980s. This plan proposed closure in place, but was never approved. During the mid- to late-1980s, all parties (LANL, DOE, EPA, and NMED) decided that clean-closure was a more appropriate standard and the plan was rewritten to reflect risk-based clean-closure. All information in the closure plan, including waste estimates, was based on best available information (a combination of operating group records and data from field investigations). However, when remediation started, it quickly became apparent that early information was not reliable, and that there would be more waste generated than originally anticipated. The ER Project clean closure of MDA-P began on November 17, 1997, and Phase I (i.e., waste management, handling, and disposal) and Phase II (i.e., confirmatory sampling) activities completed by April 2002. A total of 20,812 cubic yards of hazardous waste and 21,354 cubic yards of other waste were excavated and shipped to a disposal facility. A total of 6,600 cubic yards were shipped and used as clean fill at MDA-J.

Chemical waste quantities are higher than projections for two reasons: ER Project cleanup activities during 1999, 2000, and 2001 and the Legacy Materials Cleanup Project during 1998. The variability in ER Project waste projections is discussed above. The Legacy Materials Cleanup Project, completed in September 1998, required facilities to locate and inventory all materials for which a use could no longer be identified. All such materials (more than 22,000 items) were characterized, collected, and managed. In 1999, the Non-Key Facilities also exceeded projections, and this was attributed to ER Project cleanups of PRSs within the Non-Key Facilities. When comparing the subtotal of Key and Non-Key Facilities, only the Legacy Program in 1998 pushes the quantities over SWEIS ROD projections. Regardless, these wastes (both ER and Legacy Program) were and are shipped offsite, do not impact the local environs, and do not hasten the need to expand the size of Area G. High amounts of chemical waste at Non-Key Facilities are mostly due to new construction and some expanded operations.

Low-Level Waste

LANL generation of LLW (see Table 3.3.3-1) is generally below that projected in the SWEIS ROD (Figure 4-11). Although data from 2002 show that SWEIS projections were exceeded by both the Non-Key Facilities and the ER Project, total waste volumes remain within SWEIS projections.

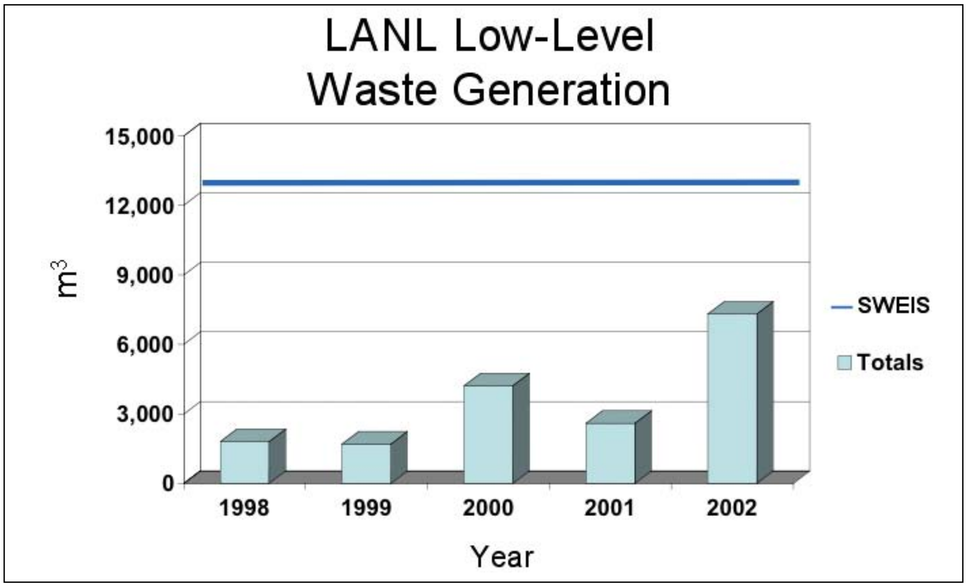


Figure 4-11. LANL low-level waste generation.

Mixed Low-Level Waste

Table 3.3.4-1 shows a significant increase in MLLW in 2000. The total LANL MLLW volume for 2000 was 598 cubic meters; 575 cubic meters of that came from the MDA-P cleanup. Waste generation returned to more typical levels in 2001 and 2002. Even with the noticeable increase in 2000, the generation of MLLW remains within SWEIS projections (Figure 4-12).

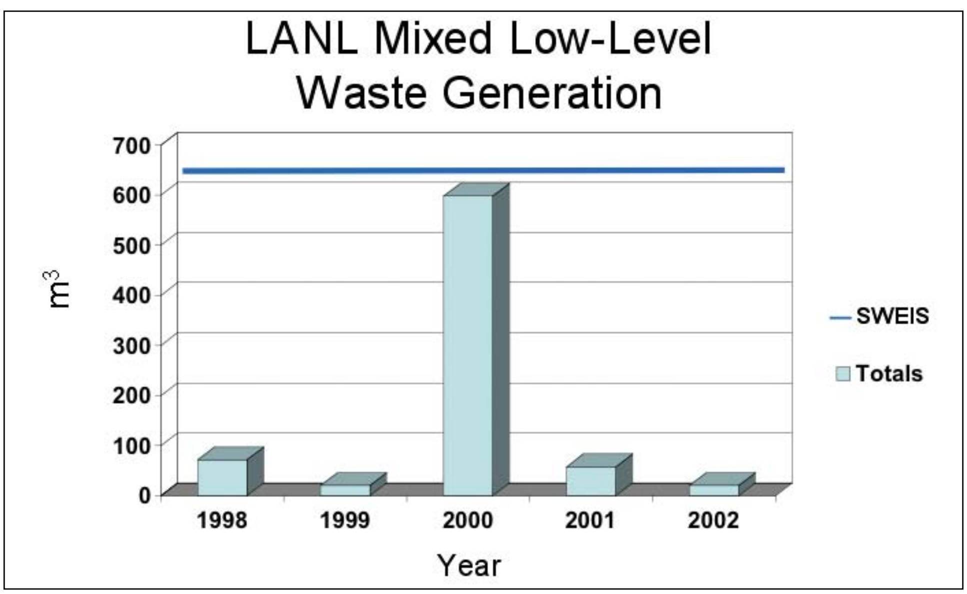


Figure 4-12. LANL mixed low-level waste generation.

TRU and Mixed TRU

Despite the expected slow, but increasing, levels of activity on pit production and related programs, generation of TRU (see Table 3.3.5-1) and mixed TRU waste (see Table 3.3.6-1) remained within the projections of the SWEIS ROD (Figures 4-13 and -14). Increasing levels of effort in the pit production program and related programs are expected to result in increasing quantities of these waste types in the near future but are not expected to exceed SWEIS projections. LANL's Offsite Source Recovery (OSR) Program has generated TRU waste that is considered to be a waste from Non-Key Facilities. The SWEIS did not anticipate TRU waste generation from Non-Key Facilities. A separate NEPA review was conducted for the OSR Program and the effects of implementing the program were determined to be bounded by the SWEIS impact analysis (DOE 2000).

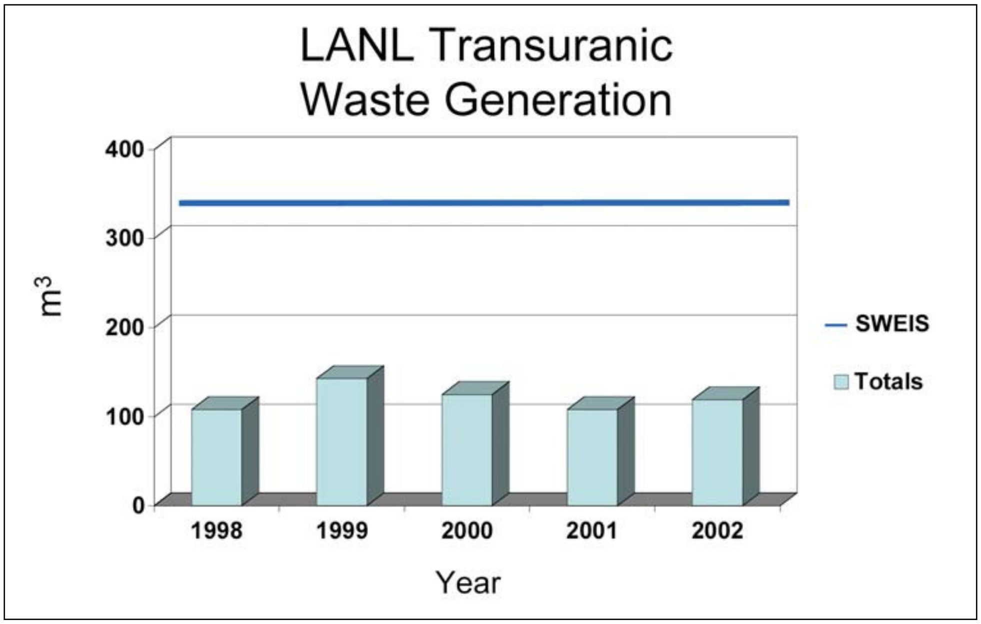


Figure 4-13. LANL transuranic waste generation.

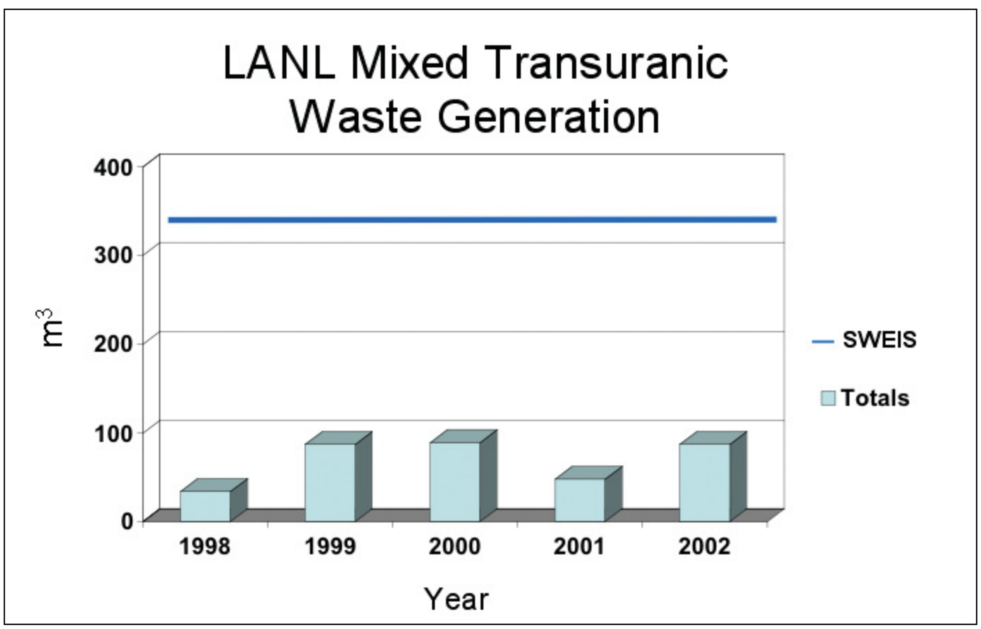


Figure 4-14. LANL mixed transuranic waste generation.

4.4 Utility Consumption

Consumption of these commodities is restricted by contract. Utility usage is compared to the SWEIS ROD projections of annual use. Section 3.4 presents these three sets of data (gas [see Table 3.4.1-1], electricity [see Tables 3.4.2-1 and 3.4.2-2], and water [see Table 3.4.3-1]) and demonstrates that none of these measured utilities exceeded SWEIS ROD projections, except for natural gas in 1993, which is before the 10-year window evaluated by the SWEIS ROD. Based on these data, it appears that utility usage remains within the SWEIS ROD environmental envelope for operations (Figures 4-15, -16, -17, and -18).

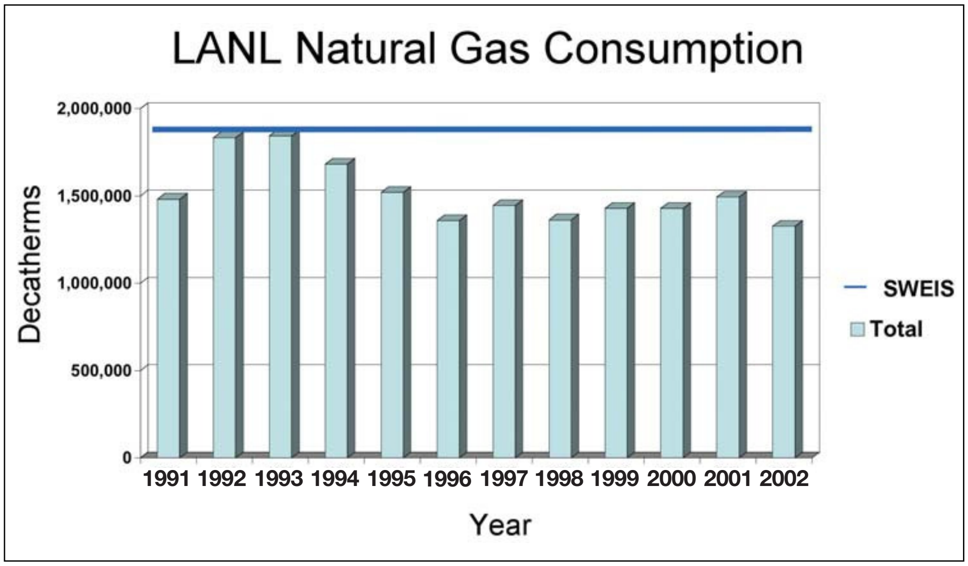


Figure 4-15. LANL natural gas consumption.

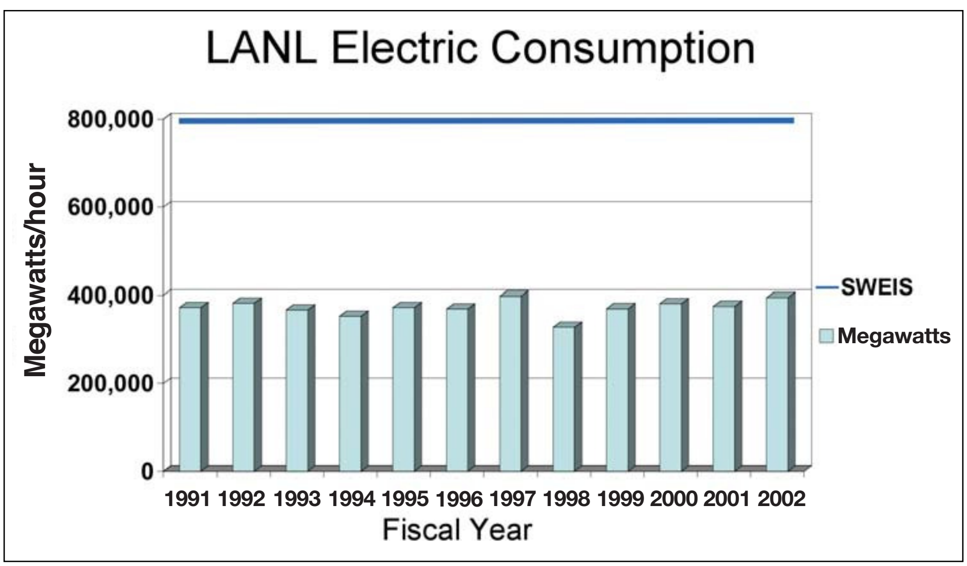


Figure 4-16. LANL electric consumption.

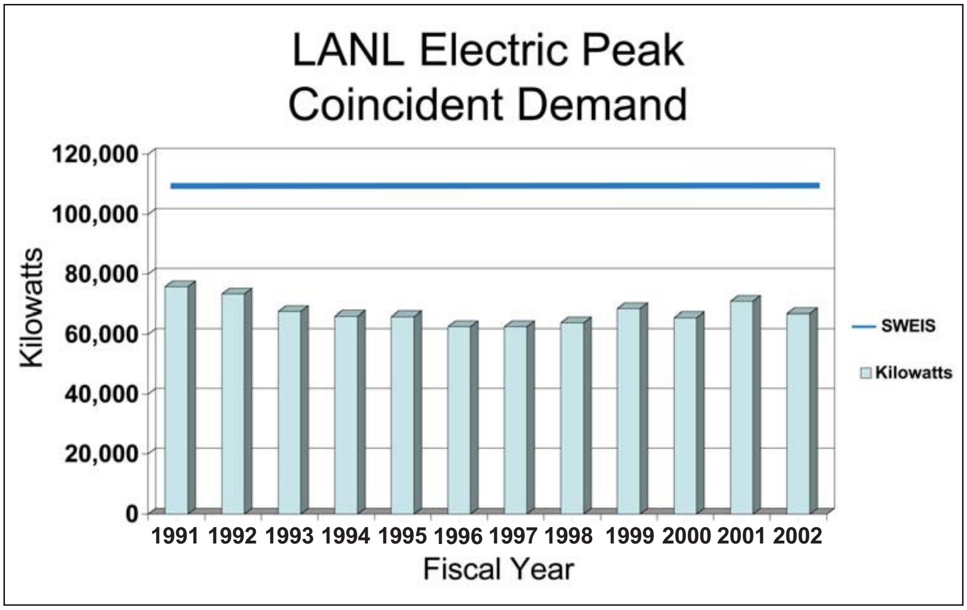


Figure 4-17. LANL electric peak coincident demand.

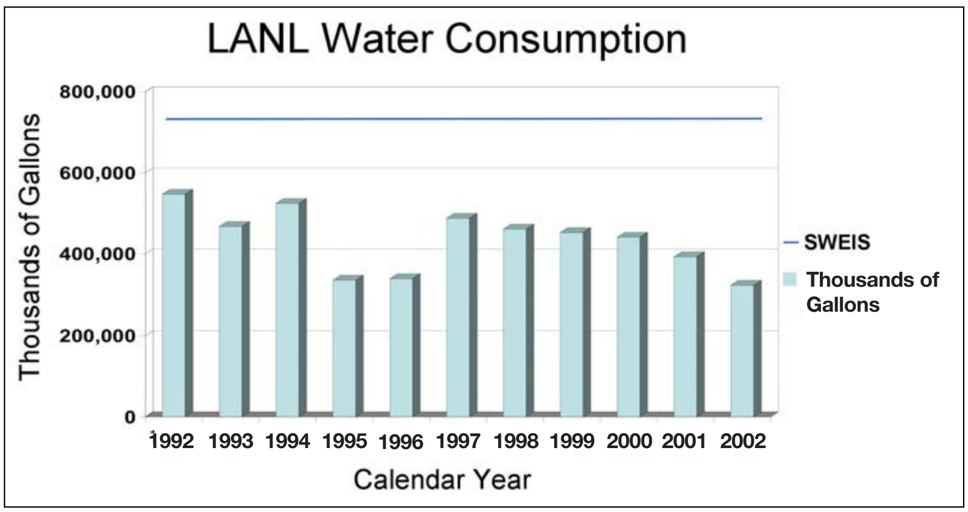


Figure 4-18. LANL water consumption.

4.5 Worker Safety

The SWEIS ROD projected 507 reportable occupational injuries (TRI) per year. Despite a small increase in 2002 in TRI and lost workday cases (LWC), the 2002 data represent about half of the projected reportable injuries in the SWEIS ROD (see Table 3.5.1-1). The overall trend has been downward since 1996 (Figures 4-19 and -20).

Radiological exposures to LANL workers (see Table 3.5.2-1) are well within the levels projected by the SWEIS ROD (Figure 4-21). There is considerable variation from year to year but in no case are the doses more than one-third the SWEIS projected level. Likewise the number of workers with nonzero doses remains below the SWEIS projection, typically half or less the number projected.

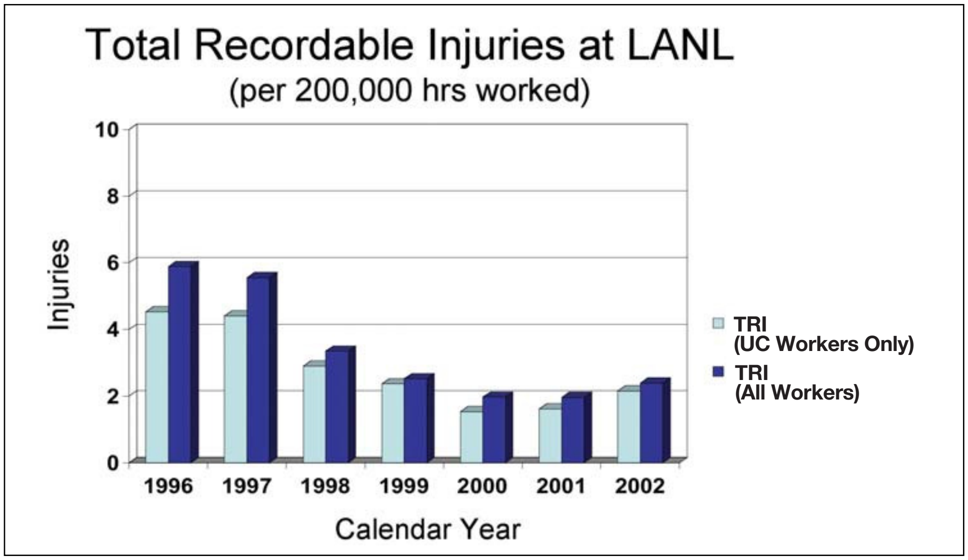


Figure 4-19. Total recordable injuries at LANL.

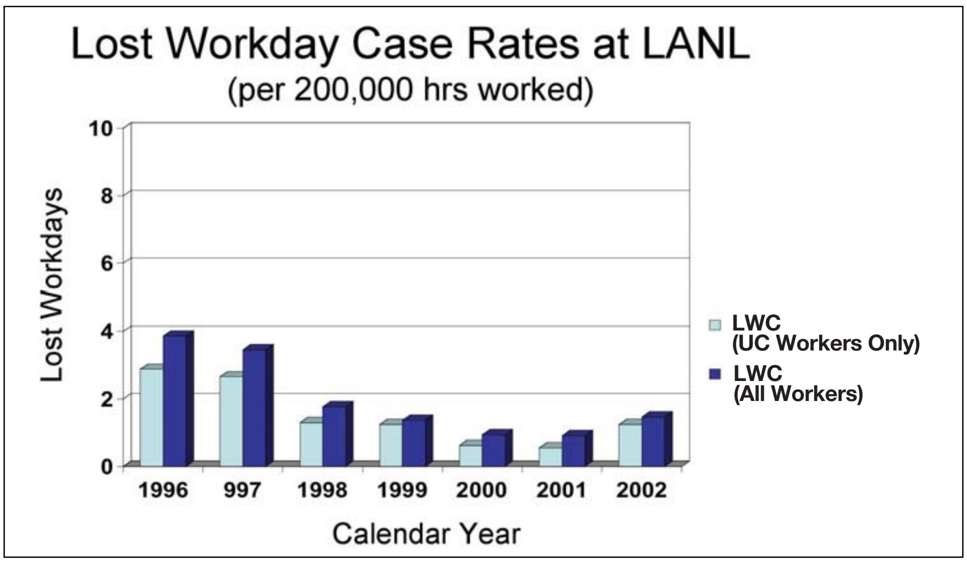


Figure 4-20. Lost workday case rates at LANL.

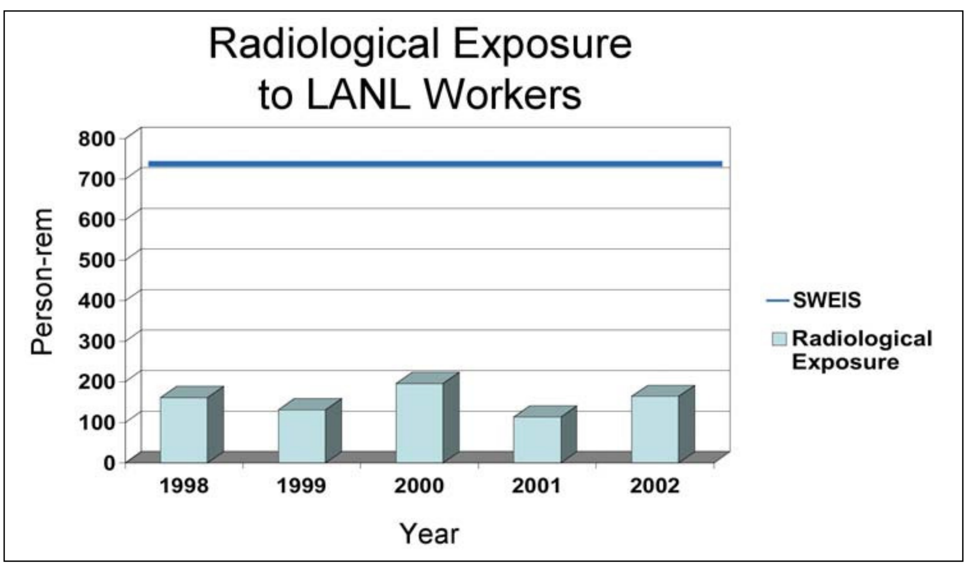


Figure 4-21. Radiological exposure to LANL workers.

4.6 Socioeconomics

The SWEIS ROD projected a workforce (UC and contractors) of 8,740 persons (see Table 3.6-1). Since 1996 the size of the workforce has increased steadily. Currently, it exceeds the SWEIS projection by nearly 1,200 persons (an increase of about 14 percent). The expected result of this increase is a somewhat greater positive impact on the economy of northern New Mexico.

4.7 Land Resources

Land use at LANL is a high-priority issue. Most of the undeveloped land is either required as buffer zones for operations or is unsuitable for development. Therefore, loss of available lands through development or Congressionally mandated land transfer has a significant impact on strategic planning for operations. Conversely, increases in available lands through cleanups performed by the ER Project and demolition of vacated buildings also affect strategic planning. To date, however, the ER Project has not significantly added to available land.

In 2002, the first of the Congressionally mandated conveyance of land to the County of Los Alamos and transfer to the Pueblo of San Ildefonso were accomplished. These disbursals effectively removed 2,209 acres from LANL and made them unavailable for LANL operational uses.

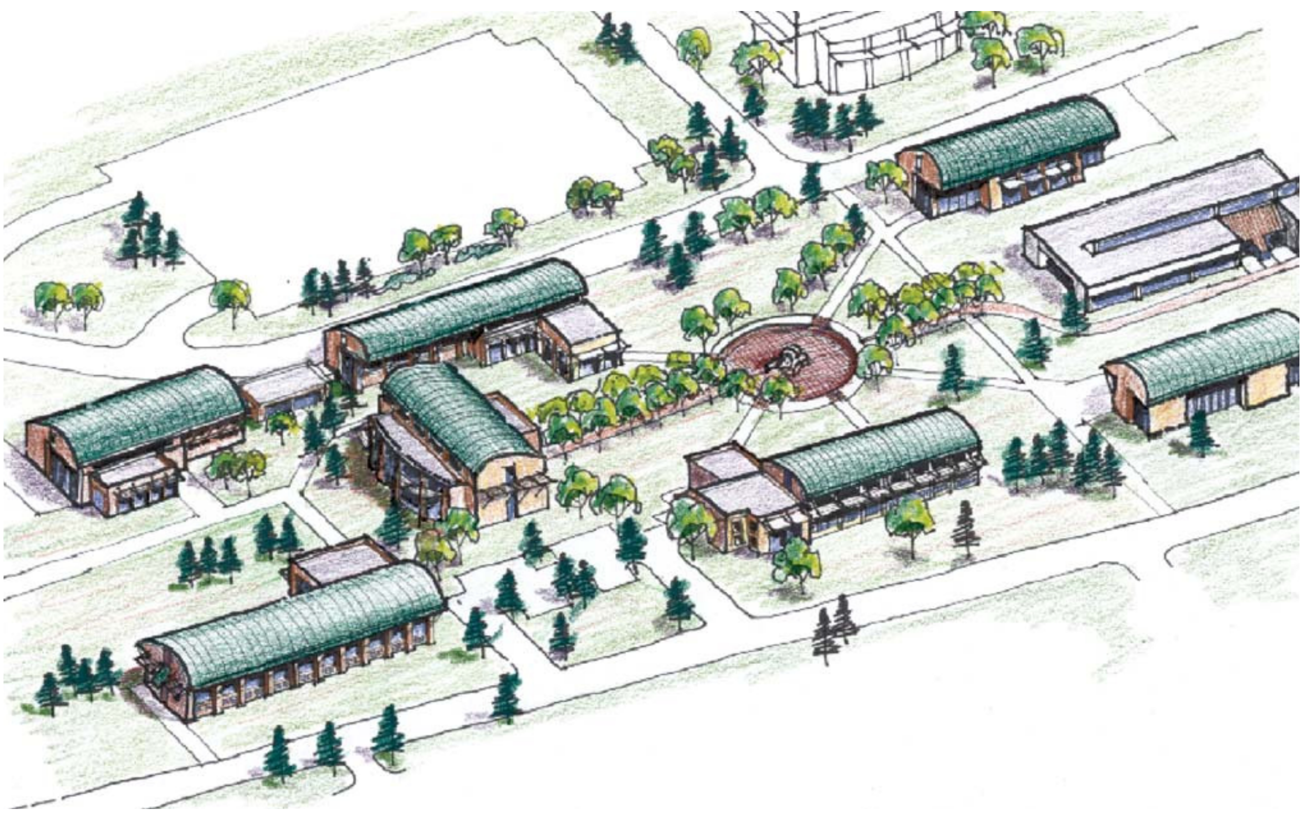
The SWEIS ROD did not anticipate any significant effects on land use. Land uses within LANL boundaries have not changed substantially since the SWEIS was issued (see Table 3.7.5-1) and are not expected to change in the next few years. Future development will be consistent with LANL's CSP2000 (LANL 1999b), which guides LANL land development.

Results of tree-thinning effort along Pajarito Road

Though construction and modification often result in substantial loss of greenfields (previously undeveloped areas), this has not been the case for the period 1998–2002. For this Yearbook, the amount of greenfield and brownfield (previously developed areas) development was estimated using geographic information system data relating to LANL's larger ground-disturbing projects. The estimates do not include small facility projects, such as installing short utility lines. Nor do they include emergency activities performed during the Cerro Grande Fire, such as cutting firebreaks. Although the Cerro Grande Rehabilitation Project thinned trees over a large portion of LANL, both greenfield and brownfield areas, the basic character (greenfield or brownfield) was not altered by these actions.

LANL's major projects between 1998 and 2002 have affected or will affect (in some cases, actual construction has not begun) about 247 acres. About 117 acres of greenfield (about 30 acres attributable to the Research Park) have been developed or proposed for development; the remaining 120 acres consist of brownfield areas. Most of the greenfield development consists of installation of monitoring wells and new utilities and creation of short access roads. Cerro Grande Rehabilitation Projects, such as the Flood Retention Structure in Pajarito Canyon, also contributed significantly to the total.

Future construction at LANL is incorporated in various facility strategic plans. A common component of these plans is consolidation of dispersed activities into central areas. As a result, future construction will frequently be concentrated in areas that are already developed or are adjacent to developed areas, thus reducing future greenfield loss.



Conceptual design of the proposed DX Complex

4.8 Groundwater

The SWEIS ROD projected that LANL operations would have a negligible effect on groundwater availability and quality but acknowledged that more information about the regional aquifer system was needed. The SWEIS projected an onsite drawdown in the level of the main aquifer of about 15.6 feet. Drawdown of aquifers remains a regional concern. However, the decline is gradual, typically about one to two feet per year with most production wells exhibiting recovery within 6 to 12 months after pumping stops.

The SWEIS projected that trace levels of tritium would continue to be found in groundwater. Trace levels of tritium continue to be found in monitoring wells, as well as some perchlorates, nitrates, high explosives constituents, uranium, and other contaminants in the perched or regional aquifers (see Table 3.8-1). Although a number of regional water monitoring wells have been drilled over the last few years, there are still uncertainties about the quality and quantity of groundwater. It is expected that these uncertainties will be resolved as additional data are gathered from the network of monitoring wells.

Sampling and analysis of water from production wells indicate that the water in the regional aquifer below the Pajarito Plateau is of high quality and meets or exceeds all applicable water quality standards. Therefore, the SWEIS projections of groundwater quality and quantity still bound existing groundwater conditions as they are currently understood.

4.9 Cultural Resources

Cultural resources surveys, particularly those conducted after the Cerro Grande Fire, have increased the number of cultural properties identified at LANL (see Table 3.9-1). The area of LANL that has been systematically surveyed has increased from 17,937 acres in 1998 (about 64 percent) to 22,476 acres (88 percent of LANL's remaining area after 2002 land transfers) in 2002. Post-fire conditions also enhanced the identification of low-visibility sites. Thus the number of known cultural properties has increased from 1,369 in 1998 to 1,835 in 2002. The increase in acreage surveyed and properties identified does not affect any SWEIS projection.

TA-8 Gun Site, a Manhattan Project Era building

LANL has also increased the inventory of historic buildings dating to the Manhattan Project and Cold War period. At the same time, LANL has begun to replace these older buildings with modern facilities. Since about 1995, 42 historic buildings have been documented and a number of them have been demolished. As plans for consolidated operations, infrastructure upgrades, and facility modernization proceed in accordance with LANL's CSP2000 and various facility strategic plans, more of the historic buildings will be demolished. The SWEIS ROD, which projected limited new construction, did not address the effects of historic building demolition.

4.10 Ecological Resources

The SWEIS stated that LANL's planned activities would enhance biological resources. Under the Habitat Management Plan (LANL 1998), LANL operations are evaluated against specified criteria to protect sensitive species. Since 1999 LANL has evaluated approximately 2,500 projects for compliance with the Habitat Management Plan. About 305 projects were modified to meet Plan criteria. A few projects could not be modified to meet these criteria and were independently reviewed by the US Fish and Wildlife Service. Some of these projects are still in the planning stages; others have been completed. Approximately 24.6 acres of undeveloped core habitat and 37.8 acres of undeveloped buffer zone would be affected by these projects.

The Habitat Management Plan restricts new development within the buffer zone to 25 percent of each Area of Environmental Interest buffer. LANL projects typically would affect, or have affected, less than 2 percent of a given Area of Environmental Interest.

The SWEIS identified approximately 50 acres of wetlands within LANL. Thirteen acres of these wetlands are supported in whole or in part by effluent from LANL outfalls. With the reductions in effluent flow noted in Section 4.2, the total area of wetlands is less than what it was when the SWEIS was prepared. The effect of closing or reducing effluent flow on these 13 acres of wetlands was assessed in the *Environmental Assessment for the Outfall Reduction Program* (DOE 1996). The environmental assessment determined that the potential loss of the affected wetlands was not significant. The actual reduction in wetland area has not been verified by field study.

Cerro Grande Fire survivor

Wetland in Pajarito Canyon

4.11 Visual Resources

The SWEIS identified some existing adverse visual resources conditions, specifically the austere and industrial character of many LANL buildings, incompatible building styles at TA-03, and highly visible tall structures that disrupted panoramic views. The SWEIS projected that, in addition to these continuing visual conditions, certain new construction and associated lighting (a possible waste disposal facility at TA-67 and a new road from TA-03 to TA-55) would have minor effects on visual resources. However, these projects were not selected in the SWEIS ROD.

Several new construction projects, not anticipated by the SWEIS, have been completed or are under development. Construction at TA-03 has reduced the number of incompatible building styles and will provide additional landscaping to create a more unified visual environment. Construction in other areas, such as TA-16, is enabling the removal of some of the austere industrial buildings that the SWEIS identified as adverse visual resources conditions. Other buildings will be refurbished and surface treatments applied so that there is greater architectural consistency. Landscaping will also reduce the industrial character of these areas.

None of the tallest buildings in the LANL viewscape have been removed but several are slated for demolition. The new National Security Sciences Building, the replacement for Building TA-03-46 that may be several stories high, is likely to be visible in the viewshed but it will be compatible with recent construction in the TA-03 area. Radio towers have been erected and are visible from some distance but due to their color, they blend to some extent with the background. Because lighting associated with new construction will comply with the New Mexico Night Sky Protection Act, there should not be any substantial degradation of night sky conditions. As a consequence, LANL operations have remained and should remain within the SWEIS projections.

4.12 Long-Term Effects

To date, LANL has continued to operate within the projections made by the SWEIS ROD. None of the measured parameters exceed SWEIS ROD projections or regulatory limits. Thus, long-term effects should remain within the projections made by the SWEIS ROD.

4.13 References

Clean Air Act. 42 USC 7401 et seq.

Department of Energy, 1996. "Environmental Assessment for the Outfall Reduction Program," DOE/EA-1156, Albuquerque, NM.

Department of Energy, 1999. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," DOE/EIS-0238, Albuquerque, NM.

Department of Energy, 2000. "Modification of Management Methods for Certain Unwanted Radioactive Sealed Sources at Los Alamos National Laboratory." Supplement Analysis, Final Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory. Los Alamos Area Office, October 17, 2000.

Los Alamos National Laboratory, 1998. "Threatened and Endangered Species Habitat Management Plan," Los Alamos National Laboratory report LA-CP-98-96, Los Alamos, NM.

Los Alamos National Laboratory, 1999a. "Environmental Surveillance at Los Alamos during 1998," LA-13633-ENV, Los Alamos, NM.

Los Alamos National Laboratory, 1999b. "Comprehensive Site Plan 2000 (Draft)," Los Alamos, NM.

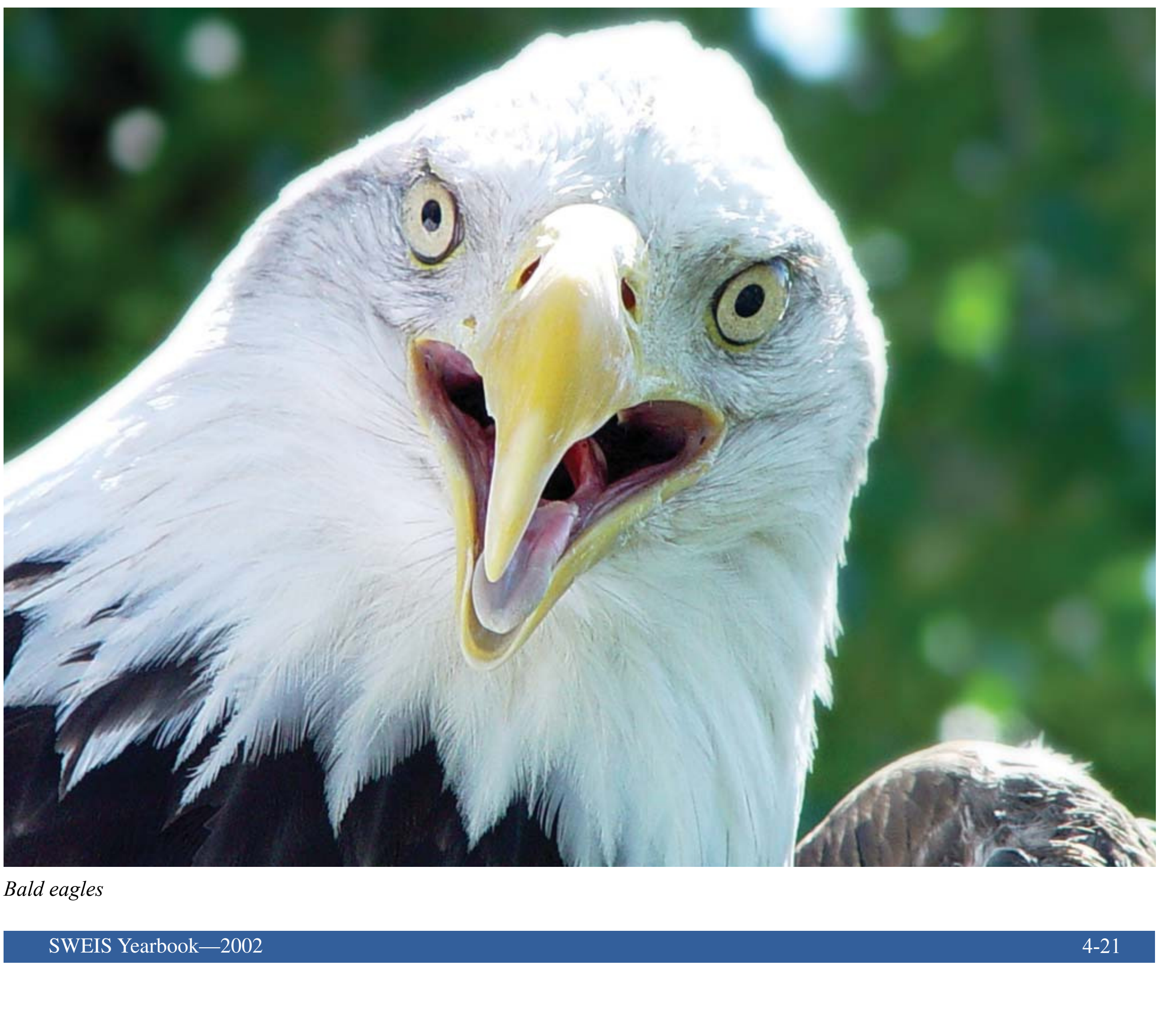
Los Alamos National Laboratory, 2000. "Environmental Surveillance at Los Alamos during 1999," Los Alamos National Laboratory report LA-13775-ENV, Los Alamos, NM.

Los Alamos National Laboratory, 2001. "Environmental Surveillance at Los Alamos during 2000," Los Alamos National Laboratory report LA-13979-ENV, Los Alamos, NM.

Los Alamos National Laboratory, 2002a. "Environmental Surveillance at Los Alamos during 2001," Los Alamos National Laboratory report LA-13979-ENV, Los Alamos, NM.

Los Alamos National Laboratory, 2002b. "Los Alamos National Laboratory 2002 Pollution Prevention Roadmap," Los Alamos National Laboratory document LA-UR-02-7430, Los Alamos, NM.

New Mexico Night Sky Protection Act, 44th Legislature, House Bill 39, First Session, April 1999.



Bald eagles

The Past

V-Site building related to the Trinity device test assembly area

Before the Cerro Grande Fire

After the Cerro Grande Fire

50th Anniversary—CMR

The Present—2002

Nonproliferation and International Security Center

The Future

Conceptual design of the Materials Science and Technology Building

Conceptual design of the Emergency Operations Center

5.0 Ten-Year Comprehensive Site Plan

This chapter presents a brief overview of DOE/NNSA's long-range planning process at LANL (LANL 2001a, 2002a). Because this planning process is used to address what happens to facilities and infrastructure at LANL, it ties into the SWEIS. The plan is updated annually and identifies what will be retained, maintained, modified, demolished, or replaced at LANL. Even though portions of this chapter may appear to be redundant with previous chapters of this report, the material presented here looks forward to the next 10 years, whereas the preceding chapters look backwards at the past five years (1998 through 2002).

The proposed projects identified in the plan are designed to

- consolidate facility operations into fewer/smaller facilities providing for more efficient facility operations in support of missions;
- consolidate nuclear materials facilities;
- replace vulnerable "temporary" structures with long-term office and light laboratory space;
- upgrade or replace infrastructure—electricity, water, waste water, natural gas, roads—and protection and communications systems; and
- construct or modify existing facilities to meet specific program needs.

The average age of the Laboratory's eight million square feet of facilities is over 40 years. Each project is designed to improve safety, security, employee morale and retention, and to reduce maintenance and operations costs. The Laboratory plans to eliminate two million of its existing eight million square feet over the next 10 to 12 years.

The following five sections parallel sections of the LANL TYCSP for FY 2003 (LANL 2002a). Each section provides a brief overview of information pertinent to the SWEIS envelope.

5.1 Introduction

5.1.1 Overview

The TYCSP is a long-range site-planning document initially delivered to DOE in September 2001 (LANL 2001a) with an updated plan delivered in October 2002 (LANL 2002a). This document serves as the link between long-range planning, proposed projects, and the budget. In doing so, the document connects the institutional plan, program plans, comprehensive site plans, and the SWEIS. The TYCSP was restructured in FY 2003 and provides information on the following topics:

- general site information,
- facility and infrastructure cost summary,
- production readiness and plant capacity,
- summary of missions and alternatives/requirements tables, and
- project lists.

The plan integrates institutional planning efforts for mission and programs, workforce, facilities, security, utilities, environment, safety, health, and operations.

5.1.2 Assumptions

The Laboratory used the following assumptions in developing the FY 2003 TYSCP.

- The Laboratory's core mission and programs will remain largely unchanged over the next 10 years.
- The primary funding sources in support of the physical plant are Readiness in Technical Base and Facilities (RTBF), Facilities and Infrastructure Recapitalization Program (FIRP), Integrated Construction Program Plan, Institutional General Plant Project, and program-specific funding.
- Funding targets for the RTBF Operations of Facilities and FIRP projects/activities cost projections are based on the Future Years Nuclear Security Program.
- Consolidation will have to achieve cost savings.
- The facility management realignment to a more centralized management structure will reduce operating costs.
- Significant increases in physical site security will be considered.

5.1.3 Current Situation

Los Alamos has the oldest and the greatest number of facilities among the three weapons laboratories and DOE-Nevada operations. The cost of equipment maintenance, integrated safeguards and security management, environmental compliance, urgent maintenance, and operations for the Laboratory's old facilities is expensive and growing. As a result, the Laboratory is exploring prioritization of maintenance and replacement as well as consolidation of operations. Maintenance backlogs are a designated baseline and are being defined to maximize benefit from the resources expended on these older facilities.

5.1.4 NEPA

The Laboratory remains committed to complying with NEPA requirements. The Laboratory performs NEPA reviews on several hundred projects each year. A recommendation on the level of NEPA review (categorical exclusion, environmental assessment, or environmental impact statement) is submitted to NNSA where a decision regarding the need for and the level of NEPA documentation is made. Once NEPA is completed, a project can proceed after NNSA notifies the Laboratory that a categorical exclusion is completed, a Finding of No Significant Impact is signed for an environmental assessment, or a ROD is published for an environmental impact statement.

5.1.5 Changes and Accomplishments from the 2002 TYCSP

In addition to specific project-related changes, changes occurred in the TYCSP document and processes. The changes include

- modifying the TYCSP to respond to and align with guidance changes such as document format and content, budget realities, and determination of historical significance and future excess facilities;
- reflecting October 2001 restructuring;
- addressing the DOE Gap analysis;
- enhancing facility strategic planning;
- expanding the information base on utilities, transportation, parking, and plant capacities;
- planning for physical security; and
- developing a sustainable design guide.

5.2 Site Description

The site, i.e., LANL, has been described in the SWEIS (DOE 1999a). This description includes the physical location of LANL as well as the environment affected by LANL. The environment covers factors such as population, economy, land use, adjacent landowners, water availability, air quality, threatened and endangered species, and archeology and cultural resources.

5.2.1 Geographic Setting

The geographic setting of the Laboratory is similar to what was described in the SWEIS. The differences are the impact of the Cerro Grande Fire on the plant communities and a change in public access due to heightened security. The public is currently allowed limited access to certain areas along State Routes 4, 501, and 502. Access to most of Pajarito Road is now restricted by the DOE.

Aerial view of Los Alamos mesas

5.2.2 Laboratory Resources

Basic information on the regional ecosystem encompassing the Laboratory and resources specifically at the Laboratory are drawn from the SWEIS and supporting documentation. Regional ecosystem data include brief summary descriptions of the canyons, watersheds, wetlands, and major vegetation zones. Brief summary descriptions of the resources for integration include the topics of air, water, surface water, ground water, soils, biological, wildlife, forest, and cultural and historic.

5.2.3 Land

The Laboratory is divided into 49 separate technical areas with location and spacing that reflect the site's historical development patterns, regional topography, and functional relationships. There are asphalt roads and parking areas. In addition, the Laboratory has many unpaved roads and remote high explosives testing or firing sites.

5.2.3.1 Land Use

Table 5.2.3.1-1 summarizes the current land use and the land use projected for the future. The major land-use changes involve consolidation of Nuclear Materials Research and Development and the expansion of Experimental Science.

Figure 5-1 shows the existing land use at LANL, and Figure 5-2 shows the future land use.

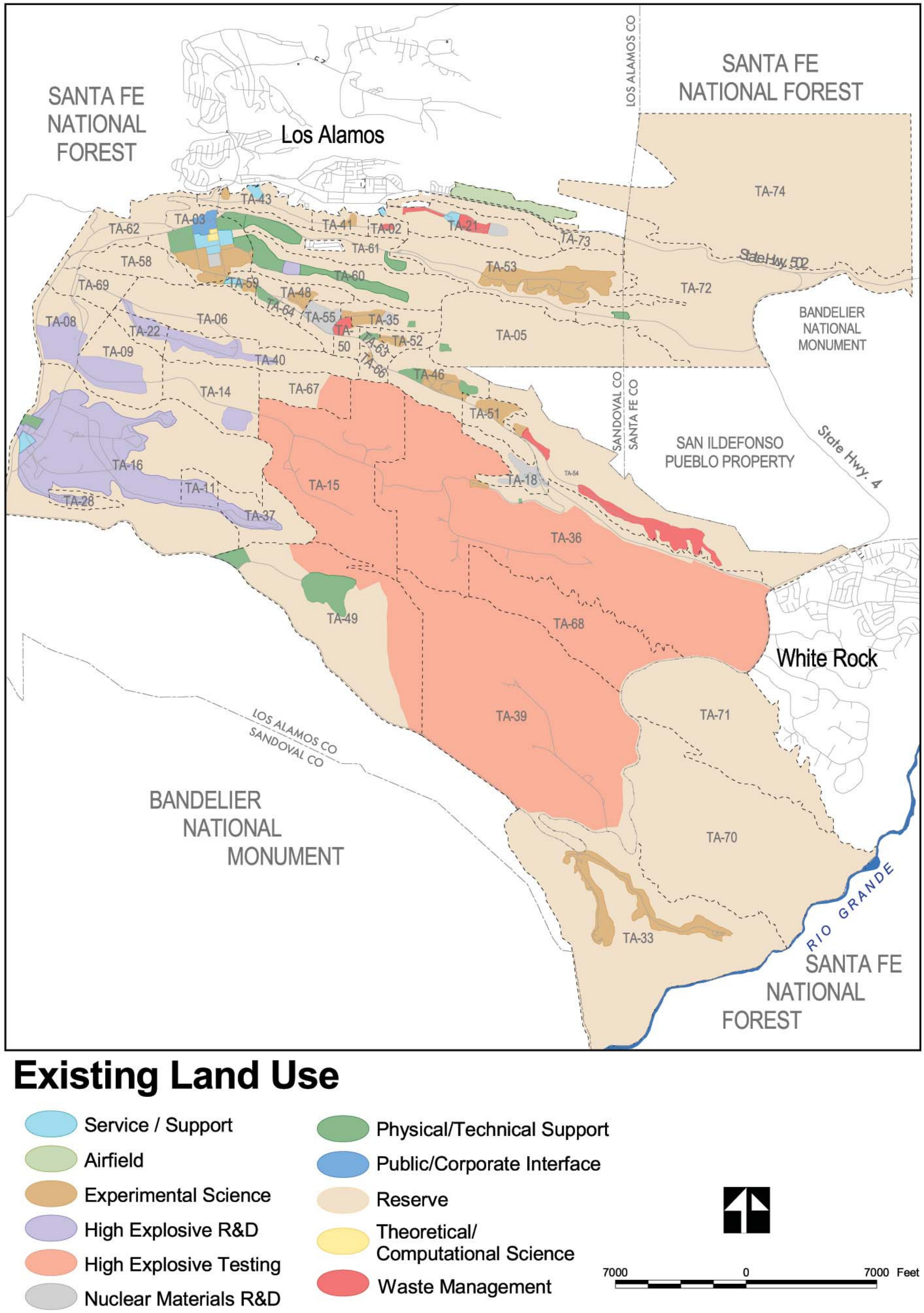


Figure 5-1. Existing land use at LANL.

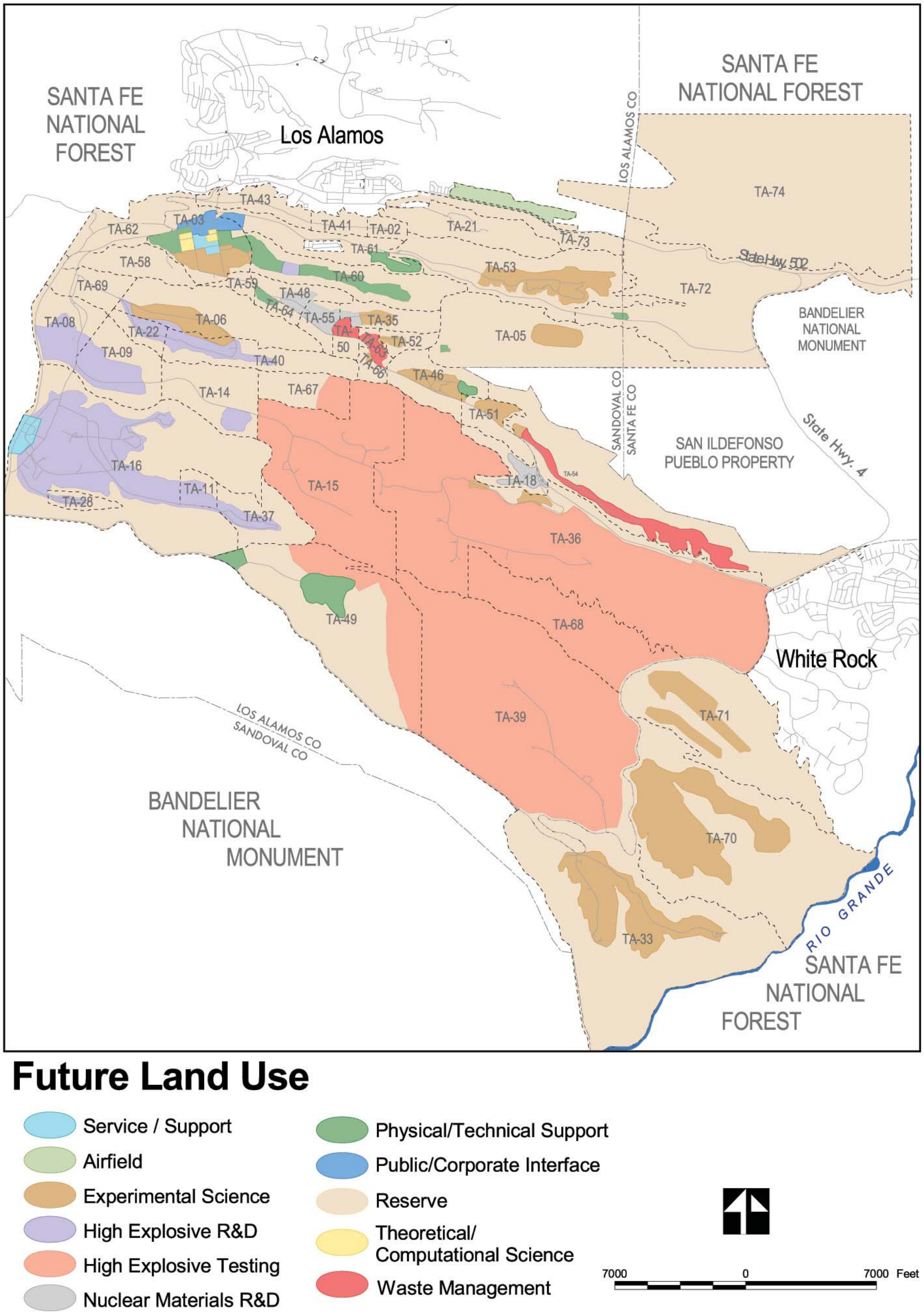


Figure 5-2. Future land use at LANL.

Table 5.2.3.1-1. Site-Wide Land Use

LAND USE CATEGORY	EXISTING LAND USE ACREAGE	FUTURE LAND USE ACREAGE
Service/Support	140	161
Experimental Science	514	544
High Explosives Research and Development	1,310	1,436
High Explosives Testing	7,096	7,096
Nuclear Materials Research and Development	374	42
Physical/Technical Support	336	340
Public/Corporate Interface	31	24
Theoretical/Computational	2	22
Waste Management	186	231
Reserve	17,874	17,856 [a]
Total	27,863	27,482

[a] Land conveyance and transfer may include up to 4,046 acres by November 2007. The first transfer occurred in 2002. All of this acreage is included in the reserve land use category.

5.2.3.2 Land Transfer

On November 26, 1997, Congress passed Public Law 105-119. Section 632 of that law directed the Secretary of Energy to convey to the Incorporated County of Los Alamos, New Mexico, or to the designee of the County and transfer to the Secretary of the Interior, in trust for the Pueblo of San Ildefonso, parcels of land under the jurisdictional administrative control of the Secretary at or in the vicinity of LANL. Such parcels, or tracts, of land had to meet the suitability criteria established by the law, that is, they were not required for the national security mission before the end of 11/26/2007; could be restored or remediated by 11/26/2007; and were suitable for historic, cultural, or environmental preservation, economic diversification, or community self-sufficiency. The DOE[1] identified 10 tracts of land for potential conveyance to the County of Los Alamos or transfer to San Ildefonso Pueblo. These 10 tracts of land have been further divided into subparcels for disbursal purposes.

The 10 tracts, which total approximately 4,600 acres, are shown in Figure 5-3 and include the following:

- TA-21 tract, 244 acres - located on the eastern end of the same mesa on which the central business district of Los Alamos is located.
- DP Road tract, 50 acres - located between the western boundary of TA-21 and the major commercial districts of the Los Alamos townsite.
- DOE Los Alamos Area Office tract, 13 acres - located within the Los Alamos townsite between Los Alamos Canyon and Trinity Drive.
- Airport tract, 198 acres - located east of the Los Alamos townsite, close to the East Gate Business Park.
- White Rock tract, 99 acres - located north of Pajarito Acres residential development and west of the White Rock townsite.
- Rendija Canyon tract, 909 acres - located north of and below Los Alamos townsite's Barranca Mesa residential subdivision.
- White Rock Y tract, 435 acres - a complex area that incorporates the alignments and intersections of State Routes 502 and 4 and the easternmost part of Jemez Road.
- Site 22 tract, 0.3 acres - located at the edge of the Los Alamos townsite mesa, south of Trinity Drive and above Los Alamos Canyon.

[1] Congress established the NNSA within the DOE to manage the nuclear weapons program for the United States. LANL is one of the facilities now managed by the NNSA. The NNSA officially began operations on March 1, 2000. Its mission is to carry out the national security responsibilities of the DOE, including maintenance of a safe, secure, and reliable stockpile of nuclear weapons and associated materials capabilities and technologies; promotion of international nuclear safety and nonproliferation; and administration and management of the naval nuclear propulsion program.

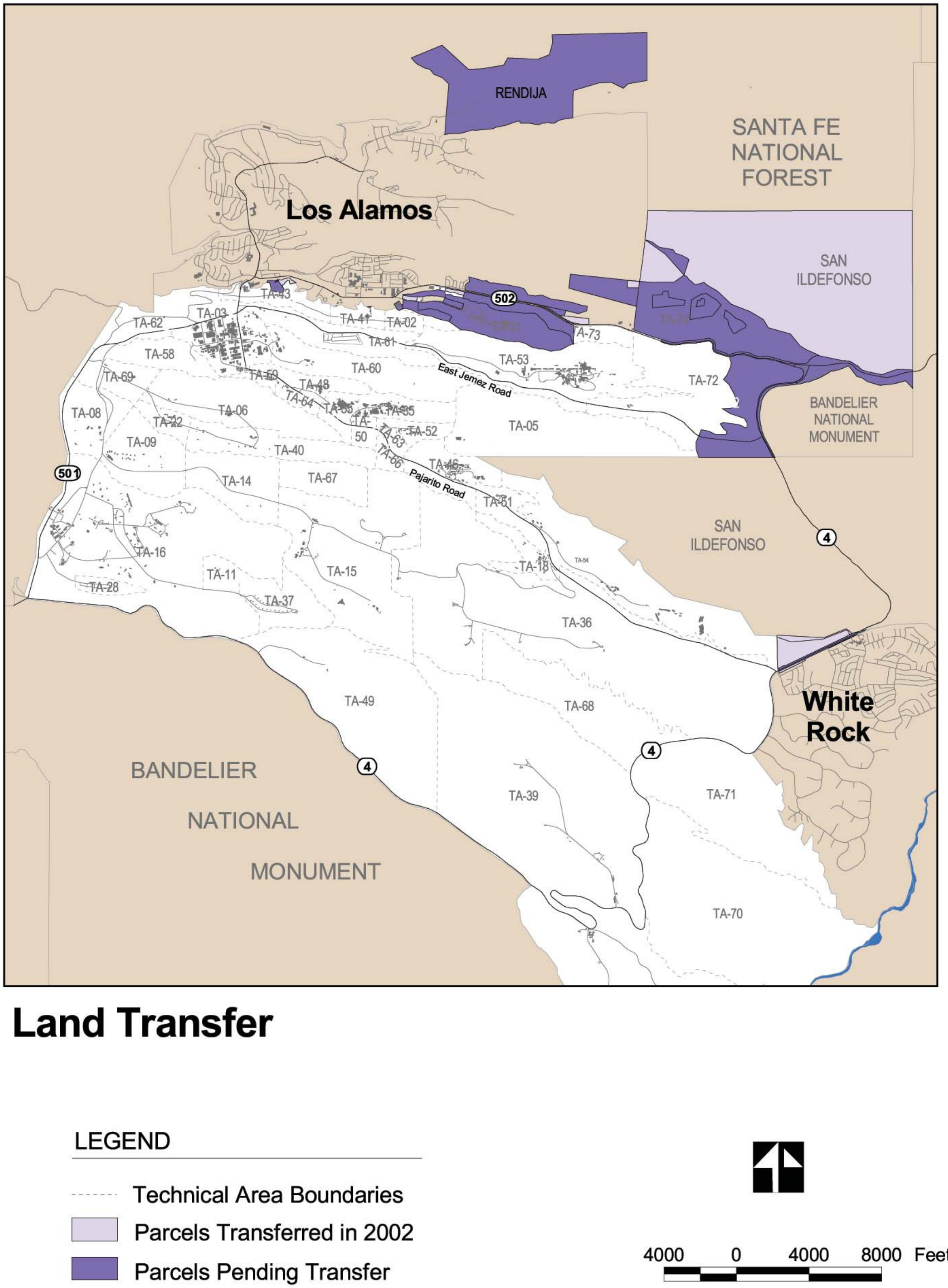


Figure 5-3. LANL parcels for conveyance and transfer.

- Manhattan Monument tract, a fraction of an acre in size; located adjacent to Ashley Pond and consists of a plaque covered by a small pavilion.
- TA-74 tract, 2,698 acres - located east of the Los Alamos townsite and includes much of Pueblo Canyon.

DOE's *Cross-Cut Guidance on Environmental Requirements for DOE Real Property Transfers* (DOE 1999b) provides guidance on the types of information needed to support real property transfers. Information such as the presence of floodplains and wetlands; critical habitats; historic properties; and hazardous substances must be gathered and provided to the potential recipients of the property.

An Environmental Baseline Survey is prepared in accordance with the *Cross-Cut Guidance on Environmental Requirements for DOE Real Property Transfers* in preparation of conveying or transferring ownership of a subparcel at LANL from the DOE/NNSA to either Los Alamos County or the Department of Interior pursuant to Public Law 105-119, Section 632. It discusses NNSA compliance with the environmental requirements associated with real property transfers. It also demonstrates that, although potentially contaminated, a subparcel is in such condition that NNSA may issue deeds on the basis that "all remedial action necessary to protect human health and the environment has been taken." The methodology used to prepare the Environmental Basline Surveys is to

- conduct an environmental site assessment of the subparcel consistent with the American Society of Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM 2000),
- review historical and current information and documents pertinent to the subparcel,
- perform a physical examination of the subparcel, and
- consult with both UC and NNSA staff to confirm existing information or develop additional information as necessary.

Table 5.2.3.2-1 identifies those subparcels transferred during CY 2002. This resulted in a boundary change of LANL and a loss of about 2,209 acres of land changing the size of LANL from about 43 square miles to about 40 square miles.

Table 5.2.3.2-1. Land Subparcels Transferred during CY 2002

DESIGNATOR	DESCRIPTION	RECIPIENT	TRANSFER DATE	ACREAGE
A-1	Manhattan Monument	Los Alamos County	October 31, 2002	0.07
A-12	Los Alamos Area Office-1 (East)	Los Alamos County	October 31, 2002	4.51
A-17	TA-74-1 (West)	Los Alamos County	October 31, 2002	5.52
A-19	White Rock-1	Los Alamos County	October 31, 2002	76.33
A-2	Site 22	Los Alamos County	October 31, 2002	0.17
A-3	Airport-1 (East)	Los Alamos County	October 31, 2002	9.44
A-6	Airport-4 (West)	Los Alamos County	October 31, 2002	4.18
A-9	DP Road-2 (North) (Tank Farm)	Los Alamos County	October 31, 2002	4.25
B-1	White Rock-2	Pueblo of San Ildefonso	October 31, 2002	14.94
B-2	TA-74-3 (North) (Includes B-4)	Pueblo of San Ildefonso	October 31, 2002	2,089.88
Total				2,209.29

5.2.4 Buildings

As of July 2001, the Laboratory had over eight million gross square feet of space and leased approximately 250,000 square feet within Los Alamos County. In early 2002, SCC was completed and made another 300,000 square feet of space available. When NISC is completed in 2003, there will be an additional 163,000 square feet of space.

There is currently a Congressional requirement to remove one square foot of old structure for each new square foot of construction. Over 500,000 square feet of space has either been identified as excess or been proposed to be excessed over the next 10 years. (See Appendix F.)

Aerial view of TA-3 before the Cerro Grande Fire

The primary construction projects funded through FY 2002 are identified in Table 5.2.4-1. The major proposed construction projects through FY 2012 are shown in Table 5.2.4-2. Each of these construction projects undergoes individual NEPA review and is closed out with a formal determination of being covered by a categorical exclusion, an environmental assessment with a finding of no significant impact, or an environmental impact statement with a record of decision from DOE. (The NEPA status for these projects is summarized in Appendix F.)

Table 5.2.4-1. Primary Construction Projects Funded through FY 2002

TA	PROJECT INITIATED	FUNDED	BENEFICIAL OCCUPANCY	FUNDING TYPE [a]	GSF [b]
15	DARHT Phase 2	FY 1999	FY 2002	LI	8,300
03	Metropolis Center (SCC)	FY 1999	FY 2002	LI	300,000
03	NISC	FY 2000	FY 2003	LI	163,400
03	Nonproliferation and International Security Division Office Building	FY 2000	FY 2003	LI	20,000
69	Emergency Operations Center	FY 2001	FY 2003	LI	38,000
16	Tritium Science and Engineering Office Building	FY 2001	FY 2003	GPP	24,100
16	Weapons Engineering Office Building	FY 2001	FY 2003	LI	22,000
46	Chemistry Division Office Building	FY 2001	FY 2003	LI	22,000
03	Health, Safety, and Radiation Protection Clinic	FY 2002	FY 2003	GPP	19,000
03	Materials Science and Technology Division Office Building	FY 2002	FY 2003	GPP	20,000
03	S-3 Facility	FY 2002	FY 2003	GPP	20,000
03	Decision Applications Division Office Building	FY 2002	FY 2003	GPP	18,000
03	BSL-3 Facility	FY 2002	FY 2003	GPP	3,300
03	Los Alamos Center for Integrated Nanotechnologies Gateway	FY 2002	FY 2005	LI	31,000
55	Manufacturing and Technical Support Facility	FY 2002	FY 2003	GPP	18,000
16	Weapons Plant Support Facility	FY 2002	FY 2003	GPP	23,000
22	High Power Detonator Facility	FY 2002	FY 2003	GPP	TBD

[a] The funding types are line item (LI) and general plant project (GPP).
[b] GSF = gross square feet.

Table 5.2.4-2. Selected Proposed Construction Projects through FY 2012

TA	PROJECT INITIATED	FUNDED	BENEFICIAL OCCUPANCY	FUNDING TYPE [a]	GSF [b]
55	CMR Replacement	FY 2003	FY 2012	LI	100,000
22	Hydrotest Facility	FY 2003	FY 2004	GPP	18,000
63	Facility Waste Operations Office Building	FY 2003	FY 2004	GPP	18,000
03	Fuel Cell Facility	FY 2003	FY 2005	LI	20,000
16	Stockpile Support Facility	FY 2003	FY 2004	GPP	18,000
16	Shock and Vibration Lab	FY 2003	FY 2004	GPP	3,700
16	High Explosives Pressing Consolidation	FY 2003	FY 2004	GPP	3,700
66	Homeland Security Building	FY 2003	FY 2004	GPP	18,000
03	National Security Sciences Building	FY 2004	FY 2006	LI	275,000
16	General Tritium Support Stockpile Life Extension Program Support Building	FY 2004	FY 2005	GPP	2,000
16	Fabrication Facility	FY 2004	FY 2005	GPP	30,000
16	Advanced Manufacturing Office	FY 2004	FY 2005	GPP	18,000
16	ESA Division Facility Management Office Building	FY 2004	FY 2005	GPP	18,000
03	Communications Shop Building	FY 2005	FY 2005	GPP	6,200
16	Calibration Lab	FY 2005	FY 2006	GPP	12,000
22	Electronics Data Systems Building	FY 2005	FY 2007	GPP	10,100
53	Advanced Hydrotest Facility	FY 2005	FY 2010	LI	TBD
22	Vessel Facility 1 of 4	FY 2006	FY 2007	GPP	4,200
60	Support Services Consolidation	FY 2007	FY 2008	LI	TBD
22	Vessel Facility 2 of 4	FY 2007	FY 2008	GPP	4,200
50	RLWTF Upgrades	FY 2007	FY 2009	LI	N/A
22	Vessel Facility 3 of 4	FY 2008	FY 2009	GPP	4,200
22	Medium Heavy Lab	FY 2008	FY 2009	GPP	5,000
22	Vessel Facility 4 of 4	FY 2009	FY 2010	GPP	4,200
22	Replace Machine Shop	FY 2009	FY 2010	GPP	10,000
22	Classified High Explosives Storage	FY 2011	FY 2011	GPP	2,000
TBD	Joint DX/ESA Conference Facility	FY 2011	FY 2011	GPP	5,000

[a] The funding types are line item (LI) and general plant project (GPP).
[b] GSF = gross square feet.

5.2.5 Workforce

The Laboratory's affiliated workforce includes employees of the prime contractor, the UC, and subcontractors. The major subcontractors in 2002 were JCNNM and PTLA. As at the time the SWEIS was published, the Laboratory employs both technical and nontechnical subcontractors, as well as consultants from around the world on a temporary basis.

5.2.6 Cerro Grande Fire

The Cerro Grande Fire damaged and destroyed important facilities, equipment, and infrastructure at the Laboratory and had a significant impact on mission-critical facilities. Emergency funding received by the Laboratory addressed the damage to Laboratory property from the fire and ongoing risk.

The Cerro Grande Rehabilitation Project has implemented a three-phased approach to recover from the fire.

- Phase 1: An emergency recovery or short-term phase addressed immediate dangers. These included constructing a flood retention structure in Pajarito Canyon, building weirs, hydro-seeding over 700 acres, and installing other erosion control measures. This phase was completed in the first quarter of FY 2001.
- Phase 2: Demonstrated vulnerabilities are being addressed by thinning forests to create fire-

A track mounted Harvester removing a ponderosa pine

Low-head weir near the White Rock Y

defensible space around all Laboratory buildings and structures. The work also includes repairing and replacing equipment, roofs, sewer lines, and gas and electrical lines. This phase was 70 percent complete at the end of FY 2002.

- Phase 3: This consists of fire-mitigation activities such as thinning approximately 10,000 acres of trees on Laboratory property, continuing erosion control, and the execution of five line-item construction projects. The line-item construction projects include the new Emergency Operations Center, two office buildings, a multichannel communications system, replacement of major portions of the Laboratory fire alarm system, and addressing demonstrated vulnerabilities at waste management facilities located at TA-50 and TA-54.

5.3 Mission Needs and Program Descriptions

5.3.1 Current Missions, Programs, and Workloads

The Laboratory's primary missions are

- to ensure the safety and reliability of the U.S. nuclear weapons stockpile;
- to develop technical means for reducing the global threat of weapons of mass destruction or terrorism (including biological, chemical, nuclear, and cyber); and
- to solve national problems in energy, environment, infrastructure, and health security, using the investment in people and facilities implied by the first two missions.

The Weapons Engineering and Manufacturing, Weapons Physics, Threat Reduction, and Strategic Research directorates are devoted to achieving the Laboratory's missions.

5.3.2 Readiness in Technical Base and Facilities

The RTBF mission (LANL 2002b, 2002c) is to ensure that the right facilities and infrastructure are in place to manufacture and certify the 21st century nuclear weapons stockpile and that the Laboratory is implementing the technologies and methods necessary to make construction, operation, and maintenance of NNSA/Defense Programs facilities safe, secure, and cost effective. The RTBF program provides the physical and operations infrastructure required to conduct the scientific, technical, and manufacturing activities of the stockpile stewardship program. The RTBF program will maintain facilities and technologies in an appropriate condition so that they are not limiting factors in the accomplishment of the NNSA/Defense Programs mission.

In order to attain the RTBF program goals, the Laboratory must

- make cost-effective investments in the infrastructure, workforce, facilities, and technologies to enable effective program management of activities;
- continue to deliver and maintain safe and secure facilities that provide the means to perform and deliver the requisite levels of science and technology associated with maintaining the safety and reliability of the nuclear weapons stockpile; and
- continue to provide the balance of the physical and intellectual infrastructure underpinnings necessary to support the goals and mission of NNSA/Defense Programs.

The majority of the RTBF direct funds support facility "warm standby" operations for the major NNSA/ Defense Programs experimental and manufacturing facilities. The "warm standby" condition is defined as the state of readiness for programmatic operations.

RTBF has been in place since FY 2000 and allows the Laboratory to embark on a set of improvements focusing on facilities and management techniques. The RTBF funds also support urgent maintenance, major upgrades, and other NNSA/Defense Programs facility maintenance not funded within the warm standby definition as well as

- material recycle and recovery that is targeted at reducing the SNM holdings at the Laboratory,
- surveillance and maintenance of excess facilities awaiting decommissioning and demolition, and
- waste management.

In FY 2002, LANSCE proposed a multiyear modernization initiative and DARHT clarified its plans to transition from construction to operations using RTBF funding.

5.3.3 Linkages Between Facilities and Infrastructure and Mission Needs

The Laboratory has developed a tabular summary relating program missions to facility alternatives and requirements. The summary also links the facility requirements to the programs and activities that are integral parts of the Laboratory's current and future missions. The table is referred to as the Summary Missions/ Alternatives/Requirements Table and it attempts to capture the forecasted 10-year program mission campaign activities and link the activities to technologies and facilities required to accomplish the missions.

5.3.4 Future Missions, Programs, Workloads, and Impacts

Future missions, programs, workloads, and potential impacts are identified in the Summary Missions/ Alternatives/Requirements Table.

5.3.5 Technology Effects

The table also identifies future technologies and the facilities and infrastructure impacts and needs for these technologies and links these technologies with directed stockpile work, RTBF, and campaigns.

5.3.6 Special Needs of Current Missions, Programs, and Workloads

In order to meet the needs of current missions and programs, the Laboratory must maintain, upgrade, and conduct work in all facilities to ensure reliability and effectiveness. Table 5.3.6-1 highlights many of the Laboratory's unique facilities and the particular mission needs they support.

Table 5.3.6-1. Specialized Facilities and Supported Mission Needs

SWEIS ROD REFERENCE	TYCSP REFERENCE	LOCATION	DOE SPONSOR	SUPPORTED MISSION NEEDS
2.1 Plutonium Complex (TA-55)	Plutonium Facilities	TA-55	NNSA/Office of Nuclear Weapons	Manufacturing of plutonium components Surveillance and disassembly of weapons components Actinide materials science and processing research and development Plutonium recovery from pit production and surveillance War reserve plutonium metal recovery and production Vault storage of nuclear materials Waste processing
2.2 Tritium Facilities (TA-16 and TA-21)	Tritium Facilities	TA-16-205 (WETF); TA-21-209 (TSFF)	NNSA/Office of Nuclear Weapons and Office of Science	High-pressure gas fills and processing Gas-boost system testing and development Tritium research and development
2.3 Chemistry and Metallurgy Research Building (TA-03)	CMR	TA-03-29	NNSA/Office of Nuclear Weapons	Analytical chemistry Microstructural analysis Support for detonation surveillance Shielded hot-cell facility for plutonium weapons evaluation Limited fabrication, including casting, forming, welding, and joining, heat treating, and metallography
2.4 Pajarito Site (TA-18)	Pajarito Site	TA-18 all	NNSA/Office of Nuclear Weapons	Design, construction, research, development, and applications of critical experiments
2.5 Sigma Complex (TA-03)	Sigma Complex	TA-03-66	General	Fabrication of metallic and ceramic items, including boost system components and joint test assemblies Mock pit fabrication Mechanical property evaluations Metallography, microscopy, and extensive materials characterization Casting, metallic deformation processing, powder metallurgy, welding and joining, and complete characterization of metals from Z number 4 (beryllium) to 92 (uranium) Capability exists to manufacture ceramic components from oxide, nitride, sulfide, and carbide materials
	Beryllium Technology Facility (BTF)	TA-03-141	NNSA/Office of Nuclear Weapons	Beryllium component fabrication for stockpile systems
2.6 Materials Science Laboratory (TA-03) [a]				
2.7 Target Fabrication Facility (TA-35) [a]				
2.8 Machine Shops (TA-03)	Engineering Machine Shops	TA-03-39; TA-03-102	NNSA/Office of Research, Development, and Simulation	Support pit and mock pit production Depleted uranium machining and inspection Beryllium product inspection

Table 5.3.6-1. Specialized Facilities and Supported Mission Needs (continued)

SWEIS ROD REFERENCE	TYCSP REFERENCE	LOCATION	DOE SPONSOR	SUPPORTED MISSION NEEDS
2.9 High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, TA-28, TA-37)	Radiography Building	TA-08-22	NNSA/Office of Research, Development, and Simulation	Nondestructive testing of pit parts, pit assemblies, and other products
2.10 High Explosives Testing (TA-14, TA-15, TA-36, TA-39, TA-40)	DARHT	TA-15-312	NNSA/Office of Research, Development, and Simulation	Hydrodynamic testing
2.11 Los Alamos Neutron Science Center (TA-53)	LANSCE	TA-53	NNSA/Office of Research, Development, and Simulation	Proton radiography and neutron resonance spectroscopy Studies of materials properties of direct relevance to stewardship, including special nuclear materials and high explosives over a neutron energy range relevant to weapons systems Research on mission-critical requirements of the stockpile stewardship program by experimental validation of predictive tools and models
2.12 Health Research Laboratory (TA-43) [a, b]				
2.13 Radiochemistry Facility (TA-48) [a]				
2.14 Radioactive Liquid Waste Treatment Facility (TA-50)	Radioactive Liquid Waste Treatment Facility	TA-50-01	NNSA/Office of Research, Development, and Simulation	Final treatment of liquid radioactive and industrial waste
2.15 Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)	Solid Radioactive Waste Management Facility	TA-54	NNSA/Office of Research, Development, and Simulation	Management of solid radioactive waste
2.16 Non-Key Facilities	Nicholas C. Metropolis Center for Modeling and Simulation (formerly SCC)	TA-03	NNSA/Office of Research, Development, and Simulation	Numerical simulation models of nuclear weapons
	NISC (complete in FY 2003)	TA-03	Nonproliferation	Arms control Treaty verification Nuclear safeguards Nonproliferation Weapons assessment
2.17 Environmental Restoration Project [a]				

[a] Not included in this specialized facilities listing.
[b] Renamed Bioscience Facilities.

5.3.7 Facilities and Infrastructure Impacts from Non-NNSA Programs

At this time, there are no identified activities from non-NNSA programs that could impact the site's current and/or future NNSA facilities and infrastructure activities. The specialized non-NNSA facilities are identified in Table 5.3.7-1. These facilities include three new buildings.

Table 5.3.7-1. Specialized Non-NNSA Facilities [a]

SWEIS ROD REFERENCE	TYCSP REFERENCE	LOCATION	DOE SPONSOR	SUPPORTED MISSION NEEDS
2.12 Health Research Laboratory [b]	Health Research Laboratory (HRL)	TA-43	Varies	Biologically inspired materials and chemistry Computational biology Environmental biology Genomic studies Measurement science and diagnostics Molecular and cell biology Cytometry Structure biology
2.16 Non-Key Facilities	Center for Integrated Nanotechnologies (CINT) (complete in FY 2005)	TA-03	Office of Science	Nano/Bio/Micro interfaces Nanophotonics and nanoelectronics Nanomechanics Complex functional materials
	Fuel Cell Facility (complete in FY 2005)	TA-03	Office of Energy Efficiency and Renewable Energy	Low-Temperature Fuel Cell research and development: membrane/electrode/research and development, theory and modeling Enabling technologies: fuel processing, catalyst development, hydrogen storage and purification, sensors Advanced components: simplified systems, direct methanol systems, electrolyzers and reversible cells, alkaline fuel cells Industrial partnerships: portable electronics manufactures, automotive original equipment manufacturers fuel cell developers
	Emergency Operations Center (complete in FY 2003)	TA-69	Cerro Grande Rehabilitation Project	Emergency management Facility operations Emergency assessment Protection action formulation Joint dispatch operations

[a] All other Key Facilities identified in the SWEIS ROD (DOE 1999c) are not included in this specialized facilities listing.

[b] Renamed Bioscience Facilities.

During the early 1990s, several facilities were transferred from NNSA/Defense Programs to Environmental Management for surveillance and maintenance followed by decommissioning. In recent years, candidate facilities for transfer have been discussed, but none have been transferred from NNSA/Defense Programs to NNSA/Environmental Management.

5.4 The Plan

5.4.1 Planning Process

The FY 2003 TYCSP focuses on the physical assets that support the Laboratory's missions and operations. The plan was developed from the four levels of the Laboratory's strategic planning process: mission objectives, permit to operate, operational plans, and supporting plans. The planning process translates into the following:

- The mission objectives incorporate the institutional plan with the Laboratory's annual goals and objectives.
- The permit to operate includes the authorization basis (facility permit to operate) and the SWEIS (operating envelope).
- The operational plans include the *Site Safeguards and Security Plan*; *Environment, Safety, and Health Management Plan*; *Integrated Natural and Cultural Resources Management Plan for Los Alamos National Laboratory* (DOE 2002), program planning, and budget, and workforce planning.
- The supporting plans that include the Comprehensive Site Plan 2000/2001 (LANL 1999a, 2001), area development plans, facility strategic plans, and master plans.

The accumulation of data from these four levels forms the TYCSP.

5.4.2 Facilities

More than half of the Laboratory's facilities are currently over 30 years old, including nuclear and nonnuclear facilities. Over the next 10 years, facilities aged 30 or more years old will increase to seven million gross square feet. Without implementing the proposed demolition and replacement of aging facilities, the Laboratory's ability to carry out the stockpile stewardship mission is seriously threatened. Nineteen percent of the Laboratory's structures are planned for excess within the next 10 years because of their inadequacy to meet long-term missions.

The facilities have been evaluated relative to their role in serving the Laboratory's mission and what maintenance each requires. Some facilities have been identified as excess. These will be converted for other use, decontaminated and demolished, or preserved for their historical value.

Table 5.4.2-1 provides a summary relative to structures for FY 2002 and FY 2003.

5.4.3 Utilities

The ownership and distribution of utility services are split between DOE and Los Alamos County. Utility systems at the Laboratory include electrical services, natural gas, steam, water, sanitary wastewater, telecommunications and data networks, and refuse.

Electrical Power. There are approximately 140 miles of transmission and primary electrical distribution lines at the Laboratory. Although the Laboratory's electrical power system is in generally good operating condition, there are specific concerns that will require attention are summarized in Table 5.4.3-1.

Sanitary Waste Disposal System. Sanitary liquids are delivered by dedicated pipelines to the sanitary wastewater systems consolidation plant at TA-46. The plant has a capacity of 600,000 gallons per day. The sanitary sewer system has approximately 744,500 feet of pipeline. In general, the collection system is in satisfactory operating condition and the plant is in excellent condition and will adequately accommodate future demand. The specific concerns and related projects for this system are identified in Table 5.4.3-2.

Table 5.4.2-1. Summary of Proposed Future Condition by Gross Square Feet–FY 2002 and FY 2003

PLANNED/BUDGETED NEW (0 TO 3 YEARS)		FY	EXISTING WITH LONG-TERM MISSION	BUILDING TO BE EXCESSED 5 TO 10 YEARS	BUILDING TO BE EXCESSED 0 TO 5 YEARS	TEMPORARY/ UTILITARIAN STRUCTURES	SPARE	LEASED
Engineering Facilities	20,000	02	405,069	188,151	251,983	17,564	0	0
	43,000	03	400,455	188,122	168,545	17,596	0	0
Tritium Facilities	20,000	02	19,568	0	74,497	0	0	0
	0	03	42,629	0	69,145	0	0	0
LANSCE	5,062	02	842,825	7,149	1,158	50,940	5,166	0
	5,062	03	843,205	7,149	0	48,410	5,166	0
Dynamic Experiments	0	02	278,331	159,332	22,931	11,687	17,349	0
	5,600	03	277,548	158,564	21,151	8,432	4,338	0
Materials Science/Laser	0	02	508,659	11,245	164	25,711	0	0
	18,000	03	526,820	0	164	2,133	0	0
Waste Management	13,200	02	209,255	47,251	2,587	37,153	0	0
	13,200	03	201,905	47,251	2,227	40,795	0	0
Computer Facilities	300,000	02	468,257	9,006	6,159	30,107	0	0
	0	03	819,179	35,707	0	25,899	0	0
Nuclear (SNM)	7,500	02	397,205	667,727	840	18,340	0	0
	25,500	03	397,205	664,672	840	20,620	0	0
Nonproliferation and International Security/Decision Applications (Threat Reduction) [a]	165,000	02	215,841	83,658	53,865	29,606	40	0
Nonproliferation and International Security/Decision Applications/Bio-sciences (Threat Reduction) [b]	206,000	03	210,980	182,735	8,744	31,143	0	0
Strategic Research [a]	21,000	02	913,335	113,638	13,754	165,847	1,055	12,082
Institutional (Facility Waste Operations) [a]	35,600	02	475,723	386,844	405,208	96,547	0	310,485
Institutional Science Base Support Divisions [b]	92,600	03	1,309,970	344,620	537,109	205,052	0	345,539
Laboratory Total	587,362	02	4,734,068	1,674,001	833,146	483,502	23,610	322,567
	408,962	03	5,029,896	1,628,820	807,925	400,080	9,544	345,539
Excess Facilities	0	02	0	0	391,808	0	0	0
	0	03	0	0	652,050	0	0	0

[a] Not listed in FY 2003.
[b] Not listed in FY 2002.

Table 5.4.3-1. Electrical Power Concerns and Related Projects

CONCERNS	RELATED PROJECTS–CY 2002 AND BEYOND
Switchgear and circuit breakers in several locations are old and obsolete for the current system and need to be replaced.	Switchgear in several locations at the Laboratory is currently being replaced. The design, delivery, and installation of switchgear and equipment was completed for Sigma during CY 2002.
Step-down transformers, which supply all the electric power to the Laboratory's main technical area (TA-03) and the Los Alamos town site, are old and do not provide adequate redundancy. At TA-03, the 50-year-old transformers (30 megawatt capability each) serve a 50 megawatt-plus load. Because a single transformer cannot address the entire load, there is no redundancy.	The WTA 115 to 13.8 MVA (56 MVA capacity) transformer was put into service during 2002 and, when operational, will allow the replacement of the TA-03 transformers. Several other transformers are on the Institutional Projects List.
The two existing 115-kilovolt transmission lines that carry all the bulk electric power for the Laboratory and Los Alamos County terminate on a common bus and therefore lack true redundancy.	To address electrical power redundancy and availability, the project list includes projects to uncross the 115-kilovolt lines and to add a backpressure turbine at the power plant.
The program to monitor usage, power quality, and log events does not cover all applicable buildings and needs to be expanded.	The Laboratory's metering network program, which monitors usage, power quality, and log events from a central computer, has been expanded to include over 70 buildings. Fifty buildings will be added to the program each year.
TA-03 transformers are 50 years old and undersized. There is no redundancy to service the load.	The WTA 115 to 13.8 million volt amperes (56 million volt amperes capacity) transformer was put into service during 2002 and, when operational, will allow the replacement of the TA-03 transformers.
Portions of the 13.8-kilovolt aerial distribution lines are not adequate to carry the anticipated loads in 2011. Replacing existing conductors with heavier conductors and adding new circuits to support them are required to accommodate these future loads.	Replacement work has been done at DARHT, WETF, the SCC, and NISC and will continue with other projects.

Table 5.4.3-2. Sanitary Waste Disposal System Concerns and Related Projects

CONCERNS	RELATED PROJECTS–CY 2002 AND BEYOND
Individual pipe segments throughout the Laboratory have inadequate slopes and require a high degree of maintenance to remove built-up solids. A minimum flow velocity of two feet per second is required.	TA-03/58 gravity line.
	Replace broken sewer lines.
	The Cooling Tower Water Conservation project, planned for late FY 2003 completion, will use solid wastewater systems consolidation water instead of potable water for a set of cooling towers.

Radioactive Liquid Waste. There are three treatment facilities for handling the Laboratory's radioactive liquid waste at TA-21, TA-53, and TA-50, and a collection system that consists of 22,000 feet of piping. The piping in the collection system is in good condition. The specific concerns and related projects for this system are identified in Table 5.4.3-3.

Table 5.4.3-3. Radioactive Liquid Waste Concerns and Related Projects

CONCERNS	RELATED PROJECTS–CY 2002 AND BEYOND
TA-21 treatment facility is over 35 years old and in poor condition. Inactivity has contributed to the general deteriorating quality and a number of storage vessels do not meet current practices for environmental protection.	Decontamination and demolition of the TA-21 treatment facility.
TA-50 treatment facility is over 35 years old and in poor condition. The facility is undersized for handling its current load of waste generated by approximately 1,800 points at the Laboratory.	Repairs and upgrades to the ventilation system at the TA-50 facility are needed to continue operations for the next 10 years. Reliability improvements to the membrane system are needed to provide additional capacity. Upgrade the facility to enhance treatment efficiencies, relieve safety concerns, and address environmental concerns.
Separated treatment operations	Relocate/upgrade the high activity pretreatment operation to meet space and safety needs.
Inadequate storage capacity could be overwhelmed by a surge of radioactive liquid waste.	Add influent storage and instrumentation for continued operations.
Flow meters at generator facilities do not function well and it is difficult to sample the radioactive liquid waste for compliance with acceptance criteria.	Add influent storage and instrumentation for continued operations.

Central Steam System. The Laboratory has two primary sources of steam with the power plant in TA-03 and the TA-21 distributed steam plant, with capabilities of 360,000 pounds per hour and 36,000 pounds per hour, respectively. The power and generator plants have the capacity to deliver three times the current demand, and this will accommodate future development in the TA-03 area. The steam distribution is primarily underground in over 20 miles of steel piping, which is well maintained and in good condition. The specific concerns and related projects for this system are identified in Table 5.4.3-4.

Table 5.4.3-4. Central Steam System Concerns and Related Projects

CONCERNS	RELATED PROJECTS–CY 2002 AND BEYOND
Steam system condensate return lines are made of various materials, only some of which have cathodic protection, and deterioration is rapid in some instances.	TA-03 condensate lines.
A condensate return rate of 60% to 75% is being currently achieved and should be increased to improve central plant performance.	
There are sections of the steam system that have had a high leak rate and therefore high repair requirements that need replacement.	Power plant steam piping replacement, cooling tower piping replacement, feed water piping, and condensate return piping.
	Flue gas recirculation ductwork.

Water Supply System. The Laboratory has a target water consumption of 1,662 acre-feet per year. Water demand based on projected growth may require water beyond recent usage levels. In accordance with the LANL Site-Wide Water Conservation Plan (Beers 2001) key recommendation, an Interim Water Conservation Committee has been established and an Acting Water Conservation Officer appointed.

Potable water is obtained from deep wells located in three well fields. This water is pumped into production lines, and booster pump stations lift the water to reservoir storage tanks for distribution. The well fields can easily provide forecasted water demands for the next 10 years. The Laboratory water system is in generally good condition. The specific concerns and related projects for this system are identified in Table 5.4.3-5.

Table 5.4.3-5. Water Supply System Concerns and Related Projects

CONCERNS	RELATED PROJECTS – CY2002 AND BEYOND
Future water availability	The Laboratory has initiated a project to increase the TA-03 and TA-53 cooling towers' cycles of concentration from two to six and is investigating water saving opportunities: • Greater use of recycled water. • Use of Los Alamos County wastewater for current and future Laboratory needs. • Sustainable design of new facilities to include water-saving fixtures, reuse of gray water, low-water-use vegetation in landscaping, and use of natural space cooling versus water cooling. • Complete reuse/recycle for potential irrigation, cooling, retention, fire suppression, and recharge.
Water pressure in lower-elevation areas often exceeds the pressure rating for the distribution piping.	The water distribution system has been enhanced by the installation of equipment to control the pressure.
Some fire hydrants are connected to undersized lines that need to be replaced.	
	A preventive maintenance program is in place.
	Laboratory is working on a project to connect the system to the SCADA (monitoring and alarm) system.

Natural Gas. Approximately 90 percent of the gas used is for heating (both steam and hot air), and the remainder is used for electrical production. In general, the natural gas system is old, with approximately 80 percent having been installed in the 1950s and 1960s. An aggressive cathodic protection installation and maintenance system was deployed in 1998, which has improved the integrity and condition of the system. The specific concerns and related projects for this system are identified in Table 5.4.3-6.

Table 5.4.3-6. Natural Gas Concerns and Related Projects

CONCERNS	RELATED PROJECTS – CY2002 AND BEYOND
No redundant border metering station capable of supplying full capacity gas demand exists.	100 psi natural gas lines at TA-03 and TA-16
The gas pipe serving TA-55 is too small to carry peak load capacity.	Pajarito Road gas line
A portion of the East Jemez Road 6-inch line is restricted.	

Utility Planning. The Laboratory has a Mitigation Action Plan for its utility systems that addresses, in part, specific measures for electrical power. The Laboratory is planning a comprehensive utility planning study that will evaluate the ability of the existing systems and will recommend necessary changes to the systems to meet Laboratory projected utility loads for the next 10 years. Future utility loads are to be modeled from the projects listed in the TYCSP. Factors to be considered are the future utility system capabilities, potential threats to existing services such as the end-of-operating life issues, maintenance history, and alternative solutions to ensure adequate utility delivery systems.

5.4.4 Production Readiness/Plant Capacity

In addition to the research and development contributions to the Stockpile Stewardship Program, the Laboratory has also established a program for limited-manufacturing assignments within the production complex for continued replacement of limited-life components and for replacement of components destructively tested as part of the surveillance program. The goal of the Laboratory's manufacturing program is to meet present and future component manufacturing requirements for the stockpile and simultaneously meet all safety and security requirements. The Laboratory is generally prepared and capable of meeting its directive-schedule production and surveillance missions. However, the aging facilities are an issue relative to readiness for future directed stockpile work.

5.4.5 Environment, Safety, and Health/Regulatory Issues

The Laboratory's Environment, Safety, and Health management processes are designed to enhance Environment, Safety, and Health performance, preparation of tactical and strategic plans, achievement of Operational Excellence Goals, business efficiency, Appendix F and O of the UC/DOE Prime Contract performance expectations, and the Laboratory's commitment to the DOE policy of attaining "daily excellence in the protection of the worker, the public, and the environment."

Compliance Issues. There are four compliance activities that may have an impact on existing and new facilities:

- Quality Assurance: The final Code of Federal Regulation Rule for nuclear facility safety management (10 CFR 830) established new requirements for the Laboratory's nuclear facilities.
- Beryllium Rule Implementation: The Laboratory developed and received approval for a Chronic Beryllium Disease Prevention Program.
- Appendix O Safety Analyses: Appendix F and Appendix O of the UC/DOE Prime Contract provide specific expectations for the development and implementation of Safety Authorization Basis documentation for both nuclear and nonnuclear facilities.
- Hydrogeologic Workplan (Barr 2001): The plan describes activities to characterize the hydrogeologic setting beneath the site and to enhance the groundwater monitoring program. The plan is driven by regulatory requirements of the NMED, DOE Orders, and the Laboratory's commitment to groundwater protection.

Commitments. The Laboratory has made commitments to non-NNSA regulators:

- Elimination of Ozone Depleting Equipment: The Laboratory is required to eliminate pre-1984 chillers larger than 150 tons that use Class 1 ozone depleting substances. Only two major replacement projects remain–TA-48 (Building RC-1) and LANSCE.
- Defense Nuclear Facilities Safety Board Recommendation 2000-2 (DNFSB 2000): The recommendation calls for improvement in configuration management of vital safety systems. The Laboratory has major initiatives to revitalize institutional support services, standardize and integrate facility management programs, and optimize facility management units.

Improvements. There are two activities that have an impact on site operations:

- Environmental Restoration: A Performance Management Plan for Accelerating Cleanup (LANL 2000a) was forwarded to DOE Headquarters in July 2002. The plan calls for completing work by 2015 and describes three primary initiatives–legacy TRU and MLLW, groundwater protection, and environmental restoration.

- Fire Hazard Mitigation: Facility Fire Hazard Assessments are being completed for all nuclear facilities, high and moderate hazard nonnuclear facilities, new facilities as they are constructed and turned over for operations, and existing facilities with unique fire hazards or risks.
- NMED Corrective Action Order: On May 2, 2002, the NMED issued a Determination to LANL alleging that radioactive, hazardous, and solid wastes have been released and "may present imminent and substantial endangerment to human health or the environment." NMED publicly stated that it issued the ISE and Draft Order to obtain additional funding from DOE for cleanup at the Laboratory. DOE and UC have requested that NMED withdraw the ISE Determination and take no further action on the Draft Order. The Laboratory is already implementing, under NMED, a comprehensive, multimedia environmental restoration program that includes addressing, on a voluntary basis, materials beyond NMED's authority.

5.4.6 Security

A Security Strategy Working Group was chartered to identify security issues, prioritize preferred solutions, and provide a multiyear project plan. In response to September 11, 2001, security posts have been added, access restrictions have been implemented, and a permanent screening station for all commercial deliveries has been added.

5.4.7 Workforce Profile

Over the next five years, the Laboratory will experience a significant increase (approximately 13 percent) in the number of personnel. Primarily increasing mission and program requirements drive the impact. Table 5.4.7-1 provides workforce data by directorate for January 2002 and projections through FY 2006. The data

Table 5.4.7-1. Current and Projected Workforce Levels by Directorate

DIRECTORATE	CURRENT (JAN 2002)	PROJECTIONS				
		FY 2002 [a]	FY 2003 [b]	FY 2004 [b]	FY 2005 [c]	FY 2006 [c]
Institutional Science Base and Support Divisions						
Workforce	3,132	3,250	3,318	3,388	3,439	3,473
Critical Skills	49	65	69	70	72	73
Strategic Research						
Workforce	1,976	2,048	2,091	2,135	2,167	2,189
Critical Skills	220	271	303	304	310	312
Threat Reduction						
Workforce	1,367	1,453	1,484	1,515	1,537	1,553
Critical Skills	64	87	89	90	92	92
Weapons Engineering and Manufacturing						
Workforce	1,716	1,901	1,941	1,982	2,011	2,032
Critical Skills	446	534	596	618	628	636
Weapons Physics						
Workforce	2,231	2,371	2,421	2,472	2,509	2,534
Critical Skills	423	475	495	511	513	514
Total						
Workforce	10,422 [d]	11,023	11,254	11,491	11,663	11,780
Critical Skills	1,202	1,432	1,552	1,593	1,615	1,627
Net Increase						
Workforce		601	231	236	172	117
Critical Skills		230	120	41	22	12

[a] FY 2002 projections are approved hires.
[b] Projections represent standard escalations (2.1%).
[c] Projections assume reduced growth rate (FY 2005–1.5%; FY 2006–1.0%).
[d] Excludes JCNNM, PTLA, affiliates, and guests.

in the table are not readily comparable to the numbers of employees that have been routinely compiled for the Yearbooks (LANL 1999b, 2000b, 2000c, 2001b, 2002d). The data in Table 5.4.7-1 exclude PTLA and JCNNM and the critical skills are both a subset of the total workforce and are mission essential for stockpile stewardship. PTLA, in response to increased security requirements, is expected to increase by 200. The support services contractor will likely remain constant. These projected increases call for facilities to support a total workforce of approximately 14,000 people.

5.4.8 Transportation and Parking

Development of roads and parking has been incremental and neglected pedestrian, bicycle, and transit improvements. Maintenance of the transportation infrastructure has generally been inadequate to keep up with the needs. The new construction at TA-03 and the population increases at TA-55 have caused parking shortages. Additional parking lots have been added and are planned for both technical areas. The Laboratory is working on the development of a transportation infrastructure that provides for security, emergency, and safety needs.

5.4.9 Current Planning Initiatives

The current planning initiatives are directed at consolidation plans to ensure that the Laboratory can meet the RTBF mission. These efforts include addressing

- integrated nuclear planning,
- nuclear facilities consolidation,
- nuclear materials storage,
- Advanced Hydrotest Facility, and
- a sanitary landfill.

The Los Alamos County landfill that serves both the townsite and the Laboratory is nearing capacity. DOE, the Laboratory, and Los Alamos County are examining potential sites for a new sanitary landfill for the county. Laboratory sites are under consideration for the new landfill and discussions have included what can be done with the current landfill after closure.

5.4.10 Facility Strategic Planning

Extensive facility strategic planning efforts for consolidation are ongoing in alignment with and support of the TYCSP. Along with these efforts, coordinating activities include NEPA, space management, security planning, project launch and development, and maintenance prioritization. Projects defined through facility strategic planning are based on organizational vision and needs. The projects are prioritized by the directorate and institution through the TYCSP project call process. The projects approved for institutional prioritization are presented in the TYCSP project lists.

5.5 Facilities and Infrastructure Projects

5.5.1 Overview of Site Project Prioritization and Cost Profile

The TYCSP includes projects from the six funding sources described in Table 5.5.1-1.

5.5.2 Line Item Highlighted Projects

The highlighted projects are DARHT, the CMR Replacement Project, and the National Nuclear Security Building. Both DARHT and the CMR Replacement projects are discussed in Chapter 2, Sections 2.10 and 2.1 respectively. The National Security Science Building is a replacement for the Laboratory's 45-year-old SM-43 Building at TA-03. The project will provide office and research space to house theoretical and applied

Table 5.5.1-1. Funding Sources

FUNDING SOURCE	INCLUDES
Defense Program Line Items	Consistent with the Integrated Construction Program Plan direction from NNSA on August 7, 2002
RTBF (no line items)	Projects for RTBF facilities achieving warm standby benefits but excluding any project needed to increase program capability or capacity
FIRP	Projects that improve long-term physical conditions and mission availability as well as address the landlord infrastructure responsibilities of NNSA's nuclear weapons complex
Campaign/Directed Stockpile Work funded (no line items)	Projects supporting Defense Programs facilities not funded by RTBF and as needed to increase program capacity and capabilities in any DP facilities
Non-NNSA/Defense Programs	Non-NNSA/Defense Programs projects supported by specific programs
Institutional General Plant Projects	Institutionally funded for institutional benefits

Artist's rendering of the proposed National Security Sciences Building at TA-03

physics, computational sciences, and the Laboratory's program and senior management functions in support of the DOE's Stockpile Stewardship Program. The new building is currently planned to be located near the new SCC and NISC facilities, to have approximately 275,000 square feet of office space, and to house a staff of approximately 700. Construction of a parking structure and decommissioning and demolition of the SM-43 Building would also occur.

5.5.3 FIRP Highlighted Projects

The highlighted FIRP projects are the Security Systems Support Facility, the Decision Applications Division Office Building, the MST Office Building, and the Health Clinic. All of these projects are discussed in Chapter 2, Section 2.16.

5.5.4 RTBF/Operations of Facilities Highlighted Projects

The highlighted projects are from ESA Division consolidation. They include

- the upgrade of TA-16 West Jemez Road–to improve traffic flow into and out of TA-16, design completed in FY 2002, construction will be completed in FY 2003;

Conceptual design of the proposed Technical Area 16 engineering complex

- Weapons Plant Support Facility–to provide office and shop space for facility crafts and a change room for high explosives workers, fully funded in FY 2002, contract awarded in September 2002, completion expected in FY 2004;
- security upgrades and fencing–infrastructure improvements; and
- roads and utilities–improvements for utility upgrades and road relocations.

5.5.5 Non-RTBF/FIRP Highlighted Projects

The highlighted projects are the NISC, the Emergency Operation Center, the Cerro Grande Fire Office replacements, the Manufacturing Technical Support Facility, and the Center for Integrated Nanotechnologies. Only the Center for Integrated Nanotechnologies is not discussed in Chapter 2.

Emergency Operations Center (above center), Manufacturing Technical Support Facility (above left), Conceptual Design of the Center for Integrated Nanotechnologies (above right)

The Center for Integrated Nanotechnologies will be a distributed center to be operated jointly by Sandia National Laboratories and Los Alamos. The Los Alamos element of the project will provide a 31,000-square-foot gateway to connect scientists to the extensive biosciences and nanomaterials capabilities of LANL.

5.5.6 Institutional General Plant Projects

Institutional General Plant Projects is a newly approved funding source for new construction projects at multiprogram NNSA sites. Projects of a general institutional nature that are required for general purpose site-wide needs are considered appropriate candidates. Examples of projects that could be proposed in future years include the following:

- multiprogrammatic/interdisciplinary scientific laboratory,
- institutional training facility,
- new roads/parking,
- multiprogrammatic office space, and
- multiprogrammatic facilities required for “Quality of Life” improvements.

The Laboratory has proposed two projects for consideration.

5.5.7 Facilities and Infrastructure Cost Projection Spreadsheets

The Laboratory accomplishes critical infrastructure development, renovations, and upgrades through line item, general plant, capital equipment, and expense-funded projects. The primary categories of projects and costs are

- existing and proposed line item construction,
- other project costs for existing and proposed line item construction,
- preliminary engineering and design for proposed line item construction,
- capital equipment,
- expense,
- General Plant Project,
- institutional,
- maintenance,
- standby,
- decommissioning and demolition, and
- facility management and site planning costs.

5.6 References

American Standard of Testing Materials International, 2000. "Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process," ASTM E 1527-00, West Conshohoken, PA.

Barr, A. R., 2001. "Hydrogeologic Workplan," LA-UR-01-6511, Los Alamos National Laboratory, Los Alamos, NM.

Beers, R. S., 2001. "Los Alamos National Laboratory Site-Wide Water Conservation Program Plan," LA-UR-01-6377, Los Alamos National Laboratory, Los Alamos, NM.

Defense Nuclear Facilities Safety Board, 2000. "Configuration Management, Vital Safety Systems," DNFSB Recommendation 2002-2, Washington, D.C.

Department of Energy, 1999a. "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," DOE/EIS-0238, Albuquerque, NM.

Department of Energy, 1999b. "Cross-Cut Guidance on Environmental Requirements for DOE Real Property Transfers," DOE/EH-413/9712, Washington, D.C.

Department of Energy, 1999c. "Record of Decision: SWEIS in the State of New Mexico," 64 FR 50797, Washington, D.C.

Department of Energy, 2002. "Integrated Natural and Cultural Resources Management Plan for Los Alamos National Laboratory," Department of Energy/National Nuclear Security Administration, Office of Los Alamos Site Operations, Los Alamos, NM.

Federal Register, 2001. "Nuclear Safety Management," US Department of Energy, 10 CFR 830, Vol. 66, No. 7, Washington, D.C.

Los Alamos National Laboratory, 1999a. "Comprehensive Site Plan 2000, Technical Site Information Document," LA-UR-99-6704, Los Alamos, NM.

Los Alamos National Laboratory, 1999b. "SWEIS 1998 Yearbook," LA-UR-99-6391, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?00460172.pdf).

Los Alamos National Laboratory, 2000a. "Environmental Restoration: A Performance Management Plan for Accelerating Cleanup," Los Alamos, NM.

Los Alamos National Laboratory, 2000b. "SWEIS Yearbook – 1999," LA-UR-00-5520, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?LA-UR-00-5520.htm).

Los Alamos National Laboratory, 2000c. "A Special Edition of the SWEIS Yearbook, Wildfire 2000," LA-UR-00-3471, Los Alamos, NM. (LANL 2000b, http://lib-www.lanl.gov/cgi-bin/getfile?/00393627.pdf).

Los Alamos National Laboratory, 2001a. "Ten Year Comprehensive Site Plan," LA-CP-01-374, Los Alamos, NM.

Los Alamos National Laboratory, 2001b. "SWEIS Yearbook – 2000," LA-UR-01-2965, Los Alamos, NM. (LANL 2001a, http://lib-www.lanl.gov/la-pubs/00818189.pdf).

Los Alamos National Laboratory, 2002a. "Ten Year Comprehensive Site Plan FY03," LA-CP-02-421, Los Alamos, NM.

Los Alamos National Laboratory, 2002b. "Readiness in Technical Base and Facilities FY2002 Implementation Plan," LA-CP-01-313, Rev. 1.1, Los Alamos, NM.

Los Alamos National Laboratory, 2002c. "Readiness in Technical Base and Facilities FY2002 Implementation Plan," LA-CP-02-413, Los Alamos, NM.

Los Alamos National Laboratory, 2002d. "SWEIS Yearbook – 2001," LA-UR-02-3143, Los Alamos, NM. (http://lib-www.lanl.gov/cgi-bin/getfile?00818857.pdf).

Tate, R. A., 2001. "Comprehensive Site Plan 2001," LA-UR-01-1838, Los Alamos National Laboratory, Los Alamos, NM.

Public Law 105-119, Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act, 1998.

University of California/Department of Energy-National Nuclear Security Administration Prime Contract W-7405-ENG-36.

6.0 Summary and Conclusion

The 2002 Yearbook is a special edition to assist DOE/NNSA in evaluating the need for preparing a new SWEIS for LANL. Instead of limiting this edition of the Yearbook to CY 2002 data, the 2002 Yearbook summarizes the data routinely collected from CY 1998 through CY 2002:

- facility and/or process modifications or additions,
- types and levels of operations during the calendar year,
- operations data for the Key Facilities, and
- site-wide effects of operations for the calendar year.

This Yearbook also contains additional text and tabular summaries as well as a trend analysis and indicates the Laboratory's programmatic progress in moving towards the SWEIS projections.

6.1 Summary

The 2002 SWEIS Yearbook reviews CY 1998 through CY 2002 operations for the 15 Key Facilities (as defined by the SWEIS) at LANL and compares those operations to levels projected by the ROD. The Yearbook also reviews the environmental parameters associated with operations at the same 15 Key Facilities and compares these data with ROD projections. In addition, the Yearbook presents a number of site-wide effects of those operations and environmental parameters. The more significant results presented in the Yearbook are as follows:

Facility Construction and Modifications. The ROD projected a total of 38 facility construction and modification projects for LANL facilities. Ten of these projects were listed only in the Expanded Operations Alternative, such as modifications at CMR for safety testing of pits in the Wing 9 hot cells, expansion of the LLW disposal area at TA-54, Area G, and the LPSS at TA-53. These ten projects could not proceed until DOE issued the ROD in September 1999. However, the remaining 28 construction projects were projected in the No Action Alternative. These included facility upgrades (e.g., safety upgrades at the CMR Building and process upgrades at the RLWTF), facility renovation (e.g., conversion of the former Rolling Mill, Building 03-141, to the Beryllium Technology Facility), and the erection of new storage domes at TA-54 for TRU wastes. Since these projects had independent NEPA documentation, they could proceed while the SWEIS was still in process.

Of the 38 facility construction and modification projects for LANL projected in the ROD, 20 projects have now been completed: Six of these projects were completed in 1998, eight in 1999, two in 2000, none in 2001, and four in 2002. The number of projects started or continued each year were 13 in 1998, 10 in 1999, seven in 2000, and six in both 2001 and 2002.

During 2002, planned construction and/or modifications continued at six of the 15 Key Facilities. These activities were both modifications within existing structures and new or replacement facilities. New structures completed and occupied during 2002 included the TA-18 Relocation Project Office Building between TA-48 and TA-55, the Vessel Preparation Facility at TA-15, a Camera Room at TA-36-12, a Carpenter Shop at TA-15, the X-Ray Calibration Facility at TA-15, a warehouse at TA-15, and the transportable office building TA-48-210. Additionally, 13 major construction projects were either completed or continued for the Non-Key Facilities. These projects were as follows:

- Construction continued on the NISC begun in March 2001.
- Atlas was disassembled and relocated to the Nevada Test Site in December 2002.
- Construction of the Emergency Operations Center started in January 2002.
- Construction of the S-3 Facility started in July 2002.

- Construction of the Decision Applications Division Office Building started in September 2002.
- Construction of the new Medical Facility started in October 2002.
- The Chemistry Division Office Building was constructed, completed, and occupied.
- Construction of the MST Office Building started in November 2002.
- Construction of the TA-72 Live-Fire Shoot House started in November 2002.
- The Security Truck Inspection Station was constructed and became operational.
- The High Pressure Tritium Facility (TA-33-86) underwent decontamination and decommissioning and is now demolished.
- Demolition activities began in July 2002 on the Omega West Facility.
- TA-41-30 and the front of TA-41-4 were demolished August to October 2002.

The suspended catwalk observation platform in the Live Fire Shoot House

A major modification project, elimination and/or rerouting of NPDES outfalls, was completed in 1999, bringing the total number of permitted outfalls down from the 55 identified by the SWEIS ROD to 20. During 2000, Outfall 03A-199, which will serve the TA-03-1837 cooling towers, was included in the new NPDES permit issued by the EPA on December 29, 2000. This brought the total number of permitted outfalls up to 21.

Demolition of the Omega West Facility

Facility Operations. The SWEIS grouped LANL into 15 Key Facilities, identified the operations at each, and then projected the level of activity for each operation. These operations were grouped in the SWEIS under 96 different capabilities for the Key Facilities. With a few exceptions, the capabilities identified in the SWEIS ROD for LANL have remained constant since 1998. The exceptions are the

- movement of the Nonproliferation Training/Nuclear Measurement School between Pajarito Site and the CMR Building during 2000 and 2002,
- relocation of the Decontamination Operations Capability from the RLWTF to the Solid Radioactive and Chemical Waste Facilities in 2001,
- transfer of part of the Characterization of Materials Capability from Sigma to the TFF in 2001, and
- loss of Cryogenic Separation Capability at the Tritium Key Facilities in 2001.

Also, following the events of September 11, 2001, the Laboratory was requested to provide support for homeland security.

Since 1998, fewer than the 96 capabilities identified for LANL have been active. During 1998, only 87 capabilities were active. The nine capabilities with no activity were Manufacturing Plutonium Components at the Plutonium Complex; both Uranium Processing and Nonproliferation Training at the CMR Building; Accelerator Transmutation of Wastes at LANSCE; Biologically Inspired Materials and Chemistry, Computational Biology, and Molecular and Cell Biology at the Bioscience Facilities; and both Size Reduction and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 1999, 91 capabilities were active. The five inactive capabilities were Fabrication and Metallography at CMR; both Accelerator Transmutation of Wastes and Medical Isotope Production at LANSCE; and both Size Reduction and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 2000, 89 capabilities were active. The seven inactive capabilities were Fabrication of Ceramic-Based Reactor Fuels at the Plutonium Complex; Diffusion and Membrane Purification at the Tritium Facilities; both Destructive and Nondestructive Assay and Fabrication and Metallography at CMR; Accelerator Transmutation of Wastes and Medical Isotope Production at LANSCE; and both Size Reduction and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 2001, 87 capabilities were active. The nine inactive capabilities were both Manufacturing Plutonium Components and Fabrication of Ceramic-Based Reactor Fuels at the Plutonium Complex; both Cryogenic Separation and Diffusion and Membrane Purification at the Tritium Facilities; both Destructive and Nondestructive Assay and Fabrication and Metallography at CMR; Accelerator Transmutation of Wastes and Medical Isotope Production at LANSCE; and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

During CY 2002, 88 capabilities were active. The eight inactive capabilities were: Manufacturing Plutonium Components at the Plutonium Complex; both the Cryogenic Separation and the Diffusion and Membrane Purification capabilities at the Tritium Facilities; both the Destructive and Nondestructive Assay and the Fabrication and Metallography capabilities at CMR; both the Accelerator Transmutation of Wastes and the Medical Isotope Production capabilities at LANSCE; and Other Waste Processing at the Solid Radioactive and Chemical Waste Facilities.

While there was activity under nearly all capabilities, the levels of these activities were mostly below levels projected by the ROD. For example, the LANSCE linac generated an H^- beam to the Lujan Center for 2,303 hours in 2002, at an average current of 105 microamps, compared to 6,400 hours at 200 microamps projected by the ROD. Similarly, a total of 160 criticality experiments were conducted at Pajarito Site, compared to the 1,050 projected experiments.

As in 1998 through 2001, only three of LANL's facilities operated during 2001 at levels approximating those projected by the ROD—the MSL, the Bioscience Facilities (formerly HRL), and the Non-Key Facilities. The two Key Facilities (MSL and Bioscience) are more akin to the Non-Key Facilities and represent the dynamic nature of research and development at LANL. More importantly, none of these facilities are major contributors to the parameters that lead to significant potential environmental impacts. The remaining 13 Key Facilities all conducted operations at or below projected activity levels.

Operations Data and Environmental Parameters*.* This 2002 Yearbook evaluates the effects of LANL operations in three general areas—effluents to the environment, workforce and regional consequences, and changes to environmental areas for which the DOE has stewardship responsibility as the owner of a large tract of land.

Effluents include air emissions, liquid effluents regulated through the NPDES program, and solid wastes. From 1998 through 2002, radioactive airborne emissions from point sources (i.e., stacks) have varied from a low of 1,900 curies during 1999 to a high of approximately 15,400 curies during 2001, 70 percent of the 10-year average of 21,700 curies projected by the SWEIS ROD. The final dose over this same five-year period has varied from a low of 0.32 millirem in 1999 to a high of 1.84 millirem during 2001 (compared to 5.44 projected), with the final dose of 1.69 millirem for 2002 being reported to the EPA by June 30, 2002. Calculated NPDES discharges have ranged from a low of 124 million gallons per year in 2001 to a high of 317 million gallons per year in 1999 compared to a projected volume of 278 million gallons per year. However, the apparent decrease in flows is primarily due to the methodology by which flow was measured and reported in the past.

Historically, instantaneous flow was measured during field visits as required in the NPDES permit. These measurements were then extrapolated over a 24-hour day/seven-day week. With implementation of the new NPDES permit on February 1, 2001, data are collected and reported using actual flows recorded by flow meters at most outfalls. At those outfalls that do not have meters, the flow is calculated as before, based on instantaneous flow. Quantities of solid radioactive and chemical wastes generated have ranged from approximately 3.2 percent of the MLLW projections during both 1999 and 2002 to 1,291 percent and 1,309 percent of the chemical waste projections during 2001 and 2000, respectively. The extremely large quantities of chemical waste (23.0 million kilograms during 2001 and 27.2 million kilograms during 2000) are a result of ER Project activities. (For example, the remediation of MDA-P resulted in 21.5 million kilograms, or 88 percent, of the 24.4 million kilograms of chemical waste generated during 2001.) Most chemical wastes are shipped offsite for disposal at commercial facilities; therefore, these large quantities of chemical waste will not impact LANL environs. The chemical waste quantities are the only solid waste type to have met or exceeded the SWEIS ROD projections between 1998 and 2002.

The workforce has been above ROD projections since 1997. The 13,524 employees at the end of CY 2002 represent 2,173 more employees than projected and the highest number of employees over the period. Thus, regional socioeconomic consequences, such as salaries and procurements, also should have exceeded projections.

Since 1998, the peak electricity consumption was 394 gigawatt-hours during 2002 and the peak demand was 72 megawatts during 2001 compared to projections of 782 gigawatt-hours with a peak demand of 113 megawatts. The peak water usage was 461 million gallons during 1998 (compared to 759 million gallons projected), and the peak natural gas consumption was 1.49 million decatherms during 2001 (compared to 1.84 projected).

Between 1998 and 2002, the highest collective TEDE for the LANL workforce was 196 person-rem during 2000, which is considerably lower than the workforce dose of 704 person-rem projected by the ROD.


Anthropomorphic petroglyph

Measured parameters for ecological resources and groundwater were similar to ROD projections, and measured parameters for cultural resources and land resources were below ROD projections. For land use, the ROD projected the disturbance of 41 acres of new land at TA-54 because of the need for additional disposal cells for LLW. As of 2002, this expansion had not become necessary. However, construction continued on 44 acres of land that are being developed along West Jemez Road for the Los Alamos Research Park. This project has its own NEPA documentation (an environmental assessment), and the land is being leased to Los Alamos County for this privately owned development.

Cultural resources remained protected, and no excavation of sites at TA-54 or any other part of LANL has occurred. (The ROD projected that 15 prehistoric sites would be affected by the expansion of Area G into Zones 4 and 6 at TA-54.) However, there have been excavations related to the land transfer project under the auspices of a programmatic agreement between the DOE, the State Historic Preservation Office, and the Advisory Council on Historic Preservation. These excavations are required before releasing these lands to Los Alamos County under Public Law 105-119.


Day flower

As projected by the ROD, water levels in wells penetrating into the regional aquifer continue to decline in response to pumping, typically by several feet each year. In areas where pumping has been reduced, water levels show some recovery. No unexplained changes in patterns have occurred in the 1995–2002 period, and water levels in the regional aquifer have continued a gradual decline that started in about 1977.

In addition, ecological resources are being sustained as a result of protection afforded by DOE ownership of LANL. These resources include biological resources such as protected sensitive species, ecological processes, and biodiversity. The recovery and response to the Cerro Grande Fire of May 2000 has included a wildfire fuels reduction program, burned area rehabilitation and monitoring efforts, and enhanced vegetation and wildlife monitoring.

6.2 Conclusions

In conclusion, LANL operations data mostly fell within projections. Operations data that exceeded projections, such as number of employees or chemical waste from cleanup, either produced a positive impact on the economy of northern New Mexico or resulted in no local impact because these wastes were shipped offsite for disposal. Overall, the 1998 through 2002 operations data indicate that the Laboratory was operating within the SWEIS envelope.

The 1998 through 2002 data indicate that LANL operations typically remained below levels projected by the SWEIS ROD. There are two main reasons for this fact. The ROD was not issued until September 1999; consequently, operations were more likely to be at levels consistent with pre-ROD conditions. Moreover, data in the SWEIS were presented for the highest level projected over the 10-year period 1996–2005. Thus, the data from early years in the projection period (1996–2002) would be expected to fall below the maximum.

One purpose of the 2002 Yearbook is to compare LANL operations and resultant 1998 through 2002 data to the SWEIS ROD to determine if LANL was still operating within the environmental envelope established by the SWEIS and the ROD. Data for 1998 through 2002 indicate that positive impacts (such as socioeconomics) were greater than SWEIS ROD projections, while negative impacts, such as radioactive air emissions and land disturbance, were within the SWEIS envelope.

6.3 To the Future

The Yearbook will continue to be prepared on an annual basis, with operations and relevant parameters in a given year compared to SWEIS projections for activity levels chosen by the ROD. The presentation proposed for the 2003 Yearbook will follow that developed for the previous Yearbooks—comparison to the SWEIS ROD. As requested by DOE/NNSA, the Laboratory will include the results of an updated wildfire analysis in the 2003 Yearbook.

The 2002 Yearbook is an important step forward in fulfilling a commitment to make the SWEIS for LANL a living document. Future Yearbooks are planned to continue that role.

Wetland in Pajarito Canyon

Pajarito Canyon

Table A-1. Chemistry and Metallurgy Research Building Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
CMR	Acetic Acid	64-19-7	kg/yr	0.2	0.5						
	Acetone	67-64-1	kg/yr	2.5	7.1	6.10	17.41			1.94	5.53
	Acetonitrile	75-05-8	kg/yr					0.27	0.79		
	Acetylene	74-86-2	kg/yr							0.00	5.26
	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.3	0.8						
	Arsenic, el.&inorg.,exc. Arsine, as As	7440-38-2	kg/yr					0.20	0.56	0.39	1.12
	Diethylene Triamine	111-40-0	kg/yr	0.3	1.0			0.17	0.48		
	Ethanol	64-17-5	kg/yr	3.1	9.0	4.01	11.47	2.95	8.43	2.62	7.50
	Ethyl Acetate	141-78-6	kg/yr					0.16	0.45		
	Formic Acid	64-18-6	kg/yr	10.0	28.7	0.43	1.22				
	Hydrogen Bromide	10035-10-6	kg/yr	1.6	4.5	1.05	3.01	0.74	2.10	1.05	3.00
	Hydrogen Chloride	7647-01-0	kg/yr	43.2	123.4	5.00	14.27	11.43	32.64	21.81	62.32
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.3	0.7	0.69	1.98	0.60	1.73	0.09	0.25
	Hydrogen Peroxide	7722-84-1	kg/yr	24.1	68.9	0.30	0.85			1.72	4.92
	Lead, el.& inorg.compounds, as Pb	7439-92-1	kg/yr							0.03	3.00
	Magnesium Oxide Fume	1309-48-4	kg/yr	0.4	1.0						
	Mercury numerous forms	7439-97-6	kg/yr					0.01	1.36	0.01	1.36
	Methyl Alcohol	67-56-1	kg/yr	0.1	0.4	2.22	6.34	8.86	25.33	0.72	2.06
	Methylene Chloride	75-09-2	kg/yr			0.47	1.33			0.46	1.33
	Molybdenum	7439-98-7	kg/yr							0.36	1.02
	n-Amyl Acetate	628-63-7	kg/yr	0.2	0.4						
	Nitric Acid	7697-37-2	kg/yr			7.49	21.41	54.48	155.65	51.81	148.02
	Nitric Oxide	10102-43-9	kg/yr			2.93	8.36				
	Pentane (all isomers)	109-66-0	kg/yr					0.22	0.63		
	Phosphoric Acid	7664-38-2	kg/yr	9.6	27.5			8.02	22.93	9.63	27.51
	Potassium Hydroxide	1310-58-3	kg/yr	16.9	48.3						
	Propane	74-98-6	kg/yr	0.0	219.3	0.00	392.98	0.00	551.69	0.00	155.10
	Rhodium Metal	7440-16-6	kg/yr					3.26	9.31		

Table A-1. Chemistry and Metallurgy Research Building Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Sulfur Hexafluoride	2551-62-4	kg/yr							5.17	14.76
	Sulfuric Acid	7664-93-9	kg/yr	70.8	202.4	6.61	18.90	7.89	22.54	25.44	72.68
	Tetrahydrofuran	109-99-9	kg/yr					0.31	0.89		
	Tin numerous forms	7440-31-5	kg/yr			0.01	0.50	0.01	0.50		
	Toluene	108-88-3	kg/yr			0.30	0.87				
	Uranium (natural) Sol. & Unsol. Comp. as U	7440-61-1	kg/yr							0.67	1.90
	Yttrium	7440-65-5	kg/yr					0.16	0.45		
	Zinc Oxide Fume	1314-13-2	kg/yr			0.01	0.50				

Table A-2. Bioscience Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
HRL	1,4-Dioxane	123-91-1	kg/yr	0.4	1.0					0.18	0.52
	2-Methoxyethanol (EGME)	109-86-4	kg/yr	0.2	0.5						
	Acetic Acid	64-19-7	kg/yr	4.0	11.5	12.36	35.31	10.65	30.43	11.20	32.00
	Acetic Anhydride	108-24-7	kg/yr	8.4	24.1						
	Acetone	67-64-1	kg/yr	10.6	30.4	0.55	1.58	0.41	1.18	0.28	0.79
	Acetonitrile	75-05-8	kg/yr	231.6	661.6	147.16	420.44	39.32	112.36	18.45	52.72
	Acrylamide	79-06-1	kg/yr	0.6	1.6			0.39	1.12		
	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.6	1.6			0.35	1.00	0.18	0.50
	Catechol	120-80-9	kg/yr	0.7	2.0						
	Chlorodifluoromethane	74-45-6	kg/yr			0.10	0.28				
	Chloroform	67-66-3	kg/yr	2.6	7.6	2.86	8.17	3.93	11.24	8.85	25.29
	Chromic Acid	1333-82-0	kg/yr	1.3	3.8						
	Cyclohexane	110-82-7	kg/yr	0.1	0.4						
	Diethanolamine	111-42-2	kg/yr					0.18	0.50		
	Ethanol	64-17-5	kg/yr	94.2	269.1	26.07	74.48	54.56	155.88	0.55	1.56
	Ethanolamine	141-43-5	kg/yr	0.7	2.0						
	Ethyl Acetate	141-78-6	kg/yr							0.14	0.41
	Ethyl Ether	60-29-7	kg/yr	2.9	8.4			1.96	5.60	1.23	3.50
	Ethylene Diamine	107-15-3	kg/yr	4.2	12.0						
	Ethylene Dichloride	107-06-2	kg/yr					0.22	0.62		
	Formamide	75-12-7	kg/yr	5.2	14.9	0.20	0.57	0.20	0.57	0.87	2.47
	Formic Acid	64-18-6	kg/yr					0.64	1.83	0.21	0.60
	Glutaraldehyde	111-30-8	kg/yr							0.39	1.10
	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	0.3	1.0						
	Hexylene Glycol	107-41-5	kg/yr	0.1	0.4						
	Hydrogen Chloride	7647-01-0	kg/yr	2.1	5.9	3.96	11.30	5.23	14.96	10.18	29.08
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.2	0.5						
	Hydrogen Peroxide	7722-84-1	kg/yr	0.5	1.4	1.27	3.62	0.25	0.70	4.23	12.10
	Hydrogen Sulfide	7783-06-4	kg/yr					0.08	0.23		

Table A-2. Bioscience Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Iso-Amyl Alcohol	123-51-3	kg/yr	0.7	2.0					0.11	0.32
	Isopropyl Alcohol	67-63-0	kg/yr	21.9	62.4	25.07	71.63	16.91	48.31	18.83	53.81
	Mercury, numerous forms	7439-97-6	kg/yr	0.0	0.5						
	Methyl Alcohol	67-56-1	kg/yr	28.5	81.3	18.30	52.30	25.73	73.52	26.31	75.18
	Methylamine	74-89-5	kg/yr			0.32	0.90				
	Methylene Chloride	75-09-2	kg/yr	16.9	48.4			0.98	2.79		
	n,n-Dimethylformamide	68-12-2	kg/yr	0.6	1.6	0.33	0.95	0.17	0.47	0.25	0.71
	n-Butyl Alcohol	71-36-3	kg/yr	0.6	1.6						
	Nitric Acid	7697-37-2	kg/yr			0.27	0.76	2.67	7.63	0.27	0.76
	Paraffin Wax Fume	8002-74-2	kg/yr	0.2	0.5						
	Phenol	108-95-2	kg/yr	1.9	5.6	0.63	1.80	0.68	1.95	0.30	0.85
	Phosphoric Acid	7664-38-2	kg/yr	1.0	3.0	0.32	0.92	0.32	0.92	0.32	0.92
	Potassium Hydroxide	1310-58-3	kg/yr	0.2	0.5	0.18	0.50	0.18	0.53	0.70	2.00
	Sec-Butyl Alcohol	105-46-4	kg/yr	0.1	0.4						
	Sulfuric Acid	7664-93-9	kg/yr	1.7	4.8	0.65	1.84	0.64	1.84		
	tert-Butyl Alcohol	75-65-0	kg/yr			0.28	0.79			0.14	0.39
	Tetrahydrofuran	109-99-9	kg/yr	17.2	49.2						
	Tetrasodium Pyrophosphate	7722-88-5	kg/yr	0.2	0.5					0.18	0.50
	Thioglycolic Acid	68-11-1	kg/yr			0.23	0.66			0.47	1.35
	Trichloroacetic Acid	76-03-9	kg/yr	4.9	14.0			0.53	1.50	0.21	0.60
	Xylene (o-,m-,p-Isomers)	1330-20-7	kg/yr	0.2	0.4						
	Zinc Chloride Fume	7646-85-7	kg/yr	0.4	1.2						

Table A-3. High Explosive Processing Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
High Explosive Processing	Acetic Acid	64-19-7	kg/yr	14.7	42.0						
	Acetone	67-64-1	kg/yr	66.4	189.8	3.32	9.50	113.08	323.07	66.63	190.37
	Acetonitrile	75-05-8	kg/yr	16.2	46.3						
	Acetylene	74-86-2	kg/yr	7.7	22.0						
	Carbon Black	1333-86-4	kg/yr	0.4	1.0						
	Chlorodifluoromethane	74-45-6	kg/yr	168.3	480.8						
	Chloroform	67-66-3	kg/yr	1.0	3.0					0.52	1.48
	Chromic acids and chromates	1333-82-0	kg/yr	0.2	0.5						
	Copper	7440-50-8	kg/yr	0.0	0.5						
	Cyclohexane	110-82-7	kg/yr	0.1	0.4						
	Cyclohexanone	108-94-1	kg/yr	0.3	0.9						
	Dichlorodifluoromethane	75-71-8	kg/yr	0.1	0.2						
	Ethanol	64-17-5	kg/yr	174.6	498.7	0.83	2.37	60.22	172.06	0.60	1.72
	Ethyl Acetate	141-78-6	kg/yr					65.92	188.34		
	Ethyl Ether	60-29-7	kg/yr	1.5	4.2						
	Ethylene Dichloride	107-06-2	kg/yr	8.6	24.7			0.43	1.24		
	Fluorine	7782-41-4	kg/yr					2.52	7.20		
	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr					0.12	0.33		
	Hydrogen Chloride	7647-01-0	kg/yr	11.9	34.1	9.58	27.36	6.23	17.81		
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.2	0.4						
	Hydrogen Peroxide	7722-84-1	kg/yr	15.8	45.0						
	Isobutyl Alcohol	78-83-1	kg/yr					0.53	1.52		
	Isopropyl Alcohol	67-63-0	kg/yr	5.5	15.6	5.51	15.74	2.20	6.28	4.40	12.57
	Lead, el. and compounds, as Pb	7439-92-1	kg/yr					0.05	4.54		
	Mercury, numerous forms	7439-97-6	kg/yr	0.3	29.0						
	Methyl Alcohol	67-56-1	kg/yr	37.3	106.4						
	Methyl Cyclohexane	108-87-2	kg/yr	0.3	0.8						

Table A-3. High Explosive Processing Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	169.7	484.9			33.83	96.65		
	Methylene Chloride	75-09-2	kg/yr	7.4	21.2						
	n,n-Dimethylformamide	68-12-2	kg/yr	4.0	11.4						
	Nitric Oxide	10102-43-9	kg/yr	2.7	7.6					5.84	16.68
	Nitrous Oxide	10024-97-2	kg/yr	3.9	11.1						
	Pentane (all isomers)	109-66-0	kg/yr					0.18	0.50		
	Phenol	108-95-2	kg/yr	0.4	1.0						
	Phosphoric Acid	7664-38-3	kg/yr			9.65	27.57				
	Potassium Hydroxide	1310-58-3	kg/yr							0.18	0.50
	Propane	74-98-6	kg/yr	0.0	4396.2			0.00	86.41	0.00	170.60
	Propyl Alcohol	71-23-8	kg/yr	1.4	4.0						
	Silver (metal dust and soluble comp., as Ag)	7440-22-4	kg/yr	0.1	6.2						
	Stoddard Solvent	8052-41-3	kg/yr							1.08	3.08
	Sulfur Hexafluoride	2551-62-4	kg/yr	1.6	4.6						
	Sulfuric Acid	7664-93-9	kg/yr	2.6	7.4						
	Tetrahydrofuran	109-99-9	kg/yr	21.5	61.4			0.16	0.44	14.32	40.90
	Thionyl Chloride	7719-09-7	kg/yr	0.2	0.5						
	Toluene	108-88-3	kg/yr	5.3	15.1	0.61	1.74			9.71	27.74
	Tungsten as W insoluble Compounds	7440-33-7	kg/yr					0.96	96.07	0.01	0.50
	Turpentine	8006-64-2	kg/yr	1.1	3.2						
	VM and P Naptha	8032-32-4	kg/yr					0.50	1.42		
	Xylene (o-,m-,p-Isomers)	1330-20-7	kg/yr	0.3	0.8						
	Zinc Oxide Fume	1314-13-2	kg/yr	0.8	2.3						

Table A-4. High Explosive Testing Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
High Explosive Testing	2-Ethoxyethanol (EGEE)	110-80-5	kg/yr			0.33	0.93				
	Acetone	67-64-1	kg/yr	0.8	2.4	5.26	15.04	7.19	20.54	2.76	7.90
	Acetylene	74-86-2	kg/yr	2.8	7.9						
	Diethylene Triamine	111-40-0	kg/yr			0.34	0.96				
	Ethanol	64-17-5	kg/yr	2.2	6.3					11.74	33.55
	Ethyl Acetate	141-78-6	kg/yr			1.26	3.61				
	Hydrogen Peroxide	7722-84-1	kg/yr							23.02	65.77
	Iron Oxide Fume, as Fe	1309-37-1	kg/yr					1.05	3.00		
	Kerosene	8008-20-6	kg/yr							0.84	2.40
	Methyl Alcohol	67-56-1	kg/yr	1.1	3.2	2.22	6.34	3.88	11.08		
	Methyl n-Amyl Ketone	110-43-0	kg/yr					0.57	1.64		
	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	0.3	0.8						
	Methylene Chloride	75-09-2	kg/yr	0.5	1.3						
	Nitromethane	75-52-5	kg/yr	0.1	0.2						
	Paraffin Wax Fume	8002-74-2	kg/yr					0.35	1.00		
	Propane	74-98-6	kg/yr	0.0	296.9			0.00	53.18		
	Stoddard Solvent	8052-41-3	kg/yr	0.3	0.7						
	Sulfur Hexafluoride	2551-62-4	kg/yr			146.36	418.18				

Table A-5. LANSCE Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
LANSCE	1,1,1-Trichloroethane	71-55-6	kg/yr	97.8	279.4						
	1,1,2-Trichloroethane	79-00-5	kg/yr			8.09	23.11				
	1,4-Dioxane	123-91-1	kg/yr							0.36	1.03
	2-Butoxyethanol	111-76-2	kg/yr	0.2	0.5						
	Acetic Acid	64-19-7	kg/yr					0.18	0.52		
	Acetic Anhydride	108-24-7	kg/yr					0.95	2.71		
	Acetone	67-64-1	kg/yr	177.0	505.6	3.74	10.69	64.42	184.05	8.85	25.28
	Acetonitrile	75-05-8	kg/yr					0.27	0.79		
	Acetylene	74-86-2	kg/yr	736.5	2104.4	0.00	1.32	0.12	0.33	0.00	2.63
	Ammonium Chloride (Fume)	12125-02-9	kg/yr					0.18	0.50		
	Benzene	71-43-2	kg/yr	0.3	0.9						
	Carbon Disulfide	75-15-0	kg/yr	0.4	1.3						
	Carbon Tetrachloride	56-23-5	kg/yr	3.3	9.6						
	Chlorodifluoromethane	74-45-6	kg/yr	8440.3	24115.2			41.28	117.94		
	Chloroform	67-66-3	kg/yr			3.64	10.40	2.60	7.42	2.65	7.56
	Cyclohexane	110-82-7	kg/yr	0.3	0.8						
	Dichlorodifluoromethane	75-71-8	kg/yr	1.5	4.4						
	Diethanolamine	111-42-2	kg/yr	0.2	0.5						
	Ethanol	64-17-5	kg/yr	197.9	565.4	61.47	175.62	12.96	37.04	2.49	7.10
	Ethyl Bromide	74-96-4	kg/yr			0.26	0.73	0.26	0.73		
	Ethylene Dichloride	107-06-2	kg/yr	0.4	1.1						
	Ethyl Ether	60-29-7	kg/yr			0.25	0.70	0.98	2.80		
	Hydrogen Chloride	7647-01-0	kg/yr					2.44	6.98	1.87	5.34
	Hydrogen Fluoride, as F	7664-39-3	kg/yr			0.16	0.45	1.21	3.45		
	Hydrogen Peroxide	7722-84-1	kg/yr					0.25	0.70		
	Hydroquinone	67-63-0	kg/yr					0.18	0.50		
	Iron Oxide Fume, as FE	1309-37-1	kg/yr	0.2	0.5						
	Isobutane	75-28-5	kg/yr	19.2	55.0						
	Isopropyl Alcohol	67-63-0	kg/yr	7.3	20.8	2.48	7.08	4.40	12.57	3.54	10.13
	Kerosene	8008-20-6	kg/yr					2.24	6.40		

Table A-5. LANSCE Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Lead, el.& inorg.compounds, as Pb	7439-92-1	kg/yr					0.01	0.50	0.00	0.45
	Mercury, numerous forms	7439-97-6	kg/yr	26.1	2612.7	1.60	159.55	1.36	136.08		
	Methyl Alcohol	67-56-1	kg/yr	3.6	10.3	2.50	7.14	5.40	15.43	4.32	12.35
	Methyl Formate	107-31-3	kg/yr					0.35	1.00		
	Methylene Chloride	75-09-2	kg/yr	0.5	1.3						
	n-Butyl Acetate	123-86-4	kg/yr	0.2	0.4						
	n,n-Dimethylformamide	68-12-2	kg/yr							0.33	0.95
	Naphtalene	91-20-3	kg/yr							0.09	0.25
	Nitric Acid	7697-37-2	kg/yr					16.47	47.04		
	Nitrobenzene	98-95-3	kg/yr							0.21	0.60
	Phosphoric Acid	7664-38-2	kg/yr	0.3	0.9					0.64	1.83
	Potassium Hydroxide	1310-58-3	kg/yr	0.2	0.5	2.12	6.05			0.88	2.50
	Propane	74-98-6	kg/yr	0.0	3797.7	0.00	497.34	0.00	810.92	0.00	560.55
	Pyridine	110-86-1	kg/yr							0.33	0.93
	Silver (metal dust and soluble comp., as Ag)	7440-22-4	kg/yr	0.0	0.5						
	Sulfur Hexafluoride	2551-62-4	kg/yr	0.2	0.7						
	Sulfuric Acid	7664-93-9	kg/yr	1.9	5.5			0.32	0.92	0.18	0.50
	Tetrachlorethylene	127-18-4	kg/yr							4.54	12.98
	Tetrahydrofuran	109-99-9	kg/yr					0.31	0.89	0.31	0.89
	Toluene	108-88-3	kg/yr	0.2	0.4	0.43	1.24	6.99	19.98		
	Trichloroacetic Acid	76-03-9	kg/yr			0.09	0.25				
	Trichloroethylene	79-01-6	kg/yr			0.24	0.69				
	Tungsten as W insoluble Compounds	7440-33-7	kg/yr	7.3	732.5						
	Zinc Chloride Fume	7646-85-7	kg/yr					0.18	0.50		
	Zinc Chromate, as Cr		kg/yr	0.4	1.1						

Table A-6. Machine Shops Air Emission

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Machine Shops	Chlorodifluoromethane	75-45-6	kg/yr					52.39	149.69		
	Ethanol	64-17-5	kg/yr					1.57	4.48	0.13	0.37
	Isopropyl Alcohol	67-63-0	kg/yr	1.1	3.1						
	Nitric Acid	7697-37-2	kg/yr							1.34	3.82
	Propane	74-98-6	kg/yr	0.0	593.8	0.00	244.23			0.00	341.21

Table A-7. Materials Science Laboratory Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
MSL	1,1,2,2-Tetrachloroethane	630-20-6	kg/yr	1.1	3.2						
	1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	kg/yr	0.5	1.6						
	1,1,2-Trichloroethane	79-00-5	kg/yr					0.50	1.44		
	2-Methoxyethanol (EGME)	109-86-4	kg/yr	0.7	1.9						
	Acetic Acid	64-19-7	kg/yr	0.2	0.5	0.18	0.53				
	Acetone	67-64-1	kg/yr	3.6	10.3	9.14	26.12	8.43	24.09	12.72	36.34
	Acetonitrile	75-05-8	kg/yr							1.10	3.14
	Aluminum numerous forms	7429-90-5	kg/yr	0.0	2.2					0.01	0.60
	Ammonia	7664-41-7	kg/yr	0.1	0.3						
	Benzene	71-43-2	kg/yr	0.3	0.9						
	Biphenyl	92-52-4	kg/yr	0.4	1.0						
	Chlorobenzene	108-90-7	kg/yr	1.5	4.4						
	Chloroform	67-66-3	kg/yr	1.0	3.0	0.52	1.49			0.52	1.48
	Copper	7440-50-8	kg/yr	0.1	6.8						
	Cyclohexane	110-82-7	kg/yr							0.27	0.78
	Diethylene Triamine	111-40-0	kg/yr	0.2	0.5						
	Ethanol	64-17-5	kg/yr	4.0	11.3	2.21	6.33				
	Ethyl Acetate	141-78-6	kg/yr	1.3	3.6						
	Ethylene Chlorohydrin	107-07-3	kg/yr	0.1	0.3						
	Ethyl Ether	60-29-7	kg/yr			0.25	0.70			0.25	0.70
	Ethylene Diamine	107-15-3	kg/yr							2.52	7.20
	Hydrogen Bromide	10035-10-6	kg/yr	0.2	0.5						
	Hydrogen Chloride	7647-01-0	kg/yr	0.6	1.8			2.08	5.94	4.99	14.24
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.2	0.7	0.18	0.50				
	Hydrogen Peroxide	7722-84-1	kg/yr	0.5	1.4	0.25	0.70	0.98	2.81		
	Isobutyl Alcohol	78-83-1	kg/yr			0.28	0.80				
	Isophorone Diisocyanate	4098-71-9	kg/yr			0.09	0.26				
	Isopropyl Alcohol	67-63-0	kg/yr	4.4	12.6	1.38	3.94	3.30	9.43	4.40	12.57
	Kerosene	8008-20-6	kg/yr					1.06	3.03		

Table A-7. Materials Science Laboratory Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Methyl Alcohol	67-56-1	kg/yr	3.3	9.5	6.94	19.83	7.76	22.16	6.65	18.99
	Methyl Methacrylate	80-62-6	kg/yr			0.17	0.47				
	Methylene Chloride	75-09-2	kg/yr	0.5	1.3	1.86	5.32			0.46	1.33
	Molybdenum	7439-98-7	kg/yr	0.0	0.5					0.42	1.20
	n,n-Dimethylformamide	68-12-2	kg/yr	0.2	0.5	0.25	0.71			0.38	1.09
	n-Butyl Acetate	123-86-4	kg/yr	0.2	0.4						
	n-Butyl Alcohol	71-36-3	kg/yr	0.3	0.8						
	Nickel, metal (dust) or Soluble & Inorganic Comp.	7440-02-0	kg/yr							1.56	4.47
	Nitric Acid	7697-37-2	kg/yr							7.74	22.13
	Phenol	108-95-2	kg/yr	0.2	0.5						
	Phosphoric Acid	7664-38-2	kg/yr			0.64	1.84				
	Phosphorus Oxychloride	10025-87-3	kg/yr	0.1	0.3						
	Potassium Hydroxide	1310-58-3	kg/yr	3.5	10.0						
	Propane	74-98-6	kg/yr					0.00	24.37		
	Pyridine	110-86-1	kg/yr	0.7	1.9						
	Silica, Quartz	14808-60-7	kg/yr	1.3	3.6						
	Silver (metal dust & soluble comp., as Ag)	7440-22-4	kg/yr	0.0	0.8			0.88	2.50	0.18	0.51
	Styrene	100-42-5	kg/yr	0.3	0.9						
	Sulfuric Acid	7664-93-9	kg/yr	2.6	7.4	3.23	9.22	1.61	4.60		
	Tert-Butyl Alcohol	75-65-0	kg/yr	0.3	0.8						
	Tetrahydrofuran	109-99-9	kg/yr			1.87	5.35				
	Toulene-2,4-diisocyanate (TDI)	584-84-9	kg/yr	0.6	1.6						
	Trichloroethylene	79-01-6	kg/yr			0.26	0.73				
	Vanadium, Respirable Dust and Fume	1314-62-1	kg/yr	0.0	0.5						
	Zinc Chloride Fume	7646-85-7	kg/yr	0.4	1.0						
	Zirconium Compounds, as Zr	7440-67-7	kg/yr	0.0	0.3						

Table A-8. Pajarito Site Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Pajarito Site	Ethanol	64-17-5	kg/yr	0.1	0.4						
	Isopropyl Alcohol	67-63-0	kg/yr	1.6	4.7	1.65	4.72			1.65	4.71
	Magnesium Oxide Fume	1309-48-4	kg/yr	15.9	45.4						
	Phenylphosphine	638-21-1	kg/yr	6.6	18.9						
	Propane	74-98-6	kg/yr	0.0	1050.2	0.00	293.07	0.00	250.37	0.00	292.46
	Xylene (o-,m-,p-Isomers)	1330-20-7	kg/yr	0.3	0.8						

Table A-9. Plutonium Facility Complex Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Plutonium Facility Complex	1,1,2-Trichloro-1,2,2-Trichloroethane	76-13-1	kg/yr					8.76	25.02		
	2-Ethoxyethanol (EGEE)	110-80-5	kg/yr					0.33	0.93	0.33	0.93
	Acetone	67-64-1	kg/yr							0.55	1.58
	Acetic Acid	64-19-7	kg/yr	14.7	42.0	0.92	2.63	0.18	0.52		
	Acetylene	74-86-2	kg/yr	2.8	7.9	0.00	1.32			0.00	7.89
	Chlorine	7782-50-5	kg/yr			23.86	68.18	12.70	36.29		
	Chloroform	67-66-3	kg/yr					2.60	7.42		
	Diacetone Alcohol	123-42-2	kg/yr					3.73	10.66		
	Diethylene Triamine	111-40-0	kg/yr					0.67	1.92		
	Ethanol	64-17-5	kg/yr	59.0	168.6	64.74	184.98	6.27	17.93		
	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr					0.92	2.64		
	Hydrogen Chloride	7647-01-0	kg/yr	311.6	890.3	225.23	643.52	282.72	807.77	287.91	822.60
	Hydrogen Fluoride, as F	7664-39-3	kg/yr			2.08	5.95	0.43	1.23	0.95	2.72
	Hydrogen Peroxide	7722-84-1	kg/yr	45.5	130.1	13.07	37.36			23.93	68.37
	Iron Oxide, as Fe	1309-37-1	kg/yr	0.1	0.3						
	Isopropyl Alcohol	67-63-0	kg/yr			1.10	3.15				
	Magnesium Oxide Fume	1309-48-4	kg/yr							0.18	0.50
	Manganese Dust and Compounds or Fume	7439-96-5	kg/yr			0.25	0.72				
	Methyl 2-Cyanoacrylate	137-05-3	kg/yr	0.5	1.5	0.54	1.53				
	Methyl Alcohol	67-56-1	kg/yr			4.44	12.69	2.49	7.12	0.28	0.79
	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	5.3	15.2						
	n,n-Dimethylformamide	68-12-2	kg/yr	1.3	3.8			3.32	9.49	2.03	5.79
	n-Heptane	142-82-5	kg/yr					1.20	3.42		
	Nitric Acid	7697-37-2	kg/yr			13.38	38.23	15.76	45.02	284.20	812.00
	Oxalic Acid	144-62-7	kg/yr							1.40	4.00
	Phosphoric Acid	7664-38-2	kg/yr			0.32	0.92	1.60	4.59		

Table A-9. Plutonium Facility Complex Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Potassium Hydroxide	1310-58-3	kg/yr	245.5	701.5	125.05	357.29	262.64	750.39		
	Propane	74-98-6	kg/yr			0.00	48.85	0.00	77.55		
	Silica, Quartz	14808-60-7	kg/yr							0.35	1.00
	Sulfuric Acid	7664-93-9	kg/yr	36.7	104.9	0.32	0.92	2.25	6.44	0.64	1.84
	Tetrahydrofuran	109-99-9	kg/yr					0.31	0.89		
	Tetrasodium Pyrophosphate	7722-88-5	kg/yr							0.18	0.50
	Tributyl Phosphate	126-73-8	kg/yr			1.36	3.90	1.36	3.89		
	Trichloroethylene	79-01-6	kg/yr	114.9	328.3	106.92	305.48			106.70	304.85
	Vanadium, Respirable Dust & Fume	1314-62-1	kg/yr							0.09	0.25
	Zinc Chloride Fume	7646-85-7	kg/yr					0.70	2.00	0.53	1.50

Table A-10. Radiochemistry Site Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Radio-chemistry Site	1,1,1-Trichloroethane	71-55-6	kg/yr	2.3	6.7			1.87	5.36		
	1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	kg/yr	2.2	6.3	4.94	14.10				
	1,3,5-Trimethylbenzene	108-67-8	kg/yr	0.2	0.5						
	1,3-Butadiene	106-99-0	kg/yr	5.3	15.0						
	1,4-Dioxane	123-91-1	kg/yr	0.4	1.0	0.36	1.04			0.98	2.79
	2-Methoxyethanol (EGME)	109-86-4	kg/yr	0.2	0.5	0.34	0.97	0.51	1.45	0.17	0.48
	Acetic Acid	64-19-7	kg/yr	1.9	5.5	0.91	2.60	0.18	0.52	0.73	2.10
	Acetic Anhydride	108-24-7	kg/yr	0.8	2.2			0.54	1.54	0.19	0.54
	Acetone	67-64-1	kg/yr	90.9	259.8	62.47	178.50	55.85	159.56	94.40	269.70
	Acetonitrile	75-05-8	kg/yr			6.07	17.35	4.78	13.67	10.19	29.11
	Acrylic Acid	79-10-7	kg/yr					0.10	0.28		
	Aluminum numerous forms	7429-90-5	kg/yr			0.00	0.27	0.08	7.57		
	Ammonia	7664-41-7	kg/yr							11.90	34.00
	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.8	2.3	0.18	0.50			1.07	3.05
	Arsenic, el. and inorg., exc. Arsine, as As	7440-38-2	kg/yr	0.4	1.1			0.20	0.56		
	Benzene	71-43-2	kg/yr	0.8	2.2	0.38	1.08	1.33	3.79	0.34	0.96
	Benzyl Chloride	100-44-7	kg/yr	0.2	0.5						
	Beryllium	7440-41-7	kg/yr			0.33	0.94	0.13	0.38		
	Bromine	7726-95-6	kg/yr	0.3	0.8	0.08	0.23			0.50	1.44
	Cadmium, el. and compounds, as Cd	7440-43-9	kg/yr					0.31	0.87		
	Carbon Tetrachloride	56-23-5	kg/yr	64.5	184.2	1.12	3.19			1.67	4.78
	Chlorine	7782-50-5	kg/yr	0.3	0.9					0.16	0.45
	Chlorobenzene	108-90-7	kg/yr					0.19	0.55		
	Chlorodifluoromethane	75-45-6	kg/yr					63.50	181.44		
	Chloroform	67-66-3	kg/yr	5.5	15.6	4.16	11.89	0.13	0.37	8.59	24.55
	Chromium, Metal and Cr III Compounds, as Cr	7440-47-3	kg/yr	0.3	0.7						

Table A-10. Radiochemistry Site Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Cobalt, elemental and inorg. Comp., as Co	7440-48-4	kg/yr	0.3	0.9	0.02	1.79				
	Copper	7440-50-8	kg/yr			0.02	2.28	0.01	0.90		
	Cyclohexanol	108-93-0	kg/yr			0.34	0.96			0.34	0.96
	Cyclohexanone	108-94-1	kg/yr					0.83	2.37		
	Cyclohexylamine	108-91-8	kg/yr	0.3	0.8						
	Dichlorodifluoromethane	75-71-8	kg/yr							0.34	0.96
	Dicyclopentadiene	77-73-6	kg/yr			0.86	2.45				
	Diethanolamine	111-42-2	kg/yr	2.3	6.7						
	Diethylamine	109-89-7	kg/yr	0.5	1.5	0.25	0.70			0.25	0.70
	Dimethyl Amine	124-40-3	kg/yr							0.48	1.38
	Dimethyl Sulfate	77-78-1	kg/yr							0.23	0.67
	Ethanol	64-17-5	kg/yr	10.0	28.6	4.71	13.45	0.55	1.58	7.15	20.42
	Ethyl Acetate	141-78-6	kg/yr	8.8	25.2	0.32	0.90	2.52	7.20	5.36	15.31
	Ethyl Bromide	74-96-4	kg/yr					0.26	0.73	0.42	1.20
	Ethyl Chloride	75-00-3	kg/yr	0.4	1.0						
	Ethyl Ether	60-29-7	kg/yr	4.4	12.6	14.12	40.33	27.93	79.80	19.67	56.21
	Ethylamine	75-04-7	kg/yr							0.12	0.35
	Ethylene Diamine	107-15-3	kg/yr	0.2	0.5						
	Ethylene Dichloride	107-06-2	kg/yr	0.9	2.5						
	Furfural	98-01-1	kg/yr	0.2	0.6						
	Hexafluoroacetone	684-16-2	kg/yr	0.3	0.7						
	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	11.2	32.0	7.90	22.56	2.31	6.60	3.93	11.23
	Hydrogen Bromide	10035-10-6	kg/yr	4.3	12.3	12.10	34.57	11.42	32.63	4.54	12.98
	Hydrogen Chloride	7647-01-0	kg/yr	211.8	605.0	88.30	252.29	176.67	504.78	92.58	264.52
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	3.2	9.0	1.59	4.55	0.90	2.57	2.49	7.12
	Hydrogen Peroxide	7722-84-1	kg/yr	11.6	33.1	5.94	16.98	7.04	20.12	15.02	42.91
	Hydrogen Sulfide	7783-06-4	kg/yr			0.16	0.45			3.67	10.48
	Indene	95-13-6	kg/yr	0.1	0.3						

Table A-10. Radiochemistry Site Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Indium & compounds, as In	7440-74-6	kg/yr							0.18	0.50
	Iron Oxide Fume, as Fe	1309-37-1	kg/yr	0.4	1.0						
	Isobutyl Alcohol	78-83-1	kg/yr					0.14	0.40		
	Isopropyl Alcohol	67-63-0	kg/yr	8.0	22.8	14.70	42.00	7.97	22.78	10.12	28.92
	Isopropyl Ether	108-20-3	kg/yr	0.1	0.3	1.02	2.90				
	Kerosene	8008-20-6	kg/yr	0.0	3.0						
	Lead, el. and inorg. Compounds, as Pb	7439-92-1	kg/yr			0.01	1.13				
	Magnesium Oxide Fume	1309-48-4	kg/yr	0.4	1.1	0.21	0.60				
	Manganese Dust & Compounds or Fume	7439-96-5	kg/yr							0.09	0.25
	Mercury numerous forms	7439-97-6	kg/yr	0.0	0.5					0.01	0.50
	Methyl Alcohol	67-56-1	kg/yr	11.1	31.7	7.91	22.60	11.63	33.24	8.86	25.33
	Methyl Cyclohexane	108-87-2	kg/yr			0.28	0.80				
	Methylene Chloride	75-09-2	kg/yr			13.82	39.48			35.11	100.33
	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	0.3	0.8						
	Methyl Formate	107-31-3	kg/yr	0.4	1.0						
	Methyl Iodide	74-88-4	kg/yr	0.4	1.0			0.14	0.40		
	Methylene Chloride	75-09-2	kg/yr	13.9	39.8			8.85	25.30		
	Molybdenum	7439-98-7	kg/yr	0.0	1.0			11.83	33.81		
	Morpholine	110-91-8	kg/yr			0.35	1.00				
	n,n-Dimethyl Acetamide or Dimethyl Acetamide	127-19-5	kg/yr			0.66	1.89			0.33	0.94
	n,n-Dimethylformamide	68-12-2	kg/yr	1.0	2.8	1.00	2.85	0.70	1.99	0.33	0.95
	n-Butyl Alcohol	71-36-3	kg/yr			0.14	0.41	0.28	0.81		
	n-Heptane	142-82-5	kg/yr			1.92	5.48	0.48	1.37	1.37	3.92
	Nitric Acid	7697-37-2	kg/yr			450.78	1287.93	623.41	1781.17	528.82	1510.92
	Nitric Oxide	10102-43-9	kg/yr	1.5	4.2						
	Nitromethane	75-52-5	kg/yr	0.2	0.6			0.20	0.57		
	Nitrous Oxide	10024-97-0	kg/yr	0.1	0.2			0.08	0.23		
	o-Dichlorobenzene	95-50-1	kg/yr			0.23	0.65	0.91	2.61		

Table A-10. Radiochemistry Site Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	p-Phenylene diamine	106-50-3	kg/yr	0.2	0.5						
	p-Toluidine	106-49-0	kg/yr							0.18	0.50
	Pentane (all isomers)	109-66-0	kg/yr	0.9	2.5	0.22	0.63	1.53	4.38	0.66	1.88
	Phenylhydrazine	100-63-0	kg/yr							0.18	0.50
	Phosphoric Acid	7664-38-2	kg/yr	2.6	7.3	3.22	9.19	609.71	1742.03	3.85	11.00
	Phosphorus Oxychloride	10025-87-3	kg/yr							0.09	0.25
	Phosphorus Trichloride	7719-12-2	kg/yr	0.1	0.3			0.09	0.25	0.53	1.50
	Potassium Hydroxide	1310-58-3	kg/yr	1.7	4.7					4.38	12.50
	Propane	74-98-6	kg/yr	0.0	1769.7			0.00	2663.99	0.00	1521.40
	Propionic Acid	79-09-4	kg/yr							0.49	1.39
	Propyl Alcohol	71-23-8	kg/yr							0.28	0.81
	Pyridine	110-86-1	kg/yr	0.8	2.4			0.20	0.56	1.14	3.26
	Silica, Quartz	14808-60-7	kg/yr					1.09	3.10		
	Silver (metal dust and soluble comp., as Ag)	7440-22-4	kg/yr	0.0	0.4			0.74	2.11		
	Sulfur Hexafluoride	2551-62-4	kg/yr					2.06	5.90		
	Sulfuric Acid	7664-93-9	kg/yr	12.2	35.0			3.38	9.66	5.80	16.56
	tert-Butyl Alcohol	75-65-0	kg/yr	0.1	0.4					0.28	0.79
	Tetrahydrofuran	109-99-9	kg/yr	5.6	16.0			19.98	57.09	12.20	34.87
	Thionyl Chloride	7719-09-7	kg/yr	0.7	1.9					0.80	2.28
	Tin numerous forms	7440-31-5	kg/yr							0.01	0.50
	Toluene	108-88-3	kg/yr	17.7	50.7			10.07	28.77	26.70	76.29
	Trichloroethylene	79-01-6	kg/yr	0.3	0.7						
	Triethylamine	121-44-8	kg/yr	0.8	2.3			0.41	1.16	0.42	1.20
	Trimethylamine	75-50-3	kg/yr					0.11	0.32		
	Tungsten as W insoluble Compounds	7440-33-7	kg/yr					0.23	22.68	0.02	1.94
	Uranium (natural) Sol.&Unsol.Comp. as U	7440-61-1	kg/yr	0.7	1.9					1.33	3.80
	VM & P Naphtha	8032-32-4	kg/yr					5.78	16.50	6.83	19.50
	Vinyl Acatate	108-05-4	kg/yr	0.3	0.9						

Table A-10. Radiochemistry Site Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Yttrium	7440-65-5	kg/yr					0.31	0.89		
	Zinc Chloride Fume	7646-85-7	kg/yr					0.09	0.25		
	Zirconium Compounds, as Zr	7440-67-7	kg/yr					0.01	1.30		

Table A-11. Sigma Complex Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Sigma Complex	2-Butoxyethanol	111-76-2	kg/yr	1.3	3.6						
	Acetone	67-64-1	kg/yr	8.0	22.9	4.43	12.66	6.64	18.96	7.19	20.54
	Acetylene	74-86-2	kg/yr	11.0	31.6					0.00	1.31
	Aluminum numerous forms	7429-90-5	kg/yr	0.1	11.8					0.00	0.27
	Ammonia	7664-41-7	kg/yr	0.2	0.5						
	Cadmium, el., and compounds, as Cd	7440-43-9	kg/yr	0.0	0.5						
	Chloroform	67-66-3	kg/yr	0.3	0.7						
	Chromium, Metal and Cr III Compounds, as Cr	7440-47-3	kg/yr	0.0	4.0						
	Copper	7440-50-8	kg/yr	0.6	56.6					0.01	1.11
	Diethylene Triamine	111-40-0	kg/yr	0.7	1.9	0.67	1.92	0.67	1.92	0.67	1.92
	Ethanol	64-17-5	kg/yr	15.2	43.5			1.11	3.16		
	Ethyl Ether	60-29-7	kg/yr			0.25	0.70				
	Hydrazine	302-01-2	kg/yr	0.1	0.3						
	Hydrogen Chloride	7647-01-0	kg/yr	5.4	15.4	196.98	562.79	6.86	19.59	6.44	18.40
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	64.9	185.4			25.56	73.03	85.09	243.11
	Hydrogen Peroxide	7722-84-1	kg/yr	1.3	3.7	3.21	9.16	2.26	6.47	4.92	14.07
	Isopropyl Alcohol	67-63-0	kg/yr	9.9	28.3	6.61	18.89	3.30	9.43	6.60	18.85
	Kerosene	8008-20-6	kg/yr	0.0	21.4					58.30	166.56
	Lead, el. and inorg. Compounds, as Pb	7439-92-1	kg/yr			0.05	5.01				
	Mercury numerous forms	7439-97-6	kg/yr			0.02	2.27			0.07	6.80
	Methyl Alcohol	67-56-1	kg/yr	4.6	13.1	3.33	9.52	3.60	10.29	1.11	3.17
	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	0.3	0.8					0.14	0.40
	Methylene Chloride	75-09-2	kg/yr	0.2	0.7						
	Molybdenum	7439-98-7	kg/yr	3.9	387.1						
	n,n-Dimethylformamide	68-12-2	kg/yr			0.17	0.48				
	Nickel, metal (dust) or Soluble and Inorganic Comp.	7440-02-0	kg/yr	0.0	4.0						

Table A-11. Sigma Complex Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Nitric Acid	7697-37-2	kg/yr			272.75	779.29	63.46	181.31	35.25	100.72
	Phosphoric Acid	7664-38-2	kg/yr	234.3	669.3			82.16	234.76		
	Potassium Hydroxide	1310-58-3	kg/yr	0.8	2.3						
	Propane	74-98-6	kg/yr			0.00	73.27	0.00	387.74	0.00	194.98
	Silica, Quartz	14808-60-7	kg/yr	0.7	2.0						
	Sulfuric Acid	7664-93-9	kg/yr	25.5	72.8	9.68	27.66			8.05	23.00
	Tantalum Metal	7440-25-7	kg/yr	0.3	27.2			0.73	2.08		
	Tellurium & Compounds, as Te	13494-80-9	kg/yr							0.18	0.50
	Tin numerous forms	7440-31-5	kg/yr	0.0	1.1						
	Tungsten as W insoluble Compounds	7440-33-7	kg/yr							0.01	1.00
	Xylene (o-,m-,p-Isomers)	1330-20-7	kg/yr	1.7	4.9						
	Zinc Oxide Fume	1314-13-2	kg/yr	0.2	0.5						
	Zirconium Compounds, as Zr	7440-67-7	kg/yr	0.0	1.0	0.01	0.50	0.00	0.30		

Table A-12. Target Fabrication Facility Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Target Fabrication Facility	1,1,1-Trichloroethane	71-55-6	kg/yr	4.9	14.1					0.23	0.67
	1,1,2-Trichloroethane	79-00-5	kg/yr	0.5	1.4						
	2-Methoxyethanol (EGME)	109-86-4	kg/yr	0.3	1.0			0.34	0.96		
	Acetic Acid	64-19-7	kg/yr							0.92	2.62
	Acetone	67-64-1	kg/yr	20.0	57.2	5.54	15.83	17.83	50.95	10.51	30.02
	Acetonitrile	75-05-8	kg/yr							0.55	1.57
	Acrylic Acid	79-10-7	kg/yr	0.2	0.6						
	Acrylonitrile	107-13-1	kg/yr	0.3	0.8						
	Aluminum numerous forms	7429-90-5	kg/yr					0.01	1.00		
	Ammonia	7664-41-7	kg/yr	1483.5	4238.6						
	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.4	1.0						
	Aniline and Homologues	62-53-3	kg/yr	0.2	0.5						
	Benzene	71-43-2	kg/yr			1.08	3.07	0.31	0.88		
	Boron Oxide	1303-86-2	kg/yr			0.35	1.00				
	Bromine	7726-95-6	kg/yr							0.32	0.90
	Chlorine	7782-50-5	kg/yr	6.9	19.7						
	Chloroform	67-66-3	kg/yr							6.28	17.95
	Cyclohexane	110-82-7	kg/yr	0.5	1.6	0.55	1.56				
	Dibutyl Phthalate	84-74-2	kg/yr	0.7	2.1						
	Diethanolamine	111-42-2	kg/yr	0.2	0.5						
	Diethyl Phthalate	84-66-2	kg/yr	0.1	0.4						
	Diethylene Triamine	111-40-0	kg/yr	0.3	1.0						
	Divinyl Benzene	1321-74-0	kg/yr			0.16	0.46	0.53	1.50	0.64	1.84
	Ethanol	64-17-5	kg/yr	9.1	25.9	1.73	4.95	3.14	8.96		
	Ethyl Acetate	141-78-6	kg/yr	1.3	3.6					1.26	3.60
	Ethyl Ether	60-29-7	kg/yr			14.73	42.09	1.47	4.20		
	Ethylene Diamine	107-15-3	kg/yr	0.2	0.4						
	Ethylene Dichloride	107-06-2	kg/yr	2.4	6.8	0.43	1.24	0.22	0.62		

Table A-12. Target Fabrication Facility Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Formic Acid	64-18-6	kg/yr							0.32	0.92
	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr			0.46	1.32	0.49	1.39	1.85	5.28
	Hydrogen Chloride	7647-01-0	kg/yr	3.9	11.0			0.10	0.30		
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.3	1.0					0.32	0.91
	Hydrogen Peroxide	7722-84-1	kg/yr	0.2	0.7					1.72	4.92
	Isopropyl Alcohol	67-63-0	kg/yr	6.9	19.6	9.92	28.34	11.00	31.42	14.30	40.85
	Mercury numerous forms	7439-97-6	kg/yr							0.09	8.54
	Methyl Alcohol	67-56-1	kg/yr	12.1	34.7	14.43	41.24	18.84	53.82	6.65	18.99
	Methyl Cyclohexane	108-87-2	kg/yr	0.3	0.8						
	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr			2.26	6.46	2.26	6.44	1.13	3.22
	Methyl Isobutyl Ketone	108-10-1	kg/yr	0.1	0.4						
	Methyl Methacrylate	80-62-6	kg/yr							0.33	0.94
	Methylene Bisphenyl Isocyanate (MDI)	101-68-8	kg/yr					0.18	0.50		
	Methylene Chloride	75-09-2	kg/yr	1.9	5.3					0.98	2.79
	Morpholine	110-91-8	kg/yr			0.35	1.00				
	n,n-Dimethyl Acetamide or Dimethyl Acetamide	127-19-5	kg/yr	0.3	0.9					0.99	2.83
	n,n-Dimethylformamide	68-12-2	kg/yr	12.3	35.1	6.65	19.01	10.63	30.36	6.64	18.97
	n-Amyl Acetate	628-63-7	kg/yr	0.3	0.9						
	n-Butyl Acetate	123-86-4	kg/yr	0.2	0.4					0.61	1.75
	n-Heptane	142-82-5	kg/yr	1.0	2.7						
	Nickel, metal (dust) or Soluble & Inorganic Comp.	7440-02-0	kg/yr							1.56	4.45
	Nitric Acid	7697-37-2	kg/yr			4.55	13.00	25.10	71.72	2.94	8.39
	Nitrous Oxide	10024-97-2	kg/yr	19.3	55.0						
	o-Dichlorobenzene	95-50-1	kg/yr					1.00	2.87		
	Osmium Tetroxide, as Os	20816-12-0	kg/yr	0.1	0.2						
	Pentane (all isomers)	109-66-0	kg/yr			0.44	1.26				
	Phosphoric Acid	7664-38-2	kg/yr	0.4	1.0						

Table A-12. Target Fabrication Facility Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Phosphorus Pentachloride	10026-13-8	kg/yr							0.42	1.20
	Potassium Hydroxide	1310-58-3	kg/yr	0.4	1.0			2.29	6.54	5.45	15.58
	Propane	74-98-6	kg/yr	0.0	45.4						
	Propyl Alcohol	71-23-8	kg/yr	0.3	0.8	0.14	0.40				
	Pyridine	110-86-1	kg/yr					0.33	0.93		
	Silica, Quartz	14808-60-7	kg/yr							0.35	1.00
	Silicon Tetrahydride	7803-62-5	kg/yr	3.1	8.9						
	Styrene	100-42-5	kg/yr	1.7	4.9			1.90	5.44		
	Sulfur Hexafluoride	2551-62-4	kg/yr	9.7	27.7						
	Sulfuric Acid	7664-93-9	kg/yr	4.8	13.8	69.38	198.22	1.42	4.05		
	Tert-Butyl Alcohol	75-65-0	kg/yr			0.28	0.79				
	Tetrahydrofuran	109-99-9	kg/yr	0.3	0.9	1.25	3.56	1.56	4.45		
	Toluene	108-88-3	kg/yr	1.2	3.5					1.22	3.49
	Triethylamine	121-44-8	kg/yr							0.25	0.73
	Tungsten as W insoluble Compounds	7440-33-7	kg/yr			0.01	0.50				
	VM & P Naphtha	8032-32-4	kg/yr			0.53	1.50			0.53	1.50
	Xylene (o-,m-,p-Isomers)	1330-20-7	kg/yr			0.91	2.59				

Table A-13. Tritium Operations Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Tritium Operations	Ammonia	7664-41-7	kg/yr	0.8	2.4						
	Copper	7440-50-8	kg/yr	0.0	0.5						
	Ethanol	64-17-5	kg/yr	0.3	0.7			0.28	0.79	0.52	1.49
	Hydrogen Chloride	7647-01-0	kg/yr	0.4	1.2						
	Methyl Alcohol	67-56-1	kg/yr	0.3	0.8						
	Phenylphosphine	638-21-1	kg/yr	0.3	0.9						
	Propane	74-98-6	kg/yr	0.0	73.4	0.00	97.69	0.00	73.12	0.00	48.74
	Sulfur Hexafluoride	2551-62-4	kg/yr	14.2	40.6						

Table A-14. Waste Management Operations Air Emissions

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
Waste Management Operations	1,1,2-Trichloro-1,1,2-Trifluoroethane	76-13-1	kg/yr	1.4	4.0						
	Acetic Acid	64-19-7	kg/yr	17.7	50.5						
	Acetone	67-64-1	kg/yr	0.8	2.4			1.11	3.16		
	Acetonitrile	75-05-8	kg/yr	0.3	0.8						
	Acetylene	74-86-2	kg/yr	6.9	19.7	0.00	2.64				
	Aluminum numerous forms	7429-90-5	kg/yr			0.00	0.27				
	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.2	0.7	0.25	0.71	0.25	0.71		
	Antimony and Compounds, as Sb	7440-36-0	kg/yr			0.23	0.67				
	Benzene	71-43-2	kg/yr					0.31	0.88		
	Cadmium, el. And compounds, as Cd	7440-43-9	kg/yr	0.2	22.7						
	Carbon Black	1333-86-4	kg/yr	0.6	1.6						
	Cyclohexanone	108-94-1	kg/yr					0.10	0.28		
	Diethanolamine	111-42-2	kg/yr	0.2	0.5						
	Ethanol	64-17-5	kg/yr	14.9	42.6			10.77	30.78	4.97	14.21
	Ethyl Acetate	141-78-6	kg/yr							0.95	2.70
	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	1.8	5.3					0.69	1.98
	Hydrogen Chloride	7647-01-0	kg/yr	94.9	271.0	3477.22	9934.93	285.24	814.97	714.89	2042.53
	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.7	2.0	1.73	4.95				
	Hydrogen Peroxide	7722-84-1	kg/yr	11.8	33.8						
	Isopropyl Alcohol	67-63-0	kg/yr							1.10	3.14
	Lead, el. and inorg. Compounds, as Pb	7439-92-1	kg/yr			0.01	1.13				
	Magnesium Oxide Fume	1309-48-4	kg/yr	0.2	0.5						
	Mercury numerous forms	7439-97-6	kg/yr			0.01	1.36	0.01	1.36		
	Methyl 2-Cyanoacrylate	137-05-3	kg/yr	0.1	0.3						
	Methyl Alcohol	67-56-1	kg/yr	3.3	9.5			1.11	3.17	2.22	6.33
	Methylene Chloride	75-09-2	kg/yr							0.46	1.33

Table A-14. Waste Management Operations Air Emissions (continued)

KEY FACILITY	CHEMICAL NAME	CAS NUMBER	UNITS	1999 ESTIMATED AIR EMISSIONS	1999 USAGE	2000 ESTIMATED AIR EMISSIONS	2000 USAGE	2001 ESTIMATED AIR EMISSIONS	2001 USAGE	2002 ESTIMATED AIR EMISSIONS	2002 USAGE
	Molybdenum	7439-98-7	kg/yr			0.36	1.02				
	Napthalene	91-20-3	kg/yr			0.18	0.50				
	Nickel, metal (dust) or Soluble and Inorganic Comp.	7440-02-0	kg/yr			0.31	0.89				
	Nitric Acid	7697-37-2	kg/yr			28.90	82.58	12.07	34.49	4.06	11.60
	Oxalic Acid	144-05-3	kg/yr	0.2	0.5						
	Phenol	108-95-2	kg/yr	0.7	2.0	0.18	0.50	0.18	0.50		
	Phosphorus	7723-14-0	kg/yr	0.2	0.6						
	Potassium Hydroxide	1310-58-3	kg/yr	3.3	9.5						
	Propane	74-98-6	kg/yr	0.0	14015.9	0.00	35.52	0.00	121.86	0.00	121.86
	Propyl Alcohol	71-23-8	kg/yr	0.1	0.4						
	Pyridine	110-86-1	kg/yr					0.33	0.93	0.33	0.93
	Selenium Compounds, as Se	7782-49-2	kg/yr			0.17	0.48				
	Silica, Quartz	14808-60-7	kg/yr	1.1	3.0						
	Silver (metal dust and soluble comp., as Ag)	7440-22-4	kg/yr	0.0	1.1						
	Stoddard Solvent	8052-41-3	kg/yr			1.02	2.92				
	Sulfuric Acid	7664-93-9	kg/yr	153.2	437.7	2.58	7.38	3.86	11.04	7.73	22.08
	Tin numerous forms	7440-31-5	kg/yr	0.0	0.7						
	Trichloroacetic Acid	76-03-9	kg/yr	0.2	0.5						
	Uranium (natural) Sol.& Unsol. Comp. as U	7440-61-1	kg/yr					0.67	1.90	0.67	1.90
	Yttrium	7440-65-5	kg/yr			0.16	0.45				
	Zinc Chloride Fume	7646-85-7	kg/yr	0.2	0.5						

Table B-1. Comparison of Nuclear Facilities Lists

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
2.1		*Plutonium Complex*											
2.1-1	TA-55-0004	Pu-238 Processing	2	Plutonium Facility	2	TA-55 Plutonium Facility	2	TA-55 Plutonium Facility	2	TA-55 Plutonium Facility	2	TA-55 Plutonium Facility	2
				Pu glovebox line; Pu-238 processing	2	Pu glovebox line; Pu-238 processing	2	Pu glovebox line; Pu-238 processing	2	Pu glovebox line; processing of isotopes of Pu	2	Pu glovebox line; processing of isotopes of Pu	2
2.1-1	TA-55-0041	Nuclear Material Storage	2										
2.2		*Tritium Facilities*											
2.2-1	TA-16-0205	WETF	2	Weapons Engineering Tritium Facility (WETF)	2	TA-16 Weapons Engineering Tritium Facility (WETF)	2	TA-16 Weapons Engineering Tritium Facility (WETF)	2	TA-16 Weapons Engineering Tritium Facility (WETF)	2	TA-16 Weapons Engineering Tritium Facility (WETF)	2
				Weapons related tritium research	2	Weapons related tritium research	2	Weapons related tritium research	2	Tritium research	2	Tritium research	2
2.2-1	TA-16-0205A	WETF	2										
2.2-1	TA-16-0450	WETF	2										
2.2-1	TA-21-0155	TSTA	2	Tritium System Test Assembly (TSTA)	2	Tritium System Test Assembly (TSTA)	2	Tritium System Test Assembly (TSTA)	2	Tritium System Test Assembly (TSTA)	2	Tritium System Test Assembly (TSTA)	2
				Tritium research; >HC-2 threshold	2	Tritium research; >HC-2 threshold	2	Tritium research	2	Stabilization and Deactivation Activities	2	Stabilization and Deactivation Activities	2
2.2-1	TA-21-0209	TSFF	2	TA-21 Tritium Science and Fabrication Facility (TSFF)	2	TA-21 Tritium Science and Fabrication Facility (TSFF)	2	TA-21 Tritium Science and Fabrication Facility (TSFF)	2	TA-21 Tritium Science and Fabrication Facility (TSFF)	2	TA-21 Tritium Science and Fabrication Facility (TSFF)	2

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401				PS-OAB-401	
								REV. 1 (JUNE 2001)		REV. 2 (DECEMBER 2001)		REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
				Support for underground testing program >HC-2 threshold; tritium	2	Support for underground testing program >HC-2 threshold; tritium	2	Support for underground testing program (tritium)	2	Stabilization activities and NTTL support		Stabilization activities and NTTL support	2
2.3		*Chemistry and Metallurgy Research Building*											
2.3-1	TA-03-0019 (Building number should be –0029)	CMR	2	TA-3 Chemistry and Metallurgy Research (CMR) Bldg.	2	TA-3 Chemistry and Metallurgy Research (CMR) Bldg.	2	TA-3 Chemistry and Metallurgy Research (CMR) Bldg.	2	TA-3 Chemistry and Metallurgy Research (CMR) Bldg.	2	TA-3 Chemistry and Metallurgy Research Facility (CMR)	2
2.3-1	TA-03-0029	Radiochemistry Hot Cell		Radiochemistry Hot Cell facility	2	Radiochemistry Hot Cell facility	2	Radiochemistry Hot Cell facility	2				
										Actinide chemistry and metallurgy research and analysis	2	Actinide chemistry and metallurgy research and analysis	2
2.3-1	TA-03-0029	SNM Vault		CMR SNM Vault	2	CMR SNM Vault	2	CMR SNM Vault	2				
2.3-1	TA-03-0029	Nondestructive analysis/ nondestructive examination Waste Assay		CMR NDA/NDE waste assay; inspection of waste drums	2	CMR NDA/NDE waste assay; inspection of waste drums	2	CMR NDA/NDE waste assay; inspection of waste drums	2				
2.3-1	TA-03-0029	IAEA Classroom				Classroom for IAEA inspectors; a.k.a. "School House"	2	Classroom for IAEA inspectors; a.k.a. "School House"	2				

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
2.3-1	TA-03-0029	Wing 9 (Enriched Uranium)		Enriched Uranium foundry & machining; operation shut-down; (Wing 9)	2	Enriched Uranium foundry & machining; operation shut-down; (Wing 9)	2	Enriched Uranium foundry & machining; operation shut-down; (Wing 9)	2				
2.4		*Pajarito Site*											
2.4-1	TA-18	Site Itself		LANL Critical Experiment Facility (LACEF) and Hillside Vault	2	TA-18 LANL Critical Experi-ment Facility (LACEF) and Hillside Vault	2	TA-18 LANL Critical Experi-ment Facility (LACEF) and Hillside	2	TA-18 LANL Critical Experi-ment Facility and Hillside	2	TA-18 LANL Critical Experi-ment Facility (LACEF)	2
				Critical Experiment Site	2	Critical Experiment Site	2	Critical Experiment Site	2	Critical Experiment Site	2	Critical Experiment Site	2
2.4-1	TA-18-0023	SNM Vault (CASA 1)	2	Category 1 SNM Vault (CASA 1)	2	Category 1 SNM Vault (CASA 1)	2	Category 1 SNM Vault (CASA 1)	2	Category 1 SNM Vault (CASA 1)	2		
2.4-1	TA-18-0026	Hillside Vault	2	Hillside Vault (Pajarito Site); contains SNM>HC-2 threshold	2	Hillside Vault (Pajarito Site); contains SNM>HC-2 threshold	2	Hillside Vault (Pajarito Site); contains SNM>HC-2 threshold	2	Hillside Vault (Pajarito Site); contains SNM>HC-2 threshold	2		
2.4-1	TA-18-0032	SNM Vault (CASA 2)	2	Category 1 SNM Vault (CASA 2)	2	Category 1 SNM Vault (CASA 2)	2	Category 1 SNM Vault (CASA 2)	2	Category 1 SNM Vault (CASA 2)	2		
2.4-1	TA-18-0116	Assembly Building (CASA 3)	2	Assembly Building (CASA 3)	2	Assembly Building (CASA 3)	2	Assembly Building (CASA 3)	2	Assembly Building (CASA 3)	2		
2.4-1	TA-18-0127	Accelerator used for weapons x-ray		Accelerator used for weapons x-ray	2	Accelerator used for weapons x-ray	2	Accelerator used for weapons x-ray	2	Accelerator used for weapons x-ray	2		
2.4-1	TA-18-0129	Calibration Laboratory		Calibration laboratory	2	Calibration laboratory	2	Calibration laboratory	2	Calibration laboratory	2		
2.4-1	TA-18-0247	Sealed Sources		Sealed sources >HC-3 threshold values; not ANSI certified	3	Sealed sources >HC-3 thres-hold values; not ANSI certified	3						

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	**BLDG.**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**
2.4-1	TA-18-0258	IAEA Classroom (Trailer)		Trailer classroom for IAEA inspectors; a.k.a. "School House"	2								
2.5		*Sigma Complex*											
2.5-1	TA-03-0066	44 metric tons of depleted uranium storage	3	Storage of 44 MT DU	3	Storage of 44 MT DU	3						
2.5-1	TA-03-0159	Thorium storage	3	Storage of 239 kg thorium ingots and oxides	3			*		*			
2.6 (NA)		*Materials Science Laboratory*											
2.7 (NA)		*Target Fabrication Facility*											
2.8 (NA)		*Machine Shops*											
2.9		*High Explosives Processing*											
2.9-1								TA-8 Radiography Facility	2	TA-8 Radiography Facility	2	TA-8 Radiography Facility	2

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	**BLDG.**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**
	TA-08-0022	Radiography Facility	2		2	Radiography facility; radio-graphs of nuclear explosives as-semblies and other sources exceed HC-2 threshold values	2						
	TA-08-0023	Radiography Facility	2		2	Radiography facility; radio-graphs of nuclear explosives assemblies and other sources exceed HC-2 threshold values	2	Betatron Building	2	Betatron Building	2	Betatron Building	2
	TA-08-0024	Isotope Building	2										
	TA-08-0070	Experimental Science	2										
	TA-16-0411	Intermediate Device Assembly			2	Intermediate Device Assembly Building	2						
2.10 (NA)		*High Explosives Testing*											
2.11		*Los Alamos Neutron Science Center*		*TA-53 Nuclear Activities at LANSCE*	3	*TA-53 Nuclear Activities at Los Alamos Neutron Science Center (LANSCE)*	*3*	*TA-53 Nuclear Activities at Los Alamos Neutron Science Center (LANSCE)*	*3*	*TA-53 Nuclear Activities at Los Alamos Neutron Science Center (LANSCE)*	*3*	*TA-53 Nuclear Activities at Los Alamos Neutron Science Center (LANSCE)*	*3*

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	**BLDG.**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**
2.11-1	TA-53-1L	Manual Lujan Neutron Scattering Center		Manual Lujan Neutron Scattering Center	3	Manual Lujan Neutron Scattering Center	3	Manual Lujan Neutron Scattering Center	3	Lujan Center Neutron Production Target	3	Lujan Center Neutron Production Target	3
	TA-53-3M	Experimental Science	3										
	TA-53-A-6	Accelerator Production of Tritium target beam stop		APT target, isotope production, beam stop	3	APT target, isotope production, beam stop	3	APT target, isotope production, beam stop	3	In-place storage DU and A-6 beam stop	3	In-place storage DU and A-6 beam stop	3
	TA-53-ER1	Actinide scattering experiment		Actinide scattering experiment	3	Actinide scattering experiment	3	TA-53 ERI Actinide scattering experiment	3	TA-53 ERI Actinide scattering experiment	3	Lujan Center ER-1/2 Actinide scattering experiment	3
	TA-53-P3E	Pion Scattering Experiment		Pion Scattering Experiment	3								
										TA-53 Target 4 WNR Neutron Production target [b]	3		
2.12 (NA)		*Health Research Laboratory*				*Bioscience Facilities*		*Bioscience Facilities*		*Bioscience Facilities*		*Bioscience Facilities*	
2.13		*Radiochemistry Facility*											
2.13-1	TA-48-0001	Radiochemistry and Hot Cell	3	TA-48 Radiochemistry and Hot Cell Facility	3	TA-48 Radiochemistry and Hot Cell Facility	3	TA-48 Radiochemistry and Hot Cell Facility	3	TA-48 Radiochemistry and Hot Cell Facility	3	TA-48 Radiochemistry and Hot Cell Facility	3

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	**BLDG.**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**
				Radiochemistry and hot cell facility; multiple small sources >HC-3 threshold values	3	Radiochemistry and hot cell facility; multiple small sources >HC-3 threshold values	3	Radiochemistry and hot cell facility; multiple small sources	3	Radiochemistry and hot cell facility; multiple small sources	3	Radiochemistry and hot cell facility; multiple small sources	3
2.14		*Radioactive Liquid WasteTtreatment Facility*		*Radioactive Liquid WasteTtreatment Facility*	3	*TA-50 Radioactive Waste Treatment Facility (RLWTF)*	*3*	*TA-50 Radioactive Waste Treatment Facility (RLWTF)*	*3*	*TA-50 Radio-active Liquid Waste Treatment Facility (RLWTF)*	*3*	*TA-50 Radio-active Liquid Waste Treatment Facility (RLWTF)*	*3*
2.14-1	TA-50-0001	Main Treatment Plant	2	Main treatment plant, pretreatment plant, decon-tamination operation	3	Main treatment plant, pre-treatment plant, decontamination operation	3	Main treatment plant, pre-treatment plant, decontamination operation	3	Main treatment plant, pre-treatment plant, decontamination operation	3	Main treatment plant, pre-treatment plant, decontamination operation	3
	TA-50-0002	LLW Tank Farm		Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks	3	Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks	3	Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks	3	Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks	3	Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks	3
	TA-50-0066	Acid and Caustic Tank Farm		Acid and Caustic waste holding tanks	3	Acid and Caustic waste holding tanks	3	Acid and Caustic waste holding tanks	3	Acid and Caustic waste holding tanks	3	Acid and Caustic waste holding tanks	3
	TA-50-0090	Holding Tank		Holding tank	3	Holding tank	3	Holding tank	3	Holding tank	3	Holding tank	3
2.15		*Solid Radioactive and Chemical Waste Facilities*											

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
2.15-1	TA-50-0037	RAMROD		Radioactive Materials, Research, Operations, and Demonstration (RAMROD)	2	TA-50 Radioactive Materials, Research, Operations, and Demonstration (RAMROD)	2	TA-50 Radioactive Materials, Research, Operations, and Demonstration (RAMROD)	2	TA-50 Radioactive Materials, Research, Operations, and Demonstration (RAMROD)	2	TA-50 Radioactive Materials, Research, Operations, and Demonstration (RAMROD)	2
				Radioactive materials, research, operations, and demonstration facility	2	Radioactive materials, research, operations, and demonstration facility	2	Radioactive materials, research, operations, and demonstration facility	2	Radioactive materials, research, operations, and demonstration facility	2	Radioactive materials, research, operations, and demonstration facility	2
	TA-50-0069	WCRRF Building	2	TA-50 Waste Characterization, Reduction, and Repackaging Facility (WCRRF)	3	TA-50 Waste Characterization, Reduction, and Repackaging Facility (WCRRF)	2	TA-50 Waste Characterization, reduction, and Repackaging Facility (WCRRF)	2	TA-50 Waste Characterization, Reduction, and Repackaging Facility (WCRRF)	2	TA-50 Waste Characterization, Reduction, and Repackaging Facility (WCRRF)	2
				Waste characterization, reduction, and repackaging facility	3	Waste characterization, reduction , and repackaging facility	3	Waste characterization, reduction, and repackaging facility	3	Waste characterization, reduction, and repackaging facility	3	Waste characterization, reduction, and repackaging facility	3
	TA-50-190			Liquid waste tank	2								
	TA-50-0069 Outside	Nondestructive Analysis Mobile Activities				NDA mobile activities outside TA-50-69	2	TA-50 External NDA mobile activities outside TA-50-69	2	TA-50 External NDA mobile activities outside TA-50-69	2	TA-50 External NDA mobile activities outside TA-50-69	2
	TA-50-0069 Outside	Drum Storage				Drum staging/ storage pad and waste container temperature equilibration activities outside TA-50-69	2	TA-50 External Drum staging/ storage pad and waste container temperature equilibration activities outside TA-50-69	2	TA-50 External Drum staging/s torage pad and waste container temperature equilibration activities outside TA-50-69	2	TA-50 External Drum staging/ storage pad and waste container temperature equilibration activities outside TA-50-69	2

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
	TA-54-AreaG	LLW Waste Storage/ Disposal	2	TA-54 Waste Storage and Disposal Facility	2	TA-54 Waste Storage and Disposal Facility (Area G)	2	TA-54 Waste Storage and Disposal Facility (Area G)	2	TA-54 Waste Storage and Disposal Facility (Area G)	2	TA-54 Waste Storage and Disposal Facility (Area G)	2
				Low level waste (LLW) (including mixed waste) storage and disposal in Domes, pits, shafts, and trenches. TRU waste storage in domes and shafts (does not include TWISP). TRU legacy waste in pits and shafts. Low level disposal of asbestos in pits and shafts. Operations building; TRU waste storage	2	Low level waste (LLW) (including mixed waste) storage and disposal in Domes, pits, shafts, and trenches. TRU waste storage in domes and shafts (does not include TWISP). TRU legacy waste in pits and shafts. Low level disposal of asbestos in pits and shafts. Operations building; TRU waste storage	2	Low level waste (LLW) (including mixed waste) storage and disposal in Domes, pits, shafts, and trenches. TRU waste storage in domes and shafts (does not include TWISP). TRU legacy waste in pits and shafts. Low level disposal of asbestos in pits and shafts. Operations building; TRU waste storage	2	Low level waste (LLW) (including mixed waste) storage and disposal in Domes, pits, shafts, and trenches. TRU waste storage in domes and shafts (does not include TWISP). TRU legacy waste in pits and shafts. Low level disposal of asbestos in pits and shafts. Operations building; TRU waste storage	2	Low level waste (LLW) (including mixed waste) storage and disposal in Domes, pits, shafts, and trenches. TRU waste storage in domes and shafts (does not include TWISP). TRU legacy waste in pits and shafts. Operations building; TRU waste storage	2
	TA-54	TWISP		Transuranic Waste Inspect-able Storage Project (TWISP)	2	TA-54 Transuranic Waste Inspect-able Storage Project (TWISP)	2	TA-54 Transuranic Waste Inspect-able Storage Project (TWISP)	2	TA-54 Transuranic Waste Inspect-able Storage Project (TWISP)	2	TA-54 Transuranic Waste Inspect-able Storage Project (TWISP)	2

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
								Pit 2 Recovery of buried TRU waste (Note: TWISP)	2	Pit 2 Recovery of buried TRU waste (Note: TWISP)	2		
	TA-54-0002	TRU Storage Dome		Operations building; TRU waste storage	3			Radioactive and chemical waste storage; fabric dome with TRU waste drum storage	3				
	TA-54-0033	TRU Drum Preparation	2					TRU waste storage, fabric dome with TRU waste drum (Note: TWISP)	2	TRU waste storage, fabric dome with TRU waste drum (Note: TWISP)	2	TRU waste storage, fabric dome with TRU waste drum (Note: TWISP)	2
	TA-54-0038	RANT	2	Radioactive Assay Nondestructive Testing (RANT) Facility	3	TA-54 Radio-active Assay Nondestructive Testing (RANT) Facility	3	TA-54 Radio-active Assay Nondestructive Testing (RANT) Facility	3	TA-54 Radio-active Assay Nondestructive Testing (RANT) Facility	3	TA-54 Radio-active Assay Nondestructive Testing (RANT) Facility	3
				Nondestructive assay and examination of waste drums, WIPP certification of TRU waste drums, TRUPACT loading of drums	3	Nondestructive assay and examination of waste drums, WIPP certi-fication of TRU waste drums, TRUPACT loading of drums	3	Nondestructive assay and examination of waste drums, WIPP certi-fication of TRU waste drums, TRUPACT loading of drums	3	Nondestructive assay and examination of waste drums, WIPP certi-fication of TRU waste drums, TRUPACT loading of drums	3	Nondestructive assay and examination of waste drums, WIPP certi-fication of TRU waste drums, TRUPACT loading of drums	3

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401				PS-OAB-401	
								REV. 1 (JUNE 2001)		REV. 2 (DECEMBER 2001)		REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
	TA-54-0048	TRU Storage Dome	2	Radioactive and chemical waste storage; fabric dome with TRU waste drum storage	3			Radioactive and chemical waste storage; fabric dome with TRU waste drum storage	3				
	TA-54-0049	TRU Storage Dome	2	Radioactive and chemical waste storage; fabric dome with TRU waste drum storage	3			Radioactive and chemical waste storage; fabric dome with TRU waste drum storage	3				
	TA-54-0144	Shed	2										
	TA-54-0145	Shed	2										
	TA-54-0146	Shed	2										
	TA-54-0153	TRU Storage Dome	2	Radioactive and chemical waste storage; fabric dome with TRU waste drum storage	3			Radioactive and chemical waste storage; fabric dome with TRU waste drum storage	3				
	TA-54-0177	Shed	2										
	TA-54-0226	Temporary Retrieval Dome	2	TRU waste placement (incidental to remediation)	2	TRU waste placement (incidental to remediation)	2						
	TA-54-0229	Tension Support Dome	2	TRU waste placement (incidental to remediation)	2	TRU waste placement (incidental to remediation)	2						
	TA-54-0230	Tension Support Dome	2	TRU waste placement (incidental to remediation)	2	TRU waste placement (incidental to remediation)	2						

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
	TA-54-0231	Tension Support Dome	2	TRU waste placement (incidental to remediation)	2	TRU waste placement (incidental to remediation)	2						
	TA-54-0232	Tension Support Dome	2	TRU waste placement (incidental to remediation)	2	TRU waste placement (incidental to remediation)	2						
	TA-54-0283	Tension Support Dome	2										
	TA-54-Pad1	Storage Pad		TRU waste remediation project	2	TRU waste remediation project	2						
	TA-54-Pad2	Storage Pad	2	TRU waste remediation project	2	TRU waste remediation project	2			Recovery of buried TRU waste (Note: TWISP)	2	Recovery of buried TRU waste (Note: TWISP)	2
	TA-54-Pad3	Storage Pad	2										
	TA-54-Pad4	TRU Storage	2	TRU waste remediation project	2	TRU waste remediation project	2						
2.16		*Non-Key Facilities*											
2.16-1	TA-03-0040	Physics Building	3										
	TA-03-0065	Source Storage	2										
	TA-03-0130	Calibration Building	3										

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401				PS-OAB-401	
								REV. 1 (JUNE 2001)		REV. 2 (DECEMBER 2001)		REV. 3 (JULY 2002)	
SECTION /TABLE	**BLDG.**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**	**DESCRIPTION**	**HC**
	TA-33-0086	Former Tritium Research	3		2	TA-33 High Pressure Tritium Facility	2	TA-33 High Pressure Tritium Facility	2	TA-33 High Pressure Tritium Facility [c]	2		
						Former tritium research facility	2	Former tritium research facility	2	Former tritium research facility	2		
	TA-35-0002	Nuclear Safeguards Research Facility	3	Multi-tenant office and laboratory facility with numerous non-ANSI certified Uranium Sources >HC-2 threshold values	3								
	TA-35-0027	Nuclear Safeguards Research Facility	3	Safeguard assay instruction and related research; Am-241 exceeding HC-2 threshold quantities	3								
2.17 (NA)		*Environmental Restoration Project*											
		(Note: on-site transportation was evaluated under 4.10.3.1 as part of the Affected Environment)						Site Wide Transportation	TBD	Site Wide Transportation	TBD	Site Wide Transportation	TBD

Table B-1. Comparison of Nuclear Facilities Lists (continued)

SWEIS ROD				DOE 1998		DOE 2000		FWO-OAB 401 REV. 1 (JUNE 2001)		FWO-OAB 401 REV. 2 (DECEMBER 2001)		PS-OAB-401 REV. 3 (JULY 2002)	
SECTION /TABLE	BLDG.	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC	DESCRIPTION	HC
												Laboratory nuclear materials transportation that is not DOT certified is now included in the scope of 10 CFR 830	TBD

[a] TA-03-0159 removed from list in April 2000.
[b] WNR Facility Target 4 downgraded to below Category 3 and removed from Nuclear Facilities List in July 2002.
[c] TA-33-86, High Pressure Tritium Facility, removed from Nuclear Facilities List in March 2002.

Table C-1. Radiological Facility List

SWEIS ROD				FWO-OAB-403, Rev. 0		PS-OAB-403, Rev. 1	
SWEIS YEARBOOK	BUILDING	DESCRIPTION	HAZ CAT	DESCRIPTION	HAZ CAT	DESCRIPTION	HAZ CAT
2.1		*Plutonium Complex* [a,b]					
2.2		*Tritium Facilities* [a,b]					
2.3		*Chemistry and Metallurgy Research Building* [a,b]					
2.4		*Pajarito Site* [a,b]					
2.5		*Sigma Complex* [b]					
2.5	TA-3-35	Press Building	L/RAD	Sigma Press Building	RAD	Sigma Press Building	RAD
2.5	TA-3-66	Sigma Building	NHC 3	Sigma Building	RAD	Sigma Building	RAD
2.5	TA-3-159	Thorium Storage	NHC 3	Sigma Thorium Storage	RAD	Sigma Thorium Storage	RAD
2.6		*Materials Science Laboratory*					
2.6	TA-3-1698	Materials Science Lab	L/CHEM	Material Science Lab	RAD	Material Science Lab	RAD
2.7		*Target Fabrication Facility* [a]					
2.8		*Machine Shops*					
2.8	TA-3-102	Tech Shops Addition	L/RAD	Tech Shop Add	RAD	Tech Shop Add	RAD
2.9		*High Explosives Processing* [b]					
2.9	TA-8-22	X-Ray Facility	NHC 2	X ray Facility [c]	RAD	X ray Facility [c]	RAD
2.9	TA-8-70	Nondestructive Testing	NHC 2	Nondestructive Testing	RAD	Nondestructive Testing	RAD
2.9	TA-8-120		NA	Radiography [c]	RAD	Radiography [c]	RAD
2.9	TA-11-30	Vibration Test Building	L/ENS	Vibration Test [c]	RAD	Vibration Test [c]	RAD
2.9	TA-16-88	Casting Rest House	L/CHEM	RAM Machine Shop	RAD	RAM Machine Shop	RAD
2.9	TA-16-202					Laboratory	RAD
2.9	TA-16-207		NA	Component Testing [c]	RAD	Component Testing [c]	RAD
2.9	TA-16-300		NA	Component Storage [c]	RAD	Component Storage [c]	RAD
2.9	TA-16-301	Rest House	L/ENS	Component Storage [c]	RAD	Component Storage [c]	RAD
2.9	TA-16-302	Process Building	L/ENS	Component Storage Training [b]	RAD	Component Storage Training [b]	RAD
2.9	TA-16-332		NA	Component Storage	RAD	Component Storage	RAD
2.9	TA-16-410	Assembly Building	L/ENS	Assembly Building	RAD	Assembly Building	RAD
2.9	TA-16-411	Rest House	NHC 2	Assembly Building [c]	RAD	Assembly Building [c]	RAD
2.9	TA-16-413	Rest House	L/ENS	Component Storage [c]	RAD		
2.9	TA-16-415	Rest House	L/ENS	Component Storage [c]	RAD		
2.9	TA-37-10	Magazine	L/ENS	Storage Magazine [c]	RAD	Storage Magazine [c]	RAD
2.9	TA-37-14	Magazine	L/ENS	Storage Magazine [c]	RAD	Storage Magazine [c]	RAD
2.9	TA-37-16					Storage Magazine	RAD
2.9	TA-37-22	Magazine	L/ENS	Storage Magazine [c]	RAD		
2.9	TA-37-24	Magazine	L/ENS	Storage Magazine [c]	RAD	Storage Magazine [c]	RAD
2.9	TA-37-25	Magazine	L/ENS	Storage Magazine [c]	RAD	Storage Magazine [c]	RAD

Table C-1. Radiological Facility List (continued)

SWEIS ROD				FWO-OAB-403, REV. 0		PS-OAB-403, REV. 1	
SWEIS YEARBOOK	BUILDING	DESCRIPTION	HAZ CAT	DESCRIPTION	HAZ CAT	DESCRIPTION	HAZ CAT
2.10		*High Explosives Testing*					
2.10	TA-15-R183		NA	Vault	RAD	Vault	RAD
2.11		*Los Alamos Neutron Science Center* [b]					
2.11	TA-53-945		NA	RLW Treatment Facility	RAD	RLW Treatment Facility	RAD
2.11	TA-53-954		NA	RLW Basins	RAD	RLW Basins	RAD
2.12		*Bioscience Facilities* [a]					
2.12	TA-43-1	Health Research Laboratory	L/RAD and CHEM			Bio Lab	RAD
2.13		*Radiochemistry Facility* [a,b]					
2.14		*Radioactive Liquid Waste Treatment Facility* [a,b]					
2.15		*Solid Radioactive and Chemical Waste Facilities* [a,b]					
2.15	TA-54-412		NA			DVRS	RAD
2.16		*Non-Key Facilities* [b]					
2.16	TA-2-1	Omega West Reactor	L/RAD	Omega Reactor [d]	RAD	Omega Reactor [d]	RAD
2.16	TA-3-16					Ion Exchange	RAD
2.16	TA-3-34	Cryogenics Bldg B	L/CHEM	Cryogenics Bldg B	RAD	Cryogenics Bldg B	RAD
2.16	TA-3-40	Physics Bldg	NHC 3	Physics Bldg (HP)	RAD	Physics Bldg (HP)	RAD
2.16	TA-3-169		NA			Warehouse	RAD
2.16	TA-3-1819		NA			Experiment Mat'l Lab	RAD
2.16	TA-33-86	High Pressure Tritium	NHC 3			High Pressure Tritium	RAD
2.16	TA-21-5	Laboratory Building	L/RAD	Lab Bldg [d]	RAD	Lab Bldg [d]	RAD
2.16	TA-21-150	Molecular Chemistry Building	L/RAD	Molecular Chemical [d]	RAD		
2.16	TA-35-2	Nuclear Safeguards Research	NHC 3	Nuclear Safeguards Research	RAD	Nuclear Safeguards Research	RAD
2.16	TA-35-27	Nuclear Safeguards Lab	NHC 3	Nuclear Safeguards Lab	RAD	Nuclear Safeguards Lab	RAD
2.16	TA-35-125	Laser Building	L/RAD				
2.16	TA-36-1		NA			Laboratory and offices	RAD
2.16	TA-36-214		NA			Central HP Calibration Facility	RAD
2.16	TA-41-1	Underground Vault	L/RAD	Undergound Vault [c]	RAD	Underground Vault [c]	RAD
2.16	TA-41-4	Laboratory Building	M/RAD	Laboratory [c]	RAD		
2.17		*Environmental Restoration Project* [a]					

[a] No radiological facilities identified in September 2001.
[b] Refer to Appendix B Nuclear Facilities List.
[c] Could contain radiological material on an interim basis.
[d] Scheduled for decontamination and decommissioning.

Appendix D. NPDES Outfall Status Summary

	NPDES CATEGORY/ OUTFALL NO.	TA	BLDG	FMU NO.	DRAINAGE BASIN	EPA DELETE DATE
1	01S	3	8	0	Sandia	
2	01A 001	3	22	80	Sandia	Remaining
3	02S	9		N/A	Pajarito	Prior to 94
4	01A 002	3	22			Combined with 001
5	03S	16		N/A	Water	Prior to 94
6	01A 003	3-	22			Combined with 001
7	04S	18		N/A	Pajarito	Prior to 94
8	01A 004	3	22			Combined with 001
9	05S	21	STP	80	Los Alamos	3/10/98
10	01A 005	3	22			Combined with 001
11	06S	41	STP			
12	02A 006	21	357			Eliminated
13	07S	46		N/A	Canada del Buey	Prior to 94
14	02A 007	16	540	80	Valle	5/15/98
15	08S	48	5			Combined with 10S
16	02A 008	22	6			Eliminated 6/84
17	09S	53		N/A	Los Alamos	Prior to 94
18	03A 009	3	102	70	Two Mile	7/31/96
19	10S	35		N/A	Mortandad	Prior to 94
20	04A 010	3	105			Eliminated 4/87
21	11S	8	9			Combined with 02S
22	04A 011	22	5			Eliminated 4/87
23	12S	46		N/A	Canada del Buey	Prior to 94
24	04A 012	35	67			Eliminated 4/87
25	13S	46	SWS	80	Canada del Buey	Remaining
26	04A 013	46	30	66	Canada del Buey	12/6/95
27	04A 014	46	88	66	Canada del Buey	7/11/95
28	04A 015	48	1			Combined with 045
29	04A 016	48	1	66	Mortandad	9/19/97
30	04A 017	53	2			Combined with 114
31	04A 018	46	24, 59, 76	66	Canada del Buey	12/6/95
32	03A 019	2	44			Eliminated 5/16/90
33	03A 020	2	49	66	Los Alamos	7/11/95
34	03A 021	3	29	65	Mortandad	Remaining
35	03A 022	3	2274	73	Mortandad	Remaining
36	03A 023	3	163, 287	77	Sandia	7/11/95
37	03A 024	3	187	73	Sandia	Remaining
38	03A 025	3	208	77	Two Mile	7/20/98
39	03A 026	3	208			Combined with 025
40	03A 027	3-285	285, SCC	63	Sandia	Remaining
41	03A 028	15	185, 202	67	Water	Remaining
42	03A 029	16	340			Combined with 054
43	03A 030	21	2			Eliminated 4/87
44	03A 031	21	143	80	Los Alamos	7/11/95
45	03A 032	21	150	66	Los Alamos	7/31/96
46	03A 033	21	152	70	Los Alamos	3/1/86
47	03A 034	21	166, 167	70	Los Alamos	9/19/97
48	03A 035	21	210	71	Los Alamos	9/19/97
49	03A 036	21	152, 155, 220	70	Los Alamos	9/19/97

Appendix D. NPDES Outfall Status Summary (continued)

	NPDES CATEGORY/ OUTFALL NO.	TA	BLDG	FMU NO.	DRAINAGE BASIN	EPA DELETE DATE
50	03A 037	21	314	66	Los Alamos	7/31/96
51	03A 038	33	114	75	Chaquehi	9/19/97
52	03A 039	35	33			Eliminated
53	03A 040	43	1	72	Los Alamos	1/11/99
54	03A 041	43	1			Combined with 040
55	03A 042	46	1	70	Canada del Buey	3/10/98
56	03A 043	46	31	66	Canada del Buey	7/31/96
57	03A 044	46	86			Eliminated 4/87
58	03A 045	48	1	66	Mortandad	12/6/99
59	03A 046	48	1			Combined with 045
60	03A 047	53	60	61	Los Alamos	Remaining
61	03A 048	53	62	61	Los Alamos	Remaining
62	03A 049	53	64	61	Los Alamos	Remaining
63	050	21	257	N/A	Los Alamos	Last DMR 6/85[a]
65	051	50	1 RLWTF	84	Mortandad	Remaining
66	05A 052	16	380	70	Water	Prior to 94
67	05A 053	16	410	70	Water	1/14/98
68	05A 054	16	340	70	Valle	7/20/98
69	05A 055	16	1507 (HEWTF)	70	Valle	Remaining
70	05A 056	16	260	70	Valle	1/14/98
71	05A 057	16	265, 267	70	Valle	Prior to 94
72	05A 058	16	300-306	70	Water	7/31/96
73	04A 059	16	460			Combined with 072
74	03A 060	16	430	70	Water	7/31/96
75	05A 061	16	280	70	Valle	7/31/96
76	05A 062	16	342	70	Valle	7/31/96
77	05A 063	16	400	70	Water	12/5/95
78	05A 064	22	34		Pajarito	
79	05A 065	22	1		Pajarito	
80	05A 066	9A	21, 28, 29, 32, 33,34, 35, 37, 38, 40	67	Valle	3/10/98
81	05A 067	9B	-41, 42, 43, 45, & 46	67	Valle	3/10/98
82	05A 068	9	48	67	Valle	3/10/98
83	05A 069	11	50	70	Water	5/15/98
84	04A 070	16	220	70	Valle	9/19/97
85	05A 071	16	430	70	Water	3/10/98
86	05A 072	16	460	70	Water	9/19/97
87	06A 073	16	222	70	Valle	1/14/98
88	06A 074	8	22	70	Valle	9/19/97
89	06A 075	8	21	67	Valle	1/14/98
90	04A 076	8	70		Valle	Combined with 115
91	06A 077	22	52	67	Pajarito	
92	06A 078	22	34	67	Pajarito	7/31/96
93	06A 079	40	4	67	Pajarito	5/15/98
94	06A 080	40	5	67	Pajarito	5/15/98
95	06A 081	40	8	67	Pajarito	3/10/98

Appendix D. NPDES Outfall Status Summary (continued)

	NPDES CATEGORY/ OUTFALL NO.	TA	BLDG	FMU NO.	DRAINAGE BASIN	EPA DELETE DATE
96	06A 082	40	12	67	Pajarito	1/14/98
97	04A 083	16	202	70	Water	9/19/97
98	04A 084	22	5			Eliminated 4/87
99	04A 085	22	6			Eliminated
100	04A 086	3	216			Eliminated 4/87
101	04A 087	35	46			Eliminated 4/87
102	04A 088	35	67			Eliminated 4/87
103	04A 089	35	34			Eliminated
104	04A 090	35	85			Eliminated 4/87
105	04A 091	16	450	70	Water	9/19/97
106	04A 092	16	370	70	Water	1/14/98
107	04A 093	15	203	67	Valle	Prior to 94
108	04A 094	3	170	62	Sandia	9/19/97
109	095	3	170			Eliminated 4/87
110	05A 096	11	51	70	Valle	5/15/98
111	05A 097	11	52	70	Water	Remaining
112	03A 098	59	1	71	Two Mile	12/6/95
113	06A 099	40	23	67	Pajarito	9/19/97
114	06A 100	40	15	67	Pajarito	5/15/98
115	04A 101	40	9	67	Pajarito	9/19/97
116	04A 102	1	40			Eliminated 6/25/91
117	04A 103	15	40			Eliminated 6/25/91
118	06A 104	18	30, 31			Eliminated 4/87
119	04A 105	15	138			Eliminated
120	06A 106	36	1	74	Three Mile	1/11/99
121	02A 108	0				Inoperative
122	07A 109	3-73	73	80	Sandia	8/4/95
123	04A 110	3-73	73			Eliminated 2/89
124	04A 111	52-1	1			Eliminated 4/87
125	04A 112	52-11	11			Eliminated 4/87
126	03A 113	53-293,1032 (LEDA)	293, 1032, 972	61	Sandia	Remaining
127	03A 114	53-2		61	Sandia	7/11/95
128	04A 115	8-70		70	Valle	9/19/97
129	04A 116	35-29				Eliminated 4/87
130	04A 117	46-41		66	Canada del Buey	7/11/95
131	04A 118	Paj #4		80	Canada del Buey	10/13/99
132	04A 119	Paj #5				Eliminated 4/87
133	120[b]	3		Geotherm	discharge	Eliminated
134	04A 121	15-263				Eliminated 4/87
135	04A 122	15-45				Eliminated 4/87
136	06A 123	15-R183		67	Valle	1/14/98
137	03A 124	46-169		66	Canada del Buey	12/6/95
138	03A 125	53-28		61	Sandia	7/20/98
139	04A 126	48-8		66	Mortandad	12/6/95
140	04A 127	35-213		73	Mortandad	9/19/97
141	128	22-91		67	Two Mile	12/5/95
142	02A 129	21-357		80	Los Alamos	Remaining
143	03A 130	11-30		70	Water	Remaining

Appendix D. NPDES Outfall Status Summary (continued)

	NPDES CATEGORY/ OUTFALL NO.	TA	BLDG	FMU NO.	DRAINAGE BASIN	EPA DELETE DATE
144	04A 131	48-1		66	Mortandad	1/14/98
145	06A 132	35-87		75	Mortandad	3/10/98
146	04A 133	53-19		61	Sandia	
147	04A 134	16-478				Eliminated 5/16/90
148	04A 135	53-18		61	Sandia	8/16/95
149	03A 136	46-200		66	Canada del Buey	12/6/95
150	04A 137	48-46		66	Mortandad	12/6/95
151	03A 138	3-127				Eliminated 12/90
152	04A 139	15-184		67	Water	9/19/97
153	04A 140	3-141		73	Mortandad	8/16/95
154	04A 141	39-69		67	Ancho	9/19/97
155	04A 142	21-5, 149		66	Los Alamos	7/11/95
156	04A 143	15-306		67	Three Mile	5/15/98
157	03A 145	53-6		61	Sandia	1/14/98
158	03A 146	53-14		61	Sandia	9/19/97
159	04A 147	33-86		70	Chaquehui	7/11/95
160	03A 148	3-1498, 1807		63	Sandia	9/19/97
161	05A 149	16-267		70	Valle	Prior to 94
162	03A 150	41-30			Los Alamos	
163	04A 151	3-22		80	Sandia	8/16/95
164	04A 152	48-28		66	Mortandad	9/19/97
165	04A 153	48-1		66	Mortandad	7/20/98
166	05A 154	40-41		67	Two Mile	12/5/95
167	04A 155	9-50		67	Water	12/6/95
168	04A 156	39-89		67	Ancho	9/19/97
169	04A 157	16-460		70	Water	9/19/97
170	03A 158	21-209		70	Los Alamos	Remaining
171	05A 159	16-360		70	Water	8/16/95
172	03A 160	35-124		73	Mortandad	Remaining
173	04A 161	Otowi #1		80	Pueblo	10/13/99
174	04A 163	Paj #1		80	Sandia	10/13/99
175	04A 164	Paj #2		80	Pajarito	10/13/99
176	04A 165	Paj #3		80	Sandia	10/13/99
177	04A 166	Paj #5		80	Canada del Buey	10/13/99
178	04A 167	LA Well #1B		80	Los Alamos	Prior to 94
179	04A 168	LA Well #2		80	Los Alamos	Prior to 94
180	04A 169	LA Well #3		80	Los Alamos	Prior to 94
181	04A 170	LA Well #5		80	Los Alamos	Prior to 94
182	04A 171	Guaje #1		80	Guaje	8/23/99
183	04A 172	Guaje #1A		80	Guaje	10/13/99
184	04A 173	Guaje #2		80	Guaje	9/21/99
185	04A 174	Guaje #4		80	Guaje	7/20/98
186	04A 175	Guaje #5		80	Guaje	8/23/99
187	04A 176	Guaje #6		80	Rendija	8/23/99
188	04A 177	Guaje Booster 1		80	Guaje	10/13/99
189	04A 178	LA Booster 1		80	Los Alamos	Prior to 94
190	04A 179	Pajarito		Potable	Water blowdown	
191	03A 180	43-44		72	Los Alamos	7/11/95
192	03A 181	55-6		76	Mortandad	Remaining

Appendix D. NPDES Outfall Status Summary (continued)

	NPDES CATEGORY/ OUTFALL NO.	TA	BLDG	FMU NO.	DRAINAGE BASIN	EPA DELETE DATE
193	04A 182	21-1003		80	Los Alamos	5/15/98
194	06A 183	3-510		63	Sandia	8/16/95
195	03A 184	53-17		N/A	Sandia	8/16/95
196	03A 185	15-312 (DARHT)		67	Water	Remaining
197	04A 186	Otowi #4		80	Los Alamos	10/13/99
198	03A 199	3-1837		63	Sandia	In permit 2-1-01

[a] DMR = Discharge Monitoring Report. The last DMR submitted for this outfall was in June 1985.

[b] Research of the NPDES records indicates that Outfall 120 has not been on any NPDES permit since 1978. The "geotherm" under the Drainage Basin Column would indicate that a geothermal discharge was anticipated.

Appendix E.

Preliminary Assessment of Potential Impact of LANL Site Boundary Changes and Land Transfer on Accident Analyses in the SWEIS

Introduction

This report summarizes the results of evaluating the potential for DOE site boundary changes and land transfers to have effects on the analyses of risk-dominant accidents in the *Site-Wide Environmental Impact Statement (SWEIS) for Continued Operation of the Los Alamos National Laboratory* (DOE 1999). A recent DOE policy on the use of site boundaries and commercial ventures and municipal operations within LANL as well as transfers of land to public entities resulted in changes in distances to public receptors at which effects are predicted. These changes potentially create the need to alter the accident analyses in the SWEIS that predict, among other things, radiological dose consequences and health effects to public receptors. As such, we conducted a preliminary assessment of the potential for these changes to cause impacts to radiological dose consequences and effects for risk-dominant accidents reported in the SWEIS.

Risk-dominant accidents analyzed in the SWEIS assess radiological consequences to maximally-exposed individual (MEI) members of the public. Each accident has a location identified, usually the nearest point of public access or location, at which a maximum dose could occur. Highways over which the DOE can exercise control during emergency conditions are not necessarily public MEI locations. Commercial ventures and municipal operations within LANL are not necessarily MEI locations. But analyses for EISs such as the SWEIS often evaluate several public receptor locations for each accident. Pajarito Road, Royal Crest Trailer Park, State Road 502, State Road 4, Diamond Drive, White Rock, or the Los Alamos town site served as MEI or alternate public receptor locations for the 16 risk-dominant radiological accidents. Alternatively, parcels of DOE/LANL property given or transferred to public entities do introduce new locations of unrestricted public access, potentially changing the MEI location for a given LANL facility. This, in turn, can potentially change the results of a radiation dose consequence/human health effects analysis. Given that the SWEIS serves as the baseline to which all subsequent (post-1999) changes in operations and potential accidents are compared under NEPA, it is important to determine whether any major changes in the distance analysis parameter might have occurred because incremental risk from the introduction of new operations are evaluated against the SWEIS. Thus, we contrasted the MEI location for risk-dominant accidents in the SWEIS against the locations of already transferred parcels, new site boundaries, or proposed new commercial ventures and municipal operations. We then used subjective judgment on whether these new locations had the potential to substantially change estimated MEI radiation doses given new distances to public receptors.

Methods

The general procedure for making this assessment was to contrast the role of a site boundary or transferred parcel of land in analyzing accidents under NEPA against the magnitude of the changes in distances to site boundaries or transferred parcels. More specifically, we developed an understanding of the nature of the site boundary and land ownership changes, identified resultant changes in distances to public MEI locations, and considered potential changes to MEI dose consequences and human health effects. We discuss the magnitude of change to accident analyses in the SWEIS.

We consulted key scientists and managers at LANL (as cited throughout this document) that conduct accident analyses or manage related programs or activities as well as reviewing the SWEIS (DOE 1999) for potential impacts. While accident analyses for NEPA can, and often do, have different objectives than accident analyses for facility safety authorization, we note that the DOE has agreed that impacts of the site boundary changes to LANL facility safety authorizations can be assessed at the time of a facility's normally scheduled update to facility safety documents (Satterwhite 2003).

Site Boundary Changes

On December 11, 2002, DOE/NNSA/LASO established a policy on the determination and use of the DOE/LANL site boundary for use in evaluating dose to the Maximally Exposed Offsite Individual (MEOI) in facility safety authorization basis (AB) documents (DOE 2002a). The new boundaries are shown in Figure E-1. The policy also included instruction on how to treat potential receptors at commercial ventures and municipal operations within LANL; e.g., the Research Park or the proposed new county landfill. These entities would include parcels of DOE/LANL property that were given to public entities through the Land Transfer process.

The first objective of the accident analysis in NEPA reviews is to characterize the overall risk posed by operations, creating a context for the decision maker and putting the operations in perspective for the public (DOE 2002b). The concern is with presenting accidents that illustrate dominant consequences and their likelihood. Dominant consequences are often judged on the basis of maximum dose to the public from a spectrum of accidents, which is often highlighted by a consideration of the MEI member of the public. This MEI is defined as the outdoor, offsite location having the highest exposure and is almost always at the site boundary closest to the release point. Other types of receptors, such as workers and populations in surrounding communities are generally unaffected by the site boundary changes. To obtain a general sense of the magnitude of change to the nearest site boundary for various facilities at LANL we consulted LANL's Probabilistic Risk and Hazards Analysis Group (D-11) (Letellier 2002, 2003). For various facilities, D-11 made preliminary estimates of distances to the new nearest site boundaries for 16 equally spaced points radiating outwardly from each facility. For some of these facilities, distances to long-standing receptor locations were contrasted with new receptor locations. While there are sometimes changes in the distance to the nearest site boundary for several sectors from a given facility, in general there has been very little change to the single nearest receptor. Using TA-55 for example (Figures E-2a and E-2b), although the receptor location in sectors 2, 3, 4, 5, 13, 14, 15, and 16 are now closer because of the addition of East Jemez Road (Truck Route) as a new receptor location, the distance to the nearest receptor–Royal Crest Trailer Park–has not changed. There are few examples where the distance to the nearest receptor from a facility has changed substantially.

The SWEIS is the most recent substantial NEPA baseline documenting the effect of accidents to human health and the environment. For many of the risk-dominant facility-specific accidents, Pajarito Road is an MEI location in the SWEIS. The most substantial changes to site boundaries with potential impact on NEPA assessments may be the allowance of continual public access to East Jemez Road and to the portion of State Road 4 from White Rock to Bandelier (Figure E-1). With no change to Pajarito Road as a receptor location, the changes for the most part do not affect maximum doses to receptors for the majority of facility-specific accidents in the SWEIS. For example, for the bounding accident in the SWEIS ("RAD-09"), a TRU waste drum puncture or failure at TA-54, the MEI location does not change from Pajarito Road. For RAD-12, an earthquake-induced release of Pu from the DARHT generating relatively high potential MEI doses and potential effects, MEI doses were computed for State Road 4, Pajarito Road, and Bandelier National Monument; these locations remain in effect for the DARHT. Thus, because EISs often do estimate doses at several offsite receptor locations, the impact of a site boundary change is lower than otherwise if only one receptor location was used.

A few facilities will be affected by the change in site boundaries. The LANSCE at TA-53, Beryllium Technology Facility (BTF) at TA-03, and Sigma Facility at TA-03 are examples of facilities that will have a closer MEI. While the change in distance to nearest MEI for the LANSCE could increase dispersion coefficients by a factor of approximately four, it was screened out of final consideration in the SWEIS due to a lack of credible accidents. The BTF was also screened due to a lack of credible accidents. Thus, for some facilities, even though the distance to MEI is shortened, the lack of consequences of concern makes the issue of closer MEIs less impacting. In the SWEIS, the Sigma Facility was retained for detailed analysis of consequences of an accident involving hydrogen cyanide. The magnitude and type of effects are measured

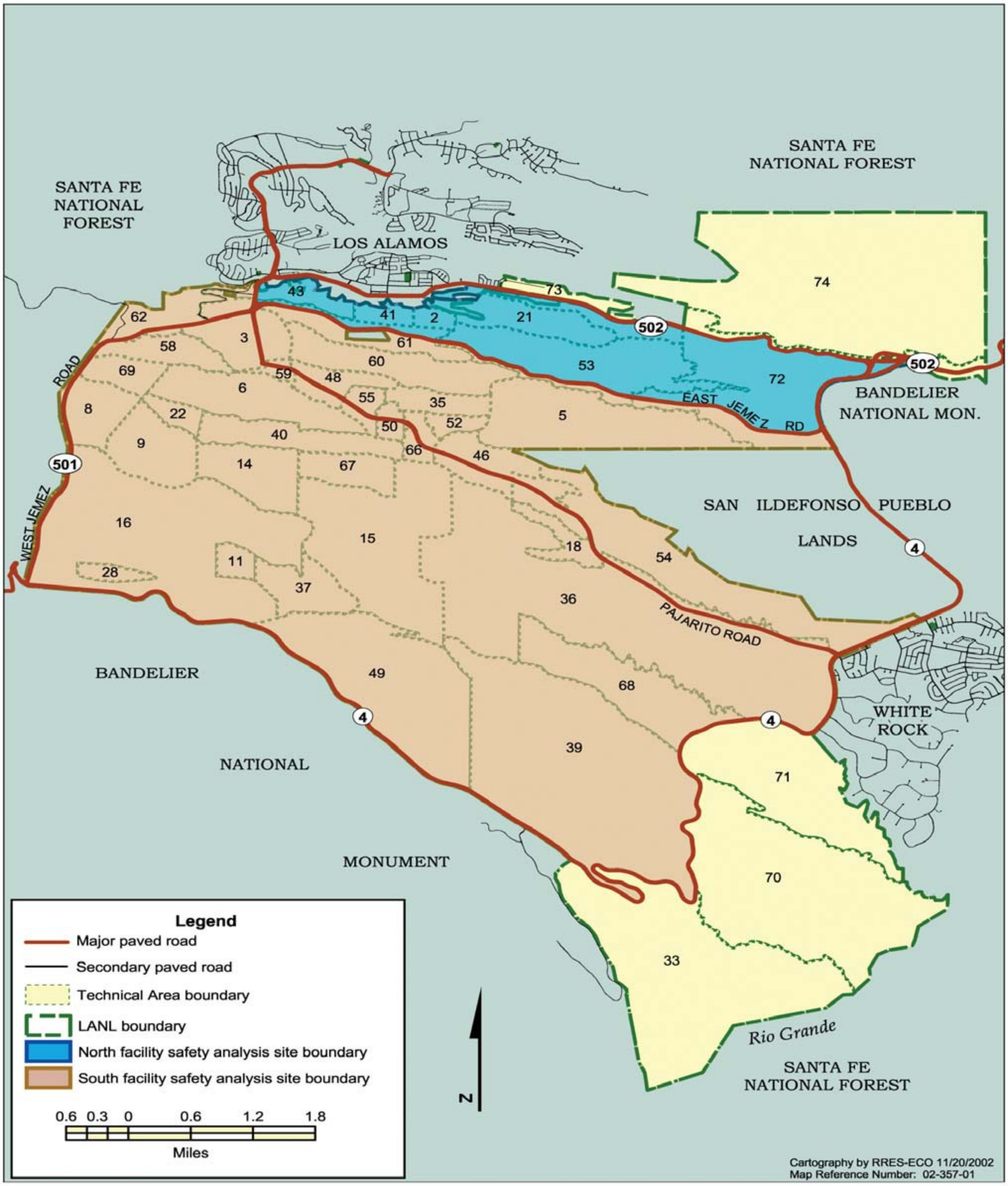


Figure E-1. Site boundaries for conducting accident analyses at LANL (Source: RRES/ECO).

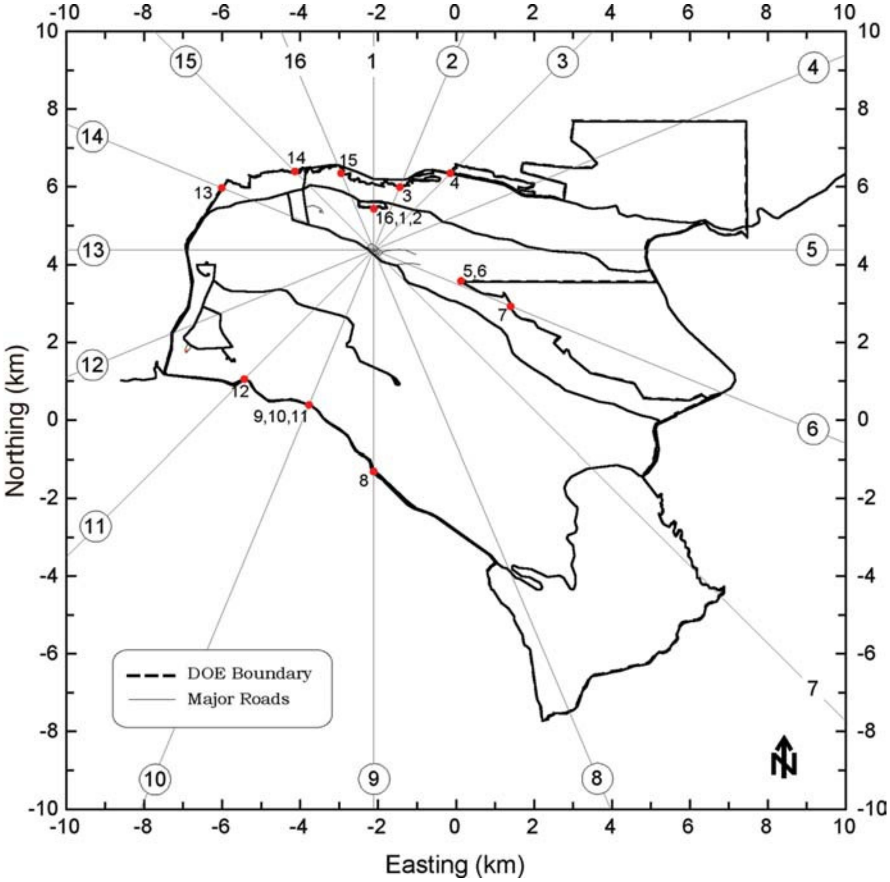


Figure E-2a. TA-55 old evaluation boundary (Source: Letellier 2002).

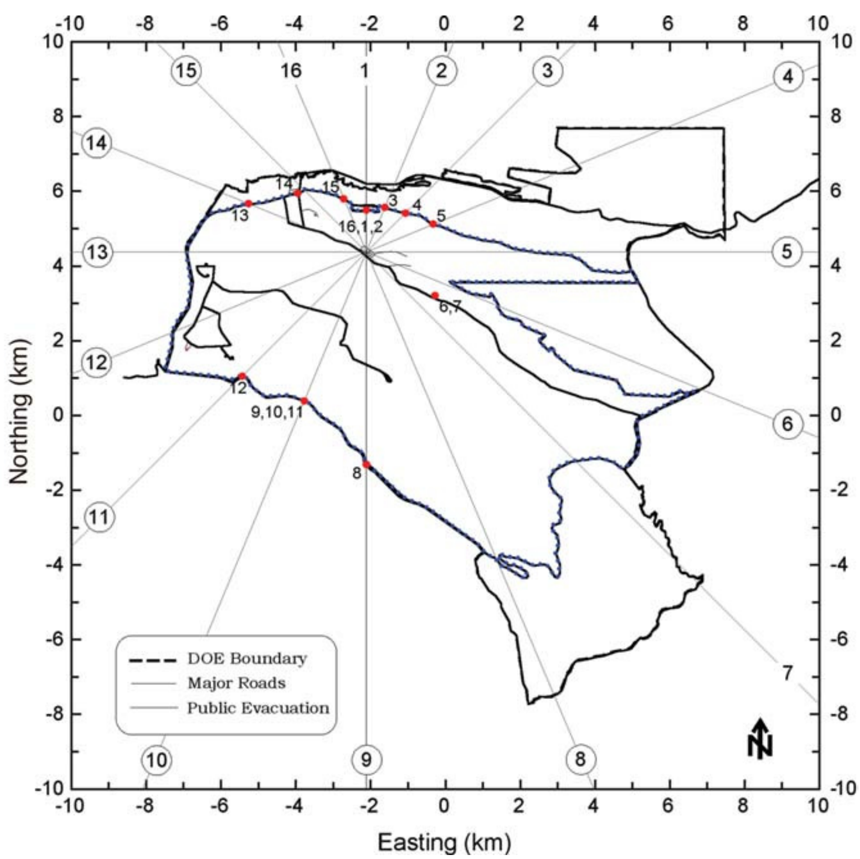


Figure E-2b. TA-55 new evaluation boundary (Source: Letellier 2002).

by estimating distances within which Emergency Response Planning Guideline (ERPG) conditions could occur. ERPG-2 or -3 effects are irreversible health effects (ERPG-2) or life threatening health effects (ERPG-3). The SWEIS showed that even under adverse dispersion conditions, the ERPG distances did not extend to the Los Alamos town site, which was the nearest public receptor location at approximately 0.7 mi away. East Jemez Road is relatively close (~0.4 mi) to the Sigma Facility. This is one example where the change in policy could result in ERPG-2 and -3 conditions applying to members of the public, at least for the more conservative scenarios analyzed in the SWEIS for this facility.

The second objective of accident analyses under NEPA is to realistically quantify the increment in risk among alternatives, as input to a reasoned choice among the alternatives. To achieve this, there is a need to identify significant changes in the frequency or consequence/effect of postulated accidents among the alternatives. Changes in site boundaries would most affect the consequence portion of risk estimates. In our review of the SWEIS for changes in consequences among the different alternatives that could be affected by the site boundary changes we almost always found no change for the No Action Alternative. Since the site boundary changes have minimal impact on consequences, little or no change is expected among the alternatives disclosed in the SWEIS.

Land Transfer

Table E-1 lists the parcels of land that were transferred in 2002 as well as those remaining to be transferred. The parcels are also shown in Figure E-3. All of the transfer parcels appear to be located at or very near a DOE/LANL boundary, the majority of them on the north boundary and some on the southeast boundary adjacent to the city of White Rock. The 16 radiological risk-dominant accidents evaluated in the SWEIS and affected facility are listed in Table E-2 and the approximate location of some of the key facilities are shown in Figure E-3. Only two of the 16 radiological accidents appear to concern facility locations that have a shorter distance to a transfer parcel than to the MEI location analyzed in the SWEIS.

Facilities for which Pajarito Road was used as an MEI location (e.g., RANT Facility, LACEF at TA-18, WCRRF and TWISP at TA-54, or Plutonium Facility at TA-55) are unaffected by the land transfer because Pajarito Road remains much closer to those facilities than the nearest transferred parcel or group of parcels such as the DOE/LASO property off of Trinity Drive or property in the TA-21 area. Facilities for which Diamond Drive was used as an MEI location such as the CMR are unaffected by the land transfer because Diamond Drive remains closer to those facilities than the nearest transferred parcel or group of parcels such as the DOE/LASO property. Facilities for which State Road 4 south of LANL were used as an MEI location such as the DARHT at TA-15 are unaffected by the land transfer because State Road 4 remains much closer to those facilities than the nearest transferred parcel or group of parcels such as the group of parcels (DOE/LASO, TA-21, Manhattan Monument, Airport, etc.) that are far to the north of the DARHT. Facilities for which the Royal Crest Trailer Park off of E. Jemez Road was used as an MEI location such as the Plutonium Facility at TA-55 are unaffected by the land transfer because the Trailer Park is still closer to those facilities to the south than the nearest transferred parcel or group of parcels such as the group of parcels (DOE/LASO, TA-21, Manhattan Monument, Airport, etc.) to the north of the Plutonium Facility.

Table E-1. Land Parcels Transferred and to be Transferred

DESIGNATOR	DESCRIPTION	RECIPIENT	TRANSFER DATE	ACREAGE
TRANSFERRED				
A-1	Manhattan Monument (0 ac)	County	11/1/06	0.07
A-12	LAAO-1 (East)	County	11/1/06	4.51
A-17	TA-74-1 (West) (3 ac)	County	11/1/06	5.52
A-19	White Rock-1	County	11/1/06	76.33
A-2	Site 22 (0 ac)	County	11/1/06	0.17
A-3	Airport-1 (East) (8 ac)	County	11/1/06	9.44
A-6	Airport-4 (West)	County	11/1/06	4.18
A-9	DP Road-2 (North) (Tank Farm) (4 ac)	County	11/1/06	4.25
B-1	White Rock-2	Pueblo	11/1/06	14.94
B-2	TA-74-3 (North)(Includes B-4)	Pueblo	11/1/06	2089.88
TO BE TRANSFERRED				
B-3	TA-74-4 (Middle) (Little Otowi)	Pueblo	10/1/07	3.40
C-1	White Rock	Highway	TBD	15.41
C-2	White Rock "Y"-1	Highway	TBD	104.10
C-3	White Rock "Y"-3 (deferred)	Highway	TBD	53.60
A-18	TA-74-2 (South)	County	10/1/07	676.52
A-7	Airport-5 (Central) (7 ac)	County	10/1/07	5.83
A-8	DP Road-1 (South) (25 ac)	County	10/1/07	24.92
A-15	TA-21-1 (West)	County	10/1/07	7.55
A-13	LAAO-2 (West) (LAAO Bldg)	County	10/1/09	8.82
A-4	Airport-2 (North) (90 ac)	County	10/1/09	92.60
A-10	DP Road-3 (East)	County	10/1/09	13.80
A-11 (3)	DP Road-4 (West) (Archives)	County	10/1/10	3.09
A-14	Rendija	County	10/1/11	918.30
A-5	Airport-3 (South) (deferred)	County	None	34.67
A-16	TA-21-2 (East) (deferred)	County	None	252.10
A-20	White Rock "Y"-2 (deferred)	County	None	323.40
C-4	White Rock "Y"-4 (deferred)	Highway	TBD	20.10

Table E-2. Sixteen Radiological Accidents Evaluated in LANL SWEIS and Affected Facilities

ACCIDENT SCENARIO DESIGNATOR	LOCATION	FACILITY
RAD-01	TA-54-38	Radioassay and Nondestructive Testing (RANT) Facility
RAD-02	TA-3-29	Chemistry and Metallurgy Research (CMR) Facility
RAD-03	TA-18-116	Los Alamos Critical Experiments Facility (LACEF)
RAD-04	TA-15-312	Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility
RAD-05	TA-21-209	Tritium Science and Fabrication Facility (TSFF)
RAD-06	TA-50-37	Radioactive Materials Research Operations and Demonstration (RAMROD) Facility
RAD-07	TA-50-69	Waste Characterization, Reduction, and Repackaging Facility (WCRRF)
RAD-08	TA-54-G	Tranuranic Waste Inspectable Storage Project (TWISP)
RAD-09	TA-54-G	Tranuranic Waste Inspectable Storage Project (TWISP)
RAD-10	TA-55-4	Plutonium Facility
RAD-11	TA-15-312	Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility
RAD-12	TA-16-411	Device Assembly Building
RAD-13	TA-18-116	Los Alamos Critical Experiments Facility (LACEF)
RAD-14	TA-55-4	Plutonium Facility
RAD-15	TA-3-29	Chemistry and Metallurgy Research (CMR) Building
RAD-16	TA-3-29	Chemistry and Metallurgy Research (CMR) Building

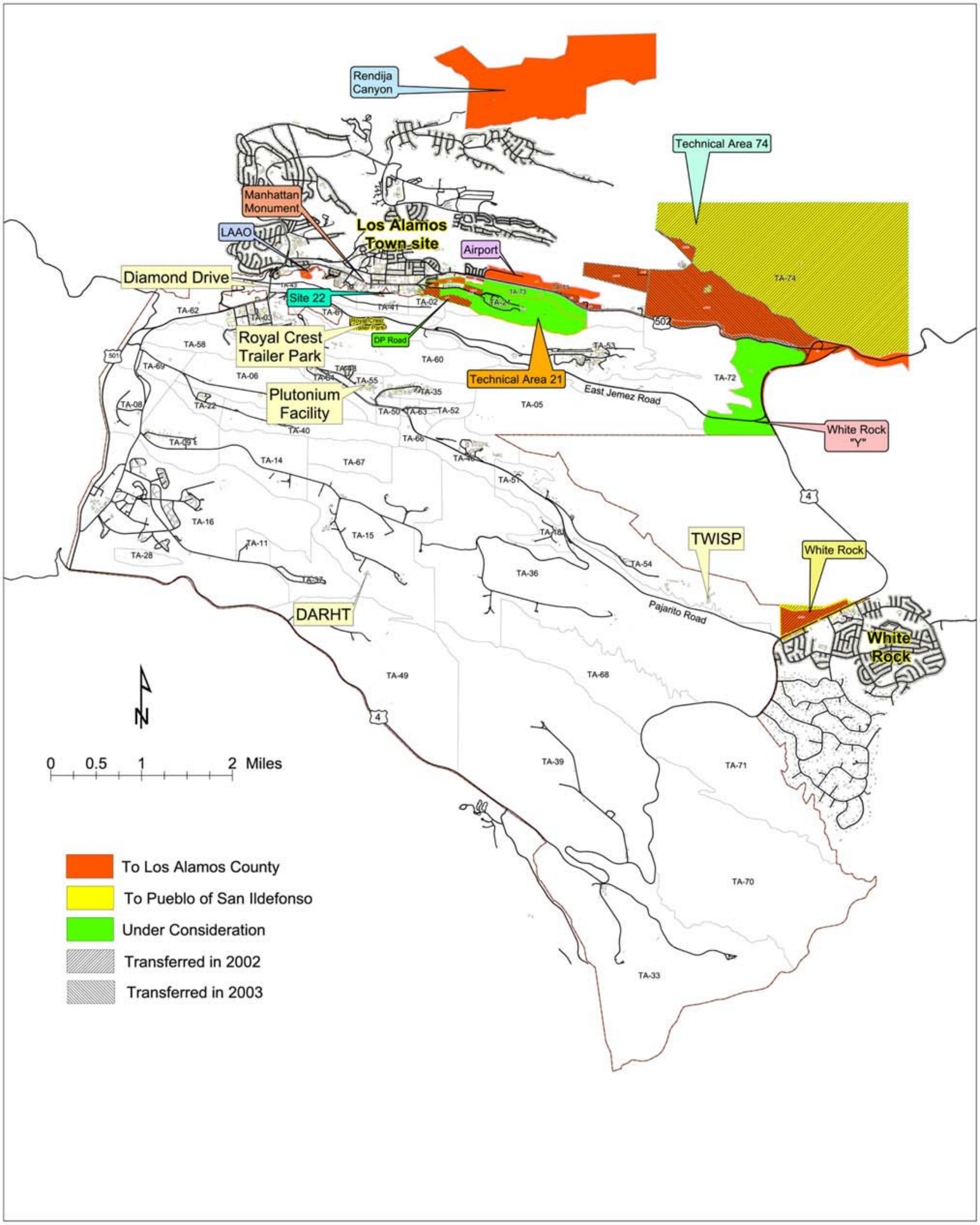


Figure E-3. Location of transfer parcels and key SWEIS accident facilities.

Analyses for which the city of White Rock was used as a receptor location for releases from TA-54 facilities have the potential to be impacted because the White Rock transfer parcels are relatively close to TA-54 facilities. Doses to the city of White Rock MEI were estimated in "RAD-08," "RAD-09," and "SITE-01." The White Rock transfer parcels ("White Rock-1," "White Rock-2" and "White Rock (C-1)") are as much as 0.34 mi closer to key facilities than a city of White Rock resident. This represents up to a 38% decrease in distance to the MEI receptor at White Rock. A decrease in distance to receptor doesn't always result in a dose increase because, depending on the type of release or accident conditions, there may be an area adjacent to the release point that receives none or little of the plume because an elevated plume travels above human receptors due to an elevated release point and/or a buoyant release. Additionally, dose estimates for any given accident in the SWEIS are usually made for several different receptors at a breadth of distances, therefore a change to one dose estimate does not invalidate the comprehensive set of analyses. The TA-54-related accidents had dose estimates made for a closer receptor (~0.13 mi to Pajarito Road) than even the new distance created by the White Rock parcels (~0.59 mi), so the dose to a receptor at the parcels is likely to still be within the range of doses for any give accident. For RAD-08, for example, dose estimates included receptors at Pajarito Road (~0.13 mi) and the dose at Pajarito Road likely bounds any estimates that would be made for the White Rock parcels.

Conclusions

The multiple distances used for analyses of potential accident radiological doses in the SWEIS and the general location of Land Transfer parcels in comparison to previously analyzed receptor locations, result in our judgement that parcels of land transferred to various public entities will have little or no impact on estimated doses in the SWEIS. On this basis there appears to be no need to revise accident analyses in the SWEIS because of land transfers from the DOE to public entities. Although we have not reviewed every facility at LANL for potential impacts to NEPA coverage as a result of the site boundary changes, a review of several facilities and postulated accidents, especially risk-dominant accidents in the SWEIS, resulted in our finding that very few or minimal changes in predicted effects are expected to occur. One exception, a hydrogen cyanide accident at the Sigma Facility, has been noted. The SWEIS still serves the purpose of characterizing LANL operations, differentiating among alternatives, and presenting a baseline that is suitable for tiering and bounding of potential accidents at LANL. We therefore recommend that site boundary changes be considered in future NEPA reviews as appropriate.

References and Key Information Sources:

DOE 2002a: U.S. Department of Energy, "NNSA/OLASO Policy on Site Boundary for Dose Evaluation of the Directionally Dependant Maximally Exposed Offsite Individual," Memorandum, Dec. 11, 2002, R. Erickson (DOE/OLASO).

DOE 2002b: U.S. Department of Energy, "Analyzing Accidents Under NEPA," Office of NEPA Compliance and Policy.

DOE 1999: U.S. Department of Energy, "Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory," DOE/EIS-0238, Albuquerque Operations Office, Albuquerque, New Mexico, 4 Volumes (January 1999).

Letellier 2002: Personal communication from Bruce Letellier (LANL/D-11) to Gil Gonzales (LANL/RRES-ECO), e-mail December 19, 2002.

Letellier 2003: Personal communications from Bruce Letellier (LANL/D-11) to Gil Gonzales (LANL/RRES-ECO), e-mails February 13, 2003 and February 20, 2003.

Satterwhite 2003: Telephone communication from David Satterwhite (LANL/PS-OAB) to Gil Gonzales (LANL/RRES-ECO), Feb. 12, 2003.

Appendix F. Future Projects

The Appendix F tables present a summary of the TYCSP reports prepared in CY 2001 and CY 2002 for FY 2001 and FY 2003, respectively. To the maximum extent possible, the tables are arranged to compare a project listed in the FY 2003 report to what is identified for the same project in the FY 2001 report. However, because the two TYCSP reports were prepared against different guidelines, the tables in the 2002 Yearbook cannot be easily compared to the tables in Appendix D of the 2001 Yearbook.

The tables in this appendix have several items in common. The Project Name and Number are as they are listed in the TYCSP. In some cases, there have been changes in the name and/or number between the two reports. The "Data from TYCSP" column indicates that the information in a given row is from the CY 2001 (or FY 2001) or from the CY 2002 (or FY 2003) report. The NEPA column identifies the coverage that either has occurred or was/is planned for the project. Other than the data from the TYCSP reports, the only data that have been added are in the Construction Status column on each table. The information in this column is not complete; the information is limited to that which is easily collected. The Funding Category typically has several subheadings. These include several that are not spelled out:

- LI for line item,
- C for proposed capital funded line item,
- TEC for total estimated cost,
- OPC for other project costs,
- PE&D for preliminary engineering and design,
- GPE for general plant equipment,
- GPP for general plant project, and
- D&D for decommissioning and demolition.

Table F-1 presents the data for RTBF line item projects. These appear directly in the budget approved by Congress.

Table F-2 shows the projects associated with RTBF operations of facilities.

Table F-3 identifies the projects under the Facilities and Infrastructure Recapitalization Program.

Table F-4 provides the data for projects that are under neither the RTBF nor the Facilities and Infrastructure Recapitalization Programs. Each project is either a budget line item or a proposed capital project. The line item projects fall into two separate categories – an existing line item or a Cerro Grande Rehabilitation line item.

Table F-5 captures the data for a second set of projects that are under neither the RTBF nor the Facilities and Infrastructure Recapitalization Programs. These projects are expense, general plant, institutional general plant, and institutional projects.

Table F-6 presents the data for a third set of projects that are under neither the RTBF nor the Facilities and Infrastructure Recapitalization Programs. These projects fall under the funding categories of maintenance, standby facility, decommissioning and demolition, and facilities management. The "standby facility" category does not apply at LANL.

Table F-7 lists general plant projects identified in the FY 2001 TYCSP that do not appear in the FY 2003 TYCSP.

Table F-8 summarizes decommissioning and demolition projects that have been identified.

Table F-1. RTBF Line Item Projects

PROJECT					FUNDING CATEGORY					
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	LI	C	TEC	OPC	PE&D	PROPOSED CAPITAL PROJECTS - TEC
CMR Upgrades	LANL-92-001	2001	EA-FONSI	Started			Into FY 2001	Into FY 2002		
		2002		Completed in CY 2002	Into FY 2001			Into FY 2002		
APT/Triple A Project	LANL-98-002	2001	EIS-TBD	Started			Into FY 2002	Into FY 2002		
		2002			Into FY 2002			Into FY 2002		
DARHT (Phase 2)	LANL-98-003	2001	EIS-ROD	Started			Into FY 2001	Into FY 2002		
DARHT (Phase 1 & 2)		2002		Continued in CY 2002	Into FY 2001			Into FY 2002		
Nicholas C. Metropolis Center (formerly Strategic Computing Complex)	LANL-99-007	2001	EA-FONSI	Started			Into FY 2002	Into FY 2002		
		2002		Occupancy completed in CY 2002	Into FY 2002			Into FY 2002		
CMR Replacement Project	LANL-03-012	2001	EIS-TBD	Started preconceptual design in 2001				Into FY 2011	Into FY 2003	Into FY 2010
		2002		Design continued in CY 2002	Into FY 2009			Into FY 2011	Into FY 2004	
National Security Sciences Building (formerly SM-43 Replacement)	LANL-03-011	2001	EA-FONSI					Into FY 2006	-	Into FY 2005
	LANL-04-011	2002			Into FY 2005			Into FY 2007	Into FY 2001	
SM-43 D&D	LANL-06-DD-13	2001	CX-TBD							
		2002						[a]		
TA-55 Infrastructure Reinvestment	LANL-04-015	2001	EIS-TBD					Into FY 2007		Into FY 2012
	LANL-05-015	2002				Into FY 2012		Into FY 2012	Into FY 2006	
DX Consolidation	LANL-04-016	2001	CX					Into FY 2005	Into FY 2005	Into FY 2008

Table F-1. RTBF Line Item Projects (continued)

PROJECT					FUNDING CATEGORY					
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	LI	C	TEC	OPC	PE&D	PROPOSED CAPITAL PROJECTS - TEC
DX High Explosives Characterization	LANL-05-016	2002	EA			Into FY 2007		Into FY 2005	Into FY 2005	
Support Services Consolidation	LANL-05-019	2001	CX					Into FY 2005	Into FY 2005	Into FY 2005
	LANL-07-019	2002				Into FY 2007		Into FY 2005		
Radiography Facility	LANL-08-026	2001	EA-TBD					Into FY 2010	Into FY 2008	Into FY 2010
Radiography Facility, TA-55	LANL-08-241	2002				Into FY 2010		Into FY 2010	Into FY 2008	
TA-18 Relocation Project	LANL-02-009	2001	EIS Draft	Started				Into FY 2010	Into FY 2002	Into FY 2010
		2002	EIS-TBD	Continued		Into FY 2007		Into FY 2010	Into FY 2005	
Central Campus Bypass Road	LANL-04-017	2001	EA-TBD	-		I		Into FY 2005	Into FY 2004	Into FY 2007
Rad Liquid Waste Upgrade	LANL-06-021	2001	EA-TBD	-		I		Into FY 2004	Into FY 2006	Into FY 2004
Replacement of Radioactive Liquid Waste Treatment Plant	LANL-07-021	2002				Into FY 2007		Into FY 2005	Into FY 2006	
LANSCE Support Complex	LANL-06-022	2001	EA-TBD	-		I			Into FY 2006	Into FY 2006
Replacement of High Voltage Distribution System for LANSCE Accelerator Complex	LANL-06-022	2002				Into FY 2009		Into FY 2006	Into FY 2006	
Infrastructure Roof Upgrades	LANL-07-023	2001	CX-TBD	-		I		Into FY 2005	-	Into FY 2005
Vulnerable Facility Replacement Program	LANL-07-024	2001	CX-TBD	-		I		Into FY 2007	Into FY 2007	Into FY 2007
LANL Infrastructure Revitalization	LANL-07-025	2001	CX-TBD	-		I		Into FY 2012	Into FY 2007	Into FY 2012
On-Site Generation #1 20MW	LANL-07-027	2001	EA-TBD	-		I		Into FY 2009	Into FY 2008	Into FY 2009

[a] D&D of the existing SM-43 structure is being funded as an OPC cost of the National Security Sciences Building project.

Table F-2. RTBF Operations of Facilities

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY			
NAME	NUMBER				GPE	CAPITAL EQUIPMENT PROJECTS	EXPENSE PROJECTS	GENERAL PLANT PROJECTS
Short Pulse Spallation Source (SPSS) Enhancement	LANL-97-045	2001	CX	Continued		Into FY 2003		
		2002		Continued	Into FY 2002			
Fire Suppression Yard Main Replacement (TA-55)	LANL-97-047	2001	CX	Started			Into FY 2002	
		2002		Completed in CY 2002 except for repaving			Into FY 2003	
Monitoring Well Project (DP)	LANL-98-048	2001	CX	Started			Into FY 2004	
Monitoring Well Project (NA)		2002	CX				Into FY 2012	
TA-15 Electrical Distribution Upgrade	LANL-00-050	2001	CX	Started				Into FY 2002
TA-15 Electrical Infrastructure Upgrades		2002						Into FY 2003
TA-53-62 Cooling Tower Replacement	LANL-00-051	2001	CX					Into FY 2002
		2002		Completed				Into FY 2002
TA-53-64 Cooling Tower	LANL-00-052	2001	CX					Into FY 2002
		2002		Completed				Into FY 2002
Electrical Infrastructure Safety Upgrade (TA-03-40)	LANL-00-053	2001						Into FY 2002
Electrical Infrastructure Upgrade (TA-03-30)	LANL-02-071	2001	CX	-				Into FY 2002
Electrical Infrastructure Upgrade (TA-03-40)	LANL-02-071	2002						Into FY 2004
Electrical Infrastructure Safety Upgrade (TA-48-01)	LANL-00-054	2001	CX	-				Into FY 2003
		2002						Into FY 2004
Electrical Infrastructure Safety Upgrade (TA-46-31)	LANL-00-055	2001	CX	-				Into FY 2003
		2002						Into FY 2004
TA-53 Cooling Tower [a]	LANL-00-DD-03	2002						
WETF Public Address/Intercom System	LANL-01-059	2001	CX	-				Into FY 2001
		2002						Into FY 2002
Water Treatment (TA-03)	LANL-01-060	2001	CX	-				Into FY 2002
Cooling Tower Water Conservation		2002	CX					Into FY 2002

Table F-2. RTBF Operations of Facilities (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY			
NAME	NUMBER				GPE	CAPITAL EQUIPMENT PROJECTS	EXPENSE PROJECTS	GENERAL PLANT PROJECTS
Switch Yard Kicker	LANL-01-046	2001	CX	-		Into FY 2003		
		2002						Into FY 2002
Electrical Infrastructure Safety Upgrade (TA-16-200)	LANL-01-064	2001	CX	-				Into FY 2002
		2002	CX-TBD					Into FY 2002
TA-8 to TA-22 Connector Road	LANL-02-089	2002	CX-TBD					Into FY 2002
ESA-TA-16-200 HVAC and Electrical Upgrades		2001	CX-TBD	-				Into FY 2002
	LANL-02-072	2002						Into FY 2002
TA-21 HIC Move to TA-16-202	LANL-02-090	2001	CX-TBD	-				Into FY 2003
		2002						Into FY2003
TA-16 Site Utilities and Roads	LANL-03-090	2001	EA-TBD	-				Into FY 2003
Roads and Utilities	LA-03-116	2002	CX-TBD					Into FY 2003
WETF 1.6 MVA Generator Installation	LANL-03-092	2001	CX-TBD	-				Into FY 2003
	LANL-02-092	2002						Into FY 2003
ESA-FM Weapons Support Building	LANL-03-093	2001	EA-TBD	-				Into FY 2003
Weapons Plant Support Building	LANL-02-093	2002	EA-TBD					Into FY 2002
FY02 RTBF Funded D&D [b]	LANL-02-DD-05	2002	CX-TBD					Into FY 2002
TSR Implementation	LANL-03-110	2002	CX-TBD				Into FY 2007	Into FY 2007
Security Upgrades/Fencing	LANL-03-109	2002	EA-Prep					Into FY 2003
Fabrication Facility	LANL-04-074	2002	EA-Prep					Into FY 2004
Central Auditorium Building 200	LANL-04-108	2001	CX-TBD	-				Into FY 2004
		2002						Into FY 2004
Lujan Center Neutron Production Target System	LANL-04-120	2001	SWEIS	-				Into FY 2004
		2002						Into FY 2004
Communication Shop Building	LANL-04-121	2001	CX	-				Into FY 2004
	LANL-05-121	2002						Into FY 2005
Vessel Facility 1 of 4	LANL-04-128	2001	CX-TBD	-				Into FY 2004
	LANL-06-128	2002						Into FY 2006
Vessel Facility 2 of 4	LANL-05-143	2001	CX-TBD	-				Into FY 2005
	LANL-07-143	2002						Into FY 2007
Calibration Laboratory	LANL-05-145	2001	EA-Prep	-				Into FY 2005
		2002						Into FY 2005

Table F-2. RTBF Operations of Facilities (continued)

PROJECT NAME	PROJECT NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY: GPE	FUNDING CATEGORY: CAPITAL EQUIPMENT PROJECTS	FUNDING CATEGORY: EXPENSE PROJECTS	FUNDING CATEGORY: GENERAL PLANT PROJECTS
Vessel Facility 3 of 4	LANL-06-152	2001	CX-TBD	-				Into FY 2006
	LANL-08-152	2002						Into FY 2008
Medium/Heavy Lab at TA-22	LANL-06-153	2001	EA-TBD	-				Into FY 2006
	LANL-08-153	2002						Into FY 2008
Vessel Facility 4 of 4	LANL-07-160	2001	CX-TBD	-				Into FY 2007
	LANL-09-160	2002						Into FY 2009
Pajarito Road TA-59 to TA-64 Access and Parking	LANL-07-162	2001	CX-TBD	-				Into FY 2007
Pajarito Road Access Control Stations	LANL-03-068	2002	CX-TBD					Into FY 2003
Replace Machine Shop at TA-22	LANL-08-166	2001	CX-TBD	-				Into FY 2008
	LANL-09-166	2002						Into FY 2009
Move Existing Vessel to TA-22	LANL-08-167	2001	CX-TBD	-				Into FY 2008
	LANL-09-167	2002						Into FY 2009
West Jemez/TA-16 Intersections	LANL-08-169	2001	CX-TBD	-				Into FY 2008
TA-16 Intersection	LANL-02-107	2002	CX					Into FY 2003
Bomb Proof at TA-22	LANL-09-175	2001	CX-TBD	-				Into FY 2009
	LANL-10-175	2002						Into FY 2010
Gas Gun Relocation TA-40 to TA-22	LANL-09-176	2001	CX-TBD	-				Into FY 2009
	LANL-10-176	2002						Into FY 2010
Classified HE Storage	LANL-10-180	2001	CX-TBD	-				Into FY 2010
	LANL-11-180	2002						Into FY 2011
Joint DX/ESA Conference Facility	LANL-10-181	2001	CX-TBD	-				Into FY 2010
	LANL-11-181	2002						Into FY 2011

[a] D&D of the existing TA-53 cooling towers and support buildings is funded within the funded GPPs replacing the towers (900 square feet).
[b] FY02 RTBF funding includes surveillance and maintenance of excess facilities; D&D of facilities in TA-03 and TA-16 with a total of 6,700 square feet.

Table F-3. Facilities and Infrastructure Recapitalization Program (FIRP)

PROJECT					FUNDING CATEGORY					
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	C	OPC	PE&D	EXPENSE PROJECTS	GENERAL PLANT PROJECTS	MAINTENANCE
Vulnerable Office Building Replacement #02-1	LANL-02-075	2001	CX-TBD	-					Into FY 2002	
Vulnerable Office Building Replacement – HSR Clinic		2002		Design and construction began in CY 2002					Into FY 2002	
Vulnerable Office Building Replacement #02-2	LANL-02-076	2001	CX-TBD	-					Into FY 2002	
Vulnerable Office Building Replacement – MST Office Building		2002		Construction began in CY 2002					Into FY 2002	
Vulnerable Office Building Replacement #02-3	LANL-02-077	2001	CX-TBD	-					Into FY 2002	
Vulnerable Office Building Replacement – S3 Office Building		2002		Design and construction began in CY 2002					Into FY 2002	
Vulnerable Office Building Replacement #02-4	LANL-02-078	2001	CX-TBD	-					Into FY 2002	
Vulnerable Office Building Replacement – D Office Building		2002		Construction began in CY 2002					Into FY 2002	
NMT Maintenance	LANL-02-215	2002	CX-TBD							Into FY 2002
FY02 FIRP Funded D&D	LANL-02-DD-06	2002	CX-TBD					Into FY 2002 [a]		
FY03 Planning	LANL-02-216	2002	CX-TBD					Into FY 2002		
Beryllium Technology Facility – Cartridge Filter House Install	LANL-01-063	2001	CX-TBD	-					Into FY 2002	
	LANL-03-063	2002							Into FY 2003	
Electrical Infrastructure Safety Upgrade (TA-3-261)	LANL-02-070	2001	CX	-					Into FY 2003	
	LANL-03-070	2002							Into FY 2003	
TA-08 Division Entrance Project	LANL-02-073	2001	CX	-					Into FY 2003	
	LANL-04-073	2002							Into FY 2005	
LANSCE Chiller Replacement	LANL-02-080	2001	CX	-					Into FY 2002	
	LANL-03-080	2002							Into FY 2004	
Electrical Infrastructure Safety Upgrade (TA-8-21)	LANL-03-082	2001	CX-TBD	-					Into FY 2004	
		2002							Into FY 2003	
Not used	*LANL-01-034*	*2001*								

Table F-3. Facilities and Infrastructure Recapitalization Program (FIRP) (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY					
NAME	NUMBER				C	OPC	PE&D	EXPENSE PROJECTS	GENERAL PLANT PROJECTS	MAINTENANCE
Electrical Infrastructure Safety Upgrade (TA-43-1)	LANL-03-034	2002	CX-TBD						Into FY 2004	
HE Pressing Consolidation (TA-16-260)	LANL-03-081	2002	EA-FONSI						Into FY 2004	
Hydrotest Design Facility	LANL-03-104	2002	CX-TBD						Into FY 2003	
Electrical Infrastructure Safety Upgrade (TA-46-1)	LANL-03-083	2001	CX-TBD	-					Into FY 2004	
	LANL-04-083	2002							Into FY 2004	
Electrical Infrastructure Safety Upgrade (TA-53-2)	LANL-03-084	2001	CX-TBD	-					Into FY 2004	
	LANL-04-084	2002							Into FY 2004	
Electrical Infrastructure Safety Upgrade (TA-59-1)	LANL-03-085	2001	CX-TBD	-					Into FY 2004	
	LANL-04-085	2002							Into FY 2004	
Electrical Infrastructure Safety Upgrade (TA-15-40)	LANL-03-086	2001	CX-TBD	-					Into FY 2004	
	LANL-04-086	2002							Into FY 2004	
Electrical Infrastructure Safety Upgrade (TA-15-183)	LANL-03-087	2001	CX-TBD	-					Into FY 2004	
	LANL-04-087	2002							Into FY 2004	
TA-9-38, 40, 42, 46 Steam to Hot Water Heating Conversion	LANL-03-088	2001	CX-TBD	-					Into FY 2003	
	LANL-04-088	2002							Into FY 2004	
Advanced Manufacturing Offices	LANL-04-098	2002	CX-TBD						Into FY 2004	
ESA-FM Office Building	LANL-04-099	2002	CX-TBD						Into FY 2004	
TA-48 Rad Liquid Waste Line Replacement	LANL-03-094	2001	CX-TBD	-					Into FY 2003	
	LANL-05-094	2002							Into FY 2005	
Electrical Infrastructure Safety Upgrade (TA-3-32)	LANL-04-100	2001	CX-TBD	-					Into FY 2005	
	LANL-05-100	2002							Into FY 2005	
Electrical Infrastructure Safety Upgrade (TA-35-2)	LANL-04-101	2001	CX-TBD	-					Into FY 2005	
	LANL-05-101	2002							Into FY 2005	
Electrical Infrastructure Safety Upgrade (TA-35-27)	LANL-04-102	2001	CX-TBD	-					Into FY 2005	
	LANL-05-102	2002							Into FY 2005	
Electrical Infrastructure Safety Upgrade (TA-33-114)	LANL-04-103	2001	CX-TBD	-					Into FY 2005	
	LANL-05-103	2002							Into FY 2005	
Electrical Infrastructure Safety Upgrade (TA-39-2)	LANL-05-135	2002	CX-TBD						Into FY 2005	
Electrical Infrastructure Safety Upgrade (TA-46-30)	LANL-05-136	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY 2005	

Table F-3. Facilities and Infrastructure Recapitalization Program (FIRP) (continued)

PROJECT					FUNDING CATEGORY					
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	C	OPC	PE&D	EXPENSE PROJECTS	GENERAL PLANT PROJECTS	MAINTENANCE
Vulnerable Office Building Replacement #04-1	LANL-04-104	2001	CX-TBD	-					Into FY 2004	
	LANL-04-105	2002							Into FY 2004	
Vulnerable Office Building Replacement #04-2	LANL-04-105	2001	CX-TBD	-					Into FY 2004	
	LANL-04-106	2002							Into FY 2004	
Vulnerable Office Building Replacement #04-3	LANL-04-106	2001	CX-TBD	-					Into FY 2004	
Shock and Vibration Laboratory	LANL-04-111	2001	EA-Prep	-					Into FY 2004	
	LANL-03-111	2002	EA-FONSI						Into FY 2003	
FWO Office Building	LANL-03-079	2002	CX-TBD						Into FY 2003	
CCF Electrical Upgrades	LANL-03-057	2002	CX-TBD						Into FY 2003	
HVAC Upgrades to North Wing of TA-43-1	LANL-03-058	2002	CX-TBD						Into FY 2003	
TA-46-24 Roof Replacement	LANL-03-061	2002	CX-TBD						Into FY 2003	
Roofing Assessment	LANL-03-053	2002	CX-TBD						Into FY 2003	
Safety/Infrastructure GPPs	LANL-03-217	2002	CX-TBD						Into FY 2003	
FY03 FIRP Funded D&D	LANL-03-DD-08	2001	CX-TBD	-				Into FY 2003 [b]		
		2002						Into FY 2003 [c]		
FY04 Planning	LANL-03-063	2002	N/A					Into FY 2003		
TA-16-450 Gas Transfer System	LANL-04-112	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY 2005	
Reconfigure TA-39-98, Close TA-39-2, 39-103, 39-07	LANL-04-113	2001	CX-TBD	-					Into FY 2004	
		2002							Into FY 2004	
TA-53 Replace Roofs	LANL-04-118	2001	CX	-					Into FY 2004	
		2002							Into FY 2004	
TA-35 TSL-189 Trident Laser HVAC Upgrades	LANL-05-119	2001	CX	-					Into FY 2004	
		2002							Into FY 2005	
Convert Heating System and Upgrade Controls at TA-48-RC1	LANL-04-124	2001	CX-TBD	-					Into FY 2004	
	LANL-05-124	2002							Into FY 2005	
HVAC/Electrical Upgrade, MPF-6	LANL-04-125	2001	CX-TBD	-					Into FY 2004	
	LANL-05-125	2002							Into FY 2005	
Otowi Floor Replacement/Upgrades	LANL-04-126	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY 2005	
Electronics/Data Systems Building	LANL-04-127	2001	CX-TBD	-					Into FY 2004	
	LANL-05-127	2002							Into FY 2005	

Table F-3. Facilities and Infrastructure Recapitalization Program (FIRP) (continued)

PROJECT					FUNDING CATEGORY					
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	C	OPC	PE&D	EXPENSE PROJECTS	GENERAL PLANT PROJECTS	MAINTENANCE
Firing Site Consolidation	LANL-04-129	2001	CX-TBD	-					Into FY 2004	
	LANL-05-129	2002							Into FY 2005	
Building 193 Reconfiguration	LANL-04-130	2001	EA-Prep	-					Into FY 2005	
		2002	EA-FONSI						Into FY 2005	
Electrical Infrastructure Safety Upgrades (TA-9-45)	LANL-05-095	2002	CX-TBD						Into FY 2005	
GTS SLEP Support Building	LANL-04-132	2001	EA-Prep	-					Into FY 2005	
		2002							Into FY 2005	
FY04 FIRP Funded D&D	LANL-04-DD-10	2002	CX-TBD					Into FY 2004[d]		
FY05 Planning	LANL-04-218	2002	N/A					Into FY 2004		
Electrical Infrastructure Safety Upgrade (TA-9-35)	LANL-05-137	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY 2005	
Electrical Infrastructure Safety Upgrade (TA-3-39)	LANL-05-138	2001	CX-TBD	-					Into FY 2006	
		2002							Into FY 2006	
Electrical Infrastructure Safety Upgrade (TA-3-102)	LANL-05-139	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY2005	
Vulnerable Office Building Replacement #05-1	LANL-05-140	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY 2005	
Vulnerable Office Building Replacement #05-2	LANL-05-141	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY 2005	
Vulnerable Office Building Replacement #05-3	LANL-05-142	2001	CX-TBD	-					Into FY 2005	
		2002							Into FY 2005	
Safety/Infrastructure GPPs	LANL-05-219	2002	CX-TBD						Into FY 2005	
FY05 FIRP Funded D&D	LANL-05-DD-12	2002	CX-TBD					Into FY 2005[e]		
FY06 Planning	LANL-05-220	2002	CX-TBD					Into FY 2005		
Power Grid Infrastructure Upgrade [f]	LANL-06-020	2001	EA-FONSI			Into FY 2005	-			
		2002			Into FY 2007	Into FY 2005				
Electrical Infrastructure Safety Upgrade (TA-9-21)	LANL-06-148	2001	CX-TBD	-					Into FY 2006	
		2002							Into FY 2006	
Vulnerable Office Building Replacement #06-1	LANL-06-149	2001	CX-TBD	-					Into FY 2006	
		2002							Into FY 2006	
Vulnerable Office Building Replacement #06-2	LANL-06-150	2001	CX-TBD	-					Into FY 2006	
		2002							Into FY 2006	

Table F-3. Facilities and Infrastructure Recapitalization Program (FIRP) (continued)

PROJECT					FUNDING CATEGORY					
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	C	OPC	PE&D	EXPENSE PROJECTS	GENERAL PLANT PROJECTS	MAINTENANCE
Vulnerable Office Building Replacement #06-3	LANL-06-151	2001	CX-TBD	-					Into FY 2006	
		2002							Into FY 2006	
Safety/Infrastructure GPPs	LANL-06-221	2002	CX-TBD						Into FY 2006	
FY06 FIRP Funded D&D	LANL-06-DD-15	2002	CX-TBD					Into FY 2006 [g]		
FY07 Planning	LANL-06-222	2002	CX-TBD					Into FY 2006		
Infrastructure Roof Upgrades	LANL-07-023	2002	CX-TBD		Into FY 2012	Into FY 2005	Into FY 2007			
LANL Infrastructure Revitalization	LANL-07-025	2002	CX-TBD		Into FY 2010	Into FY 2012	Into FY 2007			
Vulnerable Office Building Replacement #07-1	LANL-07-157	2001	CX-TBD	-					Into FY 2007	
		2002							Into FY 2007	
Vulnerable Office Building Replacement #07-2	LANL-07-158	2001	CX-TBD	-					Into FY 2007	
		2002							Into FY 2007	
Vulnerable Office Building Replacement #07-3	LANL-07-159	2001	CX-TBD	-					Into FY 2007	
		2002							Into FY 2007	
Safety/Infrastructure GPPs	LANL-07-223	2002	CX-TBD						Into FY 2007	
FY07 FIRP Funded D&D	LANL-07-224	2002	CX-TBD					Into FY 2007 [h]		
FY08 Planning	LANL-07-225	2002	CX-TBD					Into FY 2007		
Vulnerable Facility Replacement Program	LANL-08-024	2002	CX-TBD		Into FY 2010	Into FY 2010	Into FY 2008			
Vulnerable Office Building Replacement #08-1	LANL-08-163	2001	CX-TBD	-					Into FY 2008	
		2002							Into FY 2008	
Vulnerable Office Building Replacement #08-2	LANL-08-164	2001	CX-TBD	-					Into FY 2008	
		2002							Into FY 2008	
Vulnerable Office Building Replacement #08-3	LANL-08-165	2001	CX-TBD	-					Into FY 2008	
		2002							Into FY 2008	
Safety/Infrastructure GPPs	LANL-08-226	2002	CX-TBD						Into FY 2008	
FY08 FIRP Funded D&D	LANL-08-227	2002	CX-TBD					Into FY 2008 [i]		
FY09 Planning	LANL-08-228	2002	CX-TBD					Into FY 2008		
Vulnerable Office Building Replacement #09-1	LANL-09-172	2001	CX-TBD	-					Into FY 2009	
		2002							Into FY 2009	
Vulnerable Office Building Replacement #09-2	LANL-09-173	2001	CX-TBD	-					Into FY 2009	
		2002							Into FY 2009	

Table F-3. Facilities and Infrastructure Recapitalization Program (FIRP) (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY					
NAME	NUMBER				C	OPC	PE&D	EXPENSE PROJECTS	GENERAL PLANT PROJECTS	MAINTENANCE
Vulnerable Office Building Replacement #09-3	LANL-09-174	2001	CX-TBD	-					Into FY 2009	
		2002							Into FY 2009	
Safety/Infrastructure GPPs	LANL-09-229	2002	CX-TBD						Into FY 2009	
FY09 FIRP Funded D&D	LANL-09-230	2002	CX-TBD					Into FY 2009 [j]		
FY10 Planning	LANL-08-231	2002	CX-TBD					Into FY 2009		
Vulnerable Office Building Replacement #10-1	LANL-10-178	2001	CX-TBD	-					Into FY 2010	
		2002							Into FY 2010	
Vulnerable Office Building Replacement #10-2	LANL-10-179	2001	CX-TBD	-					Into FY 2010	
		2002							Into FY 2010	
Safety/Infrastructure GPPs	LANL-10-232	2002	CX-TBD						Into FY 2010	
FY10 FIRP Funded D&D	LANL-10-233	2002	CX-TBD					Into FY 2010 [k]		
FY11 Planning	LANL-10-234	2002	CX-TBD					Into FY 2010		
Safety/Infrastructure GPPs	LANL-11-235	2002	CX-TBD						Into FY 2011	
FY11 FIRP Funded D&D	LANL-11-236	2002	CX-TBD					Into FY 2011 [l]		
FY12 Planning	LANL-11-237	2002	CX-TBD					Into FY 2011		
Safety/Infrastructure GPPs	LANL-12-238	2002	CX-TBD						Into FY 2012	
FY12 FIRP Funded D&D	LANL-12-239	2002	CX-TBD					Into FY 2012 [m]		
FY13 Planning	LANL-12-240	2002	CX-TBD					Into FY 2012		

[a] FY02 F&I funding is planned for D&D of TA-3 and TA-16 facilities with a total of 76,800 square feet.
[b] Identified as D&D in FY 2002 TYCSP.
[c] FY03 F&I funding is planned for the D&D of facilities at TA-16 and TA-3 with a total of 119,500 square feet.
[d] FY04 F&I funding is planned for the D&D of facilities at TA-3, TA-6, TA-16, TA-21 and TA-69 with a total of 81,100 square feet.
[e] FY05 F&I funding for the D&D of structures to be prioritized in FY03.
[f] Identified as proposed in 2001 TYCSP with proposal including TEC funding.
[g] FY06 F&I funding for the D&D of structures to be prioritized in FY04.
[h] FY07 F&I funding for the D&D of structures to be prioritized in FY05.
[i] FY08 F&I funding for the D&D of structures to be prioritized in FY06.
[j] FY09 F&I funding for the D&D of structures to be prioritized in FY07.
[k] FY10 F&I funding for the D&D of structures to be prioritized in FY08.
[l] FY11 F&I funding for the D&D of structures to be prioritized in FY09.
[m] FY12 F&I funding for the D&D of structures to be prioritized in FY10.

Table F-4. Non-RTBF and Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Line Item and Proposed Capital Projects

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY							
					EXISTING LINE ITEMS		PROPOSED CAPITAL PROJECTS			CERRO GRANDE REHABILITATION LINE ITEMS		
NAME	NUMBER				TEC	OPC	PE&D	TEC	OPC	TEC	OPC	GPP
Spallation Neutron Source Line Accelerator	LANL-99-004	2001	EA-TBD	-	-	-						
		2002	N/A		-	-						
NMSSUP, Phase I	LANL-99-005	2001	CX	Started	Into FY 2005	Into FY 2006						
		2002			Into FY 2003	Into FY 2006						
TA-53 Isotope Production Facility	LANL-99-006	2001	EA-CX	Started	Into FY 2002	Into FY 2003						
		2002	CX		Into FY 2002	Into FY 2003						
NISC	LANL-00-008	2001	EA-FONSI	Started	Into FY 2003	Into FY 2004						
		2002		Construction continued in CY 2002	Into FY 2002	Into FY 2004						
Los Alamos CINT Gateway	LANL-02-010	2001	EA-TBD	-			Into FY 2002	Into FY 2004	Into FY 2005			
		2002	CX				Into FY 2003	Into FY 2005	Into FY 2006			
Fuel Cell Facility	LANL-03-013	2001	EA-TBD	-		-		Into FY 2004	Into FY 2002			
		2002					-	Into FY 2004	Into FY 2002			
Bypass Roads	LANL-04-017	2002	EA-TBD				-	Into FY 2006	Into FY 2006			
NMSSUP Phase 2a	LANL-04-014	2001	CX	-		-		Into FY 2006	Into FY 2007			
	LANL-05-014	2002					-	Into FY 2007	Into FY 2004			

Table F-4. Non-RTBF and Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Line Item and Proposed Capital Projects (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY							
					EXISTING LINE ITEMS		PROPOSED CAPITAL PROJECTS			CERRO GRANDE REHABILITATION LINE ITEMS		
NAME	NUMBER				TEC	OPC	PE&D	TEC	OPC	TEC	OPC	GPP
Advanced Hydrotest Facility	LANL-05-018	2001	EIS-TBD	-			Into FY 2007	Into FY 2010				
		2002					Into FY 2007	Into FY 2010	Into FY 2010			
DARHT (BCP)	LANL-01-028	2001	EIS-ROD	Started						Into FY 2001	-	
		2002								-	-	
Emergency Operations Center		2001	EA-FONSI							Into FY 2001	Into FY 2001	
	LANL-01-029	2002		Construction started in CY 2002						-	-	
Office Building Replacement Project for Vulnerable Facilities (TA-46/TA-16)	LANL-01-030	2001	CX	Started						Into FY 2001	Into FY 2001	
		2002								-	-	
Site-wide Fire Alarm Replacement	LANL-01-031	2001	CX	Started						Into FY 2001	Into FY 2001	
		2002								-	-	
Multi-Channel Communication System	LANL-01-032	2001	EA-FONSI	Started						Into FY 2001	Into FY 2001	
		2002								-	Into FY 2002	
TA-50/54 Waste Management Risk Mitigation	LANL-01-033	2001	CX	Started						Into FY 2001	Into FY 2001	
		2002								Into FY 2002	Into FY 2002	
TA-41 GTS Relocation to S-Site	LANL-01-035	2001	CX	Started								Into FY 2001
		2002										-
Water SCADA	LANL-01-036	2001	CX	Started								Into FY 2002
		2002										Into FY 2002

Table F-4. Non-RTBF and Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Line Item and Proposed Capital Projects (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY							
					EXISTING LINE ITEMS		PROPOSED CAPITAL PROJECTS			CERRO GRANDE REHABILITATION LINE ITEMS		
NAME	NUMBER				TEC	OPC	PE&D	TEC	OPC	TEC	OPC	GPP
Emergency Generator and Motor Control Center	LANL-01-037	2001	EA-FONSI	Started								Into FY 2002
		2002		Design and acquisition in process in CY 2002								Into FY 2002
Pajarito Road Gas Line	LANL-01-038	2001	CX	Started								Into FY 2002
		2002										Into FY 2002
WTA Substation	LANL-01-039	2001	EA-FONSI	Started								Into FY 2001
		2002										-
Building 202 Upgrade	LANL-01-040	2001	EA-Draft	-								Into FY 2001
		2002										-
Well-Head Protection	LANL-01-041	2001	CX	-								Into FY 2001
		2002										-
Internal Connectivity	LANL-01-042	2001	CX	-								Into 2001
		2002	EA-FONSI									-
Replacement of Destroyed/Damaged Program Equipment	LANL-01-043	2001	CX	Started								Into FY 2001
		2002										-
High Activity Waste Storage Facility	LANL-01-044	2001	CX	-								Into FY 2001
		2002										-

Table F-5. Non-RTBF Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Expense, General Plant, Institutional General Plant, and Institutional Projects

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY			
NAME	NUMBER				EXPENSE PROJECTS	GENERAL PLANT PROJECTS	INSTITUTIONAL GENERAL PLANT PROJECTS	INSTITUTIONAL
Monitoring Well Project (ER)	LANL-98-049	2001	CX	Started	Into FY 2004			
		2002			Into FY 2004			
PTLA Live Fire House	LANL-01-062	2001	CX	-		Into FY 2001		
		2002		Construction started in CY 2002	Into FY 2002			
High Power Detonator Facility	LANL-01-056	2001	SWEIS	-		Into FY 2002		
		2002				Into FY 2002		
Bioscience Level 3 Laboratory	LANL-02-065	2001	EA-Prep	-		Into FY 2002		
		2002	EA-FONSI	Construction started in CY 2002		Into FY 2002		
TA-55 Unclassified Office Building	LANL-02-066	2001	CX			Into FY 2002		
Manufacturing Technical Support Facility		2002		Construction started in CY 2002		Into FY 2002		
OLASO Office Building	LANL-02-067	2001	CX	-		Into FY 2002		
		2002				-		
TA-16 Site Utilities and Roads	LANL-03-091	2001	EA-TBD	-		Into FY 2003		
	LANL-02-091	2002				Into FY 2003		
TA-15 Firing Sites Support Facility	LANL-03-096	2001	CX-TBD	-		Into FY 2003		
Firing Point Beryllium Mitigation, TA-15-312		2002	CX-TBD			Into FY 2003		
Stockpile Support Building	LANL-03-114	2002	CX-TBD			Into FY 2003		
Homeland Security Building	LANL-03-131	2002	CX-TBD			Into FY 2003		
DX Transition Office Building	LANL-03-242	2002	CX-TBD			Into FY 2003		
TA-50-37 RAMROD Upgrade for Act. Chem.	LANL-04-115	2001	CX-TBD	-		Into FY 2004		
		2002				Into FY 2004		
TA-03-1698 Offices above Microscope Labs	LA-04-117	2001	CX	-		Into FY 2004		
		2002				Into FY 2004		
Royal Crest Intersection Improvements	LANL-04-122	2001	CX	-		Into FY 2004		
		2002			Into FY 2004			

Table F-5. Non-RTBF Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Expense, General Plant, Institutional General Plant, and Institutional Projects (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY			
NAME	NUMBER				EXPENSE PROJECTS	GENERAL PLANT PROJECTS	INSTITUTIONAL GENERAL PLANT PROJECTS	INSTITUTIONAL
TA-64 HAZMAT Vehicle Entrance	LANL-04-123	2001	CX-TBD	-		Into FY 2004		
		2002			Into FY 2004			
East Jemez Upgrade (Landfill to Royal Crest)	LANL-04-133	2001	CX-TBD	-	Into FY 2004			
		2002			Into FY 2004			
Parking Structure	LANL-04-134	2001	CX-TBD	-	Into FY 2004			
		2002			Into FY 2004			
New TA-51/54 Intersection	LANL-05-146	2001	CX-TBD			Into FY 2005		
		2002				Into FY 2005		
Anchor Ranch Road South	LANL-05-147	2001	CX-TBD			Into FY 2005		
		2002				Into FY 2005		
Anchor Road North	LANL-06-154	2001	CX-TBD			Into FY 2006		
		2002				Into FY 2006		
West Jemez from Casa Grande to West Road	LANL-06-155	2001	CX-TBD			Into FY 2006		
		2002				Into FY 2006		
Widen Pajarito Road TA-18 to TA-54	LANL-06-156	2001	EA-TBD			Into FY 2006		
		2002				Into FY 2006		
Pistol Range Intersection	LANL-07-161	2001	CX-TBD			Into FY 2007		
		2002				Into FY 2007		
Pajarito Road TA-59 to TA-64 Access and Parking	LANL-07-162	2002	CX-TBD			Into FY 2007		
Upgrade Eniwetok to Sigma Mesa	LANL-08-168	2001	CX-TBD			Into FY 2008		
		2002				Into FY 2008		
West Jemez/TA-16 Intersection	LANL-08-169	2002	CX-TBD			Into FY 2008		
TA-53 Sidewalks	LANL-08-170	2001	CX-TBD	-		Into FY 2008		
		2002				Into FY 2008		
Upgrade Guardrails	LANL-08-171	2001	CX-TBD	-		Into FY 2008		
		2002				Into FY 2008		
TA-18 Intersection	LANL-09-177	2001	CX-TBD	-		Into FY 2009		
		2002				Into FY 2009		
West Jemez Overpass at TA-3	LANL-10-182	2001	CX-TBD	-		Into FY 2010		
		2002				Into FY 2010		

Table F-5. Non-RTBF Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Expense, General Plant, Institutional General Plant, and Institutional Projects (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY			
NAME	NUMBER				EXPENSE PROJECTS	GENERAL PLANT PROJECTS	INSTITUTIONAL GENERAL PLANT PROJECTS	INSTITUTIONAL
Badge Office	LANL-02-069	2001	CX			Into FY 2002		
	TBD	2002	CX-TBD			-		
BUS-4 Office Building	TBD	2002	CX-TBD			-		
Distribution Center	LANL-03-144	2002	CX-TBD				Into FY 2003	
Parking Structure	LANL-03-243	2002	CX-TBD				Into FY 2003	
TA-3 Steam Condensate Lines	LANL-00-183	2001	CX	Started				Into FY 2012
		2002						Into FY 2012
Flue Gas Recirculation Ductwork	LANL-00-184	2001	CX	-				Into FY 2003
		2002						Into FY 2003
Replace Broken Sewer Lines	LANL-01-185	2001	CX	-				Into FY 2005
		2002						Into FY 2005
Correct Cross Connectors	LANL-01-186	2001	CX	-				Into FY 2012
		2002						Into FY 2012
PP-Plant Condensate Return Piping	LANL-01-187	2001	CX	-				Into FY 2003
		2002						Into FY 2003
Replace Old 13.8 kV Switchgears	LANL-02-188	2001	CX-TBD	-				Into FY 2009
		2002						Into FY 2009
Replace 115kv Oil Circuit Breaker	LANL-02-189	2001	CX-TBD	-				Into FY 2009
		2002						Into FY 2009
PP – Steam Piping Replacement	LANL-02-190	2001	CX-TBD	-				Into FY 2002
		2002						Into FY 2002
PP – Feed Water Piping	LANL-03-191	2001	CX-TBD	-				Into FY 2004
		2002						Into FY 2003
White Rock 115 kV Ring Bus	LANL-04-192	2001	CX-TBD	-				Into FY 2004
		2002						Into FY 2004
115 kV Transmission System Protection	LANL-04-193	2001	CX-TBD	-				Into FY 2004
		2002						Into FY 2004
Add third 115 kV Transformer TA-53	LANL-05-194	2001	CX-TBD	-				Into FY 2005
		2002						Into FY 2005
Replace 13.8 kV Cable	LANL-05-195	2001	CX-TBD	-				Into FY 2009
		2002						Into FY 2009
TA-53 Substation 115 kV Ring Bus Upgrade	LANL-06-196	2001	CX-TBD	-				Into FY 2006
		2002						Into FY 2006

Table F-5. Non-RTBF Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Expense, General Plant, Institutional General Plant, and Institutional Projects (continued)

PROJECT					FUNDING CATEGORY			
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	EXPENSE PROJECTS	GENERAL PLANT PROJECTS	INSTITUTIONAL GENERAL PLANT PROJECTS	INSTITUTIONAL
Replace TA-53 (2) 115 kV Transformers	LANL-07-197	2001	CX-TBD	-				Into FY 2008
		2002						Into FY 2008
Uncross NL and RL 115 kV Lines	LANL-07-198	2001	CX-TBD	-				Into FY 2010
		2002						Into FY 2007
PP – Cooling Tower Piping Replacement	LANL-10-199	2001	CX-TBD	-				Into FY 2010
		2002						Into FY 2010
Reconductor Norton Line	LANL-11-200	2001	CX-TBD	-				Into FY 2011
		2002						Into FY 2011
TA-3 South Sewer Relief Project	LANL-02-201	2001	CX-TBD	-				Into FY 2002
		2002						Into FY 2002
Express Feeder	LANL-02-202	2001	CX-TBD	-				Into FY 2002
		2002						Into FY 2002
New Border Station-East Jemez Road	LANL-02-203	2001	CX-TBD	-				Into FY 2002
		2002						Into FY 2002
90 MVAR SVC Capacitor	LANL-03-204	2001	CX-TBD	-				Into FY 2004
		2002						Into FY 2004
LAC Sewer Project	LANL-03-205	2001	EA-TBD	-				Into FY 2003
		2002	CX-TBD					Into FY 2003
Add Third 115 kV Transformer TA-3	LANL-05-206	2001	CX-TBD	-				Into FY 2005
		2002						Into FY 2005
TA-3/58 Gravity Line	LANL-05-207	2001	CX-TBD	-				Into FY 2005
		2002						Into FY 2005
345 kV Ring Bus Norton	LANL-06-208	2001	CX-TBD	-				Into FY 2007
		2002						Into FY 2007
100 psi Natural Gas Lines, TA-3	LANL-07-209	2001	CX-TBD	-				Into FY 2008
		2002						Into FY 2008
Add Second 115 kV Transformer TA-5 (ETA)	LANL-07-210	2002	CX-TBD					Into FY 2007
TA-70 115/13.8 kV Substation	LANL-08-211	2001	CX-TBD	-				Into FY 2008
		2002						Into FY 2008
TA-70 345/115 kV Substation	LANL-09-212	2001	CX-TBD	-				Into FY 2009
		2002						Into FY 2009

Table F-5. Non-RTBF Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Expense, General Plant, Institutional General Plant, and Institutional Projects (continued)

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY			
NAME	NUMBER				EXPENSE PROJECTS	GENERAL PLANT PROJECTS	INSTITUTIONAL GENERAL PLANT PROJECTS	INSTITUTIONAL
TA-3 Power Plant Backpressure Turbine	LANL-09-213	2001	CX-TBD	-				Into FY 2009
		2002						Into FY 2009
100 psi Natural Gas Lines, TA-16	LANL-11-214	2001	CX-TBD	-				Into FY 2012
		2002						Into FY 2012

Table F-6. Non-RTBF Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Maintenance, Standby Facility, Decommissioning and Demolition, and Facilities Management and Site Planning Projects

PROJECT					FUNDING CATEGORY			
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	MAINTENANCE	STANDBY FACILITY[a]	DECOMMISSIONING AND DEMOLITION	FACILITIES MANAGEMENT AND SITE PLANNING
F&I Initiatives Maintenance		2001	-	-	Into FY 2004			
		2002			Into FY 2004			
Preventive Maintenance – included in General Maintenance		2001						
		2002						
Predictive Maintenance – included in General Maintenance		2001						
		2002						
Corrective Maintenance – included in General Maintenance		2001						
		2002						
Maintenance Management - included in General Maintenance		2001						
		2002						
General Maintenance		2001	-	-	Into FY 2012			
		2002			Into FY 2012			
NISC Funded Decommissioning and Demolition	LANL-00-DD-04	2002	EA-FONSI				[b]	
TSTA	LANL-TBD-DD-16	2001	CX-TBD	-			Into FY 2003	
		2002					[c]	
DP-West and Ion Beam Facility	LANL-TBD-DD-17	2001	CX-TBD	-			Into FY 2003	
		2002					[d]	
TSFF		2001	CX-TBD	-	-			
	LANL-TBD-DD-18	2002					[e]	

Table F-6. Non-RTBF Non-Facilities and Infrastructure Recapitalization Program (FIRP) Facilities and Infrastructure – Maintenance, Standby Facility, Decommissioning and Demolition, and Facilities Management and Site Planning Projects (continued)

PROJECT					FUNDING CATEGORY			
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	MAINTENANCE	STANDBY FACILITY[a]	DECOMMISSIONING AND DEMOLITION	FACILITIES MANAGEMENT AND SITE PLANNING
Engineering		2001	-					Into FY 2012
		2002						Into FY 2012
Rental of Buildings and Land		2001	-					Into FY 2012
		2002						Into FY 2012
Facility Startup and Project Support		2001	-					-
		2002						
Other		2001	-					-
		2002						Into FY 2012
Utilities		2001	-					Into FY 2012
		2002						Into FY 2012
Ten Year Site Plans (All of Site Planning)		2001	-					Into FY 2012
		2002						Into FY 2012

[a] Not applicable for LANL.
[b] The NISC Line Item Project includes funding to remove 21 trailers/transportables with a total of 18,585 square feet.
[c] Transfer of the 16,350 square foot TSTA Facility from the Offices of Science to EM is currently being negotiated. The schedule for decommissioning and demolition is unknown.
[d] Transfer of the Ion Beam Facility (TA-3-16) and DP West at TA-21 from DP to EM is currently being negotiated. The schedule for decommissioning and demolition is unknown.
[e] Transfer of the 48,452 square foot TSFF Facility at TA-21 from DP to EM is anticipated to be proposed for FY 2004. The schedule for decommissioning and demolition is unknown.

Table F-7. Other General Plant Projects in 2001 TYCSP

PROJECT		DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	FUNDING CATEGORY
NAME	NUMBER				GENERAL PLANT PROJECTS
TSE Office Building	LANL-01-058	2001	CX	Completed	Into FY 2001
Site Prep for ASCI30T Initial and Phase I Installs	LANL-01-057	2001	EA-FONSI	-	Into FY 2001
TA-16-202 Room 107 Modifications	LANL-01-061	2001	CX	-	Into FY 2001
TA-03 Gateway Infrastructure	LANL-02-068	2001	CX-TBD	-	Into FY 2002
MX Cold Shop	LANL-02-074	2001	EA-Prep	-	Into FY 2002
Vulnerable Office Building Replacement #02-5	LANL-02-079	2001	CX-TBD	-	Into FY 2002
Building 260 Reconfiguration	LANL-02-081	2001	CX-TBD	-	Into FY 2002
Upgrade R Site Road (Access Safety Improvement)	LANL-03-089	2001	CX-TBD	-	Into FY 2003
TA-46 Air Exhaust System	LANL-03-095	2001	CX-TBD	-	Into FY 2003
DP-20 Safety/Infrastructure GPPs	LANL-03-097	2001	CX-TBD	-	Into FY 2003
DP-10 Safety/Infrastructure GPPs	LANL-03-098	2001	CX-TBD	-	Into FY 2003
Sigma GPP	LANL-03-099	2001	CX-TBD	-	Into FY 2003
WETF Systems Refurbishment	LANL-04-107	2001	CX-TBD	-	Into FY 2005
ESA Landscaping	LANL-04-109	2001	EA-Prep	-	Into FY 2004
Relocate JNETF and R&R NDE	LANL-04-110	2001	EA-Prep	-	Into FY 2005
SM-66 Electroplating Labs Renovation	LANL-04-114	2001	CX	-	Into FY 2004
TA-16 Security Upgrade	LANL-04-116	2001	CX-TBD	-	Into FY 2004
Hot Shop	LANL-04-131	2001	EA-Prep	-	Into FY 2004
Water Processing PMR/TCAP	LANL-05-144	2001	CX-TBD	-	Into FY 2006

Table F-8. Summary of Decommissioning and Demolition Projects

PROJECT					FUNDING CATEGORY		
NAME	NUMBER	DATA FROM TYCSP	NEPA	CONSTRUCTION STATUS	DECOMMISSIONING AND DEMOLITION CHARGES	PARTIAL D&D TRANSFER OF RESPONSIBILITY TO EM	FACILITIES MANAGEMENT & SITE PLANNING
Cerro Grande Rehabilitation Project	LANL-01-DD-01	2001	CX	Started	Into FY 2001		
Sherwood Building and Adjacent Structures	LANL-01-DD-02	2001	CX	Started	Into FY 2001		
TA-53 Cooling Towers	LANL-00-DD-03	2001	CX	-	-		
NISC Funded D&D	LANL-00-DD-04	2001	EA-FONSI	-	-		
		2002					
FY 02 RTBF Funded D&D	LANL-02-DD-05	2001	CX-TBD	-	Into FY 2002		
		2002			Into FY 2002		
FY 02 F&I Funded D&D	LANL-02-DD-06	2001	CX-TBD	-	Into FY 2002		
FY 02 FIRP Funded D&D		2002			Into FY 2002		
FY 03 RTBF Funded D&D	LANL-02-DD-07	2001	CX-TBD	-	Into FY 2003		
FY 03 F&I Funded D&D	LANL-03-DD-08	2001	CX-TBD	-	Into FY 2003		
FY 03 FIRP Funded D&D		2002			Into FY 2003		
FY 04 RTBF Funded D&D	LANL-04-DD-09	2001	CX-TBD	-	Into FY 2004		
FY 04 F&I Funded D&D	LANL-04-DD-10	2001	CX-TBD	-	Into FY 2004		
FY 04 FIRP Funded D&D		2002			Into FY 2004		
FY 05 RTBF Funded D&D	LANL-05-DD-11	2001	CX-TBD	-	Into FY 2005		
FY 05 F&I Funded D&D	LANL-05-DD-12	2001	CX-TBD	-	Into FY 2005		
FY 05 FIRP Funded D&D		2002			Into FY 2005		
SM-43 D&D	LANL-06-DD-13	2001	CX-TBD	-	-		
FY 06 RTBF Funded D&D	LANL-06-DD-14	2001	CX-TBD	-	Into FY 2006		
FY 06 F&I Funded D&D	LANL-06-DD-15	2001	CX-TBD	-	Into FY 2006		
FY 06 FIRP Funded D&D		2002			Into FY 2006		
TSTA	LANL-TBD-DD-16	2001	CX-TBD		Into FY 2003		
		2002				-	
DP-West and Ion Beam Facility	LANL-TBD-DD-17	2001	CX-TBD		Into FY 2003		
		2002				-	
TSFF	LANL-TBD-DD-18	2001	CX-TBD	-	-		
FY 07 FIRP Funded D&D	LANL-07-224	2002	CX-TBD		Into FY 2007		
FY 08 FIRP Funded D&D	LANL-08-227	2002	CX-TBD		Into FY 2008		
FY 09 FIRP Funded D&D	LANL-09-230	2002	CX-TBD		Into FY 2009		
FY 10 FIRP Funded D&D	LANL-10-233	2002	CX-TBD		Into FY 2010		
FY 11 FIRP Funded D&D	LANL-11-236	2002	CX-TBD		Into FY 2011		
FY 12 FIRP Funded D&D	LANL-12-239	2002	CX-TBD		Into FY 2012		

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