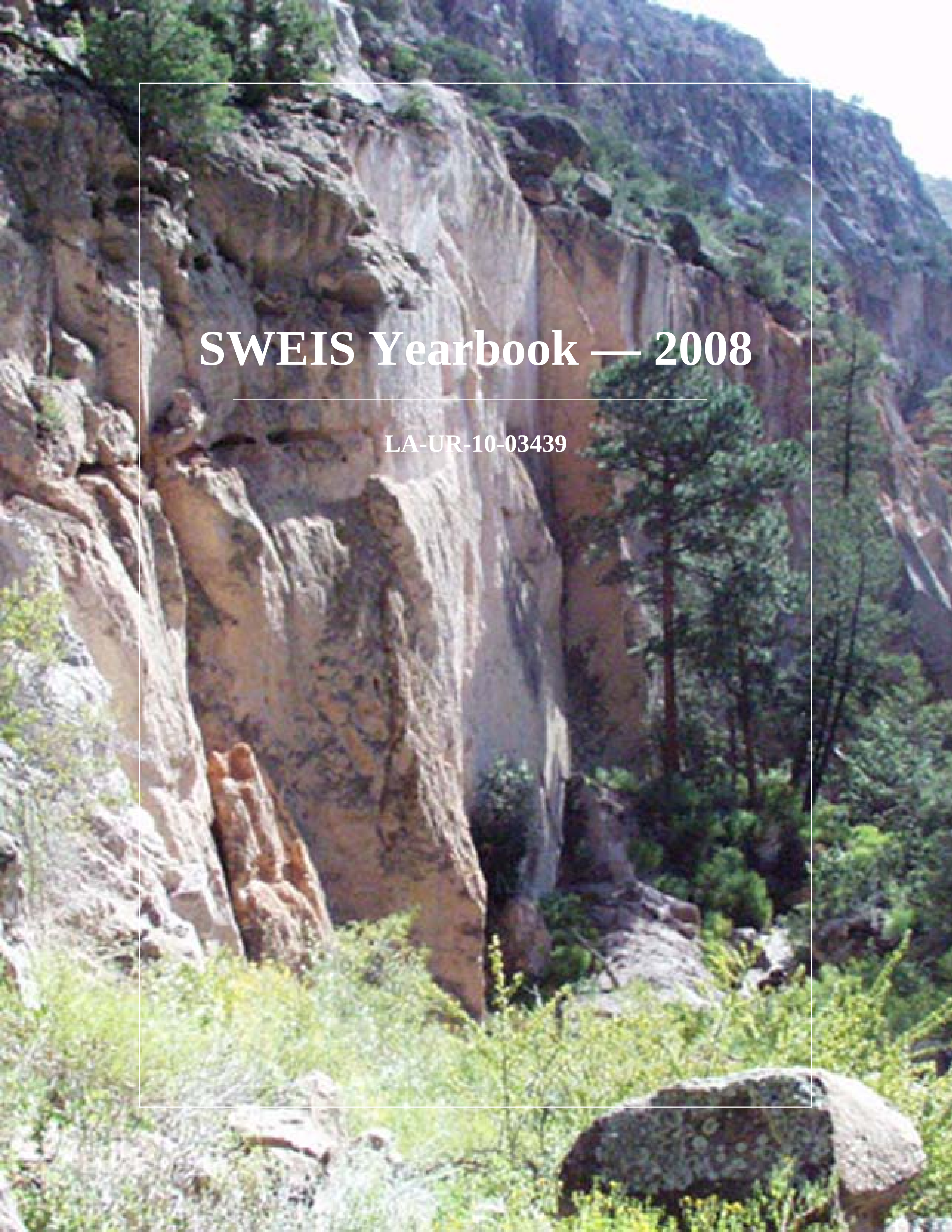

SWEIS Yearbook — 2008

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Cover photo: One of the many steep-sided canyons of the Pajarito Plateau. (Environmental Stewardship Group)

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Title

SWEIS Yearbook—2008

Comparison of 2008 Data Projections of the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory

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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). In 2004, DOE/NNSA initiated preparation of a Supplement Analysis for the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (NNSA 2004). In August 2005, a memo was issued to LANL from DOE/NNSA to prepare a new SWEIS (NNSA 2005). On September 19, 2008, DOE/NNSA issued the first ROD for the 2008 SWEIS (DOE 2008a).

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 SWEIS. Yearbook publications to date include the following:

- "SWEIS 1998 Yearbook," LA-UR-99-6391, December 1999 (LANL 1999).
- "SWEIS Yearbook – 1999," LA-UR-00-5520, December 2000 (LANL 2000a).
- "A Special Edition of the SWEIS Yearbook, Wildfire 2000," LA-UR-00-3471, August 2000 (LANL 2000b).
- "SWEIS Yearbook – 2000," LA-UR-01-2965, July 2001 (LANL 2001a).
- "SWEIS Yearbook – 2001," LA-UR-02-3143, September 2002 (LANL 2002a).
- "SWEIS Yearbook – 2002," LA-UR-03-5862, September 2003 (LANL 2003)
- "SWEIS Yearbook – 2003," LA-UR-04-6024, September 2004 (LANL 2004a)
- "SWEIS Yearbook – 2004," LA-UR-05-6627, September 2005 (LANL 2005a)
- "SWEIS Yearbook – 2005," LA-UR-06-6020, September 2006 (LANL 2006)
- "SWEIS Yearbook – 2006," LA-UR-07-6628, October 2007 (LANL 2007a)
- "SWEIS Yearbook – 2007," LA-UR-09-01653, February 2009 (LANL 2009a)

[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.

The 2008 Yearbook will present the eleventh year of data compiled since the ROD for the LANL SWEIS was issued in September 1999. The Yearbook is an essential component in DOE's five-year evaluation of how accurately the SWEIS represents LANL current and projected operations. DOE regulations require this review, called a supplement analysis, of the SWEIS every five years, to determine if the SWEIS is adequate or needs to be supplemented or a new SWEIS should be written.

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 analysis is necessary. This edition of the Yearbook summarizes the data from Calendar Year 2008 and provides data to assist DOE in its decision-making process.

Executive Summary

Los Alamos National Laboratory (LANL) Calendar Year (CY) 2008 operations have remained well below Site-Wide Environmental Impact Statement (SWEIS) projections. Operation levels that exceeded the SWEIS[*] levels were one-time, non-routine events that do not represent the day-to-day operations of the Laboratory.

Background

In 1999, the US Department of Energy (DOE) published a SWEIS for the continued operation of LANL. DOE issued a Record of Decision (ROD) for this document in September 1999.

DOE and LANL implemented a program, the Annual Yearbook, making comparisons between SWEIS projections and actual operations data. The Yearbook provides DOE/National Nuclear Security Administration (NNSA) with a tool to assist in determining the continued adequacy of the SWEIS in characterizing existing operations. The Yearbooks focus on operations during one CY and specifically address the following:

- facility and/or process modifications or additions,
- types and levels of operations,
- operations data, and
- site-wide effects of operations.

The 1999 SWEIS and 2008 SWEIS analyzed the potential environmental impacts of future operations at LANL. In 1999, 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 LANL as a whole. If operations were to routinely exceed the operating envelope, DOE would evaluate the need for a new SWEIS. As long as operations remain below the level analyzed in the SWEIS, the environmental operating envelope is valid. Thus, the levels of operation projected in the SWEIS ROD should not be viewed as goals to be achieved, but rather as acceptable operational levels/limits.

On September 19, 2008, DOE/NNSA issued the first ROD for the 2008 SWEIS. Concurrently, DOE/NNSA was analyzing actions described in the Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS or SPEIS). DOE/NNSA decided not to make any decisions regarding nuclear weapons production prior to the completion of the SPEIS. As a result, DOE/NNSA chose to implement the No Action Alternative with the addition of some elements of the Expanded Operations Alternative.

[*] There will be many instances in the Yearbook that discuss SWEIS projections—if 1999 or 2008 does not precede SWEIS, then the projections mentioned refer to both the 1999 SWEIS and the 2008 SWEIS.

Current Results

The 2008 Yearbook represents the second full year of operations data reported since LANL transitioned from the University of California (UC) to Los Alamos National Security, LLC (LANS). LANS consists of the UC, Bechtel, BWX Technologies, and Washington Group International, and currently operates LANL for the DOE/NNSA. In addition to the change in management, a major reorganization occurred during CY 2006, resulting in the formation, renaming, and/or dissolution of various LANL groups, divisions, and directorates.

This Yearbook represents data collected for CY 2008. The ROD for the 2008 SWEIS was issued in September of 2008, so January–August 2008 is based on 1999 SWEIS projections, while September–December 2008 is based on 2008 SWEIS projections. The selected levels of operation from the RODs and the SWEIS provided projections for these operations. This Yearbook compares data from CY 2008 to the 1999 SWEIS and the 2008 SWEIS projections where appropriate. There will be many instances in the Yearbook that discuss SWEIS projections—if 1999 or 2008 does not precede SWEIS, then the projections mentioned refer to both the 1999 SWEIS and the 2008 SWEIS.

The 2008 Yearbook addresses 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 (TA). Chapter 2 discusses each of the 15 Key Facilities from three aspects—significant facility construction and modifications that have occurred during 2008, the types and levels of operations that occurred during 2008, and the 2008 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.

The 1999 SWEIS projected a total of 38 facility construction and modification projects for LANL. The 2008 SWEIS No Action Alternative projected a total of 12 facility construction and modification projects. Electrical and mechanical systems were expanded to meet new computer requirements at the Nicholas C. Metropolis Center. During 2008, one construction project, the new Radiological Laboratory/Utility/Office Building continued at TA-55. At the Non-Key Facilities, one major construction, the Los Alamos Site Office building, was completed in 2008.

The capabilities identified in the 1999 SWEIS for Key Facilities at LANL have changed since the issuance of the first ROD for the 2008 SWEIS. The following changes have been made in the new SWEIS:

Chemistry and Metallurgy Research Facility (CMR):

- Actinide Research and Processing was renamed Actinide Research and Development.
- Fabrication and Metallography was renamed Fabrication and Processing.
- Large Vessel Handling was added as a new capability.

Nicholas C. Metropolis Center for Modeling and Simulation (new Key Facility):

- Computer Simulations was added as a capability in a new Key Facility.

Tritium:

- Cryogenic Separation was removed as a capability.
- Thin Film Loading was removed as a capability.
- Hydrogen Isotopic Separation was added as a new capability.
- Radioactive Liquid Waste Treatment was added as a new capability, however, this capability will be removed with decommissioning of TA-21 tritium buildings.

Bioscience (Health Research Laboratory in the 1999 SWEIS):

- Bio-Materials and Chemistry was renamed Biologically Inspired Materials and Chemistry.
- Computational Biology was added as a new capability.
- Environmental Effects was renamed Environmental Microbiology.
- Genomic and Proteomic Science was added as a new capability.
- Cytometry was renamed Measurement Science and Diagnostics.
- Molecular Synthesis was added as a new capability.
- Structural Cell Biology was renamed Structural Biology.
- Pathogenesis was added as a new capability.
- Neurobiology was removed as a capability.
- Biothreat Reduction and Bioforensics was added as a new capability.
- In-Vivo Monitoring is not a Biosciences Division capability, however, it is located at the Health Research Laboratory, therefore, it is included within this Key Facility.

Radiochemistry:

- Hydotest Sample Analysis was added as a new capability.

Radioactive Liquid Waste Treatment Facility:

- Waste Characterization, Packaging, and Labeling was combined with Waste Transport, Receipt, and Acceptance.
- Radioactive Liquid Waste Pretreatment was combined with Radioactive Liquid Waste Treatment.
- Decontamination Operations were relocated to the Solid Radioactive and Chemical Waste Key Facility.

Los Alamos Neutron Science Center (LANSCE):

- Materials Test Station was added as a new capability.
- Accelerator-Driven Transmutation Technology was removed as a capability.
- Radioactive Liquid Waste Treatment (Solar Evaporation at TA-53) was added as a new capability.

Solid Radioactive and Chemical Waste Facility:

- Other Waste Processing was renamed Waste Treatment.

- Compaction was combined with Waste Treatment.
- Size Reduction was combined with Waste Treatment.
- Disposal was renamed Waste Disposal.
- Decontamination Operations was added as a new capability.

In 2008, Pajarito Site (TA-18) was placed into Surveillance and Maintenance mode. Operations have ceased and the facility was downgraded to a Less-than Hazard Category 3 Nuclear Facility. For the purpose of the 2008 SWEIS Yearbook, Pajarito Site and its nine capabilities have been removed as a Key Facility.

During CY 2008, 85 capabilities were active. The nine inactive capabilities were Destructive and Nondestructive Analysis Project, Nonproliferation Training, Actinide Research and Development, Fabrication and Processing and Large Vessel capabilities at CMR; Hydrodynamic Tests at High Explosives Testing; Hydrogen Isotope Separation, Radioactive Liquid Waste Treatment at Tritium Facilities; Materials Test Station at the LANSCE.

While there was activity under nearly all capabilities, the levels of these activities were below levels projected in the SWEISs. For example, the LANSCE linear accelerator generated an H^- beam to the Lujan Center for 2,741 hours in 2008, at an average current of 285 microamps, compared to 6,400 hours at 200 microamps projected in the SWEIS.

During 2008, only two of LANL's facilities operated at levels approximating those projected in the SWEIS—the Materials Science Laboratory (MSL) and the Non-Key Facilities. The MSL Key Facility is more akin to the Non-Key Facilities and represents 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.

This 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/NNSA has stewardship responsibility as the administrator of LANL.

Radioactive emissions have decreased significantly since 2007, after an emission control system at LANSCE was repaired. Radioactive airborne emissions from point sources (i.e., stacks) during 2008 totaled approximately 1,670 curies, approximately 8 percent of the 10-year average of 21,700 curies projected in the SWEIS.

The 2008 chemical usage amounts were extracted from ChemLog (LANL's chemical inventory system). The quantities used for this report represent chemicals procured or brought on site in CY 2008. Appendix B includes 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. The most recent report is "Emissions Inventory Report Summary for Los Alamos National Laboratory for Calendar Year 2008."

Since 1999, the total number of permitted outfalls was reduced from 55 identified in the 1999 SWEIS to 15 that were renewed in the August 2007 National Pollutant Discharge Elimination System (NPDES) permit. As a result of these closures, there has been a 56 percent decrease in flow. In addition to the decrease of the total number of permitted outfalls, the change in methodology by which flow was measured and reported in the past has had a significant impact on the flow volumes reported. 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. Since 2001, data are collected and reported using actual flows recorded by flow meters at all of the outfalls. In 2008, 13 outfalls flowed. Calculated NPDES discharges totaled 158.4 million gallons for CY 2008 compared to a projected volume of 279 million gallons per year. This is approximately 19.8 million gallons less than the CY 2007 total of 178.2 million gallons, due largely to the change in the number of permitted outfalls. The 2007 total volume of discharge is well below the maximum flow of 279.0 million gallons that was projected in the SWEIS.

Wastes have been generated at levels below quantities projected in the SWEIS. The 2008 SWEIS combines transuranic (TRU) and mixed TRU into one waste category since they are both managed for disposal at the Waste Isolation Pilot Plant. Due to the Decontamination and Volume Reduction System repackaging of legacy TRU and mixed TRU waste at Waste Characterization, Reduction, and Repacking, the amount of mixed TRU waste exceeded projections from the 1999 SWEIS. However, because the 2008 SWEIS combines TRU and mixed TRU into one waste category, the total amount of waste generated from repacking did not exceed the TRU waste projection. In 2008, waste quantities from LANL operations were below SWEIS projections for all waste types, reflecting the levels of operations at both the Key and Non-Key Facilities.

In CY 2008, DOE/NNSA demolished four buildings, eliminating approximately 79,000 square feet of the Laboratory’s footprint, and reduced its energy intensity by 18 percent, through a number of mechanisms, including replacing older facilities with newer more energy-efficient facilities.

In the 2008 SWEIS, actual utility impacts and performance changes were analyzed. Annual electricity and water usage from 1999–2005 remained well below the levels projected in the 1999 SWEIS. In the 2008 No Action Alternative, the total electric consumption and the total water consumption were reduced to a number closer to the average electric and water consumption for the six years analyzed. The electric consumption for CY 2008 was 409 gigawatt-hours, which represents 11 gigawatt-hours more than CY 2007. The water consumption for CY 2008 was 370 million gallons, 38 million gallons more than CY 2007. Gas consumption for CY 2008 was 1.12 million decatherms, slightly less than CY 2007.

Radiological exposures to LANL workers are well within the levels projected in the SWEIS. The total effective dose equivalent for the LANL workforce was 104.7 person-rem during 2008, which is considerably lower than the workforce dose of

704 person-rem projected in the 1999 SWEIS and lower than the workforce dose of 280 person-rem projected in the 2008 SWEIS.

In the 2008 SWEIS No Action Alternative, the 2005 levels of employment were assumed to remain steady at 13,304. During 2006 and 2007, the size of the workforce slowly began to decrease. The 10,941 employees at the end of CY 2008 represent a decrease of 540 employees as compared to the 11,481 employees reported in the 2007 Yearbook.

Measured parameters for ecological resources and groundwater were similar to SWEIS projections, and measured parameters for cultural resources and land resources were below SWEIS projections. For land use, the SWEIS projected the disturbance of 41 acres of new land at TA-54 because of the need for additional disposal cells for low-level radioactive waste. As of 2008, this expansion had not become necessary.

Cultural resources remained protected in CY 2008, and no excavation of sites at TA-54 has occurred. (The 1999 SWEIS projected that 15 prehistoric sites would be affected by the expansion of Area G into Zones 4 and 6 at TA-54.)

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. In 2008, 10 alluvial monitoring wells, one perched intermediate monitoring well, and eight regional monitoring wells were installed

In addition, ecological resources are being sustained as a result of protection afforded by DOE/NNSA administration 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.

In conclusion, LANL operations in CY 2008 have fallen below SWEIS projections. Operation levels that exceeded the SWEIS levels were one-time, non-routine events that do not reflect the day-to-day operations of the Laboratory. The Laboratory is committed to reducing energy consumption and will continue to make improvements towards that goal in the future. The operations data from 2008 indicate that LANL has been operating within the 1999 SWEIS and 2008 SWEIS projections and regulatory limits.

Acknowledgments

Marjorie Wright, ENV-ES, served as document manager for the 2008 SWEIS. Hector Hinojosa provided editorial support and served as the designer and electronic publication specialist.

We would like to thank Brad McKown for creating maps, and a special thanks to John Isaacson and Jennifer Nisengard (SWEIS Program Managers) and Brenna Moore (ENV-ES) for their support and assistance.

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 contributors from each of the Key Facilities and other operations.

Area of Contribution	Contributor
Air Emissions	David Fuehne
Air Emissions	Katelyn Booth
Air Emissions	Walter Whetham
Bioscience (Formerly Health Research Laboratory)	Marc Gallegos
Chemistry and Metallurgy Research Building	Stephen Cossey
Cultural Resources	Kari Garcia
Cultural Resources	Bruce Masse
Decontamination, Decommissioning, and Demolition	Darrik Stafford
Ecological Resources	Leslie Hansen
Environmental Remediation and Surveillance Program	Debora Hall
Footprint Elimination	Randy Parks
Groundwater	Bob King
High Explosives Processing	Connie Gerth
High Explosives Testing	John Tymkowych
Land Resources	Kirt Anderson
Liquid Effluents	Marc Bailey
Liquid Effluents	Terrill Lemke
Liquid Effluents	Sam Loftin
Liquid Effluents	Shannon Smith
Los Alamos Neutron Science Center	Patricia Vardaro-Charles
Machine Shops	Marc Gallegos
Materials Science Laboratory	Marc Gallegos
National Pollutant Discharge Elimination System Data	Marc Bailey
Non-Key Facilities–Los Alamos Site Office Building	Joe Brophy
Plutonium Complex	Harvey Decker
Plutonium Complex	Randy Johnson
Pollution Prevention Program	Pat Gallagher
Radioactive Liquid Waste Treatment Facility	Chris Del Signore
Radiochemistry Facility	Marc Gallegos
Sanitary Waste/Recycling	Monica Witt
Sigma	Marc Gallegos
Socioeconomics	Jeff Toliver
Solid Radioactive and Chemical Waste Facilities	Leonard Sandoval

Area of Contribution	Contributor
Solid Radioactive and Chemical Wastes	Tim Sloan
Target Fabrication Facility	Marc Gallegos
Utilities	Monica Witt
Utilities	Maura Miller
Worker Safety/Doses	Tom Courtney
Worker Safety/Doses	Paul Hoover

Acronyms

ALARA	as low as reasonably achievable
AOC	area of concern
ARRA	American Reinvestment and Recovery Act
ARTIC	Actinide Research and Technology Instruction Complex
BIO	Basis for Interim Operation
BMP	best management practice
BSL	Biosafety Level
BTF	Beryllium Technology Facility
CGP	Construction General Permit
CME	Corrective Measures Evaluation
CMR	Chemical and Metallurgy Research (Building)
CMRR	CMR Replacement
COPC	chemicals of potential concern
CRMP	Cultural Resources Management Plan
CRT	Cultural Resources Team
CY	calendar year
D&D	decontamination and decommissioning
DD&D	decontamination, decommissioning, and demolition
DARHT	Dual-Axis Radiographic Hydrodynamic Test (facility)
DE	Dynamic and Energetic Materials (Division)
DE-1	Dynamic Experimentation
DOE	US Department of Energy
DVRS	Decontamination and Volume Reduction System
EISU	Electrical Infrastructure Safety Upgrades
EMS	Environmental Management System
EP	Environmental Programs (Directorate)
EPA	US Environmental Protection Agency
ER	Environmental Restoration (Project)
ERS	Environmental Remediation and Surveillance (Program)
ESPC	Energy Savings Performance Contract
FFCA	Federal Facility Compliance Agreement
FLUTe	Flexible Liner Underground Technology
FONSI	Finding of No Significant Impact
FY	fiscal year
HAP	hazardous air pollutant
HazCat	Hazard Category
HEPA	high-efficiency particulate air (filter)
HRL	Health Research Laboratory
HSWA	Hazardous and Solid Waste Amendment
HX	Hydrodynamic Experiments (Division)
ITSRs	Interim Technical Safety Requirements
KSL	KBR/Shaw/LATA
kV	kilovolts
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LANSCE	Los Alamos Neutron Science Center
LANSCE-R	LANSCE Refurbishment
LASO	Los Alamos Site Office
LEDA	Low-Energy Demonstration Accelerator
linac	linear accelerator
LLW	low-level radioactive waste
m	meter
MDA	material disposal area
MeV	million electron volts
MGY	million gallons per year
MIAC	Museum of Indian Arts and Culture

MLLW	mixed low-level radioactive waste
MOX	mixed oxide (fuel)
MSGP	Multi-Sector General Permit
MSL	Materials Science Laboratory
MTS	Material Test Station
NEPA	National Environmental Policy Act
NFA	no further action
NISC	Nonproliferation and International Security Center
NMED	New Mexico Environment Department
NMSHPD	New Mexico State Historic Preservation Division
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTS	Nevada Test Site
OSR	Offsite Source Recovery (Project)
P	Physics (Division)
PCB	polychlorinated biphenyl
PNM	Public Service Company of New Mexico
P^2	Pollution Prevention
PRS	potential release site
RCRA	Resource Conservation and Recovery Act
rem	roentgen equivalent man
RLUOB	Radiological Laboratory Utilities Office Building
RLWTF	Radioactive Liquid Waste Treatment Facility
ROD	Record of Decision
SAD	Safety Assessment Document
SERF	Sanitary Effluent Recycling Facility
SHPO	State Historic Preservation Officer
SIP	Safety Implementation Plan
SNM	special nuclear material
SOC	Securing Our Country (LANL Protective Force)
SPEIS	Supplemental Programmatic Environmental Impact Statement
SS	stainless steel
SST	Safe, Secure Trailer
SVE	soil vapor extraction
SWEIS	Site-Wide Environmental Impact Statement
SWMU	solid waste management unit
SWPPP	stormwater pollution prevention plan
SWWS	Sanitary Wastewater System
TA	Technical Area
TED	total effective dose
TFF	Target Fabrication Facility
TRU	transuranic
TSFF	Tritium Science and Fabrication Facility
TSTA	Tritium Systems Test Assembly (facility)
UC	University of California
VOC	volatile organic compound
W	Weapons Systems Engineering (Division)
W-6	Detonator Design
WCM	Weapons Components Manufacturing (Division)
WCM-3	Detonator Fabrication
WCRR	Waste Characterization, Reduction, and Repackaging (Facility)
WETF	Weapons Engineering Tritium Facility
WIPP	Waste Isolation Pilot Plant
WMin	Waste Minimization
WNR	Weapons Neutron Research (facility)
WSST	Worker Safety and Security Team
WT	Weapons Engineering Technology (Division)

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.

As per DOE regulations, in 2004 DOE/NNSA initiated preparation of a Supplement Analysis for the Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos National Laboratory (NNSA 2004). The purpose of the supplement analysis was to determine if the existing SWEIS remains adequate. In August 2005, a memo was issued to LANL from DOE/NNSA to prepare a new SWEIS (NNSA 2005). The new SWEIS was determined to be the appropriate level of analysis for compliance with the National Environmental Policy Act (NEPA) with regard to the required five-year adequacy review of the 1999 LANL SWEIS. Environmental impacts of specific projects for LANL facility replacements and refurbishments, as well as projects having to do with operational changes, were analyzed.

On September 19, 2008, DOE/NNSA issued the first ROD for the 2008 SWEIS (DOE 2008a). Concurrently, DOE/NNSA was analyzing actions described in the Complex Transformation Supplemental Programmatic Environmental Impact Statement (DOE 2008b) (Complex Transformation SPEIS or SPEIS). DOE/NNSA decided not to make any decisions regarding nuclear weapons production prior to the completion of the SPEIS. As a result, DOE/NNSA chose the No Action Alternative with the addition of some elements of the Expanded Operations Alternative. DOE/NNSA is expected to issue other RODs regarding the continued operation of LANL based on the 2008 SWEIS, the SPEIS, and other NEPA analyses.

1.2 Annual Yearbook

To enhance the usefulness of the SWEIS, DOE/NNSA and LANL implemented a program making annual comparisons between SWEIS projections and actual

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[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.

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. 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, environmental assessments, or environmental impact statements) that were performed.
- The types and levels of operations during the calendar year (CY). Types of operations are described using capabilities defined in the 2008 SWEIS. Levels of operations are expressed in units of production, numbers of researchers, numbers of experiments, hours of operation, and other descriptive units (Appendix A).
- Operations data for the Key and Non-Key Facilities, comparable to data projected in the SWEIS. Data for each facility include waste generated, air emissions, and liquid effluents (Appendix A).
- Site-wide effects of operations for the CY. 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 administrator of federal lands.
- Summary and conclusion. This chapter summarizes CY 2008 for LANL in terms of overall facility constructions and modifications, facility operations, and operations data and environmental parameters. These data form the basis of the conclusion for whether or not LANL is operating within the envelope of the 1999 SWEIS and 2008 SWEIS.
- Chemical usage and emissions data (Appendix B). These data summarize the chemical usage and air emissions by Key Facility.
- Nuclear facilities list (Appendix C). This appendix provides a summary of the facilities identified as nuclear at the time the SWEIS was developed through CY 2008.
- A less than Hazard Category (HazCat) 3 nuclear facilities list (Appendix D). These data identify the facilities considered as radiological in CY 2008 and indicate their categorization at the time the SWEIS was developed.
- Pollution Prevention (P^2) Awards (Appendix E). This appendix provides a summary of the DOE 2008 P^2 Awards for LANL.

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/NNSA with information needed to evaluate adequacy of the SWEIS and enable them to make decisions on when and if a new SWEIS is needed. The Yearbooks also provide facilities and managers at LANL with a guide in determining whether activities are within the SWEIS operating envelope. The Yearbooks serve as a summary of 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.

1.3 CY 2008 Yearbook

This Yearbook represents data collected for CY 2008. The ROD for the 2008 SWEIS was issued in September of 2008, so January–August 2008 reflect 1999 SWEIS projections, while September–December 2008 reflect 2008 SWEIS projections. The selected levels of operations from the RODs and the SWEIS provided projections for these operations. This Yearbook compares data from CY 2008 to the appropriate 1999 SWEIS and the 2008 SWEIS projections. There will be many instances in the Yearbook that discuss SWEIS projections—if 1999 or 2008 does not precede SWEIS, then the projections mentioned refer to both the 1999 SWEIS and the 2008 SWEIS.

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.

Changes Since the 2007 Yearbook

To make the Yearbook more user friendly, the 2008 Yearbook is organized differently than previous Yearbooks—the capability and operations data tables were taken out of Chapter 2 and moved into Appendix A and the reference citations are compiled at the end of text rather than within each chapter. New facility projects, changes, or updates that are under determination will be discussed. Complete facility updates and project descriptions before 2008 can be found in the 2007 SWEIS Yearbook (LANL 2009a). A new section was added to Chapter 3: Footprint Elimination/Decontamination, Decommissioning, and Demolition (3.11). The 2008 SWEIS provides the NEPA coverage for decontamination, decommissioning, and demolition (DD&D) activities at LANL; however, all waste volumes generated need to be tracked. DD&D activities that occur during a specific CY will be presented in the corresponding Yearbook. Finally, the number of employees at each of the Key Facilities will no longer be tracked/reported. The employee numbers projected in the 1999 SWEIS included KSL, SOC (Securing Our Country [formerly Protection Technology, Los Alamos]), and LANL employees. Due to the number of students and visiting scientists at various facilities, the numbers do not represent the same population and a direct comparison is not appropriate. The total number of employees per CY will continue to be tracked.

2.0 Facilities and Operations

The Laboratory has about 2,800 structures with approximately eight million square feet under roof, spread over an area of approximately 40 square miles of land owned by the US Government and administered by DOE/NNSA. Most of LANL is undeveloped to provide a buffer for security, safety, and expansion possibilities for future use. Approximately half of the square footage at the site is considered laboratory or production space; the remaining square footage is considered administrative, storage, service, and other space. While the number of structures changes with time (there is frequent addition or removal of temporary structures and miscellaneous buildings), the current breakdown is about 1,064 permanent buildings and 1,825 temporary structures (trailers and transportables).

To present a logical, comprehensive evaluation of the potential environmental impacts at LANL, the 1999 SWEIS developed the Key Facility concept, a framework for analyzing the types and levels of activities performed across the entire site. This framework assisted in analyzing the impacts of activities in specific locations (Technical Areas [TAs]) and the impacts related to specific programmatic operations (Key Facilities and capabilities). Taken together, the 15 Key Facilities represent the great majority of environmental risks associated with LANL operations. The 15 Key Facilities identified 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 1999 and 2008 SWEIS public hearings), or
- would be subject to change because of DOE programmatic decisions.

In 2008, Pajarito Site (TA-18) was placed into Surveillance and Maintenance mode. All operations have ceased and the facility was downgraded to a HazCat-3 Nuclear Facility (LANL 2009b). For the purpose of the 2008 SWEIS Yearbook, Pajarito Site has been removed as a Key Facility. In addition, the 2008 SWEIS recognized the Nicholas C. Metropolis Center (formerly known as the Strategic Computing Complex) as a new Key Facility because of the amounts of electricity and water it may consume.

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).

The Key Facilities, as presented in the 1999 SWEIS, comprised 42 of the 48 HazCat 2 and HazCat 3 Nuclear Structures at LANL.[2] Since the issuance of the 1999 SWEIS,

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[2] 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 on-site 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, low-level radioactive waste (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

DOE/NNSA and LANL have published 11 lists identifying nuclear facilities at LANL that significantly changed the classification of some buildings. Appendix C provides a summary of the current nuclear facilities; a table has been added to each section of this chapter to explain the differences and identify the 19 nuclear facilities currently listed by DOE/NNSA. Of these 19 facilities, all but nine reside within a Key Facility. Appendix D provides a comparison of the facilities identified as Less-than-HazCat-3 Nuclear Facility when the 2008 SWEIS was prepared (formerly known as radiological facilities) (LANL 2009b).

With the issuance of 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 1999 SWEIS. At the time the 1999 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 HazCat-3 quantities is addressed in a DOE-approved safety analysis (LANL 2002c, DOE 2002a, Steele 2002).

The definition of each Key Facility hinges upon operations[3], capabilities, and location and is not necessarily confined to a single structure, building, or TA. In fact, the number of structures comprising a Key Facility ranges from one, the Target Fabrication Facility (TFF), to more than 400 for LANSCE. Key Facilities can also exist in more than a single TA, as is the case with the High Explosives Testing and High Explosives Processing Key Facilities, which exist in all or parts of five and six TAs, 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 that have occurred during 2008. Each of these three aspects is given perspective by comparing them to projections made by the SWEIS. This comparison provides an evaluation of whether or not data resulting from LANL operations continue to fall within the environmental envelope established by the 1999 SWEIS and the 2008 SWEIS. It should be noted that modifications and construction activities that were completed before 2008 are summarized in the previous Yearbooks.

This chapter also discusses Non-Key Facilities, which include buildings and structures not part of a Key Facility, or the balance of LANL. The Non-Key Facilities represent a significant fraction of LANL and comprise all or the majority of 30 of LANL's 49 TAs, including TA-00, which comprises leased space within the Los Alamos town site and TA-57 at Fenton Hill, and approximately 14,224 of LANL's 26,480 acres. The Non-Key Facilities include such important buildings and operations as the Nonproliferation and International Security Center (NISC), the National Security Sciences Building (the main administration building), and the TA-46 sanitary sewage treatment facility, called the

radionuclides. The identification of nuclear facilities is based upon the official list maintained by DOE Los Alamos Site Office (LASO) as of December 2002 (LANL 2002b).

[3] As used in the 1999 and 2008 SWEISs 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 Los Alamos Neutron Science Center [LANSCE] linear accelerator [linac]) to collaborative efforts with industry (e.g., fuel cells for automobiles). Production involves delivery of a product, such as plutonium pits or medical radioisotopes. Examples of services provided to other LANL facilities include utilities and infrastructure support, analysis of samples, environmental surveys, and waste management.

Sanitary Effluent Recycling Facility (SERF). Table 2.0-1 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 TAs. Figure 2-3 shows the locations of the Key Facilities.

Table 2.0-1. Key and Non-Key Facilities

Facility	Technical Areas	~Size (acres)
Chemistry and Metallurgy Research (CMR) Building	TA-03	14
Sigma Complex	TA-03	11
Machine Shops	TA-03	8
Materials Science Laboratory (MSL)	TA-03	2
Nicholas C. Metropolis Center	TA-03	3
High Explosives Processing	TAs 08, 09, 11, 16, 22, 37	1,115
High Explosives Testing	TAs 15, 36, 39, 40	8,691
Tritium Facilities	TA-16 & TA-21	312
TFF	TA-35	3
Bioscience Facilities (Formerly Health Research Laboratory [HRL])	TAs 43, 03, 16, 35, 46	4
Radiochemistry Facility	TA-48	116
Radioactive Liquid Waste Treatment Facility (RLWTF)	TA-50	62
LANSCE	TA-53	751
Solid Radioactive and Chemical Waste Facilities	TA-50 & TA-54	943
Plutonium Complex	TA-55	93
Subtotal, Key Facilities		12,128
Non-Key Facilities	30 of 49 TAs	14,224
LANL		26,352

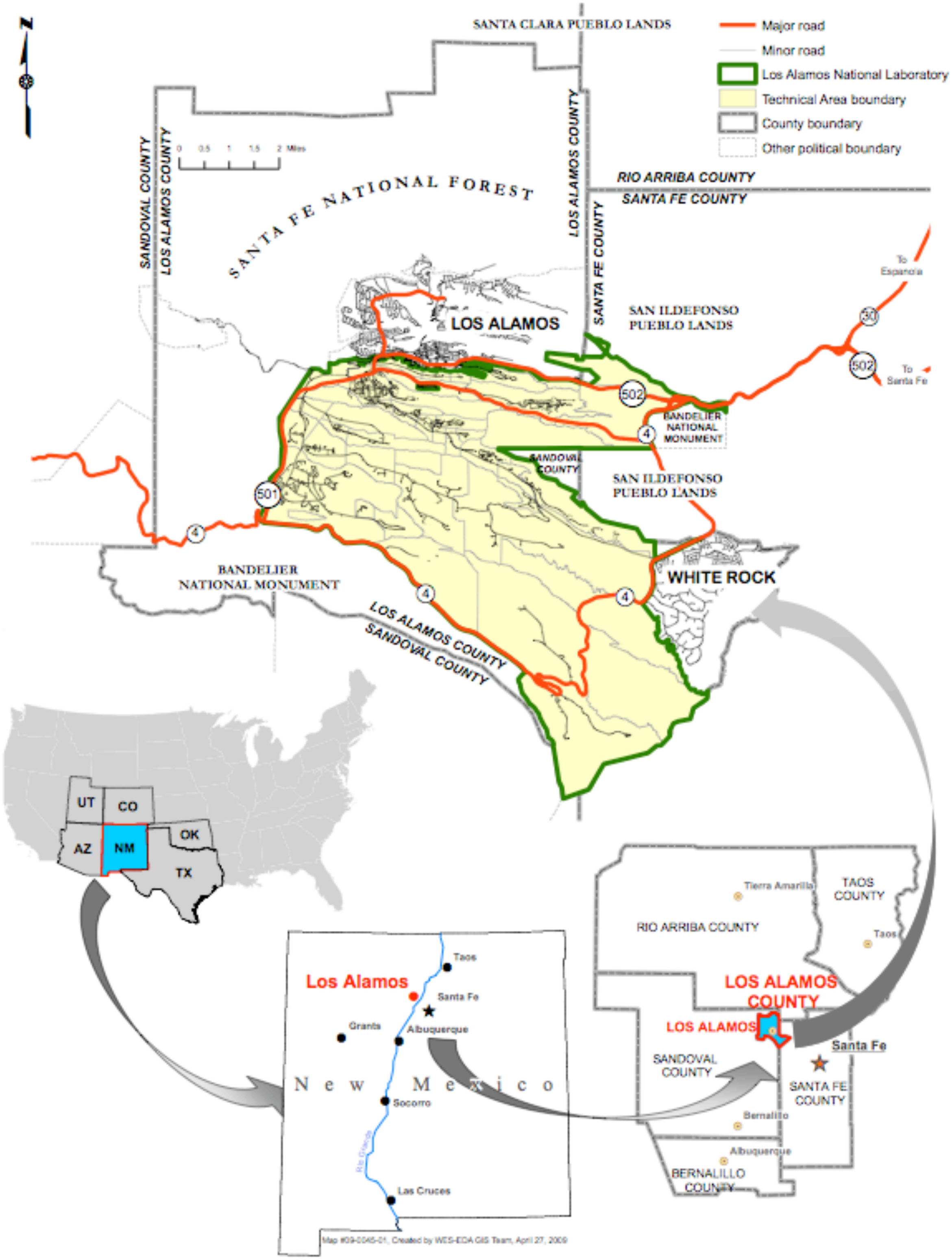

Figure 2-1. Location of LANL

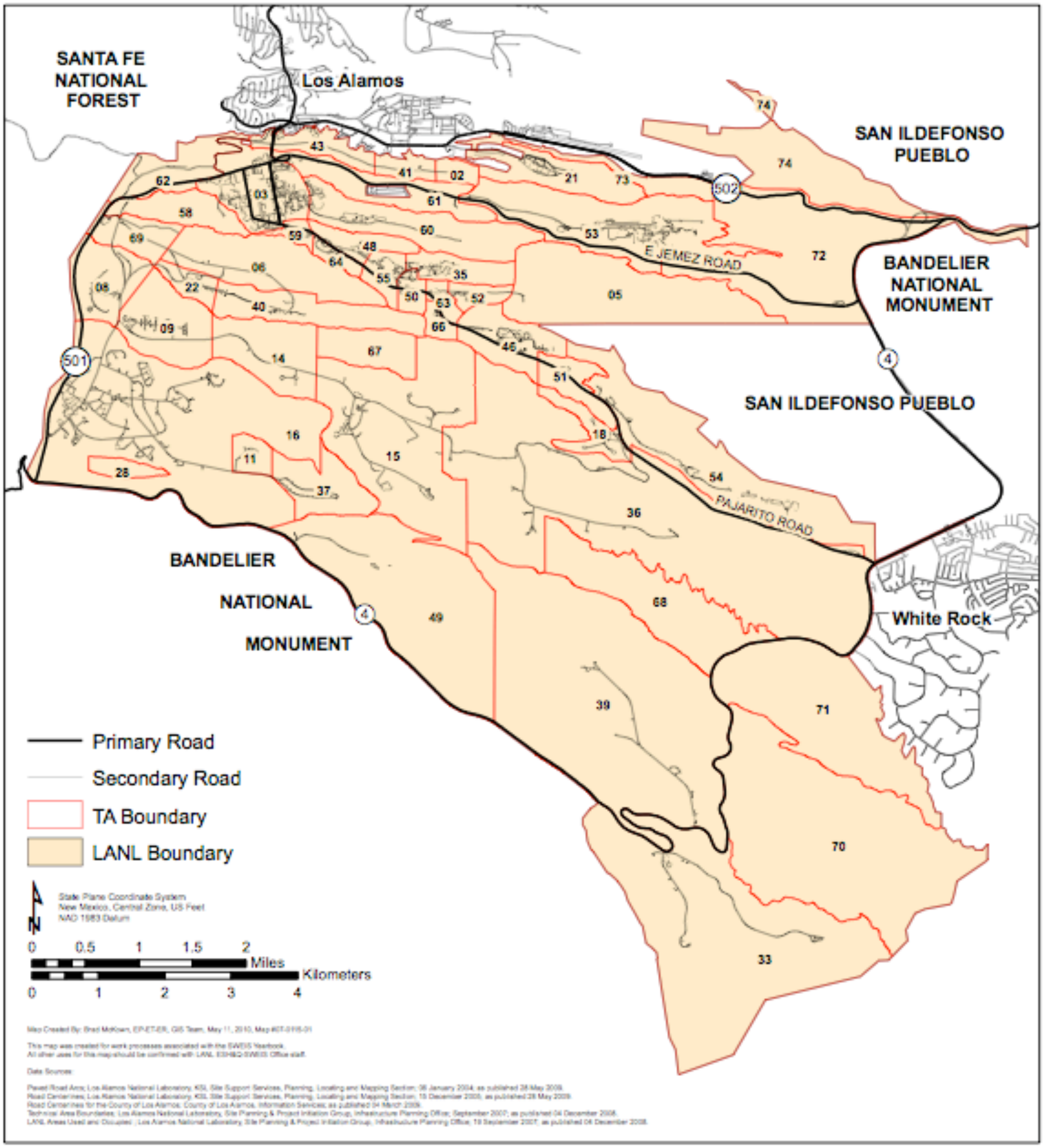

Figure 2-2. Location of TAs

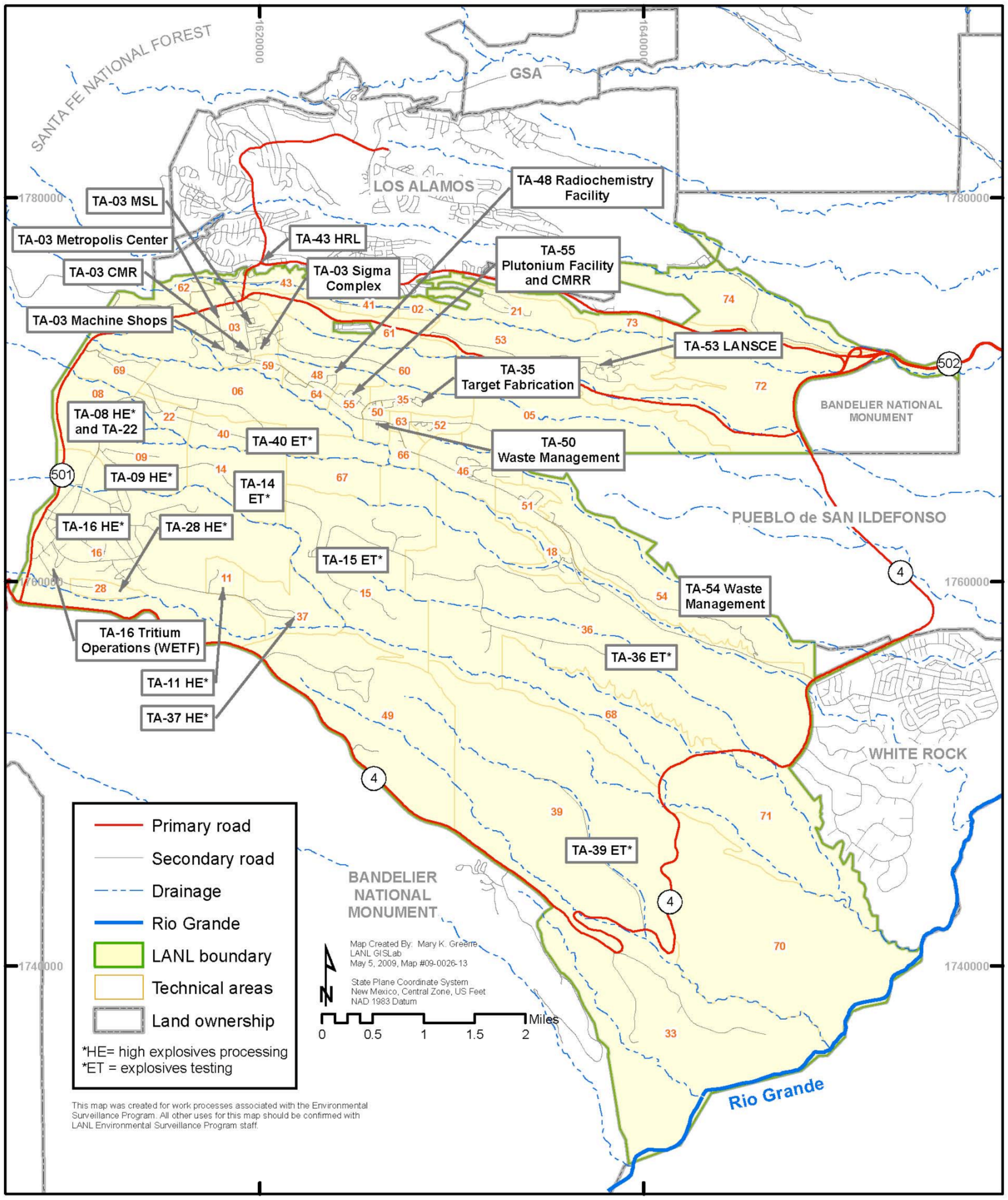

Figure 2-3. Location of Key Facilities

*HE is High Explosives Processing; ET is High Explosives Testing; WETF is Weapons Engineering Tritium Facility; CMRR is Chemistry and Metallurgy Research Building Replacement.

2.1 Chemistry and Metallurgy Research Building (TA-03)

The CMR Building was designed and constructed to the 1949 Uniform Building Code and occupied in 1952 to house analytical chemistry, plutonium metallurgy, uranium chemistry, and engineering design and drafting activity. At the time the 1999 SWEIS was issued, the CMR Building was described as a "production, research, and support center for actinide chemistry and metallurgy research and analysis, uranium processing, and fabrication of weapon components."

The CMR Facility is 550,000 square feet that consists of a main building (TA-03-29) and a LLW Storage and Transfer Facility (TA-03-154) that is no longer operational. The CMR Building consists of three floors: basement, first floor, and attic. It has seven independent wings connected by a common corridor.

As shown in Table 2.1-1, the CMR Facility has been designated a HazCat 2 Nuclear Facility since the publication of the 1999 SWEIS (DOE 1997, DOE 2009, LANL 2007b). CMR is also designated a security category 3 nuclear facility.

Table 2.1-1. CMR Buildings with Nuclear Hazard Classification

Building	Description	1999 SWEIS	NHC LANL 2009[a]
TA-03-0029	CMR	2	2

a DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2009).

Table 2.1-1 and the Nuclear Hazard Classification tables in the other sections of this Yearbook reflect the data in the published DOE listings of LANL nuclear facilities and LANL Less-than-HazCat-3 nuclear facilities that applied during the CY under review, in this case 2008. Changes in the listings that have occurred during the year will not be reflected in this table if they are not yet published in these documents. However, changes in nuclear hazard classification will be noted in the text of this section.

2.1.1 Construction and Modifications at the CMR Building

The 1999 SWEIS projected five facility modifications for this Key Facility:

- 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.

The projected modifications for production of targets for the molybdenum-99 medical isotope, recovery of sealed neutron sources, and the safety testing of pits were never completed due to loss of program funding. Upgrades to maintain safe and reliable operations to CMR were completed in 2002.

The 2008 SWEIS projected two changes to this Key Facility:

- replace the CMR building—construct and operate a CMR Building Replacement (CMRR) Facility in TA-55 and
- conduct DD&D of the CMR Building.

In November 2003, DOE/NNSA issued an *Environmental Impact Statement for the Chemistry and Metallurgy Research Building Replacement Project* (DOE 2003a), which evaluated the potential environmental impacts resulting from activities associated with consolidating and relocating the mission-critical CMR Building capabilities at LANL and replacement of the CMR Building. In its ROD issued in February 2004, the DOE/NNSA decided to replace the CMR Building with a new CMRR Facility at TA-55 and to completely vacate and demolish the CMR Building (DOE 2004). The ROD stated that the new facility would be established as a HazCat 2 Nuclear Facility. The CMRR Facility would replace the CMR Building as the Key Facility.

CMRR Geotechnical Investigation (LANL 2002d), the first phase in determining the feasibility of constructing the CMRR. Geotechnical surveys were performed in CY 2003.

In addition to the facility modifications, additional construction and modification projects were completed. A complete description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

During CY 2003, modifications to Wing 9 were started in support of the Confinement Vessel Disposition Project (previously known as the Bolas Grande Project), which would provide for the disposition of large vessels previously used to contain experimental explosive shots involving various actinides. NEPA coverage for this project was provided by a *Supplement Analysis to the 1999 Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory for the Proposed Disposition of Certain Large Containment Vessels*, *DOE/EIS-0238-SA-03* (DOE 2003b). The project was placed on hold in 2004 based on a decision by NNSA that the project was a major modification. This decision was later rescinded and the project moved forward in 2008.

CMR Safety Basis. The CMR Facility Safety Basis documentation currently consists of the 1998 Basis of Interim Operations (BIO) and associated Interim Technical Safety Requirements (ITSRs), which expire in 2010. Updates to the CMR BIO and ITSRs were submitted in April 2004 but rejected in April 2005 by DOE/NNSA who then directed that the ITSRs be updated. The ITSR update, which represents improvements in the Safety Basis through changes to existing or additional controls, was approved by NNSA in CY 2008.

2.1.2 Operations at the CMR Building

The 1999 SWEIS identified six capabilities[4] for the CMR Key Facility. The 2008 SWEIS identified seven capabilities for this Key Facility (Table A-1 in Appendix A). The following changes have been made since the 1999 SWEIS identified CMR as a Key Facility:

[4] As defined in the 1999 and 2008 SWEISs, 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.

- Actinide Research and Processing was renamed Actinide Research and Development
- Fabrication and Metallography was renamed Fabrication and Processing
- Large Vessel Handling was added as a new capability

While the CMR Facility continues to maintain normal operations in support of the Pit Manufacturing and Surveillance missions, an effort to reduce the overall risk of the facility was begun in 2006. The scope of the CMR Facility Risk Reduction Project includes relocating hazardous activities from Wings 2 and 4 that were considered particularly vulnerable to seismic activity to other areas of the facility or to another site. In 2008, Wing 3 was vacated and the Risk Reduction Project started relocating hazards to Wings 5 and 7 and to other facilities at LANL.

2.1.3 Operations Data for the CMR Building

Operations data from research, services, and production activities at the CMR Building were well below those projected in the SWEIS.[5] Table A-2 provides details.

2.2 Sigma Complex (TA-03)

The Sigma Complex Key Facility consists of four principal buildings: the Sigma Building (03-66), the Beryllium Technology Facility (BTF; TA-03-141), the Press Building (TA-03-35), and the Forming Building (previously referred to as the Thorium Storage Building) (TA-03-159), and several support and storage facilities. Primary activities are the fabrication of metallic and ceramic items, characterization of materials, and process research and development.

The 1999 SWEIS identified two HazCat-3 nuclear facilities, however, by CY 2001, 03-0159 and 03-0066 were downgraded from a HazCat-3 Nuclear Facility to Less-than-HazCat-3 nuclear facilities. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified 11 buildings within this Key Facility. Table 2.2-1 provides details.

Table 2.2-1. Sigma Buildings Identified as Less-than HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-03-0002	X-Ray Machine Lab	RAD
TA-03-0032	Superconducting Tech Center	RAD
TA-03-0035	Press Building	RAD
TA-03-0065	Source Storage Building	RAD
TA-03-0066	Sigma Building	RAD
TA-03-0141	BTF	RAD
TA-03-0159	Forming Building	RAD
TA-03-0169	Warehouse	RAD
TA-03-0317	BTF Graphite Storage	RAD
TA-03-0541	Sigma Storage Shed	RAD
TA-03-2132	Sigma Safety Storage Shed	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

[5] There will be many instances in the Yearbook that discuss SWEIS projections—if 1999 or 2008 does not precede SWEIS, then the projections mentioned refer to both the 1999 SWEIS and the 2008 SWEIS.

2.2.1 Construction and Modifications at the Sigma Complex

The 1999 SWEIS projected significant facility changes for the Sigma Building itself. Three of five planned upgrades are complete, one is essentially complete, and one remains incomplete. 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.

The 2008 SWEIS projected no new construction or major modifications to this Key Facility. Upgrades to the facility that were not projected and that have been completed are detailed in the 2007 Yearbook (LANL 2009a).

2.2.2 Operations at the Sigma Complex

The 1999 SWEIS identified three capabilities for the Sigma Complex. No new capabilities have been added, and none has been deleted in the 2008 SWEIS (Table A-3). Activity levels for all capabilities during the 2008 timeframe were less than levels projected in the 1999 and 2008 SWEISs.

2.2.3 Operations Data for the Sigma Complex

In CY 2000, the decision was made to discontinue stack monitoring at Sigma. Negligible emissions data no longer warranted compliance with Environmental Protection Agency (EPA) or DOE regulations. In CY 2008, levels of research and operations were less than those projected in the SWEIS; consequently, all of the operations data were also below projections with the exception of one. Chemical waste exceeded the SWEIS projections due to the disposal of beryllium-contaminated metal items. Table A-4 provides details.

2.3 Machine Shops (TA-03)

The Machine Shops Key Facility consists of two buildings, the Nonhazardous Materials Machine Shop (Building TA-03-39) and the Radiological Hazardous Materials Machine Shop (Building TA-03-102). Both buildings are located within the same exclusion area. Activities consist of machining, welding, fabrication, inspection, and assembly of various materials in support of many LANL programs and projects. In September 2001, Building TA-03-102 was placed on the Radiological Facilities List (LANL 2001b).

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified two buildings within this Key Facility. Table 2.3-1 provides details.

Table 2.3-1. Machine Shops Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-03-0039	Manufacturing Shops	RAD
TA-03-0102	Tuballoy Machine Shop	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.3.1 Construction and Modifications at the Machine Shops

The 1999 SWEIS and the 2008 SWEIS projected no new construction or major modifications to the Machine Shops.

2.3.2 Operations at the Machine Shops

The 1999 SWEIS identified three capabilities at the shops. These same three capabilities continue to be maintained. No new capabilities have been added, and none has been deleted in the 2008 SWEIS (Table A-5). In CY 2008, all activities occurred at levels well below those projected in the SWEIS. The workload at the Shops is directly linked to research and development and production requirements.

2.3.3 Operations Data for the Machine Shops

Operations data were well below projections by the SWEIS. Table A-6 provides details.

2.4 Materials Science Laboratory (TA-03)

The MSL Key Facility consists of a single laboratory building (TA-03-1698) containing 27 labs, 60 offices, 21 materials research areas, and support rooms. In CY 2004, construction was completed on the Material Science and Technology Office Building (TA-03-1415). In CY 2007, the newly constructed Center for Integrated Nanotechnologies (TA-03-1420) was in full operation. The two-story, 36,500-square-foot building houses approximately 50 people. Occupants include LANL staff plus collaborators from universities, other laboratories, and private industry. All activities within this Key Facility are related to research and development of materials science. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified the MSL (Table 2.4-1).

Table 2.4-1. MSL Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-03-1698	MSL	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.4.1 Construction and Modifications at the Materials Science Laboratory

The 1999 SWEIS projected one significant facility change for this Key Facility:

- completion of the top floor of the MSL

This project remains unscheduled and unfunded.

The 2008 SWEIS projected no new construction or major modifications to this Key Facility. Upgrades to the facility that were not projected and that have been completed are detailed in the 2007 Yearbook (LANL 2009a).

2.4.2 Operations at the Materials Science Laboratory

The 1999 SWEIS identified four capabilities at the 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 the 2008 SWEIS.

In CY 2008, activity levels for all capabilities were as projected in the SWEIS. Table A-7 compares CY 2008 operations to projections made by the SWEIS.

2.4.3 Operations Data for the Materials Science Laboratory

Operations data levels have been lower than projected in the SWEIS. Industrial solid waste 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 A-8 provides details.

2.5 Nicholas C. Metropolis Center for Modeling and Simulation (TA-3)

The Nicholas C. Metropolis Center (Metropolis Center) for Modeling and Simulation is a new Key Facility in the 2008 SWEIS. The facility is housed in a three-story, 303,000-square-foot structure in TA-3, which began operating in 2002. The Metropolis Center (TA-03-2327), home of the Roadrunner Supercomputer (currently one of the world's fastest and most advanced computers), is an integral part of the tri-laboratory (LANL, Lawrence Livermore National Laboratory, and Sandia National Laboratories) mission to maintain, monitor, and ensure the Nation's nuclear weapons performance through the Advanced Simulation and Computing Program. Together with the Laboratory Data Communication Center, Central Computing Facility, and Advanced Computing Laboratory, the Metropolis Center forms the center for high-performance computing at LANL.

The impacts associated with operating the Metropolis Center (formerly called the Strategic Computing Complex) at an initial capacity of a 50-teraflop platform were analyzed in the *Environmental Assessment for the Proposed Strategic Computing Complex, Los Alamos National Laboratory, Los Alamos, New Mexico* (DOE/EA-1250) (DOE 1998a) and its associated Finding of No Significant Impact (FONSI). The proposed increase in the operating platform beyond 50 teraflops to support, at a minimum, a 100 teraflops capability, and approximately 1,000 teraflops (1 petaflop) were analyzed in the SWEIS. The exact level of operations supported cannot be directly correlated to a set amount of water or electrical power consumption. Each new generation of computing capability machinery continues to be designed with enhanced efficiency in terms of both electrical consumption and cooling requirements. Therefore, the operating level that can be supported by about 15 megawatts of electrical usage and 51 million gallons per year of water has been used to project associated potential environmental impacts in the 2008 SWEIS.

2.5.1 Construction and Modifications at the Metropolis Center

The 2008 SWEIS projected one facility modification at this Key Facility:

- Installation of additional processors to increase functional capability. This expansion would involve the addition of mechanical and electrical equipment, including chillers, cooling towers, and air conditioning units.

The first computer to be located in the Metropolis Center was called "Q." The facility was initially constructed to have adequate power and cooling for the first computer, and space was allocated for future expansion of the electrical and mechanical systems as new and more powerful computers arrived.

Since that time, there have been several "supercomputers" housed in the Metropolis Center, including Lightning Bolt, Redtail, and Hurricane. In preparation for these machines, the electrical and mechanical systems in the facility were expanded to meet the new computers' requirements. The latest supercomputer to be located at the Metropolis Center is a machine called "Roadrunner," and it arrived in the 1st Quarter of fiscal year (FY) 2009. In preparation for that computer, the "Strategic Computing Complex 2.4 Mega Watt Project" was completed in July 2008. It provided the additional power and cooling required by the new computer.

2.5.2 Operations at the Metropolis Center

As described in the 2008 SWEIS, the Metropolis Center computing platform would expand the capabilities and operations levels in support of the Roadrunner Supercomputer. Computer operations are performed 24 hours a day, with personnel occupying the control room to support computer operation activities around the clock. Operations consist of office-type activities, light laboratory work such as computer and support equipment assembly and disassembly, and computer operations and maintenance. The Metropolis Center has capabilities to enable remote-site user access to the computing platform, and its co-laboratories and theatres are equipped for distance operations to allow collaboration between weapons designers and engineers across the DOE weapons complex.

Computer simulations have become the only means of integrating the complex processes that occur in the nuclear weapon lifespan. Large-scale calculations are now the primary tools for estimating nuclear yield and evaluating the safety of aging weapons in the nuclear stockpile. Continued certification of aging stockpile safety and reliability depends upon the ability to perform highly complex, three-dimensional computer simulations. Table A-9 provides details.

2.5.3 Operations Data for the Metropolis Center

The environmental measure of activities at the Metropolis Center is the amount of electricity and water it may use. The 2008 SWEIS analyzed the operating levels to be supported by about 15 megawatts of electrical usage and 51 million gallons (193 million liters) per year of water. Table A-10 presents operations data for CY 2008.

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

The High Explosives Processing Key Facility is located in all or parts of six TAs. Building types consist of production and assembly facilities, analytical laboratories, explosives storage magazines, and a facility for treatment of 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 1999 SWEIS, this Key Facility has one HazCat 2 nuclear building in TA-08 (TA-08-0023). In June 2005, this facility was removed from the Nuclear Facilities list. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified 32 buildings within this Key Facility. Table 2.6-1 provides details.

Table 2.6-1. High Explosives Processing Buildings Identified as Less-than-HazCat-3 Facilities

Building	Description	LANL 2009[a]
TA-08-0022	X-Ray Facility	RAD
TA-08-0023	Betatron Building	RAD
TA-08-0065	Sealed Sources	RAD
TA-08-0070	Nondestructive Testing and Evaluation	RAD
TA-08-0120	Radiography	RAD
TA-11-0002	Vibration Test	RAD
TA-11-0025		RAD
TA-11-0030	Vibration Test Bldg	RAD
TA-11-0036		RAD
TA-11-0065	Burn Pit	RAD
TA-16-0202	Laboratory	RAD
TA-16-0207	Component Testing	RAD
TA-16-0260	High Explosive Pressing, Machining, and Inspection	RAD
TA-16-0261	Component Storage	RAD
TA-16-0263	Component Storage	RAD
TA-16-0267	Component Storage	RAD
TA-16-0280	Inspection Building	RAD
TA-16-0281	Rest House	RAD
TA-16-0283	Component Storage	RAD
TA-16-0285	Component Storage	RAD
TA-16-0300	Component Storage	RAD
TA-16-0301	Component Storage	RAD
TA-16-0302	Component Storage/Training	RAD
TA-16-0332	Component Storage	RAD
TA-16-0410	Assembly Building	RAD
TA-16-0411	Assembly Building	RAD
TA-16-0413	Component Storage	RAD
TA-16-0414	Storage Building	RAD
TA-16-0415	Component Storage	RAD
TA-16-0955	Component Storage	RAD
TA-37-0010	Storage Magazine	RAD
TA-37-0016	Storage Magazine	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

Operations at this Key Facility are performed by personnel in multiple directorates, divisions, and groups. Weapons Technology (WT) Division is responsible for the majority of high explosives manufacturing and assembly work. Dynamic Experimentation (DE-1) in the Dynamic and Energetic Materials (DE) Division performs chemical synthesis of new explosives and provides analytical and testing services. Detonator Design (W-6) in Weapons Systems Engineering (W) Division operates a detonator test laboratory and performs research and development on new initiation systems. Detonator Fabrication (WCM-3) in Weapons Component Manufacturing (WCM) Division produces stockpile detonators and initiation devices. An Applied Engineering and Technology group conducts nondestructive testing and evaluation.

WT Division brings the majority (>99 percent) of explosives into LANL, stores them as raw material, presses the raw explosives into solid shapes, and machines these shapes to customers' specifications. The completed shapes are shipped to customers on- and off-site for use in experiments and open detonations. DE-1 produces a small quantity of high explosives during the year from basic chemistry and lab-scale synthesis operations. W-6 and WCM-3 use a small quantity of explosives for manufacturing and testing detonators and initiating devices. Waste explosives from pressing and machining operations and excess explosives are treated by open burning or open detonation.

Information from multiple divisions must be combined to capture operational parameters for production and processing high explosives. This information is presented both in separate and combined forms.

2.6.1 Construction and Modifications at High Explosives Processing

The 1999 SWEIS projected four facility modifications for this Key Facility. All four projects were completed before 1999. These four modifications were

- construction of the High Explosive Wastewater Treatment Facility
- modification of 17 outfalls and their elimination from the NPDES permit
- relocation of the Weapons Components Testing Facility
- TA-16 steam plant conversion

The 2008 SWEIS projected the following modifications to this Key Facility:

- complete construction of TA-16 Engineering Complex
- removal or demolition of vacated structures that are no longer needed

In addition to the facility modifications, additional construction and modification projects were completed. A detailed description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

The Building TA-16-1409 incinerator (DOE 2000a) associated with the burn operations of high explosives-contaminated combustible trash underwent Resource Conservation and Recovery Act (RCRA) clean-closure and was dismantled and scrapped. RCRA closure has also been obtained for TA-16-401 and -406 units at the TA-16 Burn Ground.

The High Explosive Wastewater Treatment Facility at TA-16 is a centralized treatment plant that became operational in 1997. It processed approximately 11,000 gallons of wastewater in CY 2008 through an evaporator, leaving no treated effluent at the

NPDES-permitted outfall. RCRA closure activities continued for the TA-16-387 flash pad and for the TA-16-394 burn tray, resulting in a total of about 860 cubic yards of hazardous wastes being removed. A burn unit was upgraded, improving capacity and efficiency and minimizing environmental impacts.

All high explosives burning operations were consolidated at TA-16-388 and -399. Burning operations are generally limited to TA-16-388, although TA-16-399 is still available for burning of bulk high explosives.

In CY 2008, High Explosives Engineering vacated the following structures: TA-16-363, -435, and -437 and 37-1, -2, -3, -6, -8, -9, -10, -16, -17, -19, -20, and -27 in preparation for transfer to Surveillance and Maintenance. TA-16-307 was used for high explosive packaging and transportation and parts storage. There is no longer plastics development at TA-16. Several small transportable office buildings were removed in CY 2008 in support of footprint reduction (see Section 3.11.2 for details), including TA-16-243, -245, -246, -367, -898, and -1407. Utility disconnects were completed for many other transportable office buildings in anticipation of their removal in CY 2009 (DOE 1996a, b).

The historic restoration of the TA-08 Gun Site was initiated in CY 2008 with Phase 1 completion anticipated in CY 2009 (DOE 1996c). DD&D of structures TA-08-26, -30, -32, -65, and -127 was completed (DOE 1998b).

Heavy equipment maintenance operations were relocated from TA-15-185 to TA-09-28. TA-09-28 formerly housed a machine shop (DOE 1996d). Refurbishment of laboratories and electrical infrastructure safety upgrades progressed at TA-09-21 (DOE 1996e, f).

Removal of the historically significant TA-11 Drop Tower was initiated and completed in CY 2008 (DOE 2002b).

Construction of the new Detonator Storage Facility supporting TA-22 production activities was initiated in CY 2008 with completion expected in CY 2009 (DOE 2003c).

2.6.2 Operations at High Explosives Processing

The 1999 SWEIS identified six capabilities for this Key Facility. No new capabilities have been added, and none have been deleted in the 2008 SWEIS (Table A-11). Activity levels during CY 2008 continued below those projected in the SWEIS. High explosives and plastics development and characterization operations remained below levels projected in the SWEIS. Plastics development no longer occurs at TA-16.

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 in the 1999 SWEIS were 82,700 pounds of explosives and 2,910 pounds of mock explosives. In CY 2008, 968 pounds of high explosives and 260 pounds of mock high explosives material were used in the fabrication of test components for Hydrodynamic Experimentation (HX), DE, W, Physics (P), and WT Divisions and external customers. DE-1 synthesized approximately 20 pounds of DAAF, which was formulated into plastic-bonded materials primarily for use on-site. Materials testing by DE-1 at TA-09 expended <1 pound of various explosives, including PBX-9501, DAAF, TAGzT, TAGDNAT, and DNAT. Materials testing by W-6 at TA-22 also expended <1 pound of PETN-based detonators.

During CY 2008, WT Division produced pieces of explosives weighing 968 pounds. In machining experimental components, 858.5 pounds of water-saturated explosive scrap were generated and treated by open burning. The machined components were sent to HX, W, P, WT, and DE Divisions, Lawrence Livermore National Laboratory, and external customers for experimentation and test detonations. High explosives processing and high explosives laboratory operations generated 10,644 gallons of explosive-contaminated water, which were treated at the High Explosive Wastewater Treatment Facility using a newly installed evaporator system. Explosive waste treated by open burning at the TA-16 Burn Ground in CY 2008 included 596 pounds of explosives-contaminated filters, 375 pounds of explosives-contaminated sand, and 13 gallons of the solvent dimethyl-sulfoxide containing dissolved high explosives. To treat these explosives and contaminated materials, 1,400 gallons of propane were expended. Non-detonable explosive-contaminated metal was cleaned and salvaged or sent for recycling.

Efforts continued in CY 2008 to develop protocols for obtaining stockpile returned materials, develop new test methods, and procure new equipment to support requirements for science-based studies on stockpile materials.

2.6.3 Operations Data for High Explosives Processing

In CY 2008, operations levels were well below projections made by the SWEIS (Table A-12). Under the new NPDES permit, outfalls 03A-130 and 05A-097 were eliminated. One outfall from the High Explosive Processing Facility remains on the permit: 05A-055 the High Explosive Wastewater Treatment Facility.

2.7 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 TAs, comprises more than one-half (22 of 40 square miles) of the land area occupied by LANL, and has 16 associated firing sites. All firing sites are situated 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) and the Vessel Preparation Building (building TA-15-534). Building types consist of preparation and assembly facilities, bunkers, analytical laboratories, high explosives storage magazines, and offices. Activities consist primarily of testing munitions and high explosives components for nuclear weapons and for Science-Based Stockpile Stewardship Program tests and experiments and for threat reduction activities. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified three buildings within this Key Facility. Table 2.7-1 provides details.

Table 2.7-1. High Explosives Testing Buildings/Sites Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-15-Firing Site	Firing Site (R307)	RAD
TA-15-R183	Vault	RAD
TA-39-0002	Laboratory/Office Building	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.7.1 Construction and Modifications at High Explosives Testing

The 1999 SWEIS projected one facility modification for this Key Facility:

- construction of DARHT

This facility was evaluated in a separate environmental impact statement (DOE 1995a), however, installation and component testing of the accelerator and its associated control and diagnostics systems began in 1999.

The 2008 SWEIS projected the following modifications to this Key Facility:

- Complete construction of 15 to 25 new structures within the Two-Mile Mesa Complex to replace 59 structures currently used for dynamic experimentation
- Remove or demolish vacated structures that are no longer needed

In addition to the projected facility modifications, additional construction and modification projects were completed. A complete description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

Former DX Division Strategic Plan for the Future. In 2002, DOE/NNSA determined that an environmental assessment would be required for the former DX Division strategic plan, including the new structures to be built at TA-22 and the subsequent DD&D and replacement of old buildings located in TA-15. NEPA coverage for the strategic plan was provided by the *Environmental Assessment for the Proposed Consolidation of Certain Dynamic Experimentation Activities at the Two-Mile Mesa Complex, Los Alamos National Laboratory, Los Alamos, New Mexico*, and subsequent FONSI issued in November 2003 (DOE 2003d).

No facilities within the High Explosives Testing Key Facility were decommissioned and removed during CY 2008, nor were there any significant construction projects completed that changed or advanced the capabilities within the High Explosives Testing Key Facility.

2.7.2 Operations at High Explosives Testing

The 1999 SWEIS identified seven capabilities for this Key Facility. No new capabilities have been added, and none have been deleted in the 2008 SWEIS (Table A-13).

Levels of research were below those predicted by the SWEIS. The total amount of depleted uranium expended during testing (all capabilities) is an indicator of overall activity levels at this Key Facility. Less than 10 kilograms of depleted uranium were expended in 2008, compared to approximately 3,900 kilograms projected in the 2008 SWEIS. The quantity of expended depleted uranium includes the quantity of depleted uranium expended during material sanitization.

In 2008, no hydrotesting was performed at DARHT. Intermediate-scale dynamic experiments containing beryllium, single-walled steel containment vessels continued at the Eenie Firing Point (TA-36-03) along with other programmatic experiments. The use of a steel vessel mitigates essentially all of the fragments and particulate emissions associated with an experiment.

2.7.3 Operations Data for High Explosives Testing

The operational data levels were well below what was projected in the SWEIS. Table A-14 provides details.

2.7.4 Cerro Grande Fire Effects at High Explosives Testing

Continuing Effects. The LANL Environmental Programs (EP) Directorate's Project Management and Field Services Organization continues to monitor the storm water control placements and re-vegetation efforts (best management practices [BMPs]) that were conducted immediately after the fire. To date, these efforts, a direct consequence of the fire, appear to be successful in stabilizing soils within the High Explosive Testing Key Facility area of LANL by minimizing run-off and reducing storm flows onto High Explosive Testing Key Facility property. These inspection and monitoring efforts continued through CY 2008.

Other fire-related activities involve fuel wood mitigation efforts and continued tree and undergrowth thinning throughout the High Explosive Testing Key Facility.

2.8 Tritium Facilities (TA-16)

This Key Facility consists of tritium operations at TA-16. In 2008, tritium operations at TA-21, the Tritium Science and Fabrication Facility (TSFF, Building TA-21-209) and the Tritium Systems Test Assembly (TSTA) were put in Surveillance and Maintenance mode and are planned for DD&D. Tritium operations in 2008 were conducted in the Weapons Engineering Tritium Facility (WETF, Building TA-16-205).

Limited operations involving the removal of tritium from actinide materials are conducted at LANL's TA-55 Plutonium Complex; 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 Plutonium Complex Key Facility.

The WETF is listed as a HazCat 2 Nuclear Facility (Table 2.8-1). In CY 2008,the tritium inventory was greater than 30 grams.

Table 2.8-1. Tritium Buildings with Nuclear Hazard Classification

Building	Description	NHC SWEIS ROD	NHC DOE 2009[a]	NHC LANL 2009[b]
TA-16-0205[c]	WETF	2	2	2
TA-16-0205A[c]	WETF	2		2
TA-16-0450[c]	WETF	2		2

a DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2009)
b DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities (LANL 2007b)
c In 2003, TA-16-205 and TA-16-205A were nuclear facilities while TA-16-450 was not operational with tritium. The three buildings were physically connected, but radiologically separated. Following a readiness review, TA-16-205, -205A, and -450 will be considered one facility.

2.8.1 Construction and Modifications at the Tritium Facilities

The 1999 SWEIS projected one facility modification to this Key Facility:

- Extending the WETF tritium operations into TA-16-450. This was completed in 2003

The 2008 SWEIS projected no major facility modifications to this Key Facility.

2.8.2 Operations at the Tritium Facilities

The 1999 SWEIS identified nine capabilities for this Key Facility. The 2008 SWEIS also identified nine capabilities for this Key Facility, however, with operations ceasing at TA-21, two capabilities were added and two capabilities were deleted. The following changes have been made since the 1999 SWEIS identified this as a Key Facility:

- Cryogenic Separation was removed as a capability
- Thin Film Loading was removed as a capability
- Hydrogen Isotopic Separation was added as a new capability
- Radioactive Liquid Waste Treatment was added as a new capability, however, this capability will be removed with decommissioning of TA-21 tritium buildings.

Operations in CY 2008 were within projections by the SWEIS. The WETF performed at or near the SWEIS projections of 65 gas processing operations during CY 2008.

Table A-15 lists the nine capabilities identified in the SWEIS and presents CY 2008 operational data for each of these capabilities. In addition to the capabilities listed in the SWEIS, other activities included disposition of legacy containers and shipment and receipt of bulk tritium.

2.8.3 Operations Data for the Tritium Facilities

Data for operations at the Tritium Facility were well below levels projected in the SWEIS. Operational data are summarized in Table A-16.

2.9 Target Fabrication Facility (TA-35)

The TFF is a two-story building (TA-35-213) housing activities related to weapons production and laser fusion research. This Key Facility is categorized as a Low Hazard non-nuclear facility. The TFF laboratories and shops are specialized to provide precision machining, polymer science, physical and chemical vapor deposition, and target assembly.

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified one building within this Key Facility. Table 2.9-1 provides details.

Table 2.9-1. TFF Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-35-0213	TFF	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.9.1 Construction and Modifications at the Target Fabrication Facility

The 1999 SWEIS and the 2008 SWEIS projected no major facility modifications to this Key Facility. Upgrades to the facility that were not projected and that have been completed are detailed in the 2007 Yearbook (LANL 2009a).

2.9.2 Operations at the Target Fabrication Facility

The 1999 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). No new capabilities have been added, and none has been deleted in the 2008 SWEIS.

The number of targets and specialized components fabricated for testing purposes was consistently less than the 6,100 targets per year projected in the SWEIS. As seen in Table A-17, operations at the TFF were below levels projected in the SWEIS.

2.9.3 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. In CY 2008, operation levels were lower than those projected in the SWEIS. Table A-18 details operations data for CY 2008.

2.10 Bioscience Key Facility (TA-43, TA-03, TA-16, TA-35, and TA-59)

The Bioscience Key Facility definition includes the main HRL facility (Buildings TA-43-1, -37, -45, and -20) plus additional offices and labs located at TA-35-85, -254, and -2, and TA-03-562 and -1076. Additionally, Bioscience has small operations located at TA-16-460. Operations at TA-43 and TA-35-85 and -2 include 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 and TA-16 have relatively minor impacts because of low numbers of personnel and limited quantities of materials. Bioscience research capabilities focus on the study of intact cells (conducted at Biosafety Levels 1 and 2 [e.g., BSL-1 and -2]), cellular components (e.g., RNA, DNA, and proteins), instrument analysis (e.g., laser and mass spectroscopy), and cellular systems (e.g., repair, growth, and response to stressors). All Bioscience activities are classed as Low Hazard non-nuclear in all buildings within this Key Facility; there are no Moderate Hazard non-nuclear facilities or nuclear facilities (LANL 2007b). The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified six buildings within this Key Facility. Table 2.10-1 provides details.

Table 2.10-1 Bioscience Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-43-0001	HRL	RAD
TA-43-0028	Laboratory/Office	RAD
TA-43-0047	Laboratory/Office	RAD
TA-43-0049	Laboratory/Office	RAD
TA-35-0002	Nuclear Safeguards Research Building	RAD
TA-59-0001	Occupation Health Laboratory	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.10.1 Construction and Modifications at the Bioscience Facilities

The 1999 SWEIS and 2008 SWEIS projected no new construction or major modifications to this Key Facility.

Construction and modification projects were completed. A complete description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

In CY 2007, due to the deterioration of the steam condensate return line leading to the steam plant, a temporary holding tank was installed (DOE 1996g). In CY 2008, the line was replaced.

A new roof was installed on the lower south and west sections of the facility. Only minor interior changes were made to accommodate operational needs (i.e., office reconfigurations; heating, ventilation, and air conditioning renovations; laser lab decommissioning; and the institutional Electrical Infrastructure Safety Upgrades [EISU] Project).

As in previous years, the volume of radioactive work at HRL continues to decrease. This decline is attributed to technological advances and new methods of research, such as the use of laser-based instrumentation and chemiluminescense, which do not require the use of radioactive materials. For example, DNA sequencing predominantly uses laser analysis of fluorescent dyes adhering to DNA bases instead of radioactive techniques.

The HRL facility has BSL-1 and -2 work, which includes limited work with potentially infectious microbes. All activities involving infectious microorganisms are regulated by the Centers for Disease Control, 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.

During CY 2004, Bioscience finalized construction on the BSL-3 facility. Progress on final engineering requirements, the Authorization Basis, and readiness assessments continue. BSL-3 is a 3,202-square-foot, stand-alone, containment facility located remotely from the Los Alamos town site, in the canyon east of Diamond Drive and south of Sigma Road (south of MSL and Sigma Buildings). The building will include two BSL-3 and one BSL-2 suites plus associated administrative space designed to safely handle and store infectious organisms. 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 initially provided by the *Environmental Assessment for the Proposed Construction and Operation of a Bio-Safety Level 3 Facility at Los Alamos National Laboratory*, dated February 26, 2002, and a FONSI (DOE 2002c). However, the FONSI was withdrawn by DOE/NNSA on January 22, 2004, due to the need to re-evaluate new circumstances concerning BSL-3 operations. Additional NEPA coverage for this project in the form of an environmental impact statement is in progress.

2.10.2 Operations at Bioscience Facilities

The 1999 SWEIS identified eight capabilities for the Bioscience Facilities. Reorganization and growth in Bioscience Division led to definitional changes in the existing capabilities and continues to restructure and redirect to enhance growth. The 2008 SWEIS identified 12 capabilities for this Key Facility (Table A-19). The following changes have been made since the 1999 SWEIS identified Bioscience as a Key Facility:

- Bio-Materials and Chemistry was renamed Biologically Inspired Materials and Chemistry
- Computational Biology was added as a new capability
- Environmental Effects was renamed Environmental Microbiology
- Genomic and Proteomic Science was added as a new capability
- Cytometry was renamed Measurement Science and Diagnostics
- Molecular Synthesis was added as a new capability
- Structural Cell Biology was renamed Structural Biology
- Pathogenesis was added as a new capability
- Neurobiology was removed as a capability
- Biothreat Reduction and Bioforensics was added as a new capability
- In-Vivo Monitoring is not a Biosciences Division capability, however, it is located at TA-43-1, therefore, it is included within this Key Facility

2.10.3 Operations Data for Bioscience Facilities

Table A-20 presents the operations data as measured by radioactive air emissions, NPDES discharges, and generated waste volumes. The generation of most waste (chemical, administrative, and mixed LLW [MLLW]) has decreased from historical levels and was lower than the SWEIS projections.

2.11 Radiochemistry Facility (TA-48, TA-46 and TA-59)

The Radiochemistry Key Facility includes all of TA-48 (116 acres). Since the issuance of the 1999 SWEIS, this Key Facility has expanded into buildings within TA-46 and TA-59. 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 six major research buildings: the Radiochemistry Laboratory (Building TA-48-01), the Assembly Checkout Building (TA-48-17), the Diagnostic Instrumentation and Development Building (TA-48-28), the Clean Chemistry/Mass Spectrometry Building (TA-48-45), the Weapons Analytical Chemistry Facility (48-107), and the Machine and Fabrication Shop (TA-48-08).

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified 26 buildings within this Key Facility. Table 2.11-1 provides details.

Table 2.11-1 Radiochemistry Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-48-0001	RC-1	RAD
TA-48-0008	Isotope Separator Building	RAD
TA-48-0017	Assembly and Checkout Building	RAD
TA-48-0026	Office Building	RAD
TA-48-0027	Transportable	RAD
TA-48-0028	Advanced Analytical Development Building	RAD
TA-48-0033	Transportable	RAD
TA-48-0038	Metal Building	RAD
TA-48-0039	Metal Building	RAD
TA-48-0045	Clean Chemistry/Mass Spec Building	RAD
TA-48-0063	Transportainer	RAD
TA-48-0107	Weapons Analytical Chemistry Building	RAD
TA-48-0111	Transportainer	RAD
TA-48-0168	Chemical/Storage Building	RAD
TA-48-0180	Chemical/Storage Building	RAD
TA-48-0181	Chemical/Storage Building	RAD
TA-48-0215	Transportainer	RAD
TA-48-0236	Walk-in Cooler	RAD
TA-59-0001	Occupational Health Lab	RAD
TA-46-0024	Laboratory/Office	RAD
TA-46-0031	Test Building #2	RAD
TA-46-0041	Laser Isotope Support Facility	RAD
TA-46-0154	Physical Chemistry Lab	RAD
TA-46-0158	Laser Induced Chemistry Lab	RAD
TA-46-0208	FEL Lab Building	RAD
TA-46-0416	Morgan Shed	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.11.1 Construction and Modifications at the Radiochemistry Facility

The 1999 SWEIS and 2008 SWEIS projected no major facility modifications to this Key Facility.

Construction and modification projects were completed. A complete description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a).

2.11.2 Operations at the Radiochemistry Facility

The 1999 SWEIS identified 10 capabilities for the Radiochemistry Key Facility. The 2008 SWEIS added one capability to this Key Facility—Hydrotest Sample Analysis. This capability was initiated in 2005 to measure beryllium on contaminated surfaces.

As seen in Table A-21, only four of the 10 capabilities were active at levels projected in the SWEIS: Radionuclide Transport Studies, Isotope Production, Actinide/Transuranic (TRU) Chemistry, and Sample Counting.

2.11.3 Operations Data for the Radiochemistry Facility

In CY 2008, operations data levels were below those projected in the SWEIS. Table A-22 provides details.

2.12 Radioactive Liquid Waste Treatment Facility (TA-50)

The RLWTF is located at TA-50 and consists of the treatment facility (Building TA-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 these treatment operations.

This Key Facility is a Nuclear HazCat-3 facility and includes the following structures: the RLWTF itself (Building TA-50-01), influent tanks and pumping station (TA-50-02), the acid and caustic waste storage tank vault (TA-50-66), a 100,000-gallon influent storage tank (TA-50-90), and a building that houses evaporator storage tanks (TA-50-248) (Table 2.12-1).

There are no other nuclear facilities and no Moderate Hazard non-nuclear buildings within this Key Facility (LANL 2007b).

Table 2.12-1. Radioactive Liquid Waste Treatment Facility Buildings with Nuclear Hazard Classification

Building	Description	1999 SWEIS	NHC LANL 2009[a]
TA-50-0001	Main Treatment Plant	2	3
TA-50-0002	Influent tanks and pumps		3
TA-50-0066	Acid and Caustic Waste Tanks		3
TA-50-0090	Holding Tank		3
TA-50-0248	Evaporator Storage Tanks		3

a DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2009)
b DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities (LANL 2009b)

2.12.1 Construction and Modifications at the Radioactive Liquid Waste Treatment Facility

The 1999 SWEIS projected three modifications to the RLWTF Key Facility:

- Upgrade tank farm
- Install new ultrafiltration and reverse osmosis process
- Install new nitrate reduction equipment

Construction and modification projects were completed. A complete description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

The craft shop was relocated to make room for the construction of a new 300,000-gallon influent storage facility funded by the Cerro Grande Rehabilitation Project. Construction of the new facility (TA-50-250) started during 2004; it was about 80% complete by the end of 2008.

The 2008 SWEIS projected no major modifications to this Key Facility.

2.12.2 Operations at the Radioactive Liquid Waste Treatment Facility

The 1999 SWEIS identified five capabilities for the RLWTF Key Facility. The 2008 SWEIS identified two capabilities for this Key Facility. The following changes have been made since the 1999 SWEIS identified RLWTF as a Key Facility:

- Waste Characterization, Packaging, and Labeling was combined with Waste Transport, Receipt, and Acceptance
- Radioactive Liquid Waste Pretreatment was combined with Radioactive Liquid Waste Treatment
- Decontamination Operations were relocated to the Solid Radioactive and Chemical Waste Key Facility at TA-54

The primary measurement of activity for this facility is the volume of radioactive liquid processed through the main treatment plant. In CY 2008, discharge volumes were 4.4 million liters, much less than the projected discharge volume of 35 million liters per year in the SWEIS. Two factors have contributed to reduced waste volumes—source reduction and process improvements. Source reduction efforts, for example, included the re-routing of two significant waste streams, non-radioactive 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. Process improvements included recycling of radioactive liquid waste within the RLWTF. For example, process waters are now used instead of tap water for the dissolution of chemicals needed in the treatment process and for filter backwash operations.

2.12.3 Operations Data for the Radioactive Liquid Waste Treatment Facility

The SWEIS did not project the quality of effluent, only quantity. However, there were zero violations of the State of New Mexico discharge limit for nitrate, fluoride, and total dissolved solids, zero violations of NPDES permit limits, and zero violations of the DOE discharge standards for radioactive liquid wastes during CY 2008.

In CY 2008, operations data levels were below those projected in the SWEIS Table A-24 provides details.

2.13 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 TA-53-03, which houses the linac, is 315,000 square feet. Activities consist of neutron science and nuclear physics research, proton radiography, the development of accelerators and diagnostic instruments, and production of medical radioisotopes. 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 Areas B and C. Isotope production had not occurred since 1998; however, the new Isotope Production Facility received its first beam on December 23, 2003, as part of the facility commissioning activities that continued into 2004. The Isotope Production Facility completed its fourth full run cycle in 2008.

Experimental Area C is the location of proton radiography experiments for the Science-Based Stockpile Stewardship Program. A new experimental facility for the production of ultracold neutrons was commissioned in 2005 in Area B, and completed its first full run cycle in 2006 (DOE 2002d). Experimental Area A, formerly used for materials irradiation experiments and isotope production, is currently inactive. A second accelerator facility located at TA-53, the Low-Energy Demonstration Accelerator (LEDA), was decommissioned and dismantled in 2006.

The 1999 SWEIS identified two HazCat-3 nuclear facilities (Buildings 53-07 and 53-30). In September 2006, the DOE concurred with LANSCE's request to be considered as an accelerator facility regulated under DOE Order 420.2B and all facilities at TA-53 were removed from the nuclear hazard facility list in CY 2007. LANSCE is classified as an Accelerator Facility and currently operates under two main safety basis documents. Document one is the LANSCE Safety Assessment Document (SAD), which has six volumes that describe the accelerator and the experimental areas. The SAD volumes are as follows: Volume I—LINAC, Volume II—Isotope Production Facility (IPF), Volume III—Experimental Area C, Volume IV—Experimental Area B, Volume V—Experimental Area A, Volume VI—Lujan Center. The second safety basis document is the LANSCE Accelerator Safety Envelope, which provides the operating bounds for the six areas discussed in SAD Volumes I–VI.

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified two buildings within this Key Facility. Table 2.13-1 provides details.

Table 2.13-1. LANSCE Buildings Identified as Less-than-HazCat-3 Nuclear Facilities

Building	Description	LANL 2009[a]
TA-53-0945	Liquid Waste Treatment Facility	RAD
TA-53-0954	Rad Liquid Waste Basins	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.13.1 Construction and Modifications at Los Alamos Neutron Science Center

The 1999 SWEIS projected significant facility changes and expansion to occur at LANSCE. Table 2.13.1-1 indicates that four projects have been completed, and no additional projects began in 2008.

The 2008 SWEIS projected no major modifications to this Key Facility.

Table 2.13.1-1. Status of Projected Facility Changes at LANSCE

Description	SWEIS ROD Ref.	Completed
Closure of two former sanitary lagoons	2-88-R	Yes[a]
LEDA to become operational in late 1998	2-89-R	Yes – 1999[b]
Short-Pulse Spallation Source enhancements	2-90-L	Yes[c]
One-megawatt target/blanket	2-91-L	No
New 100-MeV Isotope Production Facility	2-92-L	Yes[d]
Long-Pulse Spallation Source, including decontamination and renovation of Area A	3-25-L	No[e]
Dynamic Experiment Laboratory	3-25-R	No[f]
Los Alamos International Facility for Transmutation	3-25-R	No
Exotic Isotope Production Facility	3-27-L	No
Decontamination and renovation of Area A-East	3-27-L	No

a Characterization started in CY 1999 and continued into CY 2000. Clean up at the south lagoon began in CY 2000 with the removal of the sludge and liner. Data analysis and sampling continued through CY 2001 for both lagoons and an Interim Action Plan was written for remediation of the north lagoon. Clean up of the north lagoon was done in CY 2002. The lagoons (Solid Waste Management Unit [SWMU] 53-002[a]-99) have been remediated, with the complete removal of all contaminated sludge and liners; the nature and extent of residual contamination have been defined, and it has been shown that the residual contamination does not pose a potential unacceptable risk to humans or the environment. Currently the site is located within an industrial area under LANL (institutional) control. The site is expected to remain so for the reasonably foreseeable future. For these reasons, neither additional corrective action nor further characterization is warranted at the site. The New Mexico Environment Department (NMED) approved the final report in 2006.

b 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 in the SWEIS. LEDA was shut down in December 2001 and will remain inactive until funding is resolved. [Note: The 2003 omnibus bill passed by Congress included funding for LEDA decontamination and decommissioning (D&D). The plan was to remove the accelerator and some but not all support equipment and leave the building and certain installed equipment in place. This was accomplished/completed in 2006.]

c The Short-Pulse Spallation Source project was completed in 2003. This project consisted of two components: Accelerator Enhancement and Spectrometer Enhancement. The Accelerator Enhancement portion completed in June 2003 provided a brighter H- ion source and upgrade to the Proton Storage Ring to handle the higher beam current. The Spectrometer Enhancement subproject completed in January 2004 provided three new neutron scattering spectrometers to the Lujan Center and upgraded the capability of one instrument.

d Preparations began in the spring of CY 1999 for construction of the new 100-million-electron-volt Isotope Production Facility. Construction started in CY 2000 and the facility was completed in CY 2002. The Isotope Production Facility received its first beam on December 23, 2003. Commissioning was completed in 2004, and the facility has completed three full production run cycles as of the end of 2007.

e Renovation of Area A is underway and it is presently projected that the area will be cleared of prior programmatic equipment and in standby mode to house a new mission by the beginning of CY 2010.

f The Science-Based 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. At present, the Laboratory is not pursuing the concept of a stand-alone Dynamic Experiment Laboratory.

The 2008 SWEIS projected two modifications to LANSCE:

- Installation of Material Test Station (MTS) equipment in Experimental Area A
- Construct Nuetron Spectroscopy Facility within existing buildings (under High-Powered Microwaves and Advanced Accelerators capability)

In 2008, execution of the MTS began.

In addition to the projected facility modifications, additional construction and modification projects were completed. A complete description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

Several projects were initiated in 2008. An institutional third-party-funded Energy Savings Performance Contract (ESPC) Project was initiated in five buildings (TA-53-01, -02, -24, -31, and -622) at LANSCE. At LANSCE, lighting upgrades will include replacement/relamping and improved consistency of lighting and appropriate lighting levels (DOE 1996h). Institutionally, 40 buildings will be improved through ESPC. An institutional project to improve NPDES compliance and water conservation was initiated in 2008. At LANSCE, the first NPDES project goal is to ensure compliance with new NPDES outfall parameters for metals beginning in 2010. Eventually, two remaining LANSCE outfalls will be eliminated and water savings are expected from this second phase (DOE 1996i). One large project continued at LANSCE in 2008—the LANSCE-Refurbishment (LANSCE-R) Project, which will replace obsolete and end-of-life components to maintain acceptable reliability of the 800-million-electron-volt proton linac and increase beam delivery time to experimental areas to 3000 hours/year (LANL 2007c). The progress made in 2008 for LANSCE-R included formal project document development, project reviews, and approval for Conceptual Design 1.

2.13.2 Operations at Los Alamos Neutron Science Center

The 1999 SWEIS identified seven capabilities for this Key Facility. The 2008 SWEIS identified eight capabilities for this Key Facility (Table A-25). The following changes have been made since the 1999 SWEIS identified this as a Key Facility:

- MTS was added as a new capability
- Accelerator-Driven Transmutation Technology was removed as a capability
- Radioactive Liquid Waste Treatment (Solar Evaporation at TA-53) was added as a new capability

During CY 2008, LANSCE operated the accelerator and four of the five experimental areas. Area A has been idle for more than seven years. The primary indicator of activity for this facility is production of the 800-million-electron-volt LANSCE proton beam as shown in Table A-25. These production figures are all less than the 6,400 hours at 1,250 microamps projected in the SWEIS. There were no experiments conducted for transmutation of wastes.

The most significant accomplishment in CY 2008 for LANSCE was the successful completion of the run cycle for the three primary experimental facilities: the WNR, the Proton Radiography area, and the Manuel Lujan Center. LANSCE hosted over 480 user visits during the seven-month 2008 run cycle. The facility operated at an average 77.6 percent availability for the Lujan Center and 84.6 percent for WNR, allowing the completion of 289 experiments for internal and external neutron scattering and neutron nuclear physics users. Another significant accomplishment was the second production run for the ultra-cold neutron experimental area.

2.13.3 Operations Data for Los Alamos Neutron Science Center

In CY 2008, waste generation and NPDES discharge volumes were well below projected quantities. Radioactive air emissions are a key parameter since LANSCE emissions have historically accounted for more than 95 percent of the total LANL offsite dose. The total point source emissions were approximately 249 curies, which represents a 98 percent decrease from 2005. As in recent years, the Area A beam stop did not operate during 2008; however, operations in Line D resulted in the majority of emissions reported for 2008. Table A-26 provides details of LANSCE operations.

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

The Solid Radioactive and Chemical Waste Key Facility is 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 LANL.

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.

In September 2007, the Waste Characterization, Reduction, and Repackaging (WCRR) Facility (Building TA-50-69) was updated to a HazCat 2 Nuclear Facility (LANL 2007b).

In addition, there are several other HazCat 2 nuclear facilities/operations; the LLW disposal cells, shafts, and trenches and fabric domes and buildings within Area G; the Radioactive Assay and Nondestructive Test Facility (Building TA-54-38), and outdoor operations at the WCRR Facility. In addition to the nuclear facilities, the Decontamination and Volume Reduction System (DVRS), TA-54-412, was added to the Less-than-HazCat-3 Nuclear Facility list in CY 2002 (LANL 2002c). The Actinide Research Training and Instruction Center (ARTIC), formerly the Radioactive Materials Research Operations and Demonstration facility, was downgraded from a HazCat-3 Nuclear Facility to a Less-than-HazCat-3 Nuclear Facility.

As shown in Table 2.14-1, the SWEIS recognized 22 structures as having HazCat 2 nuclear classification (Area G was recognized as a whole and then individual buildings and structures were also recognized). The WCRR Facility was identified as a HazCat 2 in the SWEIS, but because of inventories and the newer guidelines, it was downgraded to a HazCat 3. In September 2007 the WCRR Facility was again updated to a HazCat 2 facility.

Table 2.14-1. Solid Waste Buildings with Nuclear Hazard Classification

Building	Description	1999 SWEIS	NHC LANL 2009[a]
TA-50-0069	WCRR Facility Building	2	2
TA-50-0069 Outside	Nondestructive Analysis Mobile Activities		2
TA-50-0069 Outside[b]	Drum Storage		
TA-54-Area G[c]	LLW Storage/Disposal	2	2
TA-54-0002	TRU Storage Building		2
TA-54-0008	Storage Building		
TA-54-0033	TRU Drum Preparation	2	2
TA-54-0038	Radioassay and Nondestructive Testing Facility	2	2
TA-54-0048	TRU Waste Management Dome	2	2
TA-54-0049	TRU Waste Management Dome	2	2
TA-54-0153	TRU Waste Management Dome	2	2
TA-54-0224	Mixed Waste Storage Dome		2
TA-54-0226	TRU Waste Management Dome	2	2
TA-54-0229	TRU Waste Management Dome	2	2
TA-54-0230	TRU Waste Management Dome	2	2
TA-54-0231	TRU Waste Management Dome	2	2
TA-54-0232	TRU Waste Management Dome	2	2
TA-54-0283	TRU Waste Management Dome	2	2
TA-54-0375	TRU Waste Management Dome	2	2
TA-54-1027	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome		2
TA-54-1028	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome		2
TA-54-1030	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome		2
TA-54-1041	Hazardous, Chemical, Mixed, and Tritiated Waste Storage Dome		2
TA-54-Pad10[d]	Storage Pad	2	2

a DOE/LANL list of Los Alamos National Laboratory Nuclear Facilities (LANL 2007b).
b In the most recent Nuclear Facilities List (LANL 2007b), "Drum Storage" includes drum staging/storage pad and waste container temperature equilibration activities outside TA-50-69.
c 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 TRU Waste Inspection and Storage Program); TRU legacy waste in pits and shafts; low-level disposal of asbestos in pits and shafts. Operations building: TRU waste storage.
d Pad 10 was originally designated as Pads 2 and 4 in the SWEIS.

2.14.1 Construction and Modifications at the Solid Radioactive and Chemical Waste Facility

The 1999 SWEIS projected two construction activities for this Key Facility:

- construction of four additional fabric domes for the storage of TRU wastes retrieved from earth-covered pads
- expansion of Area G

The construction of four additional fabric domes for the storage of TRU wastes retrieved from earth-covered pads was completed. Expansion of Area G has not begun due to funding.

The 2008 SWEIS projected one major modification to this Key Facility:

- plan, design, construct, and operate waste management facilities transition projects to facilitate actions required by the Consent Order

These projects will replace LANL's existing facilities for solid waste management. The existing facilities at TA-54 are scheduled for closure and remediation under the Consent Order.

In addition to project facility modifications, other construction projects were completed. A description of these projects can be found in the 2007 Yearbook (LANL 2009a). If work continued in CY 2008, it is listed below.

The Offsite 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 US Nuclear Regulatory Commission or agreement state licensee;
- are excess and unwanted and are a DOE responsibility under Public Law 99-240[6] (42 USC); 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 and focuses on the problem of sources and devices held under US Nuclear Regulatory Commission or 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 sources that will become excess and unwanted over the next decade. This reorganization combined three activities, the Radioactive Source Recovery Program, the Offsite Waste Program, and the Plutonium-239/Beryllium Neutron Source Project. As of February 2008, about 15,300 sources had been brought to LANL. Of these, about 3,500 were sent offsite for disposition (DOE 2008c). Approximately 883 sources were collected for storage at TA-54 during CY 2008. Eventually, these sources will be

[6] Public Law 99-240: an act to amend the Low-Level Radioactive Waste Policy Amendments Act of 1985. Introduced in the Senate and House of Representatives of the United States of America in Congress assembled, Ninety-Ninth Congress, January 15, 1986. The Policy Act was designed to stimulate development of new facilities by encouraging states to form interstate compacts for disposal on a regional basis.

shipped to the Waste Isolation Pilot Plant (WIPP) for final disposition. The OSR Project received NEPA coverage under an environmental assessment and subsequent FONSI (DOE 1995b), Accession Numbers 6279 (DOE 1996j), 7405 (DOE 1999c), and 7570 (DOE 1999d), the 1999 SWEIS (DOE 1999a), and the 2008 SWEIS (DOE 2008c).

2.14.2 Operations at the Solid Radioactive and Chemical Waste Facility

The 1999 SWEIS identified eight capabilities for the Solid Radioactive and Chemical Waste Key Facility. The 2008 SWEIS identified seven capabilities for this Key Facility (Table A-27). The following changes have been made since the 1999 SWEIS identified Solid Radioactive and Chemical Waste as a Key Facility:

- Other Waste Processing was renamed Waste Treatment
- Compaction was combined with Waste Treatment
- Size Reduction was combined with Waste Treatment
- Disposal was renamed Waste Disposal
- Decontamination Operations was added as a new capability

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 2008 to projections made by the SWEIS can be summarized as follows:

Chemical wastes. During CY 2008, approximately 724 metric tons of chemical wastes were generated at LANL. This compares to an average quantity of 3,250 metric tons per year projected in the SWEIS.

LLW. During CY 2008, approximately 2,594 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 in the SWEIS. No new disposal cells were constructed, and disposal operations did not expand into either Zone 4 or Zone 6 at TA-54.

MLLW. During CY 2008, 25 cubic meters were generated and delivered to TA-54, compared to an average volume of 632 cubic meters per year projected in the SWEIS.

TRU wastes. During CY 2008, 385 cubic meters of TRU wastes were shipped to WIPP, and 98 cubic meters of newly generated TRU wastes (non-hazardous) were added to storage.

Mixed TRU wastes. During CY 2008, 300 cubic meters of mixed TRU wastes were shipped to WIPP, approximately 65 cubic meters of mixed TRU wastes were received for storage.

In summary, chemical and radioactive waste management activities were at levels below those projected in the SWEIS at this Key Facility. These and other operational details are in Table A-27.

2.14.3 Operations Data for the Solid Radioactive and Chemical Waste Facility

Levels of activity in CY 2008 were less than projected in the SWEIS. Table A-28 provides details.

2.15 Plutonium Complex (TA-55)

The Plutonium Facility Complex consists of six primary buildings and a number of support, storage, security, and training structures located throughout TA-55. The Plutonium Facility, Building 55-4, is categorized as a HazCat 2 Nuclear Facility, but was built to comply with the seismic standards for HazCat 1 buildings. In addition, TA-55 includes two low hazard chemical facilities (Buildings 55-3 and 55-5) and one low hazard energy source facility (55-7). In CY 2003, the Associate Directorate for Stockpile Manufacturing acquired and took ownership of the TA-50-37 building, designated as the ARTIC. A new structure for TA-55, the TA-55-314 Fire Safe Storage Building, was completed in October of 2004. In May 2005, a staging facility, PF-185 (55-185), was upgraded to HazCat 2. A third HazCat 2 Nuclear Facility, the Safe Secure Transport (SST) Facility (55-355), was constructed and became operational in November 2005.

The DOE/NNSA listing of LANL nuclear facilities for both 1998 and 2008 (DOE 2009, LANL 2009c) retained Building TA-55-4 as a HazCat 2 Nuclear Facility. The LANL Nuclear Facilities List revised in 2005 added Buildings TA-55-185 and TA-55-355 to the list of Nuclear HazCat 2 facilities (LANL 2009b) (Table 2.15-1). TA-55-185 was slated to be used for mixed oxide (MOX) rods storage in FS65 shipping containers; however, the building was found to be unacceptable (seismic and other requirements) and was never used as such. In January 2007, TA-55-185 was removed from the Nuclear Facilities List. In January 2008, the SST pad (55-355) was removed as a nuclear facility. The SWEIS also identified one potential HazCat 2 Nuclear Facility (TA-55-41, the Nuclear Material Storage Facility), which was projected for potential modification to bring it into operational status. This was not done, and the DOE/NNSA removed this facility from its list of nuclear facilities in its April 2000 listing (DOE 2000a). DD&D of this building began in November 2007, and was completed in late summer 2008.

Table 2.15-1. Plutonium Complex Buildings with Nuclear Hazard Classification

Building	Description	1999 SWEIS[a]	NHC LANL 2009[b]
TA-55-0004	Plutonium Processing	2	2
TA-55-0041	Nuclear Material Storage	2	[c]
TA-55-185	Drum Storage Building		[d]
TA-55-355	SST Facility		[d]

a DOE List of Los Alamos National Laboratory Nuclear Facilities (DOE 2009)
b DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities (LANL 2009b)
c PF-41 was DD&D'd in 2008
d Removed from DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities (LANL 2009b)

The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified one building within this Key Facility. Table 2.15-2 provides details.

Table 2.15-2. Plutonium Facility Identified as Less-than-HazCat-3 Nuclear Facility

Building	Description	LANL 2009[a]
TA-50-0037	ARTIC	RAD

a LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b)

2.15.1 Construction and Modifications at the Plutonium Complex

The 1999 SWEIS projected four facility modifications:

- Renovation of the Nuclear Material Storage Facility
- 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 (includes the 1996 installation of a new TA-55 Facility Control System)
- Further upgrades for long-term viability of the facility and to boost production to meet the 20 pits per year capacity

The 2008 SWEIS projected two facility modifications:

- Plutonium Facility Complex Refurbishment Project—Repair and replacement of mission critical cooling system components for buildings in TA-55 to allow these facilities to continue to operate and for NNSA to install a new cooling system that meets current standards regarding phase-out of Class 1 ozone-depleting substances.
- TA-55 Radiography Facility Project—TA-55 Radiography/Interim (LANL 2001d). Completed in 2008. TA-55 Radiography, complements TA-55 Radiography/Interim, on hold in CY 2008 due to funding (LANL 2001d).

In addition to the four facility modifications listed in the 1999 SWEIS, other construction and modification projects have been completed over the years. A detailed description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

- CMRR Project DOE Pre-conceptual Design (LANL 2001c), ongoing in CY 2008.[7]
- In 2007 construction of the Radiological Laboratory/Utility/Office Building (RLUOB) began. Construction was ongoing in 2008.
- D&D and upgrades of equipment were initiated in order to upgrade small sample fabrication with a new machining line for plutonium samples. This upgrades work continued through 2008.

2.15.2 Operations at the Plutonium Complex

TA-55, located just southeast of TA-3, includes the Plutonium Facility Complex and is the chosen location for the CMRR Project. This facility provides chemical and metallurgical processes for recovering, purifying, and converting plutonium and other actinides into many compounds and forms. Additional capabilities include the means to ship, receive, handle, and store nuclear materials, as well as to manage the wastes and residues produced by TA-55 operations. Relocated chemistry and metallurgy research, actinide chemistry, and materials characterization capabilities that may be provided at the site through the Project currently are in the pre-conceptual phase of construction.

The 1999 SWEIS identified seven capabilities for this Key Facility. No new capabilities have been added in the 2008 SWEIS (Table A-29). One capability, Special Nuclear Material (SNM) Storage, Shipping, and Receiving, had planned to use the Nuclear Material Storage Facility. Because of changes in plans, the Nuclear Material Storage Facility will not be used for this activity, and the SNM storage, shipping, and receiving

[7] The CMRR Project was covered by an environmental impact statement (DOE 2003a).

capability has been renamed Storage, Shipping and Receiving. In addition to storing SNM inventory, TA-55 will provide temporary storage of Security Category I and II materials removed from TA-18 pending shipment to the Nevada Test Site (NTS) and other DOE Complex locations; sealed sources collected under the DOE's OSR Program; and MOX fuel rods and fuel rods containing archive and scrap metals from MOX fuel lead assembly fabrication.

In CY 2008, all seven capabilities activity levels were below those projected in the SWEIS.

2.15.3 Operations Data for the Plutonium Complex

Operations data at this Key Facility remained below levels projected in the SWEIS with one exception. Chemical waste generated during 2008 exceeded SWEIS projections due to the disposal of cooling tower sediment from the roof of TA-55-06. Details of the Plutonium Complex operational data are presented in Table A-30.

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 TAs and comprise approximately 14,224 of LANL's 26,480 acres.

As shown in Table 2.16-1, the 1999 SWEIS identified six buildings within the Non-Key Facilities with Nuclear Hazard Categories. The High-Pressure Tritium Facility (Building TA-33-86), classified in 2001 as a HazCat 2 Nuclear Facility, was removed from the Nuclear Facilities List in March 2002 and downgraded to a radiological facility. The DD&D of the formerly used tritium facility, TA-33-86, was completed in 2002. In November 2003, five potential release sites (PRSs) located within Non-Key Facilities were added to the Nuclear Facilities List.

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

Building	Description	SWEIS 1999	NHC LANL 2009[a]
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	
TA-35-0002	Non-American National Standards Institute Uranium Sources	3	
TA-35-0027	Safeguard Assay and Research	3	
TA-10 PRS 10-002(a)-00	Former Liquid Disposal Complex		3

a DOE/LANL List of Los Alamos National Laboratory Nuclear Facilities (LANL 2007b)

Additionally, several Non-Key Facilities were identified as Less-than-HazCat-3 nuclear facilities. The updated LANL Less-than-HazCat-3 Nuclear Facilities List (LANL 2009b) identified 32 buildings within this Non-Key Facility. Table 2.16-2 provides details.

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

Building	Description	LANL 2009[a]
TA-03-0016	Ion Beam Facility	RAD
TA-03-0034	Cryogenics Bldg. B	RAD
TA-03-0040	Physics Bldg., office and lab	RAD
TA-03-0169	Warehouse	RAD
TA-03-0215	Physics Analytical Center	RAD
TA-03-0216	Weapons Test Facility	RAD
TA-03-0217		RAD
TA-03-0494	Geochemical Analytical Facility	RAD
TA-03-1819	Experiment Mat'l Lab	RAD
TA-03-2002	X-Ray Machine Lab	RAD
TA-03-2322	NISC	RAD
TA-21-0005	Lab Bldg	RAD
TA-21-0150	Molecular Chemistry	---
TA-21-0152	Laboratory	RAD
TA-21-0155	TSTA Facility	RAD
TA-21-0209	TSFF Labs and Offices	RAD
TA-21-0213	Lab Supply Warehouse	RAD
TA-21-0257	Manhole Station	RAD
TA-33-0086	High Pressure Tritium	RAD
TA-35-0002	Nuclear Safeguards Research	RAD
TA-35-0027	Nuclear Safeguards Lab	RAD
TA-35-0034	Nuclear Safeguards Research Bldg.	RAD
TA-35-0087	Laboratory and offices	RAD
TA-35-0124	Antares Target Hall	RAD
TA-35-0125	Atlas Bldg.	RAD
TA-35-0126	Mechanical Bldg.	RAD
TA-35-0189	Trident Laser Lab	RAD
TA-35-0374	Morgan Shed	RAD
TA-36-0001	Laboratory and offices	RAD
TA-36-0214	Central HP Calibration Facility	RAD
TA-41-0001	Underground Vault	RAD
TA-41-0004	Laboratory	---

a LANL Radiological Facilities List (LANL 2009b)

2.16.1 Construction and Modifications at the Non-Key Facilities

The 1999 SWEIS projected one major construction project for the Non-Key Facilities:

- construction of Atlas

Construction and modification projects were completed. A complete description of these projects can be found in the 2007 SWEIS Yearbook (LANL 2009a). If work continued into CY 2008, it is listed below.

The 2008 SWEIS projected no major modifications to the Non-Key Facilities.

NPDES Outfall Project. The NPDES Outfall Project (DOE 1996k) is an ongoing project and is described in detail in the 2002 SWEIS Yearbook (LANL 2003), section 2.16.

Los Alamos Site Office Building

Description. The LASO Building is proposed to consolidate core personnel within DOE/NNSA into a centralized and modern office building to meet the long-term needs of the organization. This building will be located on the south side of West Jemez Road at the west end of the Wellness Center in TA-03. The facility will be single story, approximately 25,000 total gross square feet. The plans and specifications include structural, architectural, mechanical, electrical, and civil designs. The special systems designs include the fire protection system, the security system, and the building telecommunication system. Because this is greenfield development, the building services utility designs include sewer, water, and natural gas.

Status. This project received NEPA coverage through an existing DOE-approved categorical exclusion (DOE 2005). The notice of contract award was January 24, 2007, and beneficial occupancy occurred August 2008.

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) as shown in Table A-31. The eighth category, environmental restoration, is discussed in Section 2.17. During CY 2008, no new capabilities were added to the Non-Key Facilities, and none of the eight existing capabilities was deleted.

2.16.3 Operations Data for the Non-Key Facilities

The Non-Key Facilities occupy more than half of LANL and now employ about 74 percent of the workforce. In 2008, the Non-Key Facilities generated about 54 percent of the total LANL chemical waste volume; about 25 percent of the total LLW volume; about 73 percent of the MLLW volume; and about seven percent of the total TRU waste volume. Table A-32 presents details of the operations data from CY 2008.

The combined flows of the Sanitary Wastewater System (SWWS) and the TA-03 Steam Plant account for about 65 percent of the total discharge from Non-Key Facilities and about 50 percent of all water discharged by LANL. Section 3.2 has more detail.

2.17 Environmental Cleanup

The Laboratory through the EP Directorate performs cleanup of sites and facilities formerly involved in weapons research and development.

The EP Directorate includes the operations and responsibilities of the previous Environmental Restoration (ER) Project, which generates a significant amount of waste during characterization and remediation activities; therefore, the EP cleanup programs are included as a section in Chapter 2. The 1999 SWEIS projected that EP would contribute 60 percent of the chemical waste, 35 percent of the LLW, and 75 percent of the MLLW generated at the Laboratory. The 2008 SWEIS projected that implementation of the Consent Order would contribute 80 percent chemical waste, 65 percent LLW, 97 percent MLLW, and 44 percent TRU and mixed TRU at the Laboratory.

2.17.1 History of Corrective Action Sites at LANL

The DOE established the ER Project in 1989 to characterize and, if necessary, remediate SWMUs and Areas of Concern (AOCs) known or suspected to be contaminated from historical Laboratory operations. Many of the SWMUs and AOCs are located on DOE/NNSA property and some properties containing SWMUs and AOCs have been conveyed to Los Alamos County or to private (within Los Alamos town site) ownership. Characterization and remediation efforts are regulated by the NMED for chemical constituents, by the New Mexico Solid Waste Act (NMSA 1978, §74-9-36[D]) and by DOE/NNSA for radionuclides under the Atomic Energy Act implemented through DOE Order 5400.5, "Radiation Protection of the Public and the Environment," and DOE Order 435.1, "Radioactive Waste Management."

In 1990, in accordance with the requirements of RCRA, 2,124 corrective action sites were identified by LANL. Of these sites, 1,099 were subsequently listed by EPA in Module VIII of LANL's Hazardous Waste Facility Permit and became subject to the RCRA Hazard and Solid Waste Amendments of 1984 (HSWA) requirements as regulated under the administrative authority of the EPA. EPA determined that the remaining 1,025 sites did not require regulation under the same corrective action requirements of Module VIII and that 543 of these were also suitable for "no further action" (NFA), leaving only 482 non-HSWA sites. As the owner of the LANL facility, the DOE retained the regulatory administrative authority for these remaining non-HSWA sites. This administrative action reduced the total number of corrective action sites remaining in the investigation process at LANL to 1,581.

On January 1, 1996, EPA transferred their authority for implementing HSWA requirements to the NMED. From 1996 through 2007, NMED granted 166 approvals of NFA for the corrective action sites under its administrative authority and removed these sites from Module VIII of LANL's Hazardous Waste Facility Permit. Also during this time period, six previously unknown corrective action sites were identified and reported to the administrative authority. Combined, these administrative actions reduced the total number of corrective action sites remaining in the investigation process to 1,421.

During 1999 and 2000, LANL undertook an effort to consolidate corrective action sites. The consolidation effort was undertaken pursuant to NMED's Hazardous Waste Fee Regulations and to account for the number of corrective action sites subject to annual fees but did not affect the number of sites tracked in Module VIII. Sites having geographic proximity and similar operating history, contaminant types, or migration pathways were combined into consolidated units. Sites not meeting the consolidation criteria remained as discrete units. A few sites that consisted of multiple unrelated components were split into individual sites. For example, SWMU 16-017 was split into 24 individual sites and SWMUs 01-002 and 00-033 were split into two individual sites each. Splitting these sites added a total of 25 sites, altering the number of corrective action sites remaining in the investigation process at LANL to 1,446.

On March 1, 2005, the NMED, the DOE, and the University of California entered into a Compliance Order on Consent (Consent Order), which superseded Module VIII. Under the agreement of the Consent Order, all 2,124 original corrective action sites, the six newly identified sites, and the 25 sites split during the consolidation effort were subject to the new Consent Order requirements with the exception of the 166 sites removed from Module VIII by NMED and the 543 sites approved for NFA by EPA. Therefore, 1,446 sites are regulated under the Consent Order. The Consent Order provides that the status of all 1,446 sites (those requiring corrective action and those with completed corrective actions) will be tracked in LANL's Hazardous Waste Facility Permit.

The Consent Order replaced the determination for NFA with a "Certificate of Completion." Since the start of the Consent Order through the end of 2008, NMED issued 32 Certificates of Completion without Controls and 12 Certificates of Completion with Controls. Of the 44 Certificates of Completion issued, four overlapped former EPA approvals for NFA and one overlapped NMED removals from Module VIII of LANL's Hazardous Waste Facility Permit; thus, only 39 are subtracted. This administrative action reduced the total number of corrective action sites remaining in the investigation process at LANL to 1,407.

From the March 1, 2005, effective date of the Consent Order through the end of 2008, corrective actions have been completed at 94 sites. Requests for Certificates of Completion for these sites have been made to NMED in various investigation reports. For the majority of these sites, NMED has approved the report but delayed issuing Certificates of Completion contingent upon implementation of the Laboratory's NPDES Permit for Individual SWMUs and AOCs. Although not administratively complete, no additional corrective actions will be undertaken for these sites, thus reducing the total number of corrective action sites remaining in the investigation process at the close of FY 2008 to 1,313.

In Table IV-2 of the Consent Order, 45 sites within Testing Hazard Zones are deferred for investigation and corrective action until the firing site used to delineate the relevant Testing Hazard Zone is closed or inactive and the DOE determines that it is not reasonably likely to be reactivated. NMED has also approved delayed corrective action: (1) at 28 sites where investigation is not feasible until future D&D of associated operational facilities, (2) at five sites that are currently active units, and (3) at four sites until operations cease at nearby non-deferred firing sites. It is expected that corrective actions for both the deferred and the delayed sites will ultimately be implemented under LANL's Hazardous Waste Facility Permit, as facility closure is not likely to occur prior to the end date of the Consent Order (currently 2015).

LANL has also completed corrective actions at several AOCs, which have not yet been administratively closed. Prior to the effective date of the Consent Order, NMED had approved 28 non-HSWA corrective action sites in various approval letters for reports. Although no further corrective actions are required for these sites, the Consent Order provides that the process for administrative closure of these sites must be conducted through LANL's Hazardous Waste Facility Permit. This administrative closure process will be implemented after LANL's new Hazardous Waste Facility Permit is issued.

2.17.2 Environmental Cleanup Operations

The projects wrote and/or revised 24 work plans and 22 reports and submitted them to the NMED during 2008. A work plan proposes investigation activities designed to characterize SWMUs, AOCs, consolidated units, aggregate areas, canyons, or watersheds. An investigation report presents the data, evaluates the results, determines the site status, and recommends additional investigation, remediation, monitoring, or NFA, as appropriate. Thirty other plans, reports, and miscellaneous documents were submitted to NMED in 2008.

NMED granted 13 SWMUs and AOCs Certificates of Completion under the Consent Order in 2008. The following section provides summaries of the investigations for which activities were started, continued, and/or completed in 2008 and those investigations for which reports were submitted in 2008.

Upper Los Alamos Canyon Aggregate Area. Sampling and other investigation/remediation activities were started in 2008. All field activities proposed in the approved work plan were conducted using a phased approach. The objectives of the investigation work plan are to define the nature and extent of contamination associated with the sites within the aggregate area and to remove inactive structures, such as pipes or septic tanks related to the sites, where appropriate, and to conduct confirmatory sampling after removing the structures. Most of the mesa-top sites in the Los Alamos town site (TA-0 and TA-1) have been developed as commercial or residential properties. As a result, many sites addressed in the work plan, or portions of them, are inaccessible. In addition, because many of the previous activities were sparsely documented—in terms of exact locations and volumes of material excavated or placed as fill—the locations or even the existence of some Laboratory-related structures are not well known. Samples of soil, fill, sediment, and tuff were collected using the most efficient and least disruptive methods appropriate to the conditions at the site.

Guaje/Barrancas/Rendija Canyons Aggregate Area. The Laboratory conducted field investigations in 2006 and submitted both the investigation report and a revised report in 2007. Because of erosion during storms or other runoff events, potential exists for continued exposure of asphalt or tar in the vicinity of AOC C-00-041. A work plan was developed and approved by NMED to monitor, by visual inspection, the asphalt contamination at the surface of the site every two years and remove visible asphalt and tar, if exposed. Visual inspections start in 2009. Storm water discharges from SWMUs and AOCs in the Guaje/Barrancas/Rendija Canyons Aggregate Area are subject to permitting under the Clean Water Act and will be monitored under the annual update to the Laboratory's Storm Water Pollution Prevention Plan for SWMUs and AOCs and Storm Water Monitoring Plan. Following precipitation events that produce large enough volumes of discharge for sample collection, a maximum of four samples (filtered and unfiltered) will be collected quarterly during each CY (fewer may be collected if four precipitation events of sufficient magnitude do not occur). A monitoring report will be submitted to NMED following each inspection. The need to continue inspection and asphalt removal activities will be reevaluated with the United States Forest Service and NMED after every third inspection (i.e., every six years).

TA-16-340 Complex (Consolidated Units 13-003[a]-99 and 16-003[n]-99 and Solid Waste Management Units 16-003[o], 16-026[j2], and 16-029[f]). To address potential risk and extent issues, a Phase II investigation was conducted, involving additional soil removal and sampling to complete the investigation of the TA-16-340 Complex sites. The Phase II investigation was conducted to (1) define vertical and lateral extent of potential contamination present in soil and tuff at Consolidated Units 13-003(a)-99 and 16-003(n)-99, and SWMUs 16-003(o), 16-026(j2), and 16-029(f); and (2) remove soil containing elevated concentrations of organic and inorganic chemicals of potential concern (COPCs) (specifically arsenic and benzo[a]pyrene) within SWMU 16-003(o). Eighteen boreholes (17 shallow and one intermediate depth) were drilled, 106 samples were collected, and 88 yd^3 of soil and tuff was excavated during the Phase II investigation.

The lateral and vertical extent of inorganic and organic COPCs was defined using data from previous and 2008 investigations. The human health risk screening assessments concluded that there are no potential unacceptable risks or doses under the industrial and construction worker scenarios. The ecological risk screening assessment indicated no potential risk to ecological receptors.

Consolidated Units 16-007(a)-99 (30s Line) and 16-008(a)-99 (90s Line). A supplemental investigation work plan was submitted and approved by NMED, which proposed the following actions:

- Excavate and remove areas of high explosives contamination at Consolidated Unit 16-007(a)-99 and hexavalent chromium contamination at Consolidated Unit 16-008(a)-99.
- Collect samples to confirm cleanup and characterize the lateral and vertical extent of any residual contamination at both sites.
- Advance a single 300-ft depth borehole at the confluence of a prominent drainage and the 90s Line Pond to determine the vertical extent of copper, RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), trinitrobenzene (1,3,5-), and acetone in soil and tuff.
- Develop and sample the monitoring well south of the 90s Line Pond on a quarterly basis for one year and install a pressure transducer to monitor water-level fluctuations on a continuous basis following well development.
- Provide a strategy for collecting sediment samples within the 90s Line Pond and above the BMPs installed in June 2008 in the tributary drainages to the pond for minimizing transport of contaminated sediment into the pond. Collect samples at periodic intervals (every five years) to evaluate whether contaminant concentrations in sediment in the pond are increasing.

Consolidated Unit 16-021(c)-99 (260 Outfall) Groundwater Investigation. A supplemental work plan was submitted and approved to address the uncertainties identified in the Corrective Measures Evaluation (CME) report for Consolidated Unit 16-021(c)-99 intermediate and regional groundwater. The additional investigations include installing wells, sampling and monitoring existing and new wells, screening existing and new well groundwater data against applicable standards, performing single-well pump tests in all new wells, and conducting a multi-well pump test. Regional wells R-25b and R-25c were drilled in 2008.

Bayo Canyon Aggregate Area. The Laboratory completed investigation activities and submitted the investigation report and revision 1 of the report in 2008. Based on the characterization data from the investigation, the nature and extent of surface and subsurface contamination are defined for all sites within the aggregate area. The sites do not pose potential unacceptable risks or doses to human health under the recreational and construction worker scenarios or to ecological receptors. Consolidated Unit 10-001(a)-99, SWMU 10-004(a), SWMU 10-006, and AOCs 10-009 and C-10-001 do not pose potential unacceptable risks or doses to human health under the residential scenario.

The Laboratory requested Certificates of Completion for Corrective Action Complete without Controls for Consolidated Unit 10-001(a)-99, SWMUs 10-006 and 10-004(a), and AOCs 10-009 and C-10-001. The following actions are being planned for Consolidated Unit 10-002(a)-99:

- Maintain the Central Area (comprised of SWMUs 10-003[a–g, i–o], 10-004[b], and 10-007) under DOE administrative control, implement institutional controls to limit site access and potential strontium-90 mobilization, and negotiate additional actions, if needed, between DOE and the property owner (Los Alamos County).
- Remove two isolated areas of elevated strontium-90 activity identified outside of the Central Area but within Consolidated Unit 10-002(a)-99 as a good stewardship practice.

Middle Los Alamos Canyon Aggregate Area. An investigation report was submitted in 2008. The Laboratory recommended that the five sites identified as potentially having unacceptable risk or dose be remediated. NMED approved the investigation report and recommendations and a Phase II investigation work plan was submitted. The Laboratory provided an investigation work plan to address additional sampling required to define the extent of contamination at all the sites. The Phase II work plan identified specific remediation goals and specific sampling locations, sampling depths, and analytical suites required to define the extent of contamination for all sites.

Pueblo Canyon Aggregate Area. The investigation report and revision were submitted to NMED. The nature and extent of contamination is defined and no potential unacceptable risks or doses to human health are present under the residential scenario at eight sites. The ecological risk screening assessments determined that none of the sites pose risks to ecological receptors. NMED granted Certificates of Completion for Corrective Action Complete without Controls for SWMU 00-039 and AOCs 00-030(d), 00-030(eN), 00-030(j), 00-030(n), 00-030(o), 00-030(p), and C-00-043. Four sites were recommended for additional characterization or remediation. A Phase II investigation work plan was subsequently submitted and approved by NMED to conduct the additional characterization or remediation at SWMU 31-001, AOC 00-030(eS), AOC 00-030(h), and Consolidated Unit 45-001-01, as well as at SWMU 00-018(a) and AOC 00-018(b).

Middle Cañada del Buey Aggregate Area. Investigation sampling was conducted and completed in 2008 for AOCs 18-005(b), 18-005(c), 51-001, and 54-007(d).

MDA C. The Laboratory submitted a Phase II investigation work plan in 2007, which was approved by NMED and implemented in 2008. The activities proposed in the Phase II work plan were designed to provide the additional data needed to define the extent of contamination at MDA C by collecting subsurface tuff and pore-gas samples at greater depths and at additional locations. Surface soil samples were also collected and analyzed for inorganic chemicals to confirm the results of previous screening-level sample analyses. Specific activities included drilling five new boreholes outside the boundary of MDA C and extending nine existing boreholes to greater depths to define the lateral and vertical extent of contamination, collecting surface soil samples at multiple locations across MDA C to be analyzed for inorganic chemicals, installing vapor monitoring wells using the five new boreholes and nine extended boreholes, and collecting fracture-density and orientation data to evaluate the potential role of fractures in contaminant transport.

A pilot test was conducted at MDA C to evaluate three subsurface vapor-sampling systems: the packer system, the Flexible Liner Underground Technology (FLUTe) system, and the stainless-steel (SS) tubing system. Subsurface vapor samples were collected from four sets of paired boreholes inside the MDA C boundary and to the north and south outside of the MDA C boundary. Based on the pilot test results, the packer system is adequate for initial measuring of pore-gas concentrations, while the FLUTe system and the SS tubing system are preferable for subsurface vapor monitoring. Because none of the systems result in adsorption of volatile organic compounds (VOCs) and tritium in the sampling train, all systems tested are appropriate for sampling VOCs and tritium in pore gas.

A second pilot test was conducted to evaluate and compare three different vapor-sampling systems, all of which have been used at the Laboratory. The objective of the pilot test was to evaluate three subsurface vapor-sampling systems: the current or new FLUTe system, the older FLUTe monitoring system installed in MDA G during the 1990s (vintage FLUTe), and a SS system. It cannot be concluded that significant differences exist between vintage FLUTe and new FLUTe samples or between vintage FLUTe and SS samples. The comparison of VOC data from the vintage FLUTe system with data from the SS sampling system does not support the proposition that adsorption of VOCs in the vintage FLUTe sampling trains is occurring that would bias samples collected using MDA G FLUTe systems. NMED approved both pilot test reports.

MDA L. An interim subsurface vapor monitoring plan was submitted and approved with modifications. The plan describes proposed subsurface monitoring activities and the frequencies at which sampling is conducted within the vadose zone beneath MDA L. The eight boreholes drilled in 2004–2005 and the three boreholes drilled in 2007 provide complete coverage across the site and encompass all the subsurface rock units down to and including the basalt. The Laboratory developed a CME report and continued to monitor VOCs and tritium in subsurface pore gas at MDA L. Pore-gas monitoring data are reported in periodic monitoring reports. Additional characterization of groundwater beneath MDA L must be accomplished before NMED can completely review and comment on the CME report.

MDA G. The Laboratory continued to monitor VOCs and tritium in subsurface pore gas at MDA G. The VOC and tritium pore gas results are reported in periodic monitoring reports. A work plan for the implementation of a soil vapor extraction (SVE) pilot study was approved with modifications by NMED. The primary goal of the SVE pilot test conducted in 2008 was to evaluate the effectiveness of SVE and to determine whether SVE is a suitable alternative for remediating the MDA G vapor plumes. The results of the MDA G SVE pilot test indicate that SVE is an effective method for extracting vapor-phase VOC contamination from higher permeability geologic units in the vadose zone beneath MDA G. Approximately 260 lbs of VOCs were removed from the shallow-extraction borehole. The results indicate that an SVE remediation strategy using both active and passive extraction phases may increase the overall removal of vapor-phase VOCs from the subsurface. A second pilot test was conducted to evaluate Type 4 vapor monitoring systems at MDA G. NMED requested the evaluation to determine the potential for short-circuiting between sampling port depths. The pilot test indicates there is the potential for short-circuiting at distances up to 20 ft above and below each port and, therefore, creates uncertainty as to the actual depth of collected samples.

The CME report for MDA G was submitted in 2008. The CME report underwent NMED review in 2008 and will require revision in 2009.

MDA H. A study was conducted to clarify whether the pore-gas sampling systems produced comparable pore-gas data. The objective of the comparison was to determine whether the FLUTe sampling system is removing VOCs from the extracted air so as to substantially underestimate the VOC concentrations measured in the pore gas beneath MDA H. The comparison of the VOC results during the second and third quarter monitoring events in 2008 found no substantial difference in pore-gas concentrations using the FLUTe or the packer sampling systems. This conclusion is in agreement with the results from recent comparisons of the FLUTe and packer systems at MDA C and supports the conclusion that the FLUTe system is reliable for providing representative results.

Los Alamos/Pueblo Canyons. An interim measure work plan was developed and approved to reduce the migration of contaminated storm water and sediment within the watershed as part of an overall watershed-scale approach. Further watershed-scale evaluations of hydrologic processes in Los Alamos and Pueblo Canyons will be conducted to identify additional actions for controlling migration of contaminated sediment. Proposed interim measures include stabilization and enhancement of the Pueblo Canyon wetland; construction of a grade-control structure in lower Pueblo Canyon in the vicinity of the NM 4–NM 502 interchange; enhancement of the upstream wetland between the current Los Alamos County wastewater treatment plant outfall and the existing Pueblo Canyon wetland; construction of a pilot wing ditch to enhance the spread of water over the wetland, dissipation of flood energy, and deposition of suspended sediment; excavation and enhancement of basin above the Los Alamos Canyon low-head weir; construction of a new gaging station in Pueblo Canyon west of the current wastewater treatment plant outfall and east of Kwage Canyon and upgrading existing gaging stations immediately above and below the Los Alamos Canyon low-head weir; and stabilization of stream banks containing contaminated sediment.

A supplemental interim measure work plan was also developed, which provides details of additional mitigation actions to be implemented in the Los Alamos and Pueblo Canyons watershed to reduce the transport of contaminated sediment. The mitigation measures are intended to substantially reduce off-site transport of contaminated sediment and complement other actions implemented by the Laboratory and Los Alamos County. Proposed supplemental interim actions include a DP Canyon grade-control structure to reduce erosive flood energy and to cause upstream aggradation that will fill the channel and bury existing floodplain deposits; three cross-vane structures to be located in Pueblo Canyon between the confluences of Graduation and Kwage Canyons to decrease flood peaks before floods enter the downstream wetland; and extensive planting of willows to aid in surface stabilization, flow reduction, and sediment accumulation.

Pajarito Canyon. The Laboratory conducted phased investigations of sediment deposits in the Pajarito Canyon watershed from 2006 into 2008. The Pajarito Canyon biota studies were implemented in 2007 and completed in 2008. The Pajarito Canyon investigation report was submitted to NMED and presented the results of sediment, groundwater, surface water, and biota sampling and analyses. The objectives of the investigations included defining the nature and extent of COPCs in sediment, surface water, and groundwater and assessing the potential risks to human health and the environment from these COPCs. The investigations also address the sources, fate, and transport of COPCs in the canyon watershed.

The outfalls, septic systems, and surface releases primarily responsible for contaminants in surface water and groundwater are no longer active. Surface water and groundwater will continue to be monitored because contaminants in soil and alluvium and in bedrock media near the primary release sites continue to be secondary sources of contaminants to surface water and groundwater. The configuration of wells in the existing monitoring network is sufficient to meet the groundwater monitoring objectives for the watershed. The results of the Pajarito Canyon investigation indicate that human health risks and doses based on a recreational exposure scenario are acceptable. In addition, no adverse ecological effects were observed within terrestrial and aquatic systems in the Pajarito Canyon watershed.

Sandia Canyon. Phase 2 sediment investigations in Sandia Canyon were completed in 2008 and focused on evaluating the source and extent of contamination as well as on improving estimates of average concentrations of contaminants. The biota investigation work plan for Sandia Canyon investigation reaches was implemented in 2008. The proposed studies are based on assessment endpoints developed to protect the terrestrial and aquatic ecosystems within the watershed and complement previous studies conducted in the Los Alamos and Pueblo Canyons, Cañon de Valle, and Mortandad Canyon watersheds. Studies included nest box monitoring and collection of biota samples for laboratory analyses.

A fate and transport report was submitted in 2007, which is part of an ongoing investigation to address the chromium and other contaminants detected in surface water and groundwater beneath Sandia and Mortandad Canyons. An updated report presenting new results from investigations that assess the fate and transport of chromium in the environment, including modeling, laboratory experiments, and field observations, was submitted in 2008.

The chromium project investigation includes installation of several additional monitoring wells to further define the extent of contamination in the regional groundwater. In 2008, additional regional groundwater wells and one perched intermediate well were drilled to support this purpose. Regional well R-42 located in Mortandad Canyon was drilled with the objective of further characterizing the chromium contamination in the regional groundwater upgradient (west) of well R-28. This location is also thought to be within the primary chromium infiltration zone. Regional well R-43, located in Sandia Canyon, was drilled with the objective of further characterizing the chromium concentrations upgradient (northwest) of well R-28. Well R-43 is situated adjacent to perched-intermediate well SCI-2, which was drilled in Sandia Canyon to characterize the fate and transport of chromium along the infiltration pathway. Regional wells R-44 and R-45 are intended to supplement the information from regional wells R-35a, R-35b, R-36, R-13, and R-28. Well R-44 is located on the mesa south of well R-28 and is intended to define the southern limit of chromium contamination in the vicinity of well R-28. Well R-45 is located east of well R-28 and south of well R-11 and will investigate and characterize the downgradient extent of the chromium contamination.

Cañada del Buey. Sampling of the canyon reaches in Cañada del Buey was performed as proposed in the work plan and addendum and as modified by several subsequent documents all approved by the NMED. Phase 1 sediment sampling was conducted in Cañada del Buey reaches in 2008; extra sampling was also performed in 2008.

MDA V. The results of the investigation and remediation of the area of elevated radioactivity north of former absorption bed 3 were provided in a supplemental investigation report. The extent is defined for radionuclide, inorganic, and organic COPCs in both surface and subsurface media. Based on the human health risk assessment results, concentrations of COPCs in soil and tuff in the area of elevated radioactivity at Consolidated Unit 21-018(a)-99 do not pose a potential unacceptable risk/dose to human health under a residential scenario. The ecological risk screening assessment of the area of elevated radioactivity at Consolidated Unit 21-018(a)-99 indicated no potential risk/dose to ecological receptors. Based on the results of this and previous investigations, no additional corrective action is planned for Consolidated Unit 21-018(a)-99, specifically SWMUs 21-018(a), 21-018(b), 21-023(c), and 21-013(b) and AOC 21-013(g).

MDA A. Additional quarterly monitoring of the pore gas for VOCs and tritium was conducted to provide a more accurate assessment of vapor phase contamination beneath MDA A and reveal any trends in concentrations over time. Other than vapor monitoring, characterization and investigation activities at MDA A are complete. The Laboratory submitted a CME report for MDA A to NMED.

MDA B. During 2008, work focused on preparation of the site to support future remediation. Activities included construction of a haul road along the southern rim of the site to facilitate movement of materials to and from staging areas further to the east and inside the main TA-21 footprint, installation of utilities, fencing, and laydown areas.

DP Site Aggregate Area. A Phase II investigation work plan was submitted to NMED in 2008. The Phase II work plan refined the proposed extent sampling presented in the investigation report. Samples will be collected at Consolidated Unit 21-003-99 and SWMU 21-024(c) for polychlorinated biphenyls (PCBs) analyses to define the areas to be excavated. Environmental media containing total PCBs at concentrations greater than the 1-mg/kg cleanup level will be excavated. Confirmatory samples will be collected to verify that the cleanup goal has been met.

Technical Area 21, DD&D Projects. The TA-21 site contains multiple above-grade structures slated for DD&D. The 2008 activities included development of equipment removal plans for TSTA and electrical and fire panel deactivation of buildings 21-210 and 21-327.

American Reinvestment and Recovery Act (ARRA) for TA-21 Site. Targeted cleanup of several portions of the TA-21 Site were submitted through the federal granting process for possible funding under the ARRA, often referred to as the "Stimulus" program. Three major elements of future cleanup activity at the TA-21 include the TSTA D&D project, the DP East and West D&D Project, and the MDA B Cleanup Project. These projects are significant precursors to eventual closure of the site, but have lacked sufficient funding to proceed. The 2008 SWEIS supports this work activity should it receive funding.

Interim Facility-Wide Groundwater Monitoring Plan. The 2008 Interim Facility-Wide Groundwater Monitoring Plan was approved. Water monitoring in 2008 included base flow, alluvial groundwater, intermediate-perched groundwater, and regional aquifer groundwater in seven major watersheds or watershed groupings: Los Alamos/Pueblo Canyons, Sandia Canyon, Mortandad Canyon, Pajarito Canyon, Water Canyon/Cañon de Valle, Ancho/Chaquehui/Frijoles Canyons, and White Rock Canyon. Monitoring beyond LANL boundaries was conducted in areas affected in the past by LANL operations as well as in areas unaffected by LANL for the purpose of providing baseline data.

2.17.3 Site/Facility Categorization

No new Environmental Sites were added to the DOE/LANL Nuclear Facilities List during CY 2008 (Table 2.17.3-1).

Table 2.17.3-1. Environmental Sites with Nuclear Hazard Classification

Technical Area	SWMU/AOC	Description	HAZ CAT
TA-21	SWMU 21-014	MDA A is a 1.25-acre site that was used intermittently from 1945 to 1949 and from 1969 to 1977 to dispose of radioactively contaminated solid wastes, debris from D&D activities, and radioactive liquids generated at TA-21.	2
TA-21	SWMU 21-015	MDA B is an inactive 6.03-acre disposal site. It was the first common disposal area for radioactive waste generated at LANL and operated from 1945 to 1952. The site runs along the fenceline on DP Road and is located about 1,600 ft east of the intersection of DP Road and Trinity Drive.	3
TA-21	Consolidated Unit 21-016(a)-99	MDA T, an area of about 2.2 acres, consists of four inactive absorption beds, a distribution box, a subsurface retrievable waste storage area disposal shaft, a former waste treatment plant, and cement paste spills on the surface and within the retrievable waste storage area.	2
TA-35	AOC 35-001	MDA W consists of two vertical shafts or "tanks" that were used for the disposal of sodium coolant used in LAMPRE-1 sodium-cooled research reactor.	3
TA-35	Consolidated Unit 35-003(a)-99	An area consisting of residual contamination at depth that remained after the decommissioning and decontamination of the wastewater treatment plant located at the east end of Ten Site Mesa and operated from 1951 until 1963.	3
TA-35	Consolidated Unit 35-003(d)-00	The former structures associated with the Pratt Canyon component of the wastewater treatment plant. All buildings, foundations, and structures were removed during D&D activities in 1981 and 1985, then backfilled with 20 ft of clean fill material.	3
TA-49	Consolidated Unit 49-001(a)-00	MDA AB consists of an underground, former explosive test site that comprises four distinct areas, each with a series of deep shafts used for subcritical testing.	2
TA-54	SWMU 54-004	MDA H is a 0.3-acre site on Mesita del Buey containing nine inactive shafts that were used for disposal of LANL waste.	3
TA-54	Consolidated Unit 54-013(b)-99 [as an element of TA-54 Waste Storage and Disposal Facility, Area G]	MDA G is located within a 63-acre area known as Area G. MDA G was established in 1957 for disposal of LLW, and later was also used for retrievable storage of TRU waste. The site is composed of pits, shafts, and trenches that received waste until 1997. Other units at Area G continue to be used for LLW disposal and storage and processing of TRU waste for disposal at the WIPP.	2

3.0 Site-Wide 2008 Operations Data

The Yearbook's role is to provide data that could be used to develop an impact analysis. This chapter summarizes operational data at the site-wide level. These impact assessments are routinely undertaken by LANL, using standard methods that duplicate those used in the SWEIS; hence, they have been included to provide the basis for future trend analysis.

In the September 2008 ROD, DOE/NNSA decided to continue operation of LANL pursuant to the No Action Alternative analyzed in the 2008 SWEIS. The parameters of this alternative are set by the 1999 ROD and other decisions that DOE/NNSA has made regarding the continued operation of LANL.

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.

3.1 Air Emissions

3.1.1 Radiological Air Emissions

In the 2008 SWEIS No Action Alternative, radiological air emissions are projected to remain at levels similar to those projected in the 1999 SWEIS. However, short-term increases could occur during construction or DD&D activities as well as MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order.

Radiological airborne emissions from point sources (i.e., stacks) during 2008 totaled approximately 1,670 curies, approximately 8 percent of the 10-year average of 21,700 curies projected in the SWEIS.[8]

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 739 curies.

The total point source emissions from LANSCE were approximately 846 curies.

Non-point sources of radioactive air emissions are present at LANSCE, Area G, TA-18, and other locations around LANL. Non-point emissions, however, are generally small compared to stack emissions. For example, non-point air emissions from LANSCE were approximately 75 curies. Additional detail about radioactive air emissions is provided in LANL's 2008 annual compliance report to the EPA (LANL 2008a), submitted in June 2008, and in the 2008 Environmental Surveillance Report (LANL 2008b).

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[8] There will be many instances in the Yearbook that discuss SWEIS projections—if 1999 or 2008 does not precede SWEIS, then the projections mentioned refer to both the 1999 SWEIS and the 2008 SWEIS.

Maximum off-site dose for 2008 to the maximum exposed individual was 0.55 millirem. The EPA radioactive air emissions limit for DOE facilities is 10 millirem per year. This dose is calculated to the theoretical maximum exposed individual who lives at the nearest off-site receptor location 24 hours per day, eating food grown at that same site. No actual person received a dose of this magnitude.

3.1.2 Non-Radiological Air Emissions

3.1.2.1 Emissions of Criteria Pollutants

The 2008 SWEIS projects criteria pollutants would be smaller than those shown in the operating permit and well below the ambient standards established to protect human health with an adequate margin of safety. Minor non-radiological air quality impacts are projected to occur from the construction of the CMRR facility at TA-55, completion of the TA-16 Engineering Complex, demolition of structures at TA-16, construction of new buildings at the consolidated Two-mile Mesa Complex within TA-22, and implementation of the Consent Order.

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, LANL is required to estimate emissions, rather than perform actual stack sampling. As Table 3.1.2.1-1 illustrates, CY 2008 emissions of criteria pollutants are far below the estimated emissions presented in the SWEIS.

Table 3.1.2.1-1. Emissions of Criteria Pollutants as Reported on LANL's Annual Emissions Inventory[a]

Pollutants	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Carbon monoxide	Tons/year	58	58	14.5
Nitrogen oxides	Tons/year	201	201	20.8
Particulate matter	Tons/year	11	11	2.8
Sulfur oxides	Tons/year	0.98	0.98	0.3

a Emissions included on the annual Emissions Inventory Report do not include insignificant sources.

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 TA-3 combustion turbine, and the asphalt plant. In addition, emissions from the data disintegrator, carpenter shops, degreasers, oil storage tanks, and permitted beryllium machining operations are reported. For more information, refer to LANL's Emissions Inventory Report for 2008 (LANL 2009d). In CY 2008, over one-half of the most significant criteria pollutants, nitrogen oxides and carbon monoxide, resulted from the TA-03 steam plant.

In April 2004, LANL received a Title V Operating Permit from the NMED. This permit included facility-wide emission limits and additional recordkeeping and reporting requirements. Table 3.1.2.1-2 summarizes the facility-wide emission limits in the Title V Operating Permit and the SWEIS emissions and presents the 2008 emissions from all sources included in the permit. Note that emissions from insignificant sources of boilers, heaters, and emergency generators are included in these totals. All emissions were below the levels evaluated in the SWEIS.

Table 3.1.2.1-2. 2008 Emissions for Criteria Pollutants as Reported on LANL's Title V Operating Permit Emissions Reports[a]

Pollutants	Units	1999 SWEIS	2008 SWEIS	Title V Facility-Wide Emission Limits	2008 Emissions
Carbon monoxide	Tons/year	58	58	225	32.5
Nitrogen oxides	Tons/year	201	201	245	45.9
Particulate matter	Tons/year	11	11	120	4.5
Sulfur oxides	Tons/year	0.98	0.98	150	0.6

a The Title V Operating Permit Emissions Report includes two categories of sources not required in the annual emission inventory: small, exempt boilers and heaters and exempt standby emergency generators.

3.1.2.2 Chemical Usage and Emissions

The 1999 Yearbook (LANL 2000a) proposed reporting chemical usage and calculated emissions for Key Facilities from the LANL's Automated Chemical Inventory System. (Note: In CY 2002, LANL transitioned to a new chemical inventory system called ChemLog and no longer uses the Automated Chemical Inventory System.) The quantities presented here represent all chemicals procured or brought on site in the respective CY. This methodology is identical to that used by LANL for reporting under Section 313 of the Emergency Planning and Community Right-to-Know Act (42 USC 11023) and for reporting regulated air pollutants estimated from research and development operations in the annual Emissions Inventory Reports (LANL 2008a, 2009d).

Air emissions presented in Appendix B are listed as emissions by Key Facility. Emission estimates (expressed as kilograms per year) were performed in the same manner as that reported in previous Yearbooks. First, usage of listed chemicals was calculated per facility. It was then estimated that 35 percent of the chemical used was released into 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 VOCs and hazardous air pollutants (HAPs) estimated from research and development operations is shown in Table 3.1.2.2-1. Projections by the SWEIS for VOCs and HAPs were expressed as concentrations rather than emissions; therefore, direct comparisons cannot be made, and projections from the SWEIS are not presented. The VOC emissions reported from research and development activities reflect quantities procured in each CY. The HAP emissions reported from research and development activities generally reflect quantities procured in each CY. 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.

Table 3.1.2.2-1. Emissions of VOCs and HAPs from Chemical Use in Research and Development Activities

Pollutant	Emissions (Tons/year)	
	2007	2008
HAPs	5.8	4.5
VOCs	12.3	9.0

Emissions of VOCs and HAPs from chemical use in research and development activities in 2008 are similar to previous years.

3.2 Liquid Effluents

To reduce the potential impacts of LANL activities on water resources, LANL has several programs that monitor and protect surface water quality and quantity.

The NPDES industrial permit was modified to reduce the total number of outfalls. From January 1, 2008, through December 31, 2008, LANL had 15 (14 industrial outfalls and one sanitary outfall) wastewater outfalls that were regulated under NPDES Permit No. NM0028355. Based on discharge monitoring reports prepared by LANL's Water Quality and RCRA Group, 13 permitted outfalls had recorded flows in CY 2008 totaling an estimated 158.4 million gallons. This is approximately 19.8 million gallons less than the CY 2007 total of 178.2 million gallons. The 2008 total volume of discharge is below the maximum flow of 278.0 million gallons that was projected in the SWEIS. Treated wastewater released from LANL's NPDES outfalls rarely leaves the site. Details on NPDES noncompliance during 2008 is provided in the 2008 Environmental Surveillance Report (LANL 2008b).

CY 2008 discharges are summarized by watershed and compared with watershed totals projected in the SWEIS in Table 3.2-1. The bulk of the CY 2008 discharges came from Non-Key Facilities (Table 3.2-2).

Key Facilities accounted for approximately 33.0 million gallons of the 2008 total. LANSCE discharged approximately 18.6 million gallons in 2008, about 3.5 million gallons more than in 2007, accounting for about 56.4 percent of the total discharge from all Key Facilities (Table 3.2-2). Table 3.2-2 compares NPDES discharges by Key and Non-Key Facilities.

LANL has three principal wastewater treatment facilities—the SWWS at TA-46, a Non-Key Facility, the RLWTF at TA-50, (one of the Key Facilities), and the High Explosives Wastewater Treatment Facility at TA-16 (one of the Key Facilities).

The RLWTF, TA-50 Building 01, Outfall 051 discharges into Mortandad Canyon. During CY 2008, about 1.4 million gallons of treated radioactive liquid effluent, about 0.19 million gallons more than CY 2007, were released to Mortandad Canyon from the RLWTF, compared to 9.3 million gallons projected in the SWEIS.

Table 3.2-1. NPDES Discharges by Watershed (Millions of Gallons)

Watershed	# Outfalls 1999 SWEIS	# Outfalls 2008 SWEIS	Discharge 1999 SWEIS	Discharge 2008 SWEIS	Discharge CY 2008
Cañada del Buey	3	1[a]	6.4	0	0
Guaje	7	0	0.7	0	0
Los Alamos	8	5	44.8	45.6	18.2
Mortandad	7	5	37.4	44.3	2.2
Pajarito	11	0	2.6	0	0
Pueblo	1	0	1.0	0	0
Sandia	8	6	170.7	187.3	137.1
Water[b]	10	5	14.2	2.26	0.82
Totals	**55**	**22**	**278.0**	**279.5**	**158.4**

a Includes Outfall 13S from the SWWS, which is registered as a discharge to Cañada del Buey or Sandia. The effluent is actually piped to TA-03 and ultimately discharged to Sandia Canyon via Outfall 001.
b Includes 05A-055 discharge to Cañon de Valle, a tributary to Water Canyon.

Table 3.2-2. NPDES Discharges by Facility (Millions of Gallons)

Key Facility	# Outfalls 1999 SWEIS	# Outfalls 2008 SWEIS	Discharge 1999 SWEIS	Discharge 2008 SWEIS	Discharge CY 2008
Plutonium Complex	1	1	14.0	4.1	0.24
Tritium Facility	2	2	0.3	17.4	0
CMR Building	1	1	0.5	1.9	0.17
Sigma Complex	2	1	7.3	5.8	0.30
High Explosives Processing	11	3	12.4	0.06	0.003
High Explosives Testing	7	1	3.6	2.2	0.82
LANSCE	5	2	81.8	28.2	18.62
Metropolis Center		1	5.8	13.6	11.47
Biosciences	1	None	2.5	0	0
Radiochemistry Facility	2	None	4.1	0	0
RLWTF	1	1	9.3	4.0	1.40
Pajarito Site	None	None	0	0	0
MSL	None	None	0	0	0
TFF	None	None	0	0	0
Machine Shops	None	None	0	0	0
Waste Management Operations	None	None	0	0	0
Non-Key Facilities	22	5	142.1	200.9	125.39[a]
Totals	**55**	**15**	**278.0**	**279.5**	**158.41**

a Mainly due to discharge from SWWS and the TA-03 steam plant.

The TA-16 High Explosives Wastewater Treatment Facility did not discharge in CY 2008.

Discharges from the Non-Key Facilities made up the majority of the total CY 2008 discharge from LANL. This total, 125.4 million gallons, was about 16.7 million gallons less than the 142.1-million-gallon total discharge from the Non-

Key Facilities that was projected in the SWEIS. Two Non-Key Facilities, the TA-46 SWWS and the TA-03 steam plant, account for about 93 percent of the total discharge from Non-Key Facilities and about 73 percent of all water discharged by LANL. The SWWS at TA-46 processed about 101.2 million gallons of treated wastewater during CY 2008, all of which was pumped to TA-03, to be either recycled at the TA-03 power plant (as potential make-up water for the cooling towers), or discharged into Sandia Canyon via Outfall 001. The discharge of about 14.7 million gallons from the TA-03 power plant to Outfall 001 was more than the CY 2007 discharge of 3.3 million gallons. The CY 2008 contribution from TA-46 (Outfall 13S) to the Outfall 001 discharge increased by about 11.9 million gallons over the 2007 value, accounting for slightly more than half of the increase of about 23.4 million gallons discharged from Outfall 001 in CY 2008 compared to CY 2007.

The NPDES Multi-Sector General Permit (MSGP) Program regulates storm water discharges from identified industrial activities and their associated facilities. These activities include metal fabrication; hazardous waste treatment, storage, and disposal; vehicle and equipment maintenance; recycling activities; electricity generation; and asphalt manufacturing.

LANL previously operated under the MSGP-2000, which expired October 30, 2005, without EPA issuing a new permit. Administrative continuance of the MSGP-2000, which required continued compliance with the expired permit requirements, was granted to existing permit holders and remained in effect until a new permit was issued by EPA on September 29, 2008. In December 2008, Los Alamos National Security, LLC (LANS) submitted to EPA a Notice of Intent for coverage under the MSGP.

The MSGP-2000 required the development and implementation of site-specific storm water pollution prevention plans (SWPPPs), which must include identification of potential pollutants and the implementation of BMPs. SWPPPs are intended to help ensure that LANL surface waters receiving storm water runoff meet EPA and state water quality standards. The Permit requirement also includes monitoring of storm water discharges from permitted sites.

During 2008, LANL implemented and maintained 14 SWPPPs under the MSGP-2000 requirements, covering approximately 26 facilities. Compliance with the MSGP-2000 requirements for these sites was achieved primarily by implementing the following:

- Identify potential pollutants and activities that may impact surface water quality and identify and provide structural and non-structural controls (BMPs) to limit the impact of those pollutants.
- Develop and implement facility-specific SWPPPs.
- Perform routine facility inspections and conduct required corrective action.

Several additional facilities met the requirements for a MSGP-2000 “No Exposure Certification,” which identified the facility as having a regulated industrial activity but did not require permit authorization for its storm water discharges due to the existence of a condition of no exposure. Such facilities were not covered under, or subject to, the requirements of a SWPPP.

During CY 2005, LANL and the DOE/NNSA entered into a compliance agreement with the EPA to protect surface water quality at LANL through a Federal Facilities Compliance Agreement (FFCA). The purpose of the FFCA is to establish a compliance program for the regulation of storm water discharges from SWMUs and AOCs until such time as those sources are regulated by an individual storm water permit pursuant to the NPDES Permit Program. All SWMUs and AOCs (collectively, Sites) are covered by this agreement. On March 30, 2005, EPA issued an Administrative Order to the University of California that coincides with the FFCA.

The FFCA/Administrative Order established a schedule for monitoring and reporting and required the Laboratory to minimize erosion and the transport of pollutants or contaminants from Sites in storm water runoff. The FFCA also required DOE/LANS to comply with all requirements of the Laboratory's MSGP.

The FFCA/Administrative Order required two types of monitoring at specified sites, pursuant to two monitoring management plans, including 1) watershed sampling at approximately 60 automated gaging stations at various locations within Laboratory canyons pursuant to a Storm Water Monitoring Plan and 2) site-specific sampling at approximately 198 locations pursuant to a SWMU/SWPPP. The purpose of storm water monitoring is to determine if there is a release or transport of pollutants/contaminants into surface water that could cause or contribute to a violation of applicable surface water quality standards. If a release or transport occurs, it may be necessary to implement BMPs to reduce erosion or to re-examine, repair, or modify existing BMPs to reduce erosion. The SWMU/SWPPP must also describe an erosion control program to control and limit contaminant migration and transport from Sites and to monitor the effectiveness of controls at the Sites.

To achieve compliance with both the MSGP and the FFCA during CY 2008, LANL operated about 75 stream-monitoring and partial-record storm water-monitoring stations located in nine watersheds. Data gathered from these stations show that surface water, including storm water, occasionally flows off DOE/NNSA property. LANL also conducted stream monitoring and storm water monitoring at the confluence of major canyons, in certain segments of these canyons, and at a number of specific facilities. In addition, LANL conducted voluntary monitoring in the major canyons that enter and leave LANL property. Flow-discharge information is reported in discharge monitoring reports, and flow measurements and water quality data for surface water are published annually in three reports, Environmental Surveillance at Los Alamos (LANL 2008b), SWPPP for SWMUs and AOCs, and Surface Water Data at Los Alamos National Laboratory.

The 2008 SWEIS projects a temporary increase in soil disturbance and removal of vegetation as MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order are executed. This work would be addressed by the NPDES Construction General Permit (CGP) Program, which regulates storm water discharges from construction activities disturbing one or more acres, including those construction activities that are part of a larger common plan of development collectively disturbing one or more acres.

LANL and the general contractor apply individually for NPDES CGP coverage and both are permittees at most construction sites. Compliance with the NPDES CGP includes the development and implementation of a SWPPP before soil disturbance can begin and site inspections once soil disturbance has commenced. A SWPPP describes the project activities, site conditions, BMPs, and permanent control measures required for reducing pollution in storm water discharges and protecting endangered or threatened species and critical habitat. Compliance with the NPDES CGP is demonstrated through periodic inspections that document the condition of the site and identify corrective actions required to keep pollutants from moving off the construction site. Data collected from these inspections are tabulated monthly and annually in the form of Site Inspection Compliance Reports.

During 2008, the Laboratory implemented CGP requirements at 48 permitted construction sites and performed 479 site-specific storm water inspections. The percentage of compliant inspections for the year was 99.6 percent, compared to 99.1 percent in 2007. During the summer months, when most high-intensity precipitation events occur, 151 out of 152 inspections were compliant.

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, LLW, 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’s Institutional Procedures. 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 final disposition of the waste. The data are ultimately used to assess operational efficiency, help ensure environmental protection, and demonstrate regulatory compliance.

The 2008 SWEIS projected cumulative waste generation rates for all waste types to be substantially large due to future remediation and DD&D of facilities. Actual waste volumes from remediation may be smaller, depending on regulatory decisions by the NMED, and because of waste volume reduction techniques.

LANL generates radioactive and chemical wastes as a result of research, production, maintenance, construction, and the Environmental Remediation and Surveillance (ERS) Program, formerly called the ER Project, as shown in Table 3.3-1. Waste generators are assigned to one of three categories—Key Facilities, Non-Key Facilities, and ERS. Waste types are defined by differing regulatory requirements.

Table 3.3-1. LANL Waste Types and Generation

Waste Type	Units	1999 SWEIS	2008 SWEIS	CY 2008
Chemical	10^3 kg/yr	3,250	6,207	782.7
LLW	m^3/yr	12,200	25,995	2,805.4
MLLW	m^3/yr	632	3,256	14.0
TRU	m^3/yr	333	780	242.5
Mixed TRU	m^3/yr	115	[a]	166.2[b]

a The 2008 SWEIS combines TRU and Mixed TRU into one waste category since they are managed for disposal at WIPP.

b Mixed TRU exceeded 1999 SWEIS projections due to the repacking of legacy waste drums at WCRR.

Waste quantities from CY 2008 LANL operations were below SWEIS projections for all waste types, reflecting the levels of operations at both the Key and Non-Key Facilities.

3.3.1 Pollution Prevention Program

The P^2 Program improves LANL operations by minimizing environmental damage and adverse regulatory findings. LANL's commitment to P^2 and broader environmental stewardship arises from two goals: (1) maintaining a good environmental and ecological condition for present and future employees, residents, and neighbors and (2) complying with the many regulatory requirements necessary to operate LANL. To attain these goals, LANL's P^2 Program approach focuses on the following:

- ensuring that LANL policies and procedures highlight prevention as the preferred methodology to address waste issues,
- integrating waste minimization (WMin) and P^2 principles into the planning process,
- supporting the development of new technologies to reduce or eliminate waste,
- working with waste generators to identify WMin and P^2 opportunities,
- using appropriate material substitution and process improvements,
- complying with DOE Order 430.213 by use of energy- and water-efficient equipment,
- complying with DOE Order 430.213 by procurement of environmentally preferable products,
- recycling and reusing materials,
- complying with DOE Order 430.213 by sustainable design in new buildings and major renovations, and

- tracking, projecting, and analyzing waste data to identify waste generation targets and continually reduce waste.

In 2004, LANL began development and implementation of a prevention-based Environmental Management System (EMS) to comply with DOE Order 450.1 (DOE 2003e). EMS is a systematic method for assessing mission activities, determining the environmental impacts of those activities, prioritizing improvements, and measuring results. DOE Order 450.1 defines an EMS as "a continuous cycle of planning, implementing, evaluation, and improving processes and actions undertaken to achieve environmental missions and goals."

The Laboratory's EMS was third-party certified to the ISO 14001:2004 standard in April 2006 by the National Sciences Foundation International Strategic Registration. As part of the EMS, the Laboratory Governing Policy contains the Laboratory's official policy on environment. This policy is the basis for setting annual environmental targets and objectives.

The following is the Laboratory's environmental policy statement:

> We approach our work as responsible stewards of our environment to achieve our mission. We prevent pollution by identifying and minimizing environmental risk. We set quantifiable objectives, monitor progress and compliance, and minimize consequences to the environment, stemming from our past, present, and future operation. We do not compromise the environment for personal, programmatic, or operational reasons.

3.3.1.1 FY 2008 EMS Institutional Objectives

The following are LANL's EMS Institutional Objectives for FY 2008:

1. Ensure environmental compliance
2. Reduce waste with a focus on radioactive waste
3. Improve Laboratory-wide energy and fuel conservation
4. Laboratory-wide cleanout activities to disposition unneeded equipment, materials, and chemicals and associated waste by end of FY 2011
5. Achieve zero liquid discharge by 2012

3.3.2 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 was due to removal of Cerro Grande Fire debris.

The SWEIS projected that the Los Alamos County Landfill would not reach capacity until about 2014. In 2002, the DOE/NNSA renewed the special use permit for the County to operate waste disposal, transfer, and post-closure at the County landfill site. The Los Alamos County solid waste landfill was replaced by a transfer station. In compliance with NMED regulations, a landfill closure plan containing post-closure operations and maintenance manual with all the information needed to effectively monitor and maintain the facility for the entire post-closure period was submitted in September 2005.

DOE/NNSA has implemented goals for WMin. LANL has instituted an aggressive WMin and recycling program that has reduced the amount of waste disposed in sanitary landfills. 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 to 156 kilograms per person per year in 2008, equivalent to a 41 percent decrease in routine waste generation. This reduction is the result of aggressive WMin programs that include recycling of mixed office paper, cardboard, plastic, and metal and source reduction efforts such as the Stop Mail program, which has decreased the amount of junk mail sent to LANL workers.

LANL's total waste generation can be classified as routine and non-routine. The waste can also be categorized as recyclable and non-recyclable. Table 3.3.2-1 shows LANL sanitary waste generation for FY 2008. The recycle of total (routine + non-routine) sanitary waste currently stands at 45 percent compared to 1993 when LANL recycled only about 10 percent of the sanitary waste.

Table 3.3.2-1 LANL Sanitary Waste Generation in FY 2008 (metric tons)

	Routine	Non-routine	Total
Recycled	735	1,356[a]	2, 091
Landfill disposal	1,902	533[b]	2,435
Total	2,637	1,889	4,526

a Brush, dirt, concrete, and asphalt
b Construction and demolition debris, non-hazardous solid waste from TA-54.

Routine sanitary waste consists mostly of food and food-contaminated waste and cardboard, plastic, glass, styrofoam packing material, and similar items.

Nonroutine sanitary waste is typically derived from construction and demolition projects. 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. Recycling programs for concrete, asphalt, dirt, and brush were established in FY 2001 and, as a result, LANL is recycling more construction waste and decreasing landfill disposal.

3.3.3 Chemical Wastes

The 2008 SWEIS projected chemical waste to decline for normal operations at LANL; however, significant quantities of this waste type are expected due to environmental restoration activities. Chemical waste includes not only construction and demolition debris, but also all other non-radioactive 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. Construction and demolition debris consists primarily of asbestos and construction debris from

DD&D 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.) DD&D waste volumes are tracked in Section 3.11.2.

Chemical waste generation in CY 2008 was about 24 percent of the chemical waste volumes projected in the 1999 SWEIS and approximately 13 percent of the chemical waste volumes projected in the 2008 SWEIS. Table 3.3.3-1 summarizes chemical waste generation during CY 2008.

ERS Program wastes accounted for only about eight percent of the chemical waste volumes projected in the 1999 SWEIS and three percent projected in the 2008 SWEIS. All of this volume was generated at Non-Key Facilities.

Table 3.3.3-1. Chemical Waste Generators and Quantities

Waste Generator	Units	1999 SWEIS	2008 SWEIS	2008
Key Facilities	10^3 kg/yr	600	596	59.4
Non-Key Facilities	10^3 kg/yr	650	650	554.5
ERS	10^3 kg/yr	2,000	4961[a]	168.8
LANL	10^3 kg/yr	3,250	6207	782[b]

a Used conversion 1100 kg/1 m^3. 1100 kg was derived from adding all of ERS waste for CY 2008.
b Discrepancy in the additive chemical waste volumes is due to round-off error.

3.3.4 Low-Level Radioactive Wastes

The 2008 SWEIS projected that LLW generation would increase from waste generated from MDA removal. The expansion of TA-54 Area G into Zone 4, and eventually Zone 6, is expected to provide onsite LLW disposal capacity for operations waste through 2016. In CY 2008 LLW volumes were well below volumes projected in the SWEIS (Table 3.3.4-1).

Table 3.3.4-1. LLW Generators and Quantities

Waste Generator	Units	1999 SWEIS	2008 SWEIS	CY 2008
Key Facilities	m^3/yr	7,450	7,646	418.1
Non-Key Facilities	m^3/yr	520	1,529	539
ERS	m^3/yr	4,260	16,820[a]	1,848.3
LANL	m^3/yr	12,230	25,995	2,805.4

a Includes low-level, alpha low-level, and remote-handled low-level radioactive waste.

3.3.5 Mixed Low-Level Radioactive Wastes

The 2008 SWEIS projected MLLW generation to increase, but the quantity is projected to be less than two percent of the quantity of LLW generation. ERS produced less than one cubic meter of MLLW in 2008, less than one percent of the volumes projected in the 1999 SWEIS and the 2008 SWEIS. Table 3.3.5-1 examines these wastes by generator categories.

Table 3.3.5-1. MLLW Generators and Quantities

Waste Generator	Units	1999 SWEIS	2008 SWEIS	CY 2008
Key Facilities	m^3/yr	54	68	1.5
Non-Key Facilities	m^3/yr	30	31	12.2
ERS	m^3/yr	548	3157[a]	0.3
LANL	m^3/yr	632	3256	14.0

a Includes mixed low-level, mixed alpha low-level, and mixed remote-handled low-level radioactive waste.

3.3.6 Transuranic Wastes

As projected in the 1999 SWEIS, TRU wastes are generated almost exclusively in four Key Facilities (the Plutonium Facility Complex, the CMR Building, the RLWTF, and the Solid Radioactive and Chemical Waste Facility) and by the ERS, which did not produce any TRU wastes in 2008. Table 3.3.6-1 examines TRU wastes by generator categories. Approximately 75 percent of TRU waste and 42 percent of mixed TRU waste was generated as a result of repacking legacy waste drums at WCRR and will not be included in the total amount of generated waste.

Table 3.3.6-1. Transuranic Waste Generators and Quantities

Waste Generator	Units	1999 SWEIS	2008 SWEIS	CY 2008
Key Facilities	m^3/yr	322	413[a]	227.8
Non-Key Facilities	m^3/yr	0	23[a]	14.7
ERS Program	m^3/yr	11	344[a]	0
LANL	m^3/yr	333	780[a]	242.5

a The 2008 SWEIS combines TRU and mixed TRU into one waste category since they are both managed for disposal at WIPP.

3.3.7 Mixed Transuranic Wastes

LANL mixed TRU waste generation in 2008 was below the mixed TRU waste volume projected in the SWEIS ROD. In 2008, mixed TRU wastes were generated at only two facilities—the Plutonium Facility Complex and the Solid Radioactive and Chemical Waste Facility. Table 3.3.7-1 examines mixed TRU wastes by generator categories.

Table 3.3.7-1. Mixed Transuranic Waste Generators and Quantities

Waste Generator	Units	1999 SWEIS	2008 SWEIS	2008
Key Facilities	m^3/yr	115	[a]	166.2[b]
Non-Key Facilities	m^3/yr	0	[a]	0
ERS Program	m^3/yr	0	[a]	0
LANL	m^3/yr	115	[a]	166.2

a The 2008 SWEIS combines TRU and mixed TRU into one waste category since they are both managed for disposal at WIPP.

b The amount of mixed TRU waste exceeded projections from the SWEIS due to the repacking of legacy waste drums at WCRR. The 70.3 m^3 will not be included in the total amount of generated waste.

3.4 Utilities

Ownership and distribution of utility services continue to be split between DOE/NNSA and Los Alamos County as members of the Los Alamos Power Pool. DOE/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. Previous Yearbooks collected routine data for both gas and electricity on a FY basis; however, starting from this 2008 Yearbook, all data will be collected and summarized by CY.

Utility infrastructure demands for electricity, natural gas, and water are projected to increase in the LANL region of influence through 2013, mainly due to increasing demands among other Los Alamos County users who rely upon the same utility systems as LANL.

3.4.1 Gas

There was a change in ownership to the DOE/NNSA natural gas transmission line in August 1999. DOE/NNSA 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 LANL's CY 2008 gas usage. Approximately 98 percent of the gas used by LANL was 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 and for training of the power plant operators in turbine operation.

Total gas consumption for CY 2008 was less than projected in the 1999 and 2008 SWEIS. During CY 2008, less natural gas was used for heating than in CY 2007, due to the failure of the #3 steam turbine generator. Steam turbine generators #1 and #2 have also been unavailable for much of the last two years. In August 2007, the TA-21 steam plant was shut down permanently.

Table 3.4.1-1. Gas Consumption (decatherms[a]) at LANL/CY 2008

Category	Total LANL Consumption Base	Total Used for Electric Production	Total Used for Heat Production	Total Steam Production (klb)[b]
1999 SWEIS	1,840,000[a]	Not projected	Not projected	Not projected
2008 SWEIS	1,197,000[a]	Not projected	Not projected	Not projected
CY 2008	1,125,336[a]	21,382[a]	1,103,954[a]	334,596[c]

a A decatherm is equivalent to 1,000 to 1,100 cubic feet of natural gas.
b klb: Thousands of pounds
c TA-03 steam production has two components: that used for electric production (5703 klb for CY 2008) and that used for heat (323,596 klb in CY 2008).

3.4.2 Electrical

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 DOE and Los Alamos County entered into a 10-year contract (with extensions) known as the Electric Coordination Agreement whereby each entity's electric resources are consolidated or pooled. Changes in transmission agreements with PNM 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.

On-site electric generating capability for the Power Pool is limited by the existing TA-03 Co-generation Complex (the power plant generates both steam and power), which is capable of producing up to 20 megawatts of electric power that is shared by the Pool under contractual arrangement. The #3 steam turbine at the Co-generation Complex is currently a 10-megawatt unit. Rewinding of this unit began in CY 2003. The rewinding and installation of the unit is finished, but the unit is not on-line due to condenser problems. Currently, there are no plans to upgrade existing equipment.

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. Population growth in northern New Mexico, together with expanded industrial and commercial usage, has greatly increased power demands on the regional power system. LANL has completed several construction projects to expand the existing power capabilities (LANL 2009a).

The current transmission line configuration is no longer vulnerable to a single failure taking out both incoming transmission lines. The LANL 115-kilovolt system includes redundancies to enhance reliability of our sources. The construction of the portion of the line from the Norton substation to Southern Technical Area is still under consideration, and various options are being evaluated.

Internally within the LANL 13.2-kilovolt distribution system, upgrades to the existing underground ducts are needed to fully realize the capabilities of the Western Technical Area substation and the upgraded Eastern Technical Area substation. Upgrades will provide for redundant feeders to critical facilities, and upgrading the aging TA-03 substation will complete the 13.2-kilovolt distribution and 115-kilovolt transmission systems.

In September 2008, DOE/NNSA issued the first ROD for the new SWEIS. The decision was made to continue to implement the No Action Alternative with the addition of a few elements of the Expanded Operations Alternative. In the 2008 SWEIS, actual utility impacts and performance changes were analyzed. Annual electricity usage from 1999–2005 remained well below the levels projected in the 1999 SWEIS. In the 2008 SWEIS No Action Alternative, the LANL total electric consumption was reduced to a number closer to the average actual electric consumption for the six years analyzed making the new total 495,000 megawatt-hours versus the 782,000 megawatt-hours projected in the 1999 SWEIS. In addition, the electric peak load also changed under the No Action Alternative to 91,200 kilowatts versus 113,000 kilowatts projection in the 1999 SWEIS.

Expansion of the capabilities and operational levels at the Metropolis Center to support the Roadrunner Super Computer platform was one of the few elements of the Expanded Operations Alternative that was approved to go forward. This decision would impact the total electric peak demand and the total electric consumption at LANL; therefore, the LANL total in Table 3.4.2-1 under the 2008 SWEIS represents 91,200 kilowatt-hours for LANL plus 18,000 kilowatt-hours operating requirements for the Metropolis Center.

Table 3.4.2-2 shows annual use of electricity for CY 2008. LANL's electrical energy use remains below projections in the SWEIS. 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.

Table 3.4.2-1. Electric Peak Coincident Demand/CY 2008

Category	LANL Base	LANSCE	Metropolis Center	LANL Total	County Total	Pool Total
1999 SWEIS	50,000[a]	63,000	n/a[b]	113,000	Not projected	Not projected
2008 SWEIS	57,200	34,000	18,000	109,200[c]	19,800	111,000
CY 2008	36,675	18,175	8,366	63,216	17,780	81,195

a All figures in kilowatts.
b Metropolis Center became a new Key Facility in the 2008 SWEIS.
c This number represents 91,200 kilowatt-hours for LANL as part of the No Action Alternative in the 2008 SWEIS plus 18,000 kilowatt-hours to expand the capabilities and operational levels of the Metropolis Center as stated in the SWEIS ROD dated September 2008.

Table 3.4.2-2. Electric Consumption/CY 2008

Category	LANL Base	LANSCE	Metropolis Center	LANL Total	County	Pool Total
1999 SWEIS	345,000[a]	437,000	n/a[b]	782,000	Not projected	Not projected
2008 SWEIS	356,000	139,000	131,400	626,400[c]	150,000	645,000
CY 2008	265,033	92,957	51,427	409,417	124,808	536,177

a All figures in megawatt-hours.
b Metropolis Center became a new Key Facility under the 2008 SWEIS.
c This number represents 495,000 megawatt-hours for LANL under the No Action Alternative plus 131,400 megawatt-hours to expand the capabilities and operational levels of the Metropolis Center as stated in the SWEIS ROD dated September 2008.

Operations at several of the large-LANL-load facilities changed during 2004. In FY 2004 LANSCE changed their operating schedule. For the past several years their electric demand peaked with the rest of LANL, usually in July or August. But, now LANSCE's peak demand has been shifted to the winter (around January). This changes the overall electric demand for LANL. Since LANSCE's load is such a large part of LANL's total load, the peak demand for LANL will change from summer to winter. This was true for LANSCE's operation until about November of 2005. Due to budgetary constraints, LANSCE has since returned to their old schedule of running in the spring and summer.

It is expected that ground will be broken on the CMRR building near TA-55 off Pajarito Road in the near future. This building will replace the old CMR building, which is served by the TA-03 substation. The CMRR building will be served by a new proposed 115/13.8-kilovolt substation. The load will be switched from the TA-03 substation to this new substation so that very little new load will be added to the system.

Electrical Infrastructure Safety Upgrades Project

Project Overview

The EISU Project seeks to upgrade the electrical infrastructure in buildings throughout LANL to improve electrical safety. Typically, the project seeks to correct National Electrical Code violations; replace aging, unsafe equipment; and improve equipment and facility grounding.

The Conceptual Design Report for the EISU Project was completed in 1998. Thirty-one buildings were identified for upgrades and were prioritized based on the safety hazards they presented. Since then, the EISU Project has been coordinated with the LANL Ten-Year Comprehensive Site Plan and subprojects have been removed from the list as the buildings have been identified for D&D. To date, five subprojects have been removed from the list for a new total of 26 General Plant Projects. An evaluation of the LANL electrical safety maintenance backlog may increase the number of subprojects under the EISU Project. As of 2008, eight EISU projects have been completed (TA-03-43, TA-16-200, TA-40-1, TA-03-40 N&E, TA-03-40 S&W, TA-03-261, TA-43-1, TA-46-31), two projects are in construction (TA-9-21 and TA-15-183), and three projects have been designed (TA-46-1, TA-53-2, and TA-48-1).

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. In September 2001, DOE/NNSA officially turned over the water production system and transferred 70 percent of the water rights to Los Alamos County. Los Alamos County has continued to lease the remaining 30 percent of the water rights from DOE/NNSA. LANL is now considered a customer of 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 has completed a preliminary engineering study and is currently negotiating a convert contract, which will provide more stability, before further investment.

LANL has installed water meters on high usage facilities and has 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-60-year-old system as problems arise.

Expansion of the Metropolis Center to support the Roadrunner Super Computer platform would impact water usage at LANL. Expanding to a 15-megawatt maximum operating platform is expected to potentially increase current water usage to 51 million gallons (193 million liters) per year. This higher usage would include the additional water lost to cooling tower evaporation and blowdown. Improvements to the SERF will lead to increased use of recycled effluent in the cooling towers. Metropolis Center water consumption is not metered. Water usage will be reported once the facility is metered.

Table 3.4.3-1 shows water consumption in thousands of gallons for CY 2008. Under the 1999 SWEIS, water use for LANL was projected to be 759 million gallons per year. In CY 2008, LANL consumed about 370 million gallons. Actual use by LANL in 2008 was about 389 million gallons less than the 1999 SWEIS projection. In addition, the calculated NPDES discharge of 158.2 million gallons (see Table 3.2-2) in CY 2008 was about 42 percent of the total LANL usage of 370 million gallons.

Annual water usage was also analyzed in the 2008 SWEIS from 1999–2005 and consumption remained well below the levels projected in the 1999 SWEIS. In the 2008 SWEIS No Action Alternative, the LANL total water consumption was reduced to a number closer to the average actual water consumption for the years analyzed. Water use at LANL is projected to be 380 million gallons versus the 759 million gallons projected in the 1999 SWEIS.

Table 3.4.3-1. Water Consumption (thousands of gallons) for CY 2008

Category	LANL	Metropolis Center	Los Alamos County	Total
1999 SWEIS ROD	759,000	[a]	Not Projected	Not Applicable
2008 SWEIS ROD	380,000	51,000[b]	1,241,000	1,621,000
CY 2008	370,489	Not Available[c]	Not Available[d]	Not Available[d]

a Metropolis Center became a new Key Facility under the 2008 SWEIS.

b Cooling water needed in support of Metropolis Center expansion to support Roadrunner. Improvements to the SERF will lead to increased use of recycled effluent in the cooling towers.

c Metropolis Center water consumption is not metered. Water use will be reported once system is metered.

d In September 2001, 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

It is the policy of LANL to conduct our work safely and responsibly; ensure a safe and healthful working environment for our workers, contractors, visitors, and other on-site personnel; and protect the health, safety, and welfare of the general public. It is LANL's policy not to compromise safety for personal, programmatic, operational, or any other reason.

In CY 2008, LANS continued to make significant progress in the area of worker safety at LANL. Worker Safety and Security Teams (WSSTs) are now established across the Laboratory and are actively engaged in accident and injury prevention. The Institutional WSST was instrumental in determining the injury prevention goals for 2008–2009. Preparations are well underway for participation in the DOE Voluntary Protection Program. The Laboratory's compliance plan for 10 CFR 851, Worker Safety and Health Program, is well established, with specific emphasis placed on chemical management program improvements. Human performance improvement concepts and principals have been incorporated into Laboratory processes for work management, event investigation, and causal analysis. This is leading to an improved ability to identify and correct issues that contribute to events and accidents.

Implementation of Safety Implementation Plans (SIPs) by management continues across the institution with active analysis and engagement by the respective WSSTs, workers, and management. This includes monitoring and evaluating related performance and specific SIP-related deliverables.

3.5.1 Accidents and Injuries

Analysis of LANL's injury and illness performance shows significant improvement over three years with a slight decrease in performance over the past few months. This has been influenced by a decrease in some types of injuries that have been historically high, such as repetitive trauma and push/pull/lift injuries.

LANL continues to strengthen the interface between line managers, Occupational Medicine, and the Injury and Illness Group with respect to timely reporting of injuries and the completion and analysis of injury investigation reports. To derive learning from injury/illness events, LANL requires that line managers engage in a systematic in-depth analysis of the event causes and to consider the robustness of the remaining lines of defense associated with the events they evaluate.

The 2008 SWEIS under the No Action Alternative projected that occupational injury and illness rates would follow the patterns observed from 1999 through 2005. Assuming LANL's employment levels remain at current levels, there would be approximately 311 recordable cases of occupational injury and illness and approximately 153 cases that resulted in days away of restricted or transferred duties per year. However, the projected number of annual occupational injuries and illness could be higher during construction or DD&D activities as well as MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order because these activities have higher incidence rates of occupational injuries and illness than the other types of work being performed at LANL.

Table 3.5.1-1 summarizes CY 2008 occupational injury and illness rates. These rates correlate to reportable injuries and illnesses during the year for 200,000 hours worked or roughly 100 workers.

Table 3.5.1-1. Total Recordable and Lost Workday Case Rates at LANL

	LANL (all workers)	
	TRC[a]	DART[b]
2008 SWEIS	2.04	1.18
CY 2008	1.83	0.65

a Total Recordable Cases (number per 200,000 hours worked)
b Days Away, Restricted, or Transferred

3.5.2 Ionizing Radiation and Worker Exposures

Occupational radiation exposures for workers at LANL during CY 2008 are summarized in Table 3.5.2-1. The collective total effective dose, or collective TED, for the LANL workforce during CY 2008 was 104.7 person-rem. These reported doses could change with time because estimates of committed effective dose from radioactive material intakes in many cases are based on several years of bioassay results; as new results are obtained, the dose estimates may be modified accordingly. Data in Table 3.5.2-1 show 354 fewer radiation workers received measurable dose in CY 2008 than CY 2007; however, with significantly lower collective dose, the average dose per worker was also lower. Of the 104.7 person-rem collective TED reported for CY 2008, 2.2 person-rem was from internal exposures to radioactive materials, most of which was from a single contaminated wound event; the rest are from small plutonium and tritium intakes.

Note: Dose terms were changed in the 2007 amendment of 10 CFR 835, *Occupational Radiation Protection*; the new terms are used in this update (e.g., total effective dose, committed effective dose, and committed equivalent dose).

Table 3.5.2-1. Radiological Exposure to LANL Workers[a]

Parameter	Units	1999 SWEIS	2008 SWEIS	CY 2008
Collective TED (external + internal)	person-rem	704	280	104.7
Number of workers with measurable dose	number	3,548	2,018	1,207
Average non-zero dose:				
• external + internal radiation exposure	millirem	Not projected	Not projected	87
• external radiation exposure only	millirem	Not projected	Not projected	87

a Data in this report are current as of 08/10/2009.

The highest individual doses in CY 2008 were typical of doses received since CY 2000, although senior management and the Institutional Radiation Safety Committee have set expectations and put in place mechanisms to further reduce individual (and collective) doses through performance goals and other ALARA (as low as reasonably achievable) measures. For whole body doses, no worker exceeded the DOE's five-rem-per-year dose limit, and no worker's dose was above the two-rem-per-year LANL administrative control level established for external exposures. In the case of the contaminated wound event, the worker received a committed effective dose of 1.822 rem and a committed equivalent dose of 60.325 rem to bone surfaces (compared to the DOE 50-rem-per-year dose limit for organs).

Table 3.5.2-2 summarizes the highest individual dose data for CYs 2001–2008.

Table 3.5.2-2. Highest Individual Annual Doses (TED) to LANL Workers (rem)[a]

CY 2001	CY 2002	CY 2003	CY 2004	CY 2005	CY 2006	CY 2007	CY 2008
1.284	2.214	25.960	2.500	2.300	1.238	7.430	2.106
1.225	1.897	8.700	1.510	2.051	1.148	1.642	1.198
1.123	1.783	5.700	1.148	2.000	1.060	1.573	1.132
1.002	1.644	3.500	1.061	1.603	1.053	1.508	1.096
0.934	1.534	1.935	1.055	1.398	0.971	1.503	0.952

a Data in this report are current as of 08/10/2009.

Comparison with the SWEIS Baseline. The collective TED for CY 2008 is about 15 percent of the 704 person-rem per year baseline in the 1999 SWEIS and 37 percent of the 280 person-rem per year baseline in the 2008 SWEIS.

Work and Workload: Changes in workload and types of work at nuclear facilities, particularly TA-55, tend to increase or decrease the LANL collective TED. Worker exposure under the 2008 SWEIS No Action Alternative is projected to increase because of the dose associated with achieving a production level of 20 pits per year at TA-55, as well as the dose from increased levels of activity associated with additional personnel working at the new CMRR Facility. In addition, cumulative worker dose and annual average worker exposure are projected to increase due to the implementation of the actions related to the Consent Order, but long-term effects associated with MDA cleanup and closure of waste management facilities in TA-54 should reduce workers' annual radiation exposure. Plutonium-238 programs at TA-55 remain active today but accounted for only 9.2 person-rem (about 9 percent) of the LANL collective TED in CY 2008.

Plutonium Facility operations account for the majority of occupational dose at LANL. CY 2008 doses in this facility were not as high as anticipated at the beginning of the year and significantly lower than CY 2007. For various reasons, programmatic work was not executed as expected. Additionally, there was a significant reduction in work throughout the facility during a pause in operations due to criticality safety concerns, which began in the fourth quarter of CY 2007 and lasted well into CY 2008.

In addition to Plutonium Facility operations, significant portions of LANL whole body external dose were accrued by workers performing maintenance at the LANSCE at TA-53, and those supporting retrieval, repackaging, and shipping radioactive solid waste at LANL waste facilities located at TA-50 and TA-54. In fact, the two highest LANL 2008 external doses resulted from maintenance work in target and experimental areas at TA-53.

ALARA Program: LANL occupational exposure continues to be deliberately managed, with associated processes and documentation regarding these occupational dose data, work performed, dose optimization efforts, ALARA goal tracking, and other performance indicators. Based on established ALARA goals, dose accrual to date, and expected workload, CY 2009 doses are expected to reach on the order of 150 rem. Improvements in maintaining radiation exposures ALARA, such as improved dose tracking during work activities, additional shielding, and better radiological safety designs being implemented for new and recurring radiological work, should result in lower worker exposures and justified collective TED for LANL radiological workers.

Collective TEDs for Key Facilities. In general, extracting collective TEDs by Key Facility or TA is difficult because these data are collected at the group level, and members of many groups receive doses at several locations. The fraction of a group's collective TED coming from a specific Key Facility or TA can only be estimated. For example, personnel from the Health Physics Operations group and crafts workers are distributed across the Laboratory, and these two organizations account for a significant fraction of the LANL collective TED. Approximately 90 percent of the collective TED that these groups incur is estimated to come from operations at TA-55. The total collective TED for TA-55 residents in CY 2008 (five Plutonium Materials Technology groups, Weapon Component Manufacturing, two Materials Science & Technology groups, Health Physics Operations, Actinide Analytical Chemistry, and crafts) was approximately 72.7 person-rem or about 69 percent of the LANL collective TED. As discussed previously, maintenance activities at TA-53 and solid waste operations at TA-50 and TA-54 also contributed significant dose to the LANL total.

3.6 Socioeconomics

LANL continues to be a major economic force within the region of influence consisting of Santa Fe, Los Alamos, and Rio Arriba counties.

The LANL-affiliated workforce continues to include LANS employees and subcontractors. In the 2008 SWEIS No Action Alternative, the 2005 levels of employment are assumed to remain steady at 13,504 employees. An increase in the number of workers already in the region could occur with construction, DD&D activities, and actions related to the implementation of the Consent Order. As shown in Table 3.6-1, the number of employees has decreased from 1999 SWEIS projections by over 4 percent and has decreased from 2008 SWEIS projections by 19 percent. The 10,941 total employees at the end of CY 2008 reflect a decrease of 540 employees as compared to the 11,481 employees reported in the 2007 Yearbook (LANL 2009a).

Table 3.6-1. LANL-Affiliated Work Force

Category	LANS Employees	Technical Contractor	Non-Technical Contractor	KSL	SOC[a]	Total
1999 SWEIS[b]	8,740	795	Not projected[c]	1,362[d]	454	11,351
2008 SWEIS[e]	12,019	945	Not projected[c]	[d]	540	13,504
CY 2008	10,100	219	120	0	502	10,941

a Securing Our Country (SOC) (formerly Protection Technology-Los Alamos)
b Total number of employees was presented in the SWEIS, the breakdown had to be calculated based on the percentage distribution shown in the 1999 SWEIS for the base year.
c Data were not presented for non-technical contractors or consultants.
d KSL Employees converted to LANS under "CRAFT" Type of Appointment effective 12/2008.
e Total number of employees was presented in the 2008 SWEIS, the breakdown was calculated based on the percentage distribution calculated from the 1999 SWEIS.

LANL employees have had a positive economic impact on northern New Mexico. Through 1998, DOE published a report each FY regarding the economic impact of LANL on north-central New Mexico as well as the State of New Mexico (Lansford et al. 1997, 1998, and 1999). The findings of these reports indicate that LANL 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 the total payroll, benefits, and procurements, it is expected that the LANL 2008 economic contribution was similar to the three years analyzed for DOE/NNSA.

The residential distribution of LANS employees reflects the housing market dynamics of three counties. As seen in Table 3.6-2, 87 percent of the LANS employees reside in Los Alamos, Rio Arriba, and Santa Fe counties.

Table 3.6-2. County of Residence for LANS Employees[a]

Calendar Year	Los Alamos	Rio Arriba	Santa Fe	Other NM	Total NM	Outside NM	Total
1999 SWEIS[b]	4,279	1,762	1,678	671	8,390	350	8,740
2008 SWEIS[c]	6,617	2,701	2,566	1,080	12,964	540	13,504
CY 2008	4,440	1,819	2,194	871	9,324	776	10,100

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.
c Total number of employees was presented in the 2008 SWEIS, the breakdown was calculated based on the percentage distribution calculated from the 1999 SWEIS.

3.7 Land Resources

Land resources were examined during the development of the 1999 and 2008 SWEIS. Since the development of the 1999 SWEIS until now, the land resources (i.e., undeveloped and developed lands) available for use at LANL have been reduced. Between CY 2001 and CY 2008, the following lands were transferred under Public Law 105-119[9] (42 USC 2391):

[9] On November 26, 1997, Congress passed PL 105-119 (42 USC 2391). Section 632 of this Act 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

- 2,104.8 acres of land were transferred to the Department of Interior in trust for the Pueblo of San Ildefonso, and
- 402.3 acres of land were conveyed to Los Alamos County.

In CY 2008, the Airport Tract (89.9 acres) was conveyed to Los Alamos County.

Table 3.7-1 provides a summary of the potential land parcels remaining to be transferred or conveyed.

Table 3.7-1. Potential Land Transfer/Conveyance Tracts

Land Tract	Acreage	Location
TA-21/A-16	252	On the eastern end of the same mesa on which the central business district of Los Alamos is located.
DP Canyon/A-10	13	Between the western boundary of TA-21 and the major commercial districts of the Los Alamos town site.
DOE LASO/A-13	8	Within the Los Alamos town site between Los Alamos Canyon and Trinity Drive.
Rendija Canyon/ A-14	900	North of and below Los Alamos town site's Barranca Mesa residential subdivision.
TA-74 South/ A-18a	519	Southern reach of Pueblo Canyon between the White Rock Y and Airport.

Projects under construction in CY 2008 include the RLUOB, TA-55 Covered Storage Pad, DD&D of TA-55-41 (also known as PF-41), and the DD&D of TA-21. The LASO Building is on previously undeveloped land and the remainder of these projects are on previously developed or disturbed land.

CY 2008 land use was similar to the previous CYs: the land acreage (Table 3.7-2) remained constant; the ongoing construction projects from CY 2004–CY 2008 continued.

The ERS Program is unique from a land use standpoint. Rather than using land for development, this program cleans up legacy wastes and makes land available for future use. Through these efforts, LANL, Los Alamos County, or other adjacent landowners will make several large tracts of land available for use.

MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order could cleanup several tracts of land identified for conveyance or transfer and, pending cleanup, may be made available for future use.

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the jurisdictional administrative control of DOE at or in the vicinity of LANL. Such parcels, or tracts, of land must meet suitability criteria established by the Act.

The Act sets forth the criteria, processes, and dates by which the tracts will be selected, titles to the tracts reviewed, environmental issues evaluated, and decisions made as to the allocation of the tracts between the two recipients. DOE's responsibilities under the Act included identifying potentially suitable tracts of land, identifying any environmental restoration and remediation that would be needed for those tracts of land, and conducting NEPA review of the proposed conveyance or transfer of the land tracts. Under this Act, those land parcels identified suitable for conveyance and transfer must have undergone any necessary environmental restoration or remediation.

Table 3.7-2. Site-wide Land Use

Land Use Category	Acreage in CY 2004–CY 2008
Service/Support	184
Experimental Science	705
High Explosives Research and Development	1,297
High Explosives Testing	7,209
Nuclear Materials Research and Development	131
Physical/Technical Support	452
Public/Corporate Interface	31
Theoretical/Computational	7
Waste Management	196
Reserve	15,355
Total	25,590

3.8 Groundwater

Under the No Action Alternative in the 2008 SWEIS, operation levels would be similar to the current levels; therefore, there would be little change in the flow of contaminants to the alluvial or regional groundwater. MDA remediation, canyon cleanup, and other actions related to the implementation of the Consent Order would not appreciably change the rate of transport of contaminants in the short term, but would likely reduce long-term contaminant migration and impacts on the environment.

The Laboratory performed most groundwater compliance work in 2008 pursuant to the Consent Order. These activities included groundwater monitoring, groundwater investigations, and groundwater well construction.

In 2008, LANL installed 10 alluvial monitoring wells, one perched-intermediate monitoring well, and eight regional monitoring wells (Table 3.8-1). The alluvial wells were installed in Pajarito Canyon as part of the Pajarito Work Plan (LANL 1998a) investigation. Wells SCI-2, R-36, and R-43 were installed in Sandia Canyon as part of the ongoing chromium contamination investigation. Well R-42 was installed in Mortandad Canyon as part of the same investigation. Wells R-25b and R-25c were installed adjacent to existing well R-25, a nine-screen completion, to replace screens 1 and 3, respectively. Well R-38 (Cañada del Buey) and R-39 (Pajarito Canyon) were installed to augment the existing groundwater-monitoring network around MDAs G, H, and L.

Table 3.8-1. Wells and Boreholes Installed in 2008

Type[a]	Identifier	Watershed (Canyon)	Total depth (ft bgs)[b]	Screened interval (ft bgs)	Water level (ft bgs)	Comments
R	R-35a	Sandia	1086.2	1013.1–1062.2	792.1	Lower Sandia Canyon immediately southwest of municipal supply well PM-3
A	PCAO-5	Pueblo	30	14.7–24.7	6.42	Approximately 100 ft upstream from the flood retention structure
A	PCAO-6	Pueblo	20	8–15	11.0	Approximately 300 ft downstream from the flood retention structure
A	PCAO-7A	Pajarito	25	9.7–19.7	11.0	North side of Pajarito Road approximately 100 ft from the TA-18 entrance
A	PCAO-7B1	Pajarito	60	44–54	56.92	North side of Pajarito Road directly across from the TA-18 entrance
A	PCAO-7B2	Pajarito	25	10–20	12.02	North side of Pajarito Road directly across from the TA-18 entrance
A	PCAO-7C	Pajarito	25	9.7–19.7	10.55	South side of Pajarito Road approximately 50 ft from the TA-18 entrance
A	PCAO-8	Pajarito	25	9.7–19.7	22.5	In TA-36 on the south side of Pajarito Road
A	PCAO-9	Pajarito	21	6–16	7.75	In TA-36 on the south side of Pajarito Road (a quarter-mile west of the security checkpoint)
A	3MAO-2	Pajarito	30	14.7–24.7	26.6	In TA-18 in lower Three Mile Canyon just above the confluence with Pajarito Canyon
A	TMO-1	Pajarito	6.5	3.5–6.5	1.00	Lower Two Mile Canyon above the confluence with Pajarito Canyon
I	SCI-2	Sandia	570	548–568	514.3	Lower Sandia Canyon due south of TA-53 adjacent to R-43
R	R-25b	Cañon de Valle	782	750–770.8	748.6	Adjacent to existing well R-25 above Cañon de Valle
R	R-25c	Cañon de Valle	1080.8	1039.6–1060.0	Dry	Adjacent to existing well R-25 above Cañon de Valle
R	R-36	Sandia	803.7	766.9–789.9	749.1	Lower Sandia Canyon southeast of PM-3 and R-35a&b
R	R-38	Cañada del Buey	853.4	821.2–831.2	810.2	Cañada del Buey northeast of MDA L
R	R-39	Pajarito	875.6	859–869	824	Pajarito Canyon southeast of MDA G
R	R-42	Mortandad	973.5	931.8–952.9	918.8	Mortandad Canyon due south of TA-53 and southeast from R-43/SCI-2
R	R-43	Sandia	990.4	903.9–924.6 969.1–979.1	893.0 (composite)	Lower Sandia Canyon due south of TA-53 adjacent to SCI-2

a A = alluvial aquifer well; I = perched intermediate aquifer well; R = regional aquifer well
b feet below ground surface

3.9 Cultural Resources

LANL has a large and diverse number of historic properties. Approximately 86 percent of DOE-administered land in Los Alamos County has been surveyed for prehistoric and historic cultural resources. More than 1,800 prehistoric sites have been recorded (Table 3.9-1). During FY 2008, sites that have been excavated since the 1950s were removed from the overall site count numbers. Thus, the number of recorded sites is less than in reports from previous years. More than

85 percent of these archaeological 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.

LANL continues to evaluate buildings and structures from the Manhattan Project and the Early Cold War period (1943–1963) for eligibility to the National 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[10] communities as traditional cultural properties.

The 1999 SWEIS lists 2,319 historic (AD 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).

Table 3.9-1. Acreage Surveyed, Prehistoric Cultural Resource Sites Recorded, and Cultural Resource Sites Eligible for the National Register of Historic Places (NRHP) at LANL FY 2008[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 & potentially eligible NRHP sites	Percentage of total site eligibility	Number of notifications to Indian Tribes[c]
SWEIS	Not reported	Not reported	1,295	1,092	84	23
2007	4	23,134[d]	1,719[e]	1,623[e]	94	4
2008	0	23,130[f]	1,727[e]	1,625[e]	94	2

a Source: Information on LANL provided by DOE/NNSA and LANL Cultural Resources Team (CRT) to the Secretary of Interior for a Report to Congress on Federal Archaeological Activities.

b In the CY 1999 and CY 2000 Yearbooks, this column, then titled 'Total Archaeological Sites Recorded to Date,' included Historic period cultural resources (AD 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 (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 The total acreage surveyed was recalculated and corrected due to changes in the new DOE/NNSA boundary. Therefore, the total acres surveyed utilizing the new DOE/NNSA boundary and the corrected archaeological area surveyed is a total of 23,134 acres.

e As part of ongoing work to field verify sites recorded 20 to 25 years ago, LANL's CRT has identified sites that have been recorded more than once and have multiple Laboratory of Anthropology site numbers. Therefore, the total number of recorded archaeological sites is less than indicated in FY 2002. This effort will continue over the next several years and more sites with duplicate records will probably be identified.

f One tract of land was transferred to Los Alamos County during FY 2008. Therefore, the total acres surveyed using the new DOE/NNSA boundary are 23,130.

[10] Athabascan refers to a linguistic group of North American Indians. Their range extends from Canada to the American Southwest, including the languages of the Navajo and Apache.

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	Percentage of Eligible Properties	Evaluated Buildings Demolished[d]
1999 SWEIS	2,319	164	98	Not reported	Not reported	Not reported
2007	754	593	336	257	57	138
2008	758	623	346	277	55	144

a Source: Information on LANL provided by DOE/NNSA and LANL CRT to the Secretary of Interior for a Report to Congress on Federal Archaeological Activities. Numbers given represent cumulative total properties identified, evaluated, or demolished by the end of the given FY.
b This number includes historic sites that have not been evaluated, and therefore, may be potentially NRHP-eligible. In addition, beginning with the CY 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.
d This represents the total number of evaluated buildings demolished to date.

To date, LANL has identified no sites associated with the Spanish Colonial or Mexican periods. During FY 2004 it was decided to combine the historic periods (Historic Pueblo, US Territorial, Statehood, and Undetermined Athabascan) into one site affiliation code “Early Historic Pajarito Plateau” (AD 1500 to 1943). 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 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 dated June 2006 between the NNSA/LASO, the New Mexico State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation. Additionally, the CRT has evaluated many Manhattan Project and Early Cold War properties (AD 1942–1963) and those properties built after 1963 that potentially have historical significance, reducing the total number of potential historic cultural resource sites to 758. 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. As stated previously, during FY 2006, sites that have been excavated since the 1950s were removed from the overall site count numbers. Thus, the number of recorded sites is less than in reports from previous years. All have been given unique New Mexico Laboratory of Anthropology site numbers. Some of the 139 are experimental areas and artifact scatters dating from the Manhattan Project and Early Cold War periods. The majority, 118 sites, are structures or artifact scatters associated with the Early Historic Pajarito Plateau or Homestead periods. Of these 139 sites, 96 are eligible for the NRHP. LANL’s Manhattan Project and Early Cold War period buildings account for the remaining 619 of the 758 Historic period properties. At this time, the New Mexico State Historic Preservation Division (NMSHPD) does not assign Laboratory of Anthropology numbers to LANL buildings. Of these historic buildings, 487 have been evaluated for eligibility and inclusion on the NRHP. Two hundred thirty-four of these evaluated buildings have been declared not eligible for the NRHP; the remaining 250 are NRHP-eligible.

The CRT has documented 82 of the NRHP-eligible buildings in accordance with the terms of Memoranda of Agreement between the DOE/NNSA and the NMSHPD. These buildings have subsequently been DD&Ded. Sixty-two of the 234 non-eligible buildings have also been demolished through this program.

Demolished Buildings. Table 3.9-3 indicates the extent of historic building documentation and demolition to date. To date, not all buildings that have been documented as part of the DD&D Program have been demolished.

Table 3.9-3. Historic Building Documentation and Demolition Numbers

Fiscal Year	Number of Buildings for which Documentation was Completed	Number of Buildings Actually Demolished in Fiscal Year
2007	18	3
2008	1	6
TOTAL	163	111

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 SHPO and/or the Advisory Council on Historic Preservation about possible adverse effects to NRHP-eligible resources.

During FY 2008, the CRT evaluated 744 LANL-proposed actions, and no new field surveys to identify cultural resources were conducted. DOE/NNSA sent 11 survey reports to the SHPO for concurrence in findings of effects and determinations of eligibility for cultural resources located during survey projects. Additionally, one final report for the completion of data recovery stipulations was submitted to the SHPO.

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 (42 USC 1996). Tribal groups must receive notification of possible alteration of traditional and sacred places. The Governors of San Ildefonso, Santa Clara, Cochiti, Jemez, and Acoma Pueblos and the President of the Mescalero Apache Tribe received copies of two reports to identify any traditional cultural properties that a proposed action could affect.

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 (25 USC 1996). No discoveries of burials or cultural objects occurred in FY 2008 from federal undertakings.

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 (16 USC 1996). No violations of this Act were recorded on DOE/NNSA land in FY 2008.

3.9.2 Compliance Activities

Nake'muu. During FY 2006, the long-term monitoring program to assess the impact of LANL mission activities on cultural resources at the ancestral pueblo of Nake'muu was completed as part of the *Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility Mitigation Action Plan* (DOE 1996l). Nake'muu is the only pueblo at LANL with standing walls. It dates from circa AD 1200 to 1325 and contains 55 rooms with walls standing up to six feet high. During the nine-year monitoring program 1998–2006, the site witnessed a 0.9 percent displacement rate of chinking stones and 0.3 percent displacement of masonry blocks. Statistical analyses indicate that these displacement rates are significantly correlated with annual snowfall, but not with annual rainfall or explosive tests at the DARHT facility. The site was revisited during September 2007 and September 2008 and was observed to have experienced an unusually high percentage of new displaced masonry blocks. The CRT is in the process of evaluating the possibility of reinstating a monitoring program and a program of long-term stabilization and protection for the standing walls. Representatives from the Pueblo of San Ildefonso visited Nake'muu on September 26, 2008.

Traditional Cultural Properties Comprehensive Plan. During FY 2008, the CRT continued to assist DOE/NNSA in implementing the *Traditional Cultural Properties Comprehensive Plan* (LANL 2000c). This included informal meetings with the Pueblos of San Ildefonso and Santa Clara. Discussions during the year centered around working with San Ildefonso regarding properties in TA-03, along with working with both San Ildefonso and Santa Clara regarding traditional cultural properties in Rendija Canyon.

Land Conveyance and Transfer. The Laboratory began the seventh year of a multiyear program of archaeological excavation in support of the Land Conveyance and Transfer Project. Thirty-nine archaeological sites were excavated during the four field seasons, with more than 200,000 artifacts and 2,000 samples being recovered. This work was conducted under a Programmatic Agreement among the DOE/NNSA, the Advisory Council on Historic Preservation, the New Mexico SHPO, and the Incorporated County of Los Alamos concerning the conveyance of certain parcels of land to the County for economic development. During FY 2008, a report was completed (LANL 2008c) and a curation agreement was formalized, between the LASO, DOE/NNSA, and the Museum of Indian Arts and Culture (MIAC), in Santa Fe. It is anticipated that the collections will be transported to MIAC for permanent curation in FY 2009.

Cerro Grande Fire Recovery. During 2008, the CRT continued to monitor 34 Ancestral Pueblo and Archaic period archaeological sites rehabilitated by the Pueblo of San Ildefonso in CY 2004. The monitoring was in support of the

Mitigation Action Plan for the Special Environmental Analysis for the Cerro Grande Rehabilitation Project (DOE 2000b, 2000c). The monitoring is part of a long-term program to evaluate the success of erosion control measures and other aspects of rehabilitation. In addition, tree snags were removed from three homestead properties and repairs were made to the two fences surrounding traditional cultural properties in Rendija Canyon. Based on recommendations made during the FY 2007–2008 field season, a total of seven sites have been removed due to achieving satisfactory new ground vegetation and because of the helpful effects of this vegetation in erosion control. This leaves a total of 27 sites for continued monitoring in FY 2009.

3.9.3 Cultural Resources Management Plan

The Cultural Resources Management Plan (CRMP) provides 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, Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, and other laws, regulations, and policies in the context of LANS's mission.

The CRMP provides high-level guidance for implementation of the *Traditional Cultural Properties Comprehensive Plan* and all other aspects of cultural resources management at LANL. It presents a framework for collaborating with Native American Tribes and other ethnic groups and organizations in identifying traditional cultural properties and sacred sites.

Status. The CRMP was finalized and approved by LANL and DOE/NNSA in 2005 and was implemented during 2006 through a Programmatic Agreement signed on June 15, 2006, by DOE/NNSA, the New Mexico SHPO, and the Advisory Council on Historic Preservation. The CRMP will be updated every five years. During FY 2008, implementing activities included (1) site eligibility testing of one Archaic period archaeological site; (2) the evaluation and photography of a number of archaeological sites being threatened with erosion in TA-36 that are part of the proposed LANL archaeology National Register Historic District; (3) the continued monitoring of selected archaeological sites as part of the Cerro Grande Fire Recovery project; and (4) the continued assessment of individual properties within the proposed Project Y Manhattan Project National Historic Landmark, as part of data gathering for use in developing the forthcoming landmark nomination package for the National Park Service. The degree of implementation of the plan in future years is contingent on funding.

In CY 2008, the Rendija Canyon Traditional Cultural Properties District, which includes seven properties, was added to the State Register of Historic Places.

Relationship to Other Plans. The Biological Resources Management Plan (particularly the Threatened and Endangered Species Habitat Management Plan [LANL 1998b]) may limit access to certain cultural resource sites. Erosion control under the SWPPPs may have a potential impact on cultural resource sites.

3.10 Ecological Resources

LANL is located in a region of diverse landforms, elevation, and climate—features that contribute to producing diverse plant and animal communities. Plant communities range from urban and suburban areas to grasslands, wetlands, shrublands, woodlands, and mountain forest. These plant communities provide habitat for a variety of animal life.

The SWEIS projected no significant adverse impacts to biological resources, ecological processes, or biodiversity (including threatened and endangered species) resulting from LANL operations. Data collected for CY 2008 support this projection. These data are reported in the 2008 Environmental Surveillance Report (LANL 2008b).

The SWEIS Biological Assessment, completed in 2006, covers actions that were described in the 2008 SWEIS No Action Alternative and some actions that were included as part of the Expanded Operations Alternative. Actions included as part of the Expanded Operations Alternative include remediation of MDAs, DD&D of TA-21, and elimination or reduction of outfall releases in Mortandad Canyon and its tributaries.

LANL management approved a LANL Biological Resources Management Plan in September 2007 (LANL 2007d). LANL subject matter experts prepared and published a source document for sensitive species BMPs in 2008 (LANL 2008d).

3.10.1 Conditions of the Forests and Woodlands

The forests and woodlands in the LANL area have undergone significant changes that began with the 2000 Cerro Grande Fire that will have an impact on forest health for decades to come. The fire reduced tree densities in the area, particularly on Forest Service land west of LANL. Subsequent wildfire risk reduction thinning activities reduced tree density and cover on much of the LANL forest and woodland. At the same time, the recent bark beetle infestation killed many of the remaining mature conifer trees throughout the Pajarito Plateau. LANL forests and woodlands are now much more open and will continue to be dominated by understory species for many years.

The Cerro Grande Fire burned approximately 7,678 acres on LANL property (LANL 2004b). Most of this, 62 percent or 4,760 acres, was in ponderosa pine forests. An additional 17 percent of the Cerro Grande Fire burned in piñon-juniper woodlands on LANL. In either case, a large percentage of this, 88 percent, was burned at low severity and with 10 percent to 40 percent overstory mortality. Only 12 percent of the area at LANL that was burned by the Cerro Grande Fire was at moderate- or high-burn severities. In CY 2007 the Wildland Fire Management Plan (LANL 2007e) was completed and implemented. The overall goals of the Wildland Fire Management Plan are to 1) protect the public, LANL workers, facilities, and the environment from catastrophic wildfire; 2) prevent interruptions of LANL operations from wildfire; 3) minimize impacts to cultural and natural resources while conducting fire management activities; 4) improve forest health and wildlife habitat at LANL and, indirectly, across the Pajarito Plateau; and promote and support interagency collaboration for wildfire-related activities. These goals are accomplished through reducing fuel loads within LANL forests to decrease wildfire hazards, treating fuel to decrease the risk of wildfire escapes at LANL-designated firing sites, and improving wildland fire suppression capability through fire road improvements.

To minimize the potential for erosion and to facilitate recovery from the fire, a total of 1,800 acres was rehabilitated after the fire with seeded grass, straw mulch, and hydromulch (LANL 2002e). Four years after rehabilitation treatment implementation, burned areas have maintained total ground cover but vegetation cover has declined, probably as a result of drought (LANL 2007f). Cover is sufficient to protect most areas from soil loss.

LANL is located in a fire-prone region and there will always be a high potential for wildfires. Recent modeling of wildfire risks indicates that the greatest potential for lightning to ignite fires occurs along the western and southwestern boundary of LANL and in the adjacent mountainous areas. Because of this risk, thinning has been a primary management activity to reduce fire hazards in forests and woodlands at LANL. The total amount of thinning conducted since 2000 is approximately 9,150 acres (LANL 2005b). Of this, approximately 40 percent or 3,900 acres were in ponderosa pine forests, with the remaining acreage consisting of piñon-juniper woodlands. In addition, 800 acres at LANL was thinned between 1997 and 1999.

Bark beetle-induced tree mortality has leveled off over the past two years, as much through lack of live trees as an improvement in forest health. Tree mortality first became a prominent result of the drought during 2002 and continued in 2003 and 2004. By the end of 2004, 95 percent of the piñon trees had been killed. In addition, approximately 12 percent of ponderosa pine trees had been killed. In the lower elevations of the mixed conifer zone on north-facing slopes of the canyons, up to 100 percent of the Douglas fir trees were also killed by the drought and subsequent bark beetle activity.

The LANL area received approximately 16 inches of precipitation in water year 2004 (October–September), 25 inches in water year 2005, 14 inches in 2006, 20 inches in 2007, and 19 inches in 2008. The average for the TA-6 meteorological station is 17 inches. This cycle of alternating wet and dry years makes it difficult to identify any trend in vegetation recovery. We see rapid growth of understory plant species during wet years and neutral or negative response to dry years. Although we can reasonably expect to see regrowth of shrubby species, it is unlikely that there will be any appreciable increase in tree species until the current climate trends improve.

3.10.2 Threatened and Endangered Species Habitat Management Plan

LANL's Threatened and Endangered Species Habitat Management Plan (LANL 1998b) 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 and southwestern willow flycatcher. The Threatened and Endangered Species Habitat Management Plan was incorporated into the NEPA, Cultural Resources, and Biological Resources Laboratory Implementation Requirement document developed during 1999, which is now an Institutional Procedure (LANL 2008e).

In CY 2008, LANL continued conducting annual surveys for Mexican spotted owls and southwestern willow flycatchers. Surveys were also conducted for two state-listed species, the Jemez Mountains salamander and the gray vireo. The Biological Resources Compliance and Monitoring Team published "The Status of the Jemez Mountains Salamander (*Plethodon neomexicanus)* at Los Alamos National Laboratory, 2008" (LANL 2008f), which detailed survey results and habitat modeling for Jemez Mountains salamander. The Biological Resources Compliance and Monitoring Team provided guidance for avoiding human disturbance and habitat alteration impacts on federally listed species to projects and operations through excavation permit reviews and the permits and requirements identification process.

3.10.3 Biological Assessments and Compliance Packages

LANL 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.

During 2008, the Biological Resources Compliance and Monitoring Team completed one amendment of a biological assessment for monitoring wells and water sampling at LANL (LANL 2008g). The US Fish and Wildlife Service concurred in the determination that the project may affect, but was not likely to adversely affect, federally listed species.

3.11 Footprint Elimination/Decontamination, Decommissioning, and Demolition

3.11.1 Footprint Elimination

Footprint reduction efforts funded by multiple programs contribute to the reduction of the LANL footprint as required to meet all related goals and mandates in place since 2006, and is a cornerstone facility strategy necessary to achieve the robust sustainable infrastructure required for current and future missions. The consolidation of people and functions into facilities that represent a better-built environment, coupled with the elimination of aged permanent and temporary structures, is the goal. This strategy allows the reduction of operational and maintenance costs of the eliminated facilities to more appropriately fund the remaining sustainable facilities. It also allows the associated deferred maintenance backlog and the energy/water usage of those same facilities to be avoided.

The institutionally funded Footprint Reduction Project is dedicated to forwarding specific facilities toward their ultimate elimination. These activities include

- funding the moves of functions/people to vacate a building,
- funding modifications in enduring facilities to house organizations that are vacating obsolete structures,
- addressing the specific institutional requirements necessary to formally declare a facility “excess” to maintain a backlog of structures ready for elimination once DD&D funding is acquired (approximately 0.75 million gross square feet), and
- in some cases, removing small structures.

In CY 2008, DOE/NNSA demolished four buildings, eliminating approximately 79,000 square feet of the Laboratory’s footprint, and reduced its energy intensity by 18 percent, through a number of mechanisms, including replacing older facilities with newer more energy-efficient facilities.

3.11.2 Decontamination, Decommissioning, and Demolition

DD&D are those actions taken at the end of the useful life of a building or structure to reduce or remove substances that pose a substantial hazard to human health or the environment, retire it from service, and ultimately eliminate all or a portion of the building or structure.

When DOE/NNSA declares a LANL facility as surplus (no longer needed) it is shut down and prepared for DD&D. NEPA for DD&D activities at LANL are covered under the 2008 SWEIS, however, all waste volumes generated from these activities will be tracked in the SWEIS Yearbook.

In CY 2008, DOE/NNSA demolished four buildings. Building TA-55-41 (the Nuclear Storage Facility) demolition was completed in August 2008. Because this building was never used for its intended purpose of nuclear material storage, approximately 96 percent of the building and contents were recycled. Table 3.11.2-1 summarizes the waste volumes for all buildings DD&Ded in CY 2008.

Table 3.11.2-1. CY 2008 DD&D Facilities

Construction/ Demolition Debris[a] 2008 SWEIS	Building Number[b]	DD&D com- pleted	Waste Volumes (cubic meters)				
			Construction/ Demolition Debris	Asbes- tos	Univer- sal waste	Recy- clable metal	Recyclable Asphalt/ Concrete
235,408 m^{3}[c]	TA-55-0041	6/28/08	164.3	0	5.3	344 (steel)	4,824.3
	TA-35-0248	9/20/08	38.2	7.6	0.76	0	0
	TA-35-0251	9/20/08	38.2	7.6	0.76	0	0
	TA-21-0014	11/25/08	45.8	122.3	0.76	0	0
			286.5	**137.6**	**7.6**	**344**	**4,824.3**

a Construction/Demolition Debris included uncontaminated wastes such as steel, brick, concrete, pipe, and vegetative matter from land clearance.

b DD&D covered under existing environmental assessments are not included here.

c This number represents 186,476 m^3 from the No Action Alternative, 35,934 m^3 from the TA-21 DD&D Option, and 12,998 m^3 from the TA-18 DD&D Option.

4.0 Summary and Conclusion

The 2008 SWEIS Yearbook reviews CY 2008 operations for the 15 Key Facilities (as defined by the SWEIS[11]) and Non-Key Facilities 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 the Non-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 1999 SWEIS projected a total of 38 facility construction and modification projects for LANL facilities. The 2008 SWEIS No Action Alternative projected a total of 12 facility construction and modification projects. Electrical and mechanical systems were expanded to meet new computer requirements at the Nicholas C. Metropolis Center. During 2008, one construction project, the new RLUOB, continued at TA-55. At the Non-Key Facilities, one major construction, the LASO building, was completed in 2008.

Facility Operations. The capabilities identified in the 1999 SWEIS for Key Facilities at LANL have changed since the issuance of the first ROD for the 2008 SWEIS. The following changes have been made in the new SWEIS:

CMR Facility:

- Fabrication and Metallography was renamed Fabrication and Processing and was combined with Radioactive Liquid Waste Treatment.
- Large Vessel Handling was added as a new capability.

Nicholas C. Metropolis Center for Modeling and Simulation (new Key Facility):

- Computer Simulations was added as a capability in a new Key Facility.

Tritium:

- Cryogenic Separation was removed as a capability.
- Thin Film Loading was removed as a capability.
- Hydrogen Isotopic Separation was added as a new capability.
- Radioactive Liquid Waste Treatment was added as a new capability, however, this capability will be removed with decommissioning of TA-21 tritium buildings.

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[11] There will be many instances in the Yearbook that discuss SWEIS projections—if 1999 or 2008 does not precede SWEIS, then the projections mentioned refer to both the 1999 SWEIS and the 2008 SWEIS.

Bioscience (HRL in the 1999 SWEIS):

- Bio-Materials and Chemistry was renamed Biologically Inspired Materials and Chemistry.
- Computational Biology was added as a new capability.
- Environmental Effects was renamed Environmental Microbiology.
- Genomic and Proteomic Science was added as a new capability.
- Cytometry was renamed Measurement Science and Diagnostics.
- Molecular Synthesis was added as a new capability.
- Structural Cell Biology was renamed Structural Biology.
- Pathogenesis was added as a new capability.
- Neurobiology was removed as a capability.
- Biothreat Reduction and Bioforensics was added as a new capability.
- In-Vivo Monitoring is not a Biosciences Division capability, however, it is located at the Health Research Laboratory, therefore, it is included within this Key Facility.

Radiochemistry:

- Hydotest Sample Analysis was added as a new capability.

Radioactive Liquid Waste Treatment Facility:

- Waste Characterization, Packaging, and Labeling was combined with Waste Transport, Receipt, and Acceptance.
- Radioactive Liquid Waste Pretreatment was combined with Radioactive Liquid Waste Treatment.
- Decontamination Operations were relocated to the Solid Radioactive and Chemical Waste Key Facility.

LANSCE:

- MTS was added as a new capability.
- Accelerator-Driven Transmutation Technology was removed as a capability.
- Radioactive Liquid Waste Treatment (Solar Evaporation at TA-53) was added as a new capability.

Solid Radioactive and Chemical Waste Facility:

- Other Waste Processing was renamed Waste Treatment.
- Compaction was combined with Waste Treatment.
- Size Reduction was combined with Waste Treatment.
- Disposal was renamed Waste Disposal.
- Decontamination Operations was added as a new capability.

In 2008, Pajarito Site (TA-18) was placed into Surveillance and Maintenance mode. Operations have ceased and the facility was downgraded to a Less-than-

HazCat-3 Nuclear Facility. For the purpose of the 2008 SWEIS Yearbook, Pajarito Site and its nine capabilities have been removed as a Key Facility.

During CY 2008, 85 capabilities were active. The nine inactive capabilities were Destructive and Nondestructive Analysis Project, Nonproliferation Training, Actinide Research and Development, Fabrication and Processing and Large Vessel capabilities at CMR; Hydrodynamic Tests at High Explosives Testing; Hydrogen Isotope Separation, Radioactive Liquid Waste Treatment at Tritium Facilities; MTS at the LANSCE.

While there was activity under nearly all capabilities, the levels of these activities were below levels projected in the SWEISs. For example, the LANSCE linac generated an H^- beam to the Lujan Center for 2,741 hours in 2008, at an average current of 285 microamps, compared to 6,400 hours at 200 microamps projected in the SWEIS.

During 2008, only two of LANL's facilities operated at levels approximating those projected in the SWEIS—the MSL and the Non-Key Facilities. The MSL Key Facility is more akin to the Non-Key Facilities and represents 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.

This Yearbook evaluates the effects of LANL operations in three general areas—effluent to the environment, workforce and regional consequences, and changes to environmental areas for which the DOE/NNSA has stewardship responsibility as the administrator of LANL.

Radioactive emissions have decreased significantly since 2007, after an emission control system at LANSCE was repaired. Radioactive airborne emissions from point sources (i.e., stacks) during 2008 totaled approximately 1,670 curies, approximately 8 percent of the 10-year average of 21,700 curies projected in the SWEIS.

The 2008 chemical usage amounts were extracted from ChemLog (LANL's chemical inventory system). The quantities used for this report represent chemicals procured or brought on site in CY 2008. Appendix B includes 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. The most recent report is "Emissions Inventory Report Summary for Los Alamos National Laboratory for Calendar Year 2008" (LANL 2009d).

Since 1999, the total number of permitted outfalls was reduced from 55 identified in the 1999 SWEIS to 15 that were renewed in the August 2007 NPDES permit. As a result of these closures, there has been a 56 percent decrease in flow. In addition to the decrease of the total number of permitted outfalls, the change in methodology by which flow was measured and reported in the past has had a significant impact on the flow volumes reported. 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. Since 2001, data are collected and reported using actual flows recorded by flow meters at most outfalls. In 2008, 13 outfalls flowed. Calculated NPDES discharges totaled 158.4 million gallons for CY 2008 compared to a projected volume of 279 million gallons per year. This is approximately 19.8 million gallons less than the CY 2007 total of 178.2 million gallons, due largely to the change in the number of permitted outfalls. The 2008 total volume of discharge is well below the maximum flow of 279.0 million gallons that was projected in the SWEIS.

Wastes have been generated at levels below quantities projected in the SWEISs. The 2008 SWEIS combines TRU and mixed TRU into one waste category since they are both managed for disposal at the WIPP. Due to the DVRS repackaging of legacy TRU and mixed TRU waste at the WCRR Facility, the amount of mixed TRU waste exceeded projections from the 1999 SWEIS. However, because the 2008 SWEIS combines TRU and mixed TRU into one waste category, the total amount of waste generated from repacking did not exceed the TRU waste projection. In 2008, waste quantities from LANL operations were below SWEIS projections for all waste types, reflecting the levels of operations at both the Key and Non-Key Facilities.

In CY 2008, DOE/NNSA demolished four buildings, eliminating approximately 79,000 square feet of the Laboratory's footprint, and reduced its energy intensity by 18 percent, through a number of mechanisms, including replacing older facilities with newer more energy-efficient facilities.

In the 2008 SWEIS, actual utility impacts and performance changes were analyzed. Annual electricity and water usage from 1999–2005 remained well below the levels projected in the 1999 SWEIS. In the 2008 No Action Alternative, the total electric consumption and the total water consumption were reduced to a number closer to the average electric and water consumption for the six years analyzed. The electric consumption for CY 2008 was 409 gigawatt-hours, which represents 11 gigawatt-hours more than CY 2007. The water consumption for CY 2008 was 370 million gallons, 38 million gallons more than CY 2007. Gas consumption for CY 2008 was 1.12 million decatherms, slightly less than CY 2007.

Radiological exposures to LANL workers are well within the levels projected in the SWEIS. The total effective dose equivalent for the LANL workforce was 104.7 person-rem during 2008, which is considerably lower than the workforce dose of 704 person-rem projected in the 1999 SWEIS and lower than the workforce dose of 280 person-rem projected in the 2008 SWEIS.

In the 2008 SWEIS No Action Alternative, the 2005 levels of employment were assumed to remain steady at 13,304. During 2006 and 2007, the size of the workforce slowly began to decrease. The 10,941 employees at the end of CY 2008 represent a decrease of 540 employees as compared to the 11,481 employees reported in the 2007 Yearbook.

Measured parameters for ecological resources and groundwater were similar to SWEIS projections, and measured parameters for cultural resources and land resources were below SWEIS projections. For land use, the SWEIS projected the disturbance of 41 acres of new land at TA-54 because of the need for additional disposal cells for LLW. As of 2008, this expansion had not become necessary.

Cultural resources remained protected in CY 2008, and no excavation of sites at TA-54 has occurred. (The 1999 SWEIS projected that 15 prehistoric sites would be affected by the expansion of Area G into Zones 4 and 6 at TA-54.)

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. In 2008, 10 alluvial monitoring wells, one perched intermediate monitoring well, and eight regional monitoring wells were installed.

In addition, ecological resources are being sustained as a result of protection afforded by DOE/NNSA administration 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.

In conclusion, LANL operations in CY 2008 have fallen below SWEIS projections. Operation levels that exceeded the SWEIS levels were one-time, non-routine events that do not reflect the day-to-day operations of the Laboratory. The Laboratory is committed to reducing energy consumption and will continue to make improvements towards that goal in the future. The operations data from 2008 indicate that LANL has been operating within the 1999 SWEIS and 2008 SWEIS projections and regulatory limits.

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Appendix A: Capability and Operations Tables for Key and Non-Key Facilities

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

Capability	SWEIS Projections[a]	2008 Operations
Analytical Chemistry	Support actinide research and processing activities by processing approximately 7,000 samples/yr.	Analytical Chemistry received approximately 800 samples during CY 2008 and conducted over 7,000 analytical processes involving microgram quantities of nuclear material.
Uranium Processing	Recover, process, and store LANL's highly enriched uranium inventory.	No activity to recover or process highly enriched uranium occurred in 2008. Some storage and inventory activities did take place.
Destructive and Nondestructive Analysis (Design Evaluation Project)	Evaluate up to 10 secondary assemblies/yr through destructive/nondestructive analyses and disassembly.	No activity in CY 2008. Project has not been active since 1999.
Nonproliferation Training	Conduct nonproliferation training using SNM.	No nuclear measurement schools were conducted in CY 2008.
Actinide Research and Development[b]	Characterize approximately 100 samples/yr using microstructural and chemical metallurgical analyses. Perform compatibility testing of actinides and other metals to study long-term aging and other material effects. Analyze TRU waste disposal related to validation of WIPP performance assessment models. Perform TRU waste characterization. Analyze gas generation as could occur in TRU waste during transportation to WIPP. Demonstrate actinide decontamination technology for soils and materials. Develop actinide precipitation method to reduce mixed wastes in LANL effluents. Process up to 400 kilograms of actinides/yr between TA-55 and the CMR building.	No microstructural/chemical analysis and compatibility testing of actinides were performed in CY 2008. Process activity was moved to TA-55 in 2007. Project was completed in 2001. No activity in CY 2008.

Table A-1 (cont.)

Capability	SWEIS[a]	2008 Operations
Fabrication and Processing	Process up to 5,000 curies of neutron sources/yr (both plutonium-238 and beryllium and americium-241 and beryllium sources). Process neutron sources other than sealed sources. Stage a total of up to 1,000 plutonium-238 and beryllium and americium-241 and beryllium neutron sources in Wing 9 floor holes. Produce 1,320 targets/yr for isotope production. Separate fission products from irradiated targets. Support fabrication of metal shapes using highly enriched uranium (as well as related uranium processing activities) with an annual throughput of approximately 2,200 pounds (1,000 kilograms).	Project was terminated in CY 1999. No process activity in CY 2008. Casting furnace capability was removed in 1999. No enriched uranium solution processing was conducted in CY 2008.
Large Vessel Handling[c]	Process up to two large vessels from the Dynamic Experiments Program annually.	No vessels processed in 2008.

a There will be many instances in the Yearbook that discuss SWEIS projections—if 1999 or 2008 does not precede SWEIS, then the projections mentioned refer to both the 1999 SWEIS and the 2008 SWEIS.

b The actinide activities at the CMR Building and at TA-55 are expected to total 400 kilograms/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 specific to the facility (but are related directly to the activities themselves), are only projected for the total of 400 kilograms/yr.

c Currently referred to as the Containment Vessel Disposition Project.

Table A-2. CMR Building (TA-03)/Operations Data

Parameter	Units[a]	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Total Actinides[b]	Ci/yr	7.60E-4	7.60E-4	1.21E-05
Strontium-90/Yttrium-90	Ci/yr	Not projected[c]	Not projected[c]	None detected
Krypton-85	Ci/yr	1.00E+2	1.00E+2	None detected
Germanium-68/Gallium-68	Ci/yr	Not projected[c]	Not projected[c]	None detected
Xenon-131m	Ci/yr	4.50E+1	4.50E+1	Not measured[d]
Xenon-133	Ci/yr	1.50E+3	1.50E+3	Not measured[d]
Tritium Water	Ci/yr	Negligible	Negligible	Not measured[d]
Tritium Gas	Ci/yr	Negligible	Negligible	Not measured[d]
NPDES Discharge:				
03A–021	MGY	0.53	1.9	0.17
Wastes:				
Chemical	kg/yr	10,800	10,886	69.3
LLW	m^3/yr	1,820	1,835	200
MLLW	m^3/yr	19	19	0.66
TRU	m^3/yr	28	42[e]	2.08
Mixed TRU	m^3/yr	13	[e]	0.52

a Ci/yr = curies per year; MGY = million gallons per year; FTEs = full-time equivalent workers.
b Includes uranium, plutonium, americium, and thorium.
c The radionuclide was not projected in the SWEIS because it was either dosimetrically insignificant or not isotopically identified.
d Potential emissions during the period were sufficiently small that measurement of these radionuclides was not necessary to meet facility or regulatory requirements.
e 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-3. Sigma Complex (TA-03)/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Research and Development on Materials Fabrication, Coating, Joining, and Processing	Fabricate items from metals, ceramics, salts, beryllium, enriched and depleted uranium, and other uranium isotope mixtures.	Capability maintained and enhanced, as projected.
Characterization of Materials	Perform research and development on properties of ceramics, oxides, silicides, composites, and high-temperature materials.	Totals of 187 assignments and 830 specimens were characterized.
	Analyze up to 36 tritium reservoirs/yr.	Total of 12 tritium reservoirs analyzed in CY 2008.
	Develop a library of aged non-SNM material from stockpiled weapons and develop techniques to test and predict changes. Store and characterize up to 2,500 non-SNM component samples, including uranium.	Approximately 1,250 non-SNM materials samples and 1,250 non-SNM component samples stored in library.
Fabrication of Metallic and Ceramic Items	Fabricate stainless steel and beryllium components for up to 80 pits/yr.	Fabricated approximately 72 stainless steel and beryllium pit components.
	Fabricate up to 200 reservoirs for tritium/yr.	Fewer than 25 reservoirs fabricated.
	Fabricate components for up to 50 secondary assemblies/yr (of depleted uranium, depleted uranium alloy, enriched uranium, deuterium, and lithium).	Fabricated components for fewer than 50 secondary assemblies.
	Fabricate nonnuclear components for research and development: about 100 major hydrotests and 50 joint test assemblies/yr.	Fabricated components for fewer than 100 major hydrotests and for less than 50 joint test assemblies.
	Fabricate beryllium targets.	Provided material for the production of inertial confinement fusion targets and fabricated fewer than 10 targets.
	Fabricate targets and other components for accelerator production of tritium research.	On hold in 2008.
	Fabricate test storage containers for nuclear materials stabilization.	Produced approximately 20 containers.

Table A-4. Sigma Complex (TA-03)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:[a]				
Uranium-234	Ci/yr	6.60E-5	6.60E-5	Not measured
Uranium-238	Ci/yr	1.80E-3	1.80E-3	Not measured
NPDES Discharge:				
Total Discharges	MGY	7.3	5.8	0.29
03A–022	MGY	4.4	5.8	0.29
03A–024	MGY	2.9	[b]	0
Wastes:				
Chemical	kg/yr	10,000	9,979	26,855.4[c]
LLW	m^3/yr	960	994	5.7
MLLW	m^3/yr	4	4	0
TRU	m^3/yr	0	0[d]	0
Mixed TRU	m^3/yr	0	0[d]	0

a Stack monitoring at Sigma was discontinued early in CY 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 EPA or DOE regulations. Therefore, no emissions from monitoring data are available.
b Outfall was eliminated in the NPDES Permit.
c Chemical waste generated exceeded the SWEIS projection due to disposal of beryllium-contaminated metal items.
d 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-5. Machine Shops (TA-03)/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
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 in the SWEIS.
Fabrication Utilizing Unique Materials	Fabricate items using unique and unusual materials such as depleted uranium and lithium.	Fabrication with unique materials was conducted at levels below those projected in the SWEIS.
Dimensional Inspection of Fabricated Components	Perform dimensional inspection of finished components. Perform other types of measurements and inspections.	Dimensional inspection was provided for the above fabrication activities. Additional types of measurements and inspections were not undertaken.

Table A-6. Machine Shops (TA-03)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Americium-241	Ci/yr	Not projected[a]	Not projected[a]	None detected
Thorium-228	Ci/yr	Not projected[a]	Not projected[a]	None detected
Thorium-230	Ci/yr	Not projected[a]	Not projected[a]	None detected
Thorium-232	Ci/yr	Not projected[a]	Not projected[a]	2.28E-10
Uranium-234	Ci/yr	Not projected[a]	Not projected[a]	2.94E-09
Uranium-235	Ci/yr	Not projected[a]	Not projected[a]	None detected
Uranium-238	Ci/yr	1.50E-4	1.50E-4	None detected
NPDES Discharge	MGY	No outfalls	No outfalls	No outfalls
Wastes:				
Chemical	kg/yr	474,000	474,002	623.6
LLW	m^3/yr	606	604	0
MLLW	m^3/yr	0	0	0
TRU	m^3/yr	0	0[b]	0
Mixed TRU	m^3/yr	0	0[b]	0

a The radionuclide was not projected in the SWEIS because it was either dosimetrically insignificant or not isotopically identified.

b 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-7. Materials Science Laboratory (TA-03)/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Materials Processing	Support development and improvement of technologies for materials formulation. Support development of chemical processing technologies, including recycling and reprocessing techniques to solve environmental problems.	These capabilities were maintained as projected in the SWEIS. Single crystal growth, amorphous alloy research, powder processing, and materials characterization were expanded in CY 2008. Cold mock up of weapons assembly and processing as well as other technologies continued to be expanded in CY 2008.
Mechanical Behavior in Extreme Environments	Study fundamental properties of materials and characterize their performance, including research on the ageing of weapons. Develop and improve techniques for these and other types of studies.	These two capabilities were maintained as projected in the SWEIS and additional capabilities continued to be expanded as projected in the SWEIS. Fabrication, assembly, and prototype experiments were expanded in CY 2008. Improvements were accomplished in the conduct of dynamic load and crack testing and measurement.
Advanced Materials Development	Synthesis and characterize single crystals and nanophase and amorphous materials. Perform ceramics research, including solid-state, inorganic chemical studies involving materials synthesis. A substantial amount of effort in this area would be dedicated to producing new high-temperature superconducting materials. Provide facilities for synthesis and mechanical characterization of materials systems for bulk conductor applications. Develop and improve techniques for development of advanced materials.	Capability was maintained as projected and improved. Capability for ion beam modification of materials was increased. Superconductivity capability has been expanded to include electron beam deposition and performance measurement capabilities, including atomic force microscopy.
Materials Characterization	Perform materials characterization activities to support materials development.	Improvements occur on a continual basis, including expansion of electron microscopy to include atomic scale microscopy and improvement of X-ray capabilities.

Table A-8. Materials Science Laboratory (TA-03)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions	Ci/yr	Negligible	Negligible	Not Measured
NPDES Discharge Volume	MGY	No outfalls	No outfalls	No outfalls
Wastes:				
Chemical	kg/yr	600	590	127
LLW	m^3/yr	0	0	0
MLLW	m^3/yr	0	0	0
TRU	m^3/yr	0	0[a]	0
Mixed TRU	m^3/yr	0	0[a]	0

a 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-9. Metropolis Center (TA-03)/Comparison of Operations

Capability	2008 SWEIS Projections	2008 Operations
Computer Simulations	Perform complex three-dimensional computer simulations to estimate nuclear yield and ageing effects to demonstrate nuclear stockpile safety. Apply computing capability to solve other large-scale, complex problems.	As projected.

Table A-10. Metropolis Center (TA-03)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions	Ci/yr	[a]	Not Estimated	Not Measured
NPDES Discharge Volume[b]	MGY	5.8	13.6	11.47[b]
Wastes:				
Chemical	kg/yr	[a]	0	0
LLW	m^3/yr	[a]	0	0
MLLW	m^3/yr	[a]	0	0
TRU	m^3/yr	0	0[c]	0
Mixed TRU	m^3/yr	0	0[c]	0

a The Metropolis Center became a Key Facility in the 2008 SWEIS. In earlier yearbooks it was part of the Non-Key Facility section.

b Additional water usage in support of Metropolis Center expansion to support Roadrunner. Improvements to the SERF will lead to increased use of recycled effluent in the cooling towers.

c 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

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

Capability	SWEIS Projections[a]	2008 Operations
High Explosives Synthesis and Production	Perform high explosives synthesis and production research and development. Produce new materials for research, stockpile, security interest, and other applications. Formulate, process test, and evaluate explosives.	The high explosives synthesis and production operations were less than those projected in the SWEIS.
High Explosives and Plastics Development and Characterization	Evaluate stockpile returns and materials of specific interest. Develop and characterize new plastics and high explosives for stockpile, military, and security interest improvements. 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 in the SWEIS. There is no longer plastics development at TA-16.
High Explosives and Plastics Fabrication	Perform stockpile surveillance and process development. Supply parts to the Pantex Plant for surveillance and stockpile rebuilds and joint test assemblies. Fabricate materials for specific military, security interest, hydrodynamic, and environmental testing.	Fewer than 1,000 parts were fabricated in support of the weapons program in CY 2008, including high explosives characterization studies, subcritical experiments, hydrotests, surveillance activities, environmental weapons tests, and safety tests. There is no longer plastics development at TA-16.
Test Device Assembly	Assemble test devices. Perform radiographic examination of assembled devices to support stockpile related hydrodynamic tests, joint test assemblies, environmental and safety tests, and research and development activities. Support up to 100 major hydrodynamic test device assemblies/yr.	W Division provided fewer than 100 major assemblies for NTS subcritical and joint environmental test programs.
Safety and Mechanical Testing	Conduct safety and environmental testing related to stockpile assurance and new materials development. Conduct up to 15 safety and mechanical tests/yr.	HX Division performed fewer than 15 stockpile related safety and mechanical tests during CY 2008.
Research, Development, and Fabrication of High-Power Detonators	Continue to support stockpile stewardship and management activities. Manufacture up to 40 major product lines/yr. Support DOE-wide packaging and transport of electro-explosive devices.	High-power detonator activities by WCM Division resulted in the manufacture of fewer than 40 product lines in CY 2008.

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 in the SWEIS are 82,700 pounds of explosives and 2,910 pounds of mock explosives. Actual amounts used in CY 2008 were 968 pounds of high explosive and 260 pounds of mock high explosives.

Table A-12. High Explosives Processing (TA-08, TA-09, TA-11, TA-16, TA-22, and TA-37)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Uranium-238	Ci/yr	9.96E-7	9.96E-7	Not Measured[a]
Uranium-235	Ci/yr	1.89E-8	1.89E-8	Not Measured[a]
Uranium-234	Ci/yr	3.71E-7	3.71E-7	Not Measured[a]
NPDES Discharge:				
Number of outfalls		22		3
Total Discharges	MGY	12.4	0.06	0.0026
03A-130 (TA-11)	MGY	0.04	[b]	0.0026
05A-055 (TA-16)	MGY	0.13	[b]	0
05A-097 (TA-11)	MGY	0.01	[c]	0
Wastes:				
Chemical	kg/yr	13,000	13,154	7,004.4
LLW	m^3/yr	16	15	0.20
MLLW	m^3/yr	0.2	<1	0
TRU	m^3/yr	0	0[d]	0
Mixed TRU	m^3/yr	0	0[d]	0

a No stacks require monitoring; all non-point sources are measured using ambient monitoring.
b The 2008 SWEIS did not calculate individual flow per outfall.
c Outfall was eliminated in the new NPDES permit.
d 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-13. High Explosives Testing (TA-14, TA-15, TA-36, TA-39, and TA-40)/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Hydrodynamic Tests	Develop containment technology. Conduct baseline and code development tests of weapons configuration. Conduct 100 major hydrodynamic test/yr.	No hydrodynamic tests were conducted.
Dynamic Experiments	Conduct dynamic experiments to study properties and enhance understanding of the basic physics and equation of state and motion for nuclear weapons materials, including some SNM experiments.	Dynamic experiments were conducted at a level below those projected in the SWEIS.
Explosives Research and Testing	Conduct tests to characterize explosive materials.	Explosives research and testing were conducted at a level below those projected in the SWEIS.
Munitions Experiments	Support the U.S. Department of Defense with research and development of conventional munitions. Conduct experiments to study external-stimuli effects on munitions.	Munitions experiments were conducted at a level below those projected in the SWEIS.
High-Explosives Pulsed-Power Experiments	Conduct experiments using explosively driven electromagnetic power systems.	Experiments were conducted at a level below those projected in the SWEIS.
Calibration, Development, and Maintenance Testing	Perform experiments to develop and improve techniques to prepare for more involved tests.	Calibration, development, and maintenance testing were conducted at a level below those projected in the SWEIS.
Other Explosives Testing	Conduct advanced high explosives or weapons evaluation studies.	Other explosives testing were conducted at a level below explosives testing projected in the SWEIS.

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

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Depleted Uranium	Ci/yr	1.5E-1[a]	1.5E-1[a]	Not Measured[b]
Chemical Usage:[c]				
Aluminum[d]	kg/yr	45,450	45,450	217.16
Beryllium	kg/yr	90	90	1.63
Copper[d]	kg/yr	45,630	45,630	8.6
Depleted Uranium	kg/yr	3,130[e]	3,130[e]	30.54
Lead	kg/yr	240	240	0
Tantalum	kg/yr	300	300	0.0012
Tungsten	kg/yr	300	300	0
NPDES Discharge:				
Number of outfalls	----	14	2	2
Total Discharges	MGY	3.6	2.2	0.82
03A–028 (TA-15)	MGY	2.2	[f]	0
03A–185 (TA-15)	MGY	0.73		0.82
Wastes:				
Chemical	kg/yr	35,300	35,380	2,641.6
LLW	m^3/yr	940	918	0
MLLW	m^3/yr	0.9	8	0
TRU[g]	m^3/yr	0.2	<1[h]	0
Mixed TRU	m^3/yr	0	[h]	0

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.

b No stacks require monitoring; all non-point sources are measured using ambient monitoring.

c Usage listed for the SWEIS 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 evaluated in the DARHT environmental impact statement (DOE 1995a).

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 The SWEIS projection for depleted uranium emission has been erroneously reported in previous Yearbooks (1998–2003) due to a discrepancy between the ROD and Table 3.6.1-20 in the SWEIS. The additive volume for depleted uranium in the table is 8,666 lbs/yr (3,930 kg/yr), however, the ROD states the annual amount of depleted uranium will increase to 6,900 lbs/yr (3,130 kg/yr).

f Outfall was eliminated in the new NPDES permit.

g TRU waste (steel) will be generated as a result of DARHT's Phased Containment Option (see DARHT environmental impact statement [DOE 1995a]).

h 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-15. Tritium Facilities/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
High-Pressure Gas Fills and Processing: WETF	Handle and process tritium gas in quantities of about 100 grams approximately 65 times/yr.	High-pressure gas fills/processing operations were performed in 2008 with additional activities being performed to bring the capability at or near 65 times/yr.
Gas Boost System Testing and Development: WETF	Conduct gas boost system research and development and testing and gas processing operations approximately 35 times/yr using quantities of about 100 grams of tritium.	Gas boost tests were performed in 2008.
Diffusion and Membrane Purification	Conduct research on gaseous tritium movement and penetration through materials—perform up to 100 major experiments/yr. Use this capability for effluent treatment.	Capability was used in 2008.
Metallurgical and Material Research	Conduct metallurgical and materials research and applications studies and tritium effects and properties research and development. Small amounts of tritium would be used for these studies.	Activities resulted in less than 2% tritium emissions from WETF.
Gas Analysis	Measure the composition and quantities of gases (in support of tritium operations).	Gas analysis operations were continued at WETF during 2008. No changes in facility emissions occurred from this activity.
Calorimetry	Perform calorimetry measurements in support of tritium operations.	Calorimetry activities were conducted at WETF. No changes occurred in facility emissions from this activity.
Solid Material and Container Storage: WETF	Store about 1,000 grams of tritium inventory in process systems and samples, inventory for use, and waste.	Inventory is stored and maintained at the WETF.
Hydrogen Isotopic Separation	Perform research and development of tritium gas purification and processing in quantities of about 200 grams of tritium per test.	No activity
Radioactive Liquid Waste Treatment	Pretreat liquid LLW at TA-21 prior to transport for treatment. Activity ends with decommissioning of TA-21 tritium buildings.	No activity[a]

a TSFF and TSTA were put into Surveillance and Maintenance mode in 2008.

Table A-16. Tritium Facilities (TA-16)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
TA-16/WETF, Elemental tritium	Ci/yr	3.00E+2	3.00E+2	3.46E+02
TA-16/WETF, Tritium in water vapor	Ci/yr	5.00E+2	5.00E+2	3.87E+02
TA-21/TSTA, Elemental tritium	Ci/yr	1.00E+2	1.00E+2	9.71E-02[a]
TA-21/TSTA, Tritium in water vapor	Ci/yr	1.00E+2	1.00E+2	5.78E+00[a]
TA-21/TSFF, Elemental tritium	Ci/yr	6.40E+2	6.40E+2	Not measured[a]
TA-21/TSFF, Tritium in water vapor	Ci/yr	8.6E+2	8.6E+2	Not measured[a]
NPDES Discharge:				
Total Discharges	MGY	0.3	17.4	0
02A-129 (TA-21)	MGY	0.1	[b]	0[a]
03A-158 (TA-21)	MGY	0.2	[b]	0[a]
Wastes:				
Chemical	kg/yr	1,700	1,724	0
LLW	m^3/yr	480	482	16.4
MLLW	m^3/yr	3	3	0
TRU	m^3/yr	0	0[c]	0
Mixed TRU	m^3/yr	0	0[c]	0

a TA-21 Steam Plant and adjacent buildings have been shut down and await final decommissioning.
b The 2008 SWEIS did not calculate individual flow per outfall.
c 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-17. Target Fabrication Facility (TA-35)/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Precision Machining and Target Fabrication	Provide targets and specialized components for approximately 12,400 laser and physics tests/yr. Perform approximately 100 high-energy-density physics tests/yr. Analyze up to 36 tritium reservoirs/yr.	Provided targets and specialized components for about 800 tests. Provided components to HX and P Divisions for high-energy-density physics tests. Did not support high-explosive pulsed-power tests at levels identified in the SWEIS.
Polymer Synthesis	Produce polymers for targets and specialized components for approximately 12,400 laser and physics tests/yr. Perform approximately 100 high-energy-density physics tests/yr.	Produced polymers for targets and specialized components for about 100 tests. Did not support high-explosive pulsed-power tests or high-energy-density physics tests at levels identified in the SWEIS.
Chemical and Physical Vapor Deposition	Coat targets and specialized components for about 12,400 laser and physics tests/yr. Support approximately 100 high-energy-density physics tests/yr. Support plutonium pit rebuild operations.	Coated targets and specialized components for about 400 tests. Did not support high-explosive pulsed-power tests or high-energy-density physics tests at levels identified in the SWEIS.

Table A-18. Target Fabrication Facility (TA-35)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radiological Air Emissions	Ci/yr	Negligible	Negligible	Not Measured[a]
NPDES Discharge:	MGY	No outfalls	No outfalls	No outfalls
Wastes:				
Chemical	kg/yr	3,800	3,810	45.4
LLW	m^3/yr	10	10	1.0
MLLW	m^3/yr	0.4	<1	0
TRU	m^3/yr	0	0[b]	0
Mixed TRU	m^3/yr	0	0[b]	0

a The emissions continue to be sufficiently low that monitoring is not required.
b 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-19. Bioscience Key Facility/Comparison of Operations

Capabilities	SWEIS Projections	2008 Operations
Biologically Inspired Materials and Chemistry	Determine formation and structure of biomaterials. Synthesize biomaterials. Characterize biomaterials.	In CY 2008, 2 FTEs[a] were associated with Biologically Inspired Materials and Chemistry.
Cell Biology	Study stress-induced effects and responses on cells. Study host-pathogen interactions. Determine effects of beryllium exposure.	In CY 2008, 9 FTEs were associated with Cell Biology.
Computational Biology	Collect, organize, and manage information on biological systems. Develop computational theory to analyze and model biological systems.	In CY 2008, 4 FTEs were associated with Computational Biology.
Environmental Microbiology	Study microbial diversity in the environment. Collect and analyze environmental samples. Study biomechanical and genetic processes in microbial systems.	In CY 2008, 5 FTEs were associated with Environmental Microbiology.
Genomic Studies	Analyze genes of living organisms such as humans, animals, microbes, viruses, plants, and fungi.	In CY 2008, 28 FTEs were associated with Genomic Studies.
Genomic and Proteomic Science	Develop and implement high-throughput tools. Perform genomic and proteomic analysis. Study pathogenic and nonpathogenic systems.	In CY 2008, 28 FTEs were associated with Genomic and Proteomic Science.
Measurement Science and Diagnostics	Develop and use spectroscopic tools to study molecules and molecular systems. Perform genomic, proteomic, and metabolomic studies.	In CY 2008, 17 FTEs were associated with Measurement Science and Diagnostics.
Molecular Synthesis	Synthesize molecules and materials. Perform spectroscopic characterization of molecules and materials. Develop new molecules that incorporate stable isotopes. Develop chem-bio sensors and assay procedures. Synthesize polymers and develop applications for them. Utilize stable isotopes in quantum computing systems.	In CY 2008, 4 FTEs were associated with Molecular Synthesis.
Structural Biology	Research three-dimensional structure and dynamics of macromolecules and complexes. Use various spectroscopy techniques. Perform neutron scattering. Perform X-ray scattering and diffraction.	In CY 2008, 8 FTEs were associated with Structural Biology.
Pathogenesis	Perform genome-scale, focused, and computationally enhanced experimental studies on pathogenic organisms.	In CY 2008, 17 FTEs were associated with Pathogenesis.
Biothreat Reduction and Bioforensics	Analyze samples for biodefense and national security purposes. Identify pathogen strain signatures using DNA sequencing and other molecular approaches.	In CY 2008, biodefense work was performed.

Table 19 (cont.)

Capabilities	SWEIS	2008 Operations
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.	Performs whole-body scans as a service to the LANL personnel monitoring program, which supports operations with radioactive materials conducted elsewhere at LANL.	Conducted more than 1,140 lung and whole-body scans and about 750 other counts (detector studies, quality assurance measurements, etc.). In CY 2008, 7 FTEs were associated with this capability.

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

Table A-20. Bioscience Facilities/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions	Ci/yr	Not estimated	Not estimated	Not measured
NPDES Discharge:		No outfalls	No outfalls	No outfalls
Wastes:				
Chemical	kg/yr	10,500	13,154	2,297.0
LLW	m^3/yr	20	34	0.0005
MLLW	m^3/yr	1.5	3	0
TRU	m^3/yr	0	0[a]	0
Mixed TRU	m^3/yr	0	0[a]	0

a 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-21. Radiochemistry Facility (TA-48)/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Radionuclide Transport Studies	Conduct 80 to 160 actinide transport, sorption, and bacterial interaction studies/yr. Develop models for evaluation of groundwater. Assess performance of risk of release for radionuclide sources at proposed waste disposal sites.	During CY 2008, operations continued at approximately twice the levels identified in the SWEIS.
Environmental Remediation Support	Conduct background contamination characterization pilot studies. Conduct performance assessments, soil remediation research and development, and field support. Support environmental remediation activities.	During CY 2008, operations continued at approximately half the levels identified in the SWEIS.
Ultra-Low-Level Measurements	Perform chemical isotope separation and mass spectrometry at current levels.	Level of operations decreased during 2008.
Nuclear and Radiochemistry Separations	Conduct radiochemical operations involving quantities of alpha-, beta-, and gamma-emitting radionuclides at current levels for nonweapons and weapons work.	Decrease in quantities of alpha-emitting radionuclides used in operations.
Isotope Production	Conduct target preparation, irradiation, and processing to recover medical and industrial application isotopes to support approximately 150 offsite shipments/yr.	Slightly increased level of operations, but approximately the same as levels identified in the SWEIS.
Actinide and TRU Chemistry	Perform radiochemical operations involving alpha-emitting radionuclides.	Slightly increased level of operations, but approximately the same as levels identified in the SWEIS.
Data Analysis	Re-examine archive data and measure nuclear process parameters of interest to weapons radiochemists.	Less than projected in the SWEIS.
Inorganic Chemistry	Conduct synthesis, catalysis, and actinide chemistry activities: • Conduct chemical synthesis of organo-metallic complexes • Conduct structural and reactivity analysis, organic product analysis, and reactivity and mechanistic studies • Conduct synthesis of new ligands for radiopharmaceuticals Conduct environmental technology development activities: • Ligand design and synthesis for selective extraction of metals • Soil washing • Membrane separator development • Ultrafiltration	Below projections of the SWEIS.
Structural Analysis	Perform synthesis and structural analysis of actinide complexes at current levels. Conduct X-ray diffraction analysis of powders and single crystals.	Decreased levels of those projected in the SWEIS.
Sample Counting	Measure the quantity of radioactivity in samples using alpha-, beta-, and gamma-ray counting systems.	During CY 2008, maintained slightly higher sample processing than the number of samples projected in the SWEIS.
Hydrotest Sample Analysis	Measure beryllium contamination from simulated nuclear weapons hydrotesting.	Capability active in CY 2008.

Table A-22. Radiochemistry Facility (TA-48)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Mixed Fission Products[a]	Ci/yr	1.4E-4	1.4E-4	Not measured[b]
Plutonium-239	Ci/yr	1.1E-5	1.1E-5	9.63E-10
Uranium-234 & U-235	Ci/yr	4.4E-7	4.4E-7	None detected
Mixed Activation Products[a]	Ci/yr	3.1E-6	3.1E-6	Not measured[b]
Arsenic-72	Ci/yr	1.1E-4	1.1E-4	None detected
Arsenic-73	Ci/yr	1.9E-4	1.9E-4	1.95E-06
Arsenic-74	Ci/yr	4.0E-5	4.0E-5	None detected
Beryllium-7	Ci/yr	1.5E-5	1.5E-5	None detected
Bromine-77	Ci/yr	8.5E-4	8.5E-4	2.01E-05
Germanium-68	Ci/yr	1.7E-5	1.7E-5	7.13E-03
Gallium-68	Ci/yr	1.7E-5	1.7E-5	7.13E-03
Rubidium-86	Ci/yr	2.8E-7	2.8E-7	None detected
Selenium-75	Ci/yr	3.4E-4	3.4E-4	1.52E-05
NPDES Discharge:		No outfalls	No outfalls	No outfalls
Wastes:				
Chemical	kg/yr	3,300	3,311	3,180.0
LLW	m^3/yr	270	268	3.7
MLLW	m^3/yr	3.8	4	0.04
TRU	m^3/yr	0	0[c]	0
Mixed TRU	m^3/yr	0	0[c]	0

a 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.
b 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.
c 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-23. Radioactive Liquid Waste Treatment Facility (TA-50)/ Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Waste Transport, Receipt, and Acceptance	Collect radioactive liquid waste from generators and transport it to the RLWTF at TA-50. Support, certify, and audit generator characterization programs. Maintain the waste acceptance criteria for the RLWTF. Send approximately 66,000 gallons of evaporator bottoms to an offsite commercial facility for solidification/yr. (Approximately 25 yd^3 of solidified evaporator bottoms would be returned/yr for disposal as LLW at TA-54 Area G.) Transport annually to TA-54 for storage or disposal: • 330 yd^3 of LLW • 3 yd^3 of mixed LLW • 13 yd^3 of TRU waste • 880 pounds of hazardous waste	As projected.
Radioactive Liquid Waste Treatment	Pretreat 110,000 liters/yr of liquid TRU waste.	No pretreatment took place.
	Solidify, characterize, and package 12 m^3/yr of TRU waste sludge.	No TRU waste sludge was solidified in 2008.
	Treat 15 million liters/yr of liquid LLW.	Processed 5.3 million liters of liquid LLW.
	Dewater, characterize, and package 50 m^3/yr of LLW sludge.	No LLW sludge was generated during 2008.
	Process 1 million liters/yr of secondary liquid waste generated by the RLWTF treatment processes through the RLWTF evaporator.	
	Discharge treated liquids through an NPDES outfall.	Discharged 4.4 million liters in 2008.

Table A-24. Radioactive Liquid Waste Treatment Facility (TA-50)/ Comparison of Operations

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Americium-241	Ci/yr	Negligible	Negligible	8.39E-09
Plutonium-238	Ci/yr	Negligible	Negligible	None detected
Plutonium-239	Ci/yr	Negligible	Negligible	2.00E-08
Thorium-228	Ci/yr	Negligible	Negligible	None detected
Thorium-230	Ci/yr	Negligible	Negligible	None detected
Thorium-232	Ci/yr	Negligible	Negligible	1.92E-08
Uranium-234	Ci/yr	Negligible	Negligible	None detected
NPDES Discharge:				
051	MGY	9.3	4.0	1.39
Wastes:				
Chemical	kg/yr	2,200	399	0
LLW	m^3/yr	160	252	98.
MLLW	m^3/yr	0	2	0.14
TRU	m^3/yr	30	10[a]	0
Mixed TRU	m^3/yr	0	[a]	0

a 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-25. Los Alamos Neutron Science Center (TA-53)/ Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Accelerator Beam Delivery, Maintenance, and Development	Operate 800-million-electron-volt linac beam and deliver beam to Areas A, B, C, WNR facility, Manuel Lujan Center, Dynamic Test Facility, and Isotope Production Facility for 10 months/yr (6,400 hrs). The H+ beam current would be 1,250 microamps; the H- beam current would be 200 microamps.	In 2008, H+ beam was delivered to the Isotope Production Facility for 3,200 of 3,729 scheduled hours at an average current of 726 microamperes/hour with 85.8% reliability. H- beam was delivered as follows: (a) to the Lujan Center for 2,741 of 3,532 scheduled hours at an average current of 285 microamperes/hour with 77.6% total availability; (b) to WNR Target 2 for 294 of 336 scheduled hours in a “pulse on demand” mode of operation with 87.4% total availability; (c) to WNR Target 4 for 2,583 of 3.159 scheduled hours at an average current of 4.1microamperes/hour with 81.8% total availability; (d) through Line X to Line B (ultracold neutron) for 1,719 of 2,091 scheduled hours in a “pulse on demand” mode of operation with 82.2% total availability; (e) through Line X to Line C (pRad) for 699 of 828 scheduled hours in a “pulse on Accelerator Beam Delivery, Maintenance, and Development demand” mode of operation with 84.4% total availability.
	Reconfigure beam delivery and support equipment to support new facilities, upgrades, and experiments.	No major upgrades to the beam delivery complex.
Experimental Area Support	Provide support to ensure availability of the beam lines, beam line components, handling and transport systems, and shielding, as well as radio-frequency power sources.	Support activities were conducted per the projections of the SWEIS.
	Perform remote handling and packaging of radioactive material, as needed.	Remote handling and packaging were performed.
Neutron Research and Technology	Conduct 1,000 to 2,000 experiments/yr using neutrons from the Lujan Center and WNR facility.	209 experiments were conducted at the Lujan Center and 80 experiments at WNR.

Table 25 (cont.)

Capability	SWEIS Projections	2008 Operations
Neutron Research and Technology (cont.)	Support contained weapons-related experiments using small to moderate quantities of high explosives, including: - Approximately 200 experiments/yr using nonhazardous materials and small quantities of high explosives - Approximately 60 experiments/yr using up to 4.5 kilograms of high explosives and depleted uranium - Approximately 80 experiments/yr using small quantities of actinides, high explosives, and sources - Shockwave experiments involving small amounts, up to nominally 50 grams of plutonium - Support for static stockpile surveillance technology research and development.	Weapons-related experiments were conducted: - Some with actinides - Some with nonhazardous materials and high explosives - Some with high explosives, and depleted uranium - Some shock wave experiments. Support was provided for surveillance research and development.
Materials Test Station	Irradiate materials and fuels in a fast-neutron spectrum and in a prototype temperature and coolant environment.	No activity
Subatomic Physics Research	Conduct 5 to 10 physics experiments/yr at Manuel Lujan Center and WNR facility.	During CY 2008 Ultracold Neutron Research focused on accelerator data gathering during the entire run cycle.
	Conduct up to 100 proton radiography experiments, including using small to moderate quantities of high explosives, including: - Dynamic experiments in containment vessels with up to 4.5 kilograms of high explosives and 45 kilograms of depleted uranium - Dynamic experiments in powder launcher with up to 300 grams of gun powder. Conduct research using ultracold neutrons; operate up to 10 microamperes/yr of negative beam current.	50 of 52 experiments conducted in CY 2008 involved the use of propellants containing either black powder or high explosives.
Medical Isotope Production	Irradiate up to 120 targets/yr for medical isotope production at the Isotope Production Facility.	A total of 40 targets were irradiated in 2008 (22 RbCl targets for Sr-82; 13 Gallium targets for Ge-68 production; 1 Aluminum target for Na-22 production; 1 Niobium target for Y-88 production ; 2 Germanium targets for As-73 production; and 1 Hafnium target for Lu-173 production).
High-Power Microwaves and Advanced Accelerators	Conduct research and development in high-power microwaves and advanced accelerators in areas including microwave research for industrial and environmental applications.	Research and development were conducted.
Radioactive Liquid Waste Treatment (Solar Evaporation at TA-53)	Treat about 520,000 liters/yr of radioactive liquid waste.	Treated approximately 567,811 liters of radioactive liquid waste in CY 2008.

Table A-26. Los Alamos Neutron Science Center (TA-53)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Argon-41	Ci/yr	7.44E+1	7.44E+1	1.78E+01
Particulate & Vapor Activation Products	Ci/yr	Not projected[a]	Not projected[a]	6.30E-03
Carbon-10	Ci/yr	2.65E+0	2.65E+0	9.41E-01
Carbon-11	Ci/yr	2.96E+3	2.96E+3	5.92E+02
Nitrogen-13	Ci/yr	5.35E+2	5.35E+2	4.72E+01
Nitrogen-16	Ci/yr	2.85E-2	2.85E-2	8.15E-02
Oxygen-14	Ci/yr	6.61E+0	6.61E+0	3.52E+00
Oxygen-15	Ci/yr	6.06E+2	6.06E+2	2.29E+02
Tritium as Water	Ci/yr	Not projected[a]	Not projected[a]	3.03E+01
NPDES Discharge:				
Total Discharges	MGY	81.8	1.3	18.59
03A-047	MGY	7.1	[b]	0
03A-048	MGY	23.4	[c]	18.2
03A-049	MGY	11.3	[b]	0
03A-113	MGY	39.8	[c]	0.39
Wastes:				
Chemical	kg/yr	16,600	16,783	4,216.2
LLW	m^3/yr	1,085	1,070	15.5
MLLW	m^3/yr	1	1	0
TRU	m^3/yr	0	0[d]	0
Mixed TRU	m^3/yr	0	0[d]	0

a The radionuclide was not projected in the SWEIS because it was either dosimetrically insignificant or not isotopically identified.
b Outfall was eliminated in the new NPDES permit.
c The 2008 SWEIS did not calculate individual flow per outfall.
d 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-27. Solid Radioactive and Chemical Waste Facilities (TA-50 and TA-54)/Comparison of Operations

Capability	SWEIS Projections	2008 Operations
Waste Characterization, Packaging, and Labeling	Support, certify, and audit generator characterization programs.	As projected.
	Maintain waste acceptance criteria for LANL waste management facilities.	As projected.
	Characterize 420 cubic meters of newly generated TRU waste.	Characterized 283 cubic meters.
	Characterize 8,400 cubic meters of legacy TRU waste.	Characterized approximately 786 cubic meters of TRU waste in 2008.
	Characterize LLW, MLLW, and chemical waste, including waste from DD&D and remediation activities.	As projected.
	Maintain waste acceptance criteria for offsite treatment, storage, and disposal facilities.	As projected.
	Overpack and bulk small waste, as required.	As projected.
	Perform coring and visual inspection of a percentage of TRU waste packages.	Performed visual examinations on 96 TRU waste packages in CY 2008; no drums were cored in 2008.
	Ventilate TRU waste retrieved from belowground storage.	No activity.
	Maintain WIPP waste acceptance criteria compliance and liaison with WIPP operations.	As projected.
Waste Transport, Receipt, and Acceptance	Collect chemical and mixed wastes from LANL generators and transport to Consolidated Remote Storage Sites and TA-54.	Collected and transported chemical and mixed wastes.
	Ship 320 cubic meters/yr of newly generated TRU waste to WIPP.	Shipped 98 cubic meters.
	Ship 8,400 cubic meters/yr of legacy TRU waste to WIPP.	Shipments to WIPP began 3/26/1999.
	Ship 55 cubic meters of MLLW for offsite treatment and disposal in accordance with EPA land disposal restrictions.	Approximately 20 cubic meters of MLLW were shipped for offsite treatment and disposal from the Solid Radioactive and Chemical Waste Facility.
	Ship LLW to offsite disposal facilities.	As projected.
	Ship 6,400 metric tons of chemical wastes for offsite treatment and disposal in accordance with EPA land disposal restrictions.	Approximately 724 metric tons of chemical waste were shipped for offsite treatment and disposal from the Solid Radioactive and Chemical Waste Facility.
	Ship LLW, MLLW, and chemical waste from DD&D and remediation activities.	As projected.
	Receive, on average, 5 to 10 shipments/yr of LLW and TRU waste from offsite locations.	No LLW was received from any offsite locations.[c]
Waste Storage	Stage chemical and mixed wastes before shipment for offsite treatment, storage, and disposal.	Chemical and mixed wastes were staged before shipment.
	Store TRU waste until it is shipped to WIPP.	As projected.
	Store MLLW pending shipment to a treatment facility.	As projected.

Table 27 (cont.)

Capability	SWEIS Projections	2008 Operations
Waste Storage (cont.)	Store LLW uranium chips until sufficient quantities are accumulated for stabilization campaigns.	No uranium chips were stored for stabilization in CY 2008.
	Manage and store sealed sources for the OSR Project.	As projected.
Waste Retrieval	Begin retrieval operations in 1997.	Retrieval begun in 1997.
	Retrieve 4,700 cubic meters of TRU waste from Pads 1, 2, 4 by 2004.	Retrieval activities completed in 2001. No retrieval occurred in 2008.
Waste Treatment	Demonstrate treatment (e.g., electrochemical) of liquid MLLW.	No activity.
	Compact up to 2,540 cubic meters/yr of LLW.	Compacted 93 cubic meters in 2008
	Process 2,400 cubic meters of TRU waste through size reduction at the DVRS.	No waste was processed at the DVRS.
	Stabilize 870 cubic meters of uranium chips.	No activity.
Waste Disposal	Dispose 84 cubic meters of LLW in shafts, 23,000 cubic meters of LLW in in pits, and small quantities of radioactively contaminated polychlorinated biphenyls in shafts in Area G/yr.	Approximately 4 cubic meters of LLW were disposed of in shafts at Area G.
	Migrate operations in Area G to Zones 4 and 6, as necessary, to allow continued onsite disposal of LLW.	No activity
Decontamination Operations	Decontaminate approximately 700 personnel respirators and 300 air-proportional probes for reuse per month.	In 2008, decontaminated approximately 500 personnel respirators and 40 faces and 40 bodies per month at TA-54-1009.
	Decontaminate vehicles and portable instruments for reuse (as required).	No activity in 2008.
	Decontaminate precious metals for resale using an acid bath.	No activity.
	Decontaminate scrap metals for resale by sandblasting the metals.	No activity.
	Decontaminate 200 cubic meters of lead for reuse by grit blasting.	No activity.

Table A-28. Solid Radioactive and Chemical Waste Facilities (TA-54 and TA-50)/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:[a]				
Tritium	Ci/yr	6.09E+1	6.09E+1	Not monitored[a]
Americium-241	Ci/yr	6.60E-7	6.60E-7	None detected[a]
Plutonium-238	Ci/yr	4.80E-6	4.80E-6	9.34E-11
Plutonium-239	Ci/yr	6.80E-7	6.80E-7	6.70E-11
Uranium-234	Ci/yr	8.00E-6	8.00E-6	None detected[a]
Uranium-235	Ci/yr	4.10E-7	4.10E-7	3.03E-10
Uranium-238	Ci/yr	4.00E-6	4.00E-6	None detected[a]
Strontium-90/Yttrium-90	Ci/yr	Not projected[b]	Not projected[b]	None detected[a]
Thorium isotopes	Ci/yr	Not projected[b]	Not projected[b]	1.30E-09
NPDES Discharge	MGY	No outfalls	No outfalls	No outfalls
Wastes:[c]				
Chemical	kg/yr	920	907	0
LLW	m^3/yr	174	229	0.38
MLLW	m^3/yr	4	8	0
TRU	m^3/yr	27	27[d]	181.9[e]
Mixed TRU	m^3/yr	0	[d]	70.3[e]

a Data shown are measured emissions from WCRR Facility and the ARTIC 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 These radionuclides were not projected in the SWEIS because they were either dosimetrically insignificant or not isotopically identified.

c 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.

d 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

e TRU and mixed TRU exceeded SWEIS projections due to the repacking of legacy waste drums at WCRR. This number will not be added to the newly generated waste for 2008.

Table A-29. Plutonium Complex/Comparison of Operations

Capability	SWEIS Projections[a]	2008 Operations
Plutonium Stabilization	Recover, process, and store existing plutonium inventory.	Highest priority items have been stabilized. The implementation plan has been modified between DOE and the Defense Nuclear Facilities Safety Board to be complete by 2010. The project is funded to 2010 but may potentially extend beyond this time by a year or so.
Manufacturing Plutonium Components	Produce nominally 20 plutonium pits/yr.	Fewer than 20 qualified pits were produced in CY 2008.
	Fabricate parts and samples for research and development activities, including parts for dynamic and subcritical experiments.	Research and development of plutonium materials continued.
Surveillance and Disassembly of Weapons Components	Disassemble, survey, and examine up to 65 plutonium pits/yr.	Fewer than 65 pits were disassembled during CY 2008. Fewer than 40 pits were destructively examined as part of the stockpile evaluation program (pit surveillance) in CY 2008.
Actinide Materials Science and Processing Research and Development	Perform plutonium (and other actinide) materials research, including metallurgical and other characterization of samples and measurements of mechanical and physical properties.	Research and development of plutonium (and other actinide) materials continued.
	Operate the 40-millimeter Impact Test Facility and other test apparatus.	The 40-millimeter Impact Test Facility conducted ten experiments.
	Develop expanded disassembly capacity and disassemble up to 200 pits/yr.	Fewer than 200 pits were disassembled/converted in CY 2008. Fewer than 12 pits were processed through tritium separation in CY 2008.
	Process up to 5,000 curies of neutron sources (including plutonium and beryllium and americium-241 and beryllium).	Neutron sources were processed in CY 2008 but well below the 5,000 curies/yr level.
	Process neutron sources other than sealed sources.	Continued processing neutron sources other than sealed sources.
	Process up to 400 kilograms/yr of actinides between TA-55 and the CMR Building.[a]	Fewer than 400 kilograms of actinides were processed in CY 2008.
	Process pits through the Special Recovery Line (tritium separation).	Continued processing of pits through the Special Recovery Line.
	Perform oralloy decontamination of 28 to 48 uranium components per month.	In CY 2008, fewer than 48 uranium components were decontaminated per month.
	Conduct research in support of DOE actinide cleanup activities and on actinide processing and waste activities at DOE sites.	Research supporting DOE actinide cleanup activities continued at low levels. No plutonium residues from Rocky Flats were processed during CY 2008.
	Fabricate and study nuclear fuels used in terrestrial and space reactors.	The DOE/Office of Nuclear Energy Advanced Fuel Cycle and Mixed Oxide Fuel Initiative is fabricating actinide nitride fuels for irradiation in a reactor environment.
	Fabricate and study prototype fuel for lead test assemblies.	The DOE/Office of Nuclear Energy Advanced Fuel Cycle and Mixed Oxide Fuel Initiative is fabricating actinide nitride fuels for irradiation in a reactor environment.

Table A-29 (cont.)

Capability	SWEIS Projections[a]	2008 Operations
Actinide Materials and Science Processing, Research, and Development (cont.)	Develop safeguards instrumentation for plutonium assay.	Continued support of safeguards instrumentation development during CY 2008.
	Analyze samples.	Analysis of actinide samples at TA-55 continued in CY 2008 in support of actinide reprocessing and research and development activities.
Fabrication of Ceramic-Based Reactor Fuels	Make prototype MOX fuel.	Research and development activities occurred in CY 2008.
	Build test reactor fuel assemblies.	No assembly or fabrication.
	Continue research and development on other fuels.	Research and development activities occurred in CY 2008.
Plutonium-238 Research, Development, and Applications	Process, evaluate, and test up to 25 kilograms/yr plutonium-238 in production of materials and parts to support space and terrestrial uses.	Approximately <25 kilograms of plutonium-238 were processed, evaluated, and/or tested in 2008.
	Recover, recycle and blend up to 18 kilograms/yr plutonium-238.	Less than 18 kilograms of plutonium-238 were recovered, recycled, or blended in 2008.
Storage, Shipping, and Receiving	Provide interim storage of up to 6.6 metric tons of the LANL SNM inventory, mainly plutonium.	SNM storage, shipping, and receiving will continue to be performed at the Plutonium Facility (Building 55-4).
	Store working inventory in the vault in Building 55-4; ship and receive SNM as needed to support LANL activities.	Building 55-4 vault levels remained approximately constant at levels identified during preparation of the SWEIS.
	Provide temporary storage of Security Category I and II materials removed in support of TA-18 closure, pending shipment to the NTS and other DOE Complex locations.	Continued temporary storage for TA-18 Category I and II material.
	Store sealed sources collected under DOE's OSR Project.	Continued temporary storage of OSR Project sources.
	Store MOX fuel rods and fuel rods containing archive and scrap metals from MOX fuel lead assembly fabrication.	Continued storage of MOX fuel rods until a shipping container is available to transport the material to another DOE site were the fuel rods will be evaluated.

a The actinide activities at the CMR Building and at TA-55 are expected to total 400 kilograms/yr. 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/yr.

Table A-30. Plutonium Complex/Operations Data

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:				
Plutonium-239[a]	Ci/yr	2.70E-5	2.70E-5	9.53E-10
Plutonium-238	Ci/yr	Not projected[b]	Not projected[b]	None detected
Americium-241	Ci/yr	Not projected[b]	Not projected[b]	None detected
Other actinides[c]	Ci/yr	Not projected[b]	Not projected[b]	4.01E-08
Strontium-90/Yttrium-90	Ci/yr	Not projected[b]	Not projected[b]	None detected
Tritium in Water Vapor	Ci/yr	7.50E+2	7.50E+2	4.07E+00
Tritium as a Gas	Ci/yr	2.50E+2	2.50E+2	5.34E+00
NPDES Discharge				
03A–181	MGY	14	4.1	0.24
Wastes:				
Chemical	kg/yr	8,400	8,618	12,364[f]
LLW	m^3/yr	754[d]	757	78
MLLW	m^3/yr	13[d]	15	0.35
TRU	m^3/yr	237[e]	336[g]	43.9
Mixed TRU	m^3/yr	102[e]	[g]	43.9

a Projections for the SWEIS were reported as plutonium or plutonium-239, the primary material at TA-55.
b The radionuclide was not projected in the SWEIS because it was either dosimetrically insignificant or not isotopically identified.
c These radionuclides include isotopes of thorium and uranium.
d Includes estimates of waste generated by the facility upgrades associated with pit fabrication.
e 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.
f Chemical waste generated exceeded the SWEIS projection due to disposal of cooling tower fill media and sediment from the roof of building TA-55-06.
g The 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

Table A-31. 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, historic properties, and environmental media (groundwater, air, surface waters).

Table A-32. Operations Data at the Non-Key Facilities

Parameter	Units	1999 SWEIS	2008 SWEIS	2008 Operations
Radioactive Air Emissions:[a]				
Tritium	Ci/y	9.1E+2	9.1E+2	None measured
Plutonium	Ci/y	3.3E-6	3.3E-6	None measured
Uranium	Ci/y	1.8E-4	1.8E-4	None measured
NPDES Discharge:				
Total Discharges	MGY	142	200.9	125.2
001	MGY	114	[b]	14.7
013	MGY		[b]	101.2
03A-160	MGY	5.1	28.5	0.10
03A-199	MGY	---	[b]	9.2
Wastes:				
Chemical	kg/yr	651,000	651,000	554,460
LLW	m^3/yr	520	1,529	538.9
MLLW	m^3/yr	30	31	12.1
TRU	m^3/yr	0	23[c]	14.7
Mixed TRU	m^3/yr	0	[c]	0

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 The 2008 SWEIS did not calculate individual flow per outfall. Three outfalls in Sandia Canyon are projected to discharge 172.4 million gallons per year.
c The 2008 SWEIS combined TRU and mixed TRU waste. Both waste categories are managed for disposal at WIPP.

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Appendix B: Chemical Usage and Estimated Emissions Data

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Key Facility	Chemical Name	CAS Number	Units	2008 Estimated Air Emissions	2008 Usage
CMR Building	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.53	1.50
CMR Building	Arsenic, el.&inorg.,exc. Arsine, as As	7440-38-2	kg/yr	0.39	1.12
CMR Building	Hydrogen Bromide	10035-10-6	kg/yr	0.53	1.50
CMR Building	Hydrogen Chloride	7647-01-0	kg/yr	9.56	27.30
CMR Building	Hydrogen Peroxide	7722-84-1	kg/yr	0.25	0.70
CMR Building	Mercury numerous forms	7439-97-6	kg/yr	0.01	1.36
CMR Building	Molybdenum	7439-98-7	kg/yr	0.36	1.02
CMR Building	Nitric Acid	7697-37-2	kg/yr	24.57	70.20
CMR Building	Phosphorus	7723-14-0	kg/yr	0.16	0.47
CMR Building	Sulfuric Acid	7664-93-9	kg/yr	9.66	27.60
CMR Building	Uranium (natural) Sol.&Unsol.Comp. as U	7440-61-1	kg/yr	0.67	1.90
Health Research Laboratory	Acetic Acid	64-19-7	kg/yr	0.18	0.52
Health Research Laboratory	Acetone	67-64-1	kg/yr	1.38	3.95
Health Research Laboratory	Acetonitrile	75-05-8	kg/yr	4.43	12.65
Health Research Laboratory	Acrylamide	79-06-1	kg/yr	1.41	4.04
Health Research Laboratory	Chloroform	67-66-3	kg/yr	0.26	0.74
Health Research Laboratory	Cyclohexanone	108-94-1	kg/yr	0.33	0.95
Health Research Laboratory	Dicyclopentadiene	77-73-6	kg/yr	0.17	0.49
Health Research Laboratory	Ethanol	64-17-5	kg/yr	34.89	99.70
Health Research Laboratory	Ethyl Acetate	141-78-6	kg/yr	0.32	0.90
Health Research Laboratory	Formamide	75-12-7	kg/yr	1.01	2.89
Health Research Laboratory	Formic Acid	64-18-6	kg/yr	0.09	0.26
Health Research Laboratory	Hydrogen Chloride	7647-01-0	kg/yr	1.04	2.97
Health Research Laboratory	Hydrogen Peroxide	7722-84-1	kg/yr	6.94	19.83
Health Research Laboratory	Iodine	7553-56-2	kg/yr	0.59	1.69
Health Research Laboratory	Isopropyl Alcohol	67-63-0	kg/yr	9.49	27.10
Health Research Laboratory	Methyl Alcohol	67-56-1	kg/yr	7.29	20.83
Health Research Laboratory	n,n-Dimethylformamide	68-12-2	kg/yr	0.33	0.95
Health Research Laboratory	n-Butyl Alcohol	71-36-3	kg/yr	0.43	1.21
Health Research Laboratory	Phenol	108-95-2	kg/yr	0.41	1.16
Health Research Laboratory	Phosphoric Acid	7664-38-2	kg/yr	0.96	2.75
Health Research Laboratory	Sulfuric Acid	7664-93-9	kg/yr	0.64	1.84
Health Research Laboratory	Tetrahydrofuran	109-99-9	kg/yr	0.90	2.56
Health Research Laboratory	Toluene	108-88-3	kg/yr	0.15	0.43

Key Facility	Chemical Name	CAS Number	Units	2008 Estimated Air Emissions	2008 Usage
High Explosive Processing	2-Methoxyethanol (EGME)	109-86-4	kg/yr	0.68	1.93
High Explosive Processing	Acetone	67-64-1	kg/yr	9.12	26.07
High Explosive Processing	Acetonitrile	75-05-8	kg/yr	6.60	18.86
High Explosive Processing	Acetylene	74-86-2	kg/yr	0.00	1.31
High Explosive Processing	Aluminum numerous forms	7429-90-5	kg/yr	0.01	0.91
High Explosive Processing	Carbon Tetrachloride	56-23-5	kg/yr	0.56	1.59
High Explosive Processing	Ethanol	64-17-5	kg/yr	13.59	38.84
High Explosive Processing	Ethyl Acetate	141-78-6	kg/yr	10.08	28.81
High Explosive Processing	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	9.24	26.41
High Explosive Processing	Hydrogen Chloride	7647-01-0	kg/yr	2.91	8.31
High Explosive Processing	Hydrogen Fluoride, as F	7664-39-3	kg/yr	5.13	14.66
High Explosive Processing	Iodine	7553-56-2	kg/yr	0.18	0.50
High Explosive Processing	Isophorone Diisocyanate	4098-71-9	kg/yr	0.17	0.50
High Explosive Processing	Isopropyl Alcohol	67-63-0	kg/yr	8.80	25.14
High Explosive Processing	Methyl Alcohol	67-56-1	kg/yr	9.42	26.91
High Explosive Processing	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	16.91	48.32
High Explosive Processing	Methylene Chloride	75-09-2	kg/yr	2.79	7.96
High Explosive Processing	Nitric Acid	7697-37-2	kg/yr	0.53	1.53
High Explosive Processing	Pyridine	110-86-1	kg/yr	0.98	2.79
High Explosive Processing	Tetrahydrofuran	109-99-9	kg/yr	14.97	42.77
High Explosive Processing	Toluene	108-88-3	kg/yr	12.74	36.41
High Explosive Processing	Zinc Chloride Fume	7646-85-7	kg/yr	0.09	0.25
High Explosive Processing	Zirconium Compounds, as Zr	7440-67-7	kg/yr	0.01	0.60
High Explosive Testing	1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	kg/yr	8.76	25.02
High Explosive Testing	Acetone	67-64-1	kg/yr	13.27	37.92
High Explosive Testing	Benzene	71-43-2	kg/yr	0.09	0.26
High Explosive Testing	Bromoform	75-25-2	kg/yr	0.10	0.28
High Explosive Testing	Ethanol	64-17-5	kg/yr	35.24	100.69
High Explosive Testing	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	0.25	0.73
High Explosive Testing	Mercury numerous forms	7439-97-6	kg/yr	0.00	0.45
High Explosive Testing	n-Butyl Acetate	123-86-4	kg/yr	0.15	0.44
High Explosive Testing	Nitromethane	75-52-5	kg/yr	0.60	1.72
High Explosive Testing	Sulfur Hexafluoride	2551-62-4	kg/yr	85.25	243.58
High Explosive Testing	Toluene	108-88-3	kg/yr	0.09	0.26

Key Facility	Chemical Name	CAS Number	Units	2008 Estimated Air Emissions	2008 Usage
LANSCE	1,4-Dioxane	123-91-1	kg/yr	3.62	10.34
LANSCE	Acetone	67-64-1	kg/yr	22.67	64.77
LANSCE	Acetonitrile	75-05-8	kg/yr	2.75	7.86
LANSCE	Aluminum numerous forms	7429-90-5	kg/yr	0.01	0.59
LANSCE	Boron Oxide	1303-86-2	kg/yr	0.70	2.00
LANSCE	Chloroform	67-66-3	kg/yr	3.11	8.90
LANSCE	Cyclohexane	110-82-7	kg/yr	1.91	5.45
LANSCE	Diethylamine	109-89-7	kg/yr	0.25	0.70
LANSCE	Ethanol	64-17-5	kg/yr	34.73	99.22
LANSCE	Ethyl Acetate	141-78-6	kg/yr	4.73	13.50
LANSCE	Ethyl Ether	60-29-7	kg/yr	7.35	21.00
LANSCE	Ethylene Oxide	75-21-8	kg/yr	0.08	0.23
LANSCE	Hydrazine	302-01-2	kg/yr	0.18	0.50
LANSCE	Hydrogen Fluoride, as F	7664-39-3	kg/yr	1.38	3.95
LANSCE	Isobutane	75-28-5	kg/yr	28.27	80.77
LANSCE	Isopropyl Alcohol	67-63-0	kg/yr	3.79	10.83
LANSCE	Isopropylamine	75-31-0	kg/yr	1.69	4.82
LANSCE	Methyl Alcohol	67-56-1	kg/yr	13.71	39.17
LANSCE	Methyl Silicate	681-84-5	kg/yr	0.18	0.50
LANSCE	Methylene Chloride	75-09-2	kg/yr	7.43	21.23
LANSCE	n,n-Dimethylformamide	68-12-2	kg/yr	13.95	39.85
LANSCE	Nitric Acid	7697-37-2	kg/yr	5.34	15.26
LANSCE	Nitromethane	75-52-5	kg/yr	0.20	0.57
LANSCE	Phenol	108-95-2	kg/yr	1.10	3.14
LANSCE	Potassium Hydroxide	1310-58-3	kg/yr	0.35	1.00
LANSCE	Propane	74-98-6	kg/yr	0.00	3.64
LANSCE	Sulfur Hexafluoride	2551-62-4	kg/yr	19.91	56.88
LANSCE	Sulfuric Acid	7664-93-9	kg/yr	6.44	18.40
LANSCE	Tantalum Metal	7440-25-7	kg/yr	0.48	1.36
LANSCE	Tetrahydrofuran	109-99-9	kg/yr	10.27	29.34
LANSCE	Thionyl Chloride	7719-09-7	kg/yr	0.42	1.20
LANSCE	Toluene	108-88-3	kg/yr	8.50	24.27
LANSCE	Trichloroethylene	79-01-6	kg/yr	1.95	5.56
Machine Shops	Acetone	67-64-1	kg/yr	1.11	3.16
Machine Shops	Acetylene	74-86-2	kg/yr	0.00	15.45
Machine Shops	Diacetone Alcohol	123-42-2	kg/yr	0.16	0.44

Key Facility	Chemical Name	CAS Number	Units	2008 Estimated Air Emissions	2008 Usage
Machine Shops	Methyl Alcohol	67-56-1	kg/yr	1.11	3.17
Machine Shops	Propane	74-98-6	kg/yr	0.00	0.86
Material Science Laboratory	2-Butoxyethanol	111-76-2	kg/yr	0.32	0.90
Material Science Laboratory	Acetone	67-64-1	kg/yr	9.95	28.44
Material Science Laboratory	Aniline & Homologues	62-53-3	kg/yr	0.18	0.51
Material Science Laboratory	Chloroform	67-66-3	kg/yr	0.52	1.48
Material Science Laboratory	Ethanol	64-17-5	kg/yr	2.96	8.47
Material Science Laboratory	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.17	0.49
Material Science Laboratory	Hydrogen Peroxide	7722-84-1	kg/yr	0.54	1.55
Material Science Laboratory	Isopropyl Alcohol	67-63-0	kg/yr	17.60	50.27
Material Science Laboratory	Magnesium Oxide Fume	1309-48-4	kg/yr	0.14	0.40
Material Science Laboratory	Mercury numerous forms	7439-97-6	kg/yr	0.00	0.45
Material Science Laboratory	Methyl Alcohol	67-56-1	kg/yr	5.54	15.83
Material Science Laboratory	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	0.85	2.42
Material Science Laboratory	Molybdenum	7439-98-7	kg/yr	0.35	1.00
Material Science Laboratory	Toluene	108-88-3	kg/yr	0.30	0.87
Material Science Laboratory	Trichloroethylene	79-01-6	kg/yr	0.51	1.46
Material Science Laboratory	Xylene (o-,m-,p-Isomers)	1330-20-7	kg/yr	0.30	0.86
Pajarito Site	Propane	74-98-6	kg/yr	0.00	25.58
Plutonium Facility Complex	Acetone	67-64-1	kg/yr	0.14	0.39
Plutonium Facility Complex	Aluminum numerous forms	7429-90-5	kg/yr	0.00	0.27
Plutonium Facility Complex	Beryllium	7440-41-7	kg/yr	0.08	0.23
Plutonium Facility Complex	Chlorine	7782-50-5	kg/yr	6.44	18.41
Plutonium Facility Complex	Cyclohexane	110-82-7	kg/yr	0.14	0.39
Plutonium Facility Complex	Ethanol	64-17-5	kg/yr	10.02	28.64
Plutonium Facility Complex	Hydrogen Chloride	7647-01-0	kg/yr	159.74	456.41
Plutonium Facility Complex	Hydrogen Fluoride, as F	7664-39-3	kg/yr	0.70	1.99
Plutonium Facility Complex	Methyl Alcohol	67-56-1	kg/yr	0.55	1.58
Plutonium Facility Complex	Nitric Acid	7697-37-2	kg/yr	13.89	39.68
Plutonium Facility Complex	Oxalic Acid	144-62-7	kg/yr	1.05	3.00
Plutonium Facility Complex	Phosphoric Acid	7664-38-2	kg/yr	0.32	0.92
Plutonium Facility Complex	Propane	74-98-6	kg/yr	0.00	24.37
Plutonium Facility Complex	Trichloroethylene	79-01-6	kg/yr	106.70	304.85
Radiochemistry Site	1,4-Dioxane	123-91-1	kg/yr	0.90	2.58
Radiochemistry Site	Acetic Acid	64-19-7	kg/yr	1.84	5.25
Radiochemistry Site	Acetone	67-64-1	kg/yr	67.04	191.55

Key Facility	Chemical Name	CAS Number	Units	2008 Estimated Air Emissions	2008 Usage
Radiochemistry Site	Acetonitrile	75-05-8	kg/yr	1.25	3.57
Radiochemistry Site	Acrylonitrile	107-13-1	kg/yr	0.28	0.81
Radiochemistry Site	Ammonium Chloride (Fume)	12125-02-9	kg/yr	0.18	0.50
Radiochemistry Site	Arsenic, el.&inorg.,exc. Arsine, as As	7440-38-2	kg/yr	0.10	0.28
Radiochemistry Site	Chloroform	67-66-3	kg/yr	12.46	35.60
Radiochemistry Site	Cyclohexane	110-82-7	kg/yr	0.27	0.78
Radiochemistry Site	Dimethyl Phthalate	131-11-3	kg/yr	0.42	1.19
Radiochemistry Site	Divinyl Benzene	1321-74-0	kg/yr	0.08	0.23
Radiochemistry Site	Ethanol	64-17-5	kg/yr	20.02	57.19
Radiochemistry Site	Ethanolamine	141-43-5	kg/yr	4.05	11.56
Radiochemistry Site	Ethyl Ether	60-29-7	kg/yr	5.02	14.35
Radiochemistry Site	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	9.24	26.41
Radiochemistry Site	Hydrogen Bromide	10035-10-6	kg/yr	4.20	12.00
Radiochemistry Site	Hydrogen Chloride	7647-01-0	kg/yr	40.51	115.73
Radiochemistry Site	Hydrogen Fluoride, as F	7664-39-3	kg/yr	8.34	23.83
Radiochemistry Site	Hydrogen Peroxide	7722-84-1	kg/yr	4.68	13.36
Radiochemistry Site	Iodine	7553-56-2	kg/yr	0.18	0.50
Radiochemistry Site	Isopropyl Alcohol	67-63-0	kg/yr	7.97	22.78
Radiochemistry Site	Methacrylic Acid	79-41-4	kg/yr	0.18	0.51
Radiochemistry Site	Methyl Alcohol	67-56-1	kg/yr	5.46	15.59
Radiochemistry Site	Methyl Methacrylate	80-62-6	kg/yr	0.33	0.94
Radiochemistry Site	Methylene Chloride	75-09-2	kg/yr	8.91	25.47
Radiochemistry Site	Molybdenum	7439-98-7	kg/yr	1.79	5.10
Radiochemistry Site	n,n-Dimethyl Acetamide or Dimethyl Acetamide	127-19-5	kg/yr	0.33	0.94
Radiochemistry Site	n,n-Dimethylformamide	68-12-2	kg/yr	2.49	7.12
Radiochemistry Site	n-Butyl Alcohol	71-36-3	kg/yr	4.82	13.77
Radiochemistry Site	n-Heptane	142-82-5	kg/yr	0.12	0.34
Radiochemistry Site	Nitric Acid	7697-37-2	kg/yr	153.59	438.82
Radiochemistry Site	Oxalic Acid	144-62-7	kg/yr	1.05	3.00
Radiochemistry Site	Pentane (all isomers)	109-66-0	kg/yr	1.32	3.76
Radiochemistry Site	Phosphoric Acid	7664-38-2	kg/yr	3.85	11.00
Radiochemistry Site	Propane	74-98-6	kg/yr	0.00	219.97
Radiochemistry Site	Propargyl Alcohol	107-19-7	kg/yr	0.08	0.24
Radiochemistry Site	Propionitrile	107-12-0	kg/yr	0.14	0.39

Key Facility	Chemical Name	CAS Number	Units	2008 Estimated Air Emissions	2008 Usage
Radiochemistry Site	Styrene	100-42-5	kg/yr	0.95	2.72
Radiochemistry Site	Sulfuric Acid	7664-93-9	kg/yr	0.67	1.91
Radiochemistry Site	Tetrahydrofuran	109-99-9	kg/yr	8.41	24.02
Radiochemistry Site	Toluene	108-88-3	kg/yr	7.90	22.58
Radiochemistry Site	Yttrium	7440-65-5	kg/yr	0.39	1.12
Sigma Complex	Acetone	67-64-1	kg/yr	1.11	3.16
Sigma Complex	Acetylene	74-86-2	kg/yr	0.00	34.52
Sigma Complex	Aluminum numerous forms	7429-90-5	kg/yr	0.10	10.00
Sigma Complex	Chromium, Metal &Cr III Compounds, as Cr	7440-47-3	kg/yr	0.32	0.90
Sigma Complex	Diethylene Triamine	111-40-0	kg/yr	0.34	0.96
Sigma Complex	Ethanol	64-17-5	kg/yr	14.64	41.83
Sigma Complex	Hydrogen Chloride	7647-01-0	kg/yr	0.21	0.59
Sigma Complex	Isopropyl Alcohol	67-63-0	kg/yr	8.80	25.14
Sigma Complex	Lithium Hydride	7580-67-8	kg/yr	0.38	1.08
Sigma Complex	Propane	74-98-6	kg/yr	0.00	49.08
Sigma Complex	Silica, Fused (respirable)	60676-86-0	kg/yr	0.10	0.28
Sigma Complex	Sulfuric Acid	7664-93-9	kg/yr	0.32	0.92
Target Fabrication Facility	Acetone	67-64-1	kg/yr	12.03	34.36
Target Fabrication Facility	Carbon Tetrachloride	56-23-5	kg/yr	0.28	0.80
Target Fabrication Facility	Cyclopentane	287-92-3	kg/yr	0.25	0.70
Target Fabrication Facility	Ethanol	64-17-5	kg/yr	6.27	17.93
Target Fabrication Facility	Ethyl Bromide	74-96-4	kg/yr	0.51	1.46
Target Fabrication Facility	Ethyl Ether	60-29-7	kg/yr	3.43	9.80
Target Fabrication Facility	Hexane (other isomers)* or n-Hexane	110-54-3	kg/yr	19.41	55.47
Target Fabrication Facility	Isopropyl Ether	108-20-3	kg/yr	0.25	0.72
Target Fabrication Facility	Methyl Alcohol	67-56-1	kg/yr	8.03	22.95
Target Fabrication Facility	Methyl Ethyl Ketone (MEK)	78-93-3	kg/yr	0.15	0.42
Target Fabrication Facility	Methyl Formate	107-31-3	kg/yr	0.35	1.00
Target Fabrication Facility	Methyl Propyl Ketone	107-87-9	kg/yr	0.14	0.40
Target Fabrication Facility	Methyl Silicate	681-84-5	kg/yr	0.42	1.20
Target Fabrication Facility	Methylene Chloride	75-09-2	kg/yr	23.22	66.33
Target Fabrication Facility	n-Propyl Acetate	109-60-4	kg/yr	0.31	0.89
Target Fabrication Facility	Potassium Hydroxide	1310-58-3	kg/yr	4.20	12.00
Target Fabrication Facility	Propyl Alcohol	71-23-8	kg/yr	1.13	3.22

Key Facility	Chemical Name	CAS Number	Units	2008 Estimated Air Emissions	2008 Usage
Target Fabrication Facility	Pyridine	110-86-1	kg/yr	0.26	0.74
Target Fabrication Facility	Tetrahydrofuran	109-99-9	kg/yr	4.98	14.23
Target Fabrication Facility	Toluene	108-88-3	kg/yr	10.32	29.48
Target Fabrication Facility	Tributyl Phosphate	126-73-8	kg/yr	0.20	0.58
Tritium Operations	Nitric Acid	7697-37-2	kg/yr	0.27	0.76
Tritium Operations	Oxalic Acid	144-62-7	kg/yr	0.33	0.95
Tritium Operations	Propane	74-98-6	kg/yr	0.00	0.57
Waste Management Operations	n,n-Dimethylaniline	121-69-7	kg/yr	1.27	3.62
Waste Management Operations	Potassium Hydroxide	1310-58-3	kg/yr	2.64	7.55
Waste Management Operations	Propane	74-98-6	kg/yr	0.00	12.26
Waste Management Operations	Yttrium	7440-65-5	kg/yr	0.20	0.56

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Appendix C: Nuclear Facilities List

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Safety Basis Division	Documentation and Records	Rev. 11 September 2009

DOE/LANL LIST OF LOS ALAMOS NATIONAL LABORATORY NUCLEAR FACILITIES

U.S. Department of Energy
National Nuclear Security Administration
Los Alamos Site Office

Los Alamos National Laboratory
Safety Basis Division

APPROVED FOR USE	
LANL Safety Basis Division	R. M. Molley Date 9/21/09
LASO Safety Basis Team Leader	for B.E. Date 9/28/09
LASO Manager	Date 9/30/09

Record of Document Revisions

Revision Record		
Revision	**Date**	**Summary**
0	April 2000	Original Issue.
1	June 2001	Updated nuclear facility list and modified format.
2	December 2001	Corrected CSOs, referenced DOE approval memo for 10 CFR 830 compliant facilities, new acronym list, and safety basis documentation update since last revision.
3	July 2002	Semi-annual update.
4	February 2004	Update safety basis documentation for Transportation, TA-18 LACEF, TA-8-23 Radiography, TA-21 TSTA, and TA-50 RLWTF. Added 11 Environmental Sites that were categorized as Hazard Category 2 and Hazard Category 3 Nuclear Facilities. TA-21 TSTA, TA-48-1 Radiochemistry, and TA-50 RAMROD were downgraded to Radiological Facilities and removed from this list. The facility contacts were changed from the Facility Manager and Facility Operations to Responsible Division Leader and Facility Management Unit.
5	August 2004	Updated TA-50 RLWTF as Hazard Category 2 Nuclear Facility, Added DVRS as a temporary Hazard Category 2 Nuclear Facility. Downgraded TSFF to a Hazard Category 3 Nuclear Facility from a Hazard Category 2. The organization of the Nuclear Facility List was modified to identify only the document that categorizes the facility. Other safety basis documents related to a facility would be identified in the Authorization Agreements. The purpose of this was to reduce redundancy and conflicts between the Nuclear Facility List and Authorization Agreements.
6	June 2005	Removed TA-8-23 from Nuclear Facility per SABM/STEELE 040805, "Approval of request to Recategorize the TA-8-23 Nuclear Facility to a less than High Hazard Radiological Facility" dated 4/8/2005. Updated TA55 PF-185 as a Hazard Category 2 Nuclear Facility per SABM:STEEL, "TA-55-PF185 OSRP SB Approval" dated 5/17/2005. Updated TA55 PF-355 as a Hazard Category 2 Nuclear Facility per SER for SST Facility, dated 5/25/2005. Updated various RDLs, editorial changes, etc. Tables columns listing the DOE CSO, and the LANL·FMU were deleted upon consultation between SBO and SABT. Table rows re-ordered for easier reading.
7	October 2005	Removed TSFF per the successful OFO V&V per SABM: Steele: Approval of 2nd LANL Submittal Request for TSFF Downgrade; dated 8/1/2005

Revision Record		
Revision	**Date**	**Summary**
8	January 2007	Removed LANSCE 1L Target, Lujan Center, and component storage facilities due to PCM-06-016; Removed TA-55, PF-185 per SBT:5485.3:5SS-06-003; Removed TWISP per SABT:5485.3:CMK:103105; Updated RDL to be the current FODs relative to 5485.1 SABT:8JF-001; Updated general editorial elements (e.g., PS-SBO to SB, summary of Table 5-1, deletion of "Performance Surety", etc.)
9	September 2007	Removed TA-18 due to facility downgrade per FRT:5RA-001; Removed DVRS per EO:2JEO-007 dated 4/2/2007; Removed TA-10 due to SBT:5KK-003; updated WCRR due to ABD-WFM-005, R. 0; updated NES to be referenced to NES-ABD-0101, R.1.0
10	January 2008	Re-categorized RLWT Facility per memo SBT:CMK-002, Removed SST Pad per 5485.3/SBT:JF-39193
11	September 2009	Removed MDA B per SBT:25BLJ-56803; Removed WWTP per SBT:25BLJ-49261; Removed Pratt Canyon per SBT:25BLJ-49261. Added EF Firing Site per AD-NHHO:09-93; editorial changes (e.g., removed SB-401 since the old EWMO-document numbering system is no longer utilized by the Safety Basis Division).

Changes in Nuclear Facility Status

Date	Description
3/97	Omega West Reactor (OWR), TA-2-1, downgraded from hazard category 2 reactor facility to a radiological facility. OWR removed from the nuclear facilities list.
9/98	Safety Analysis Report (SAR) approved accepting the Radioactive Materials, Research, Operations, and Demonstration Facility (RAMROD), TA-50-37, as a hazard category 2 nuclear facility. RAMROD added to the nuclear facilities list.
9/98	TA-35 Buildings 2 and 27 downgraded from a hazard category 2 nuclear facility to a hazard category 3 nuclear facility.
9/98	Basis of Interim Operations (BIO) approved accepting the Los Alamos Neutron Science Center (LANSCE) A-6 Isotope Production and Materials Irradiation and 1L Manuel Lujan Neutron Scattering Center (MLNSC) Target Facilities as hazard category 3 nuclear facilities.
10/98	TA-8 Radiography Facility Buildings 24 and 70 downgraded from hazard category 2 nuclear facilities to radiological facilities.
11/98	Health Physics Calibration Facility (TA-3 SM-40, SM-65 and SM-130) downgraded from a hazard category 2 nuclear facility to a radiological facility. SM-40 and SM-65 had been hazard category 2 nuclear facilities while SM-130 had been a hazard category 3 nuclear facility. Health Physics Calibration Facility removed from the nuclear facilities list.
12/98	Radioactive Liquid Waste Treatment Facility (RLWTF) downgraded from a hazard category 2 nuclear facility to a hazard category 3 nuclear facility.
1/99	Pion Scattering Experiment of the TA-53 Nuclear Activities at Los Alamos Neutron Science Center (LANSCE) removed from the nuclear facilities list.
2/00	Building TA-50-190, Liquid Waste Tank, of the Waste Characterization Reduction and Repackaging Facility (WCRRF) removed from the nuclear facilities list.
3/00	DOE SER clarifies segmentation of the Waste Characterization Reduction and Repackaging Facility (WCRRF) as: 1) Building TA-50-69 designated as a hazard category 3 nuclear facility, 2) an outside operational area designated as a hazard category 2 nuclear facility, and 3) the Non-Destructive Assay (NDA) Mobile Facilities located outside TA-50-69 and designated as a hazard category 2 nuclear facility.
4/00	Building TA-3-159 of the TA-3 SIGMA Complex downgraded from hazard category 3 nuclear facility to a radiological facility and removed from the nuclear facilities list.
4/00	TA-35 Nonproliferation and International Security Facility Buildings 2 and 27 downgraded from hazard category 3 nuclear facilities to radiological facilities and removed from the nuclear facilities list.
3/01	TA-3-66, Sigma Facility, downgraded and removed from this nuclear list.
5/01	TA-16-411, Assembly Facility, downgraded and removed from this nuclear list.
5/01	TA-8-22, Radiography Facility, downgraded and removed from this nuclear list.
6/01	Site Wide Transportation added as a nuclear activity (included in 10 CFR 830 plan).
9/01	TA-53 LANSCE, WNR Target 4 JCO approved as hazard category 3 nuclear activity.
10/01	TA-53 LANSCE IL JCO in relation to changes in operational parameters of the coolant system with an expiration date of 1/31/02.

Changes in Nuclear Facility Status

Date	Description
10/01	TA-53 LANSCE Actinide BIO approved as hazard category 3 nuclear activity.
3/02	TA-33-86, High Pressure Tritium Facility (HPTF) removed from nuclear facilities list.
4/02	TA-53 LANSCE, DOE NNSA approves BIO for Storing Activated Components (A6, etc.) in Bldg 53-3 Sector M "Area A East" and added as hazard category 3 nuclear activity.
7/02	TA-53 LANSCE, WNR Facility Target 4 downgraded to below hazard category 3 and removed from the nuclear facilities list.
1/03	TA-50 Radioactive Materials, Research, Operations, and Demonstration (RAMROD) facility was downgraded to below hazard category 3 and removed from the nuclear facilities list.
6/03	TA-48-1, Radiochemistry and Hot Cell Facility was downgraded to below hazard category 3 and removed from the nuclear facilities list.
7/03	TA-21 Tritium System Test Assembly (TSTA) facility was downgraded to below hazard category 3 and removed from the nuclear facilities list.
11/03	TA-10 PRS 10-002(a)-00 (Former liquid disposal complex) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-21 PRS 21-014 (Material Disposal Area A) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-21 PRS 21-015 (Material Disposal Area B) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-21 PRS 21-016(a)-99 (Material Disposal Area T) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-35 PRS 35-001 (Material Disposal Area W, Sodium Storage Tanks) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-35 PRS 35-003(a)-99 (Wastewater treatment plant (WWTP)) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-35 PRS 35-003(d)-00 (Wastewater treatment plant – Pratt Canyon) environmental site was categorized as a hazard category 3 nuclear facility
11/03	TA-49 PRS 49-001(a)-00 (Material Disposal Area AB) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-50 PRS 50-009 (Material Disposal Area C) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-53 PRS 53-006(b)-99 (Underground tank with spent resins) environmental site was categorized as a hazard category 2 nuclear facility
11/03	TA-54 PRS 54-004 (Material Disposal Area H) environmental site was categorized as a hazard category 3 nuclear facility
3/04	TA-54-38, Radioassay and Nondestructive Testing (RANT) Facility, is re-categorized as a Hazard Category 2 nuclear facility from Hazard Category 3.

Changes in Nuclear Facility Status

Date	Description
6/04	TA-54-412 Decontamination and Volume Reduction Glovebox (DVRS) added to Nuclear Facility List. The facility will operate as a Hazard Category 2 not exceeding 5 months from the date LASO formally releases the facility for operations following readiness verification.
6/04	DOE Safety Evaluation Report for the TSFF BIO establishes that TSFF is re-categorized as a Hazard Category 3 from Hazard Category 2.
7/04	TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) was re-categorized as a Hazard Category 2 Nuclear Facility based on a DOE Memo dated March 20, 2002.
4/05	Removed TA-8-23 from Nuclear Facility List per SABM/STEELE 040805, "Approval of request to Recategorize the TA-8-23 Nuclear Facility to a less than High Hazard Radiological Facility" dated 4/8/2005.
5/05	Updated TA55 PF-185 as a Hazard Category 2 Nuclear Facility per SABM:STEEL, "TA-55-PF185 OSRP SB Approval" dated 5/17/2005.
5/05	Updated TA55 PF-355 as a Hazard Category 2 Nuclear Facility per SER for SST Facility dated 5/25/2005.
10/05	Removed TSFF from the Nuclear Facility List per SABM: Steele: Approval of 2nd LANL Submittal Request for TSFF Downgrade; dated 8/1/2005
1/07	Removed TWISP from the Nuclear Facility List per "Authorization for Removal of TWISP Mission from the LANL Nuclear Facility List as a hazard Category 2 Activity; SABT:5485.3:CMK:103105; Removed TA-55 PF-185 from the List per "Authorization for Removal of TA-55-PF-185 from the Nuclear Facility List; SBT:5485.3:5SS-06-003; Remove LANSCE 1L Target, Lujan Center, and component storage facilities due to PCM-06-016 Titles of positions updated to reflect current operations model (RDL to FODs, SABM to SBT Leader)

Changes in Nuclear Facility Status

Date	Description
9/07	Removed TA-18 from the Nuclear Facility List per FRT:5RA-001, " Downgrade of TA 18 from a Hazard Category 2 Nuclear Facility to a Radiological Low Hazard Facility," dated 4/5/2007 Removed DVRS from the Nuclear Facility List per EO:2JEO-007, "Approval of Strategy for Future Operations at the Decontamination and Volume Reduction System (DVRS) Facility," dated 4/2/2007 Removed TA-10 per SBT:5KK-003, "Re-categorization of TA-10, Bayo Canyon Nuclear Environmental Site," dated 8/10/2007. Updated WCRR due to ABD-WFM-005, R.0, Basis for Interim Operation for Waste Characterization, Reduction, and Repackaging Facility (WCRRF)," dated 4/23/2007. Updated NESs to be referenced "Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R1.0, dated 6/26/07.
11/08	TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) was approved to be re-categorized as a Hazard Category 3 Nuclear Facility per SBT:CMK-002. SST Pad removed as a Nuclear Facility per 5485.3/SBT:JF-39193, "Revocation of the Authorization Agreement for the Technical Area (TA)-55 Safe Secure Transport Facility, dated 1/16/08.
9/09	Removed MDA B per SBT:25BLJ-56803 which approved final hazard categorization MDAB-ADB-1004; Removed WWTP per SBT:25BLJ-49261 which approved final hazard categorization NES-ABD-0501 R1; Removed Pratt Canyon per SBT:25BLJ-49261 which approves final hazard categorization NES-ABD-0401 R1; Added EF Firing Site per AD-NHHO:09-093.

FORWORD

1. This joint U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA), Los Alamos Site Office (LASO) and Los Alamos National Laboratory (LANL), document has been prepared by the LASO Safety Basis Team (SBT) and Safety Basis personnel at LANL. This document provides a tabulation and summary information concerning hazard category 1, 2 and 3 nuclear facilities at LANL. Currently, there are no hazard category 1 facilities at LANL.

2. This nuclear facility list will be updated to reflect changes in facility status caused by inventory reductions, final hazard classifications, exemptions, facility consolidations, and other factors.

3. DOE-STD-1027-92 methodologies are the bases used for identifying nuclear facilities to be included in this standard. Differences between this document and other documents that identify nuclear facilities may exist as this list only covers nuclear hazard category 2 and 3 facilities that must comply with the requirements stipulated in 10 CFR 830, Subpart B. Other documents might include facilities that have inventories below the nuclear hazard category 3 thresholds, such as radiological facilities.

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Meaning
ARIES	Advanced Recovery and Integration Extraction System
BIO	Basis for Interim Operations
BUS	Business Operations (Division)
C	Chemistry (Division)
CFR	Code of Federal Regulations
CMR	Chemistry and Metallurgy Research (Facility)
CSO	cognizant secretarial officer
DD	Division Director
DOE	U.S. Department of Energy
DOE/AL	DOE Albuquerque Operations
DP	Defense Programs (DOE)
DSA	Documented Safety Analysis
DVRS	decontamination and volume reduction glovebox
EM	Environmental Management (DOE)
ESA	Engineering Sciences and Applications (Division)
ESH	Environment, Safety and Health (Division)
F&IB	Feedback and Improvement Board
FSAR	final safety analysis report
FM	facility management
FMU	facility management unit
FWO	Facility and Waste Operations (Division)
HA	hazard analysis
HC	hazard category
HPTF	High Pressure Tritium Facility
HSR	Health, Safety and Radiation
IAW	in accordance with
IFIT	Isotopic Fuel Impact Test
ITSR	interim technical safety requirements
JCO	justification for continued operations
LACEF	Los Alamos Criticality Experiment Facility
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LASO	Los Alamos Site Office
LLW	low-level waste
MER	management evaluation report
MDA	material disposal area
MLNSC	Manuel Lujan Neutron Scattering Center
N	Nuclear Nonproliferation (Division)
NIS	Nonproliferation and International Security (Division) (name changed to Nuclear Nonproliferation Division)
NDA	non-destructive assay
NES	Nuclear Environmental Site

NNSA.......................National Nuclear Security Administration
NSM Rule ....Nuclear Safety Management Rule, 10 CFR 830
NTTL ....neutron tube target loading
NWIS...................Nuclear Waste Infrastructure Services
OAB ....Office of Authorization Basis
OLASO ....Office of Los Alamos Site Operation
OSR..........................operational safety requirement
OWR ....Omega West Reactor
PRS ....Potential Release Site
Pu ....plutonium
RAMROD...............Radioactive Material, Research, Operations, and Demonstration (Facility)
RANT.......................Radioactive Assay Nondestructive Testing (Facility)
RDL.........................Responsible Division Leader
Rev. ....revision
RLWTF...................Radioactive Liquid Waste Treatment Facility
SA ....safety assessment
SAR.........................safety analysis report
SBD.........................Safety Basis Division
SER ....safety evaluation report
SM...........................South Mesa
STD ....standard
SST......................Safe-Secure Trailer
SUP ....Supply Chain Management (Division) (formerly known as BUS)
TA ....technical area
TBD.........................to be determined
TRU.........................transuranic
TSD ....transportation safety document
TSE ....Tritium Science Engineering (Group)
TSR ....technical safety requirement
USQ ....unreviewed safety question
WCRRF ....Waste Characterization, Reduction and Repackaging Facility
WETF......................Weapons Engineering Tritium Facility

1 SCOPE

Standard DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, provides methodologies for the hazard categorization of DOE facilities based on facility material inventories and material at risk. This document lists hazard category 2 and 3 nuclear facilities because they must comply with requirements in Title10, *Code of Federal Regulations*, Part 830, Nuclear Safety Management, Subpart B, "Safety Basis Requirements." The Los Alamos National Laboratory (LANL) nuclear facilities that are below hazard category 3 (radiological facilities) have not been included on this list because they are exempt from the requirements in 10 CFR 830, Subpart B.

2 PURPOSE

This standard provides a list of hazard category 2 (HC2) and 3 (HC3) nuclear facilities at LANL. The list will be revised, as appropriate, to reflect changes in facility status resulting from final hazard categorization or movement, relocation, or final disposal of radioactive inventories. The list shall be used as the basis for determining initial applicability of DOE nuclear facility requirements. The list now identifies the categorization of site wide transportation and environmental sites per the requirements of 10 CFR 830, Subpart B.

3 APPLICABILITY

This standard is intended for use by NNSA and contractors with responsibilities for facility operation and/or oversight at LANL.

4 REFERENCES

4.1 49 CFR 173.469, Title 49, *Code of Federal Regulations,* Part 173 "Shippers - General Requirements for Shipments and Packagings."

4.2 DOE O 420.2, Change 1, *Safety of Accelerator Facilities*, USDOE, 5/26/99.

4.3 DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, USDOE, 9/97.

4.4 10 CFR 830, Title 10, *Code of Federal Regulations*, Part 830, "Nuclear Safety Management."

4.5 ANSI N43.6, American National Standards Institute (ANSI) N43.6, "American National Standard for General Radiation Safety—Sealed Radioactive Sources, Classification".

5 NUCLEAR FACILITIES LIST

Table 5-1 identifies all HC2 and HC3 nuclear facilities at LANL. Facilities have been categorized based on criteria in DOE-STD-1027-92, Change 1. Site, zone or area, building number, name, and dominant hazard category identifies each facility. The dominant hazard category is determined by identifying the highest hazard category for multi-process facilities. Buildings, structures, and processes addressed by a common documented safety analysis have been designated as a single facility. DOE-STD-1027-92, Change 1, permits exclusion of sealed radioactive sources from a radioactive inventory of the facility if the sources were fabricated and tested in accordance with 49 CFR 173.469 or ANSI N43.6. In addition, material contained in U.S. Department of Transportation (DOT) Type B shipping containers may also be excluded from radioactive inventory. Facilities containing only material tested or stored in accordance with these standards do not appear in the list and tables that follow.

TABLE 5-1. Summary of LANL Nuclear Facilities

HAZ CAT	FACILITY NAME
2	Site Wide Transportation
2	TA-16 Weapons Engineering Tritium Facility (WETF)
2	TA-3 Chemistry and Metallurgy Research Facility (CMR)
2	TA-55 Plutonium Facility
3	TA-50 Radioactive Liquid Waste Treatment Facility (RLWT)
2	TA-50 Waste Characterization Reduction and Repackaging Facility (WCRR)
2	TA-54 Waste Storage and Disposal Facility (Area G)
2	TA-54 Radioactive Assay Nondestructive Testing (RANT) Facility
2	TA-21 MDA A NES
2	TA-21 MDA T NES
3	TA-35 MDA W NES
2	TA-49 MDA AB NES
2	TA-50 MDA C NES
2	TA-53 Resin Tank NES
3	TA-54 MDA H NES
3	EF Site

6 LANL NUCLEAR FACILITIES SUMMARY TABLES

The Table 5-2 lists the categorization basis information and a brief description for each nuclear facility identified in Table 5-1.

TABLE 5-2. Nuclear Facility Categorization Information

TA	Bldg	Haz Cat	Facility Name	Description	Categorization Basis	FOD
Site Wide		2	Site Wide Transportation	Laboratory nuclear materials transportation	SER TSD.01, Safety Evaluation Report, Rev 3, approving Los Alamos National Laboratory (LANL) Transportation Safety Document (TSD) P&T-SA-002, R5 Technical Safety Requirements (TSRs) P&T-TSR-001, R2, September 2008	OSD
16	0205 0450	2	Weapons Engineering and Tritium Facility (WETF)	Tritium Research	Safety Evaluation Report (SER) for WETF, SER-Rev.0, March 27, 2002.	WFO
3	0029	2	Chemistry and Metallurgy Research Facility CMR	Actinide chemistry research and analysis	CMR Basis for Interim Operations, dated August 26, 1998	CMR
55	4	2	TA-55 Plutonium Facility	Pu glovebox lines; processing of isotopes of Pu	Safety Evaluation Report of the Los Alamos National Laboratory Technical Area 55 Plutonium Building-4, Safety Analysis Report and Technical Safety Requirements, December 1996.	TA-55
50	0001	3	TA-50 Radioactive Liquid Waste Treatment Facility (RLWT)	Main treatment plant, pretreatment plant, decontamination operation	LANL Letter: Comment Response Regarding the RLWTF Hazard Category 3 Confirmation, AD-NHHO:08-100, April 2008.	TA-55
	0002	3		Low level liquid influence tanks, treatment effluent tanks, low level sludge tanks		
	0066	3		Acid and Caustic waste holding tanks		
	0090	3		Holding tank		
50	0069	2	TA-50 Waste Characterization Reduction and Repackaging Facility (WCRR)	Waste characterization, reduction, and repackaging facility	*Basis for Interim Operation for Waste Characterization, Reduction. and Repackaging Facility (WCRRF)*, ABD-WFM-005, R.0, April 23, 2007	EMO
	External	2		Drum staging activities outside TA-50-69		

TA	Bldg	Haz Cat	Facility Name	Description	Categorization Basis	FOD
54	Area G	2	TA-54 Waste Storage and Disposal Facility (Area G)	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.	U.S. Department of Energy, National Nuclear Security Administration SER for TA-55 Area G DSA 11/28/03; Final Documented Safety Analysis (DSA) Technical Area 54, Area g, ABD-WFM-001, Rev.0 April 9, 2003, ADB-WFM-002, Rev. 0, November 10, 2003.	EMO
54	0038	2	TA-54 Radioactive Assay Nondestructive Testing (RANT) Facility	TRUPACT-II and HalfPACT loading of drums for shipment to WIPP	Safety Evaluation Report, Basis for Interim Operation (BIO) and Technical Safety Requirements for the Radioassay and Nondestructive Testing (RANT) Facility, Technical Area 54-38, ABD-WFM-007, Rev. 0, May 30, 2003; LASO December 23, 2003	EMO
21	21-014	2	TA-21 MDA A NES	An inactive Material Disposal Area containing two buried 50,000 gal. storage tanks (the "General's Tanks") and three disposal pits	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA-21
21	TA-21	2	TA-21 MDA T NES	An inactive Material Disposal Area consisting of four inactive absorption beds, a distribution box, a portion of the subsurface retrievable waste storage area, and disposal shafts.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA-21
5	35-001	3	TA-35 MDA W NES	An inactive Material Disposal Area consisting of two vertical shafts or "tanks" that were used for the disposal of sodium coolant used in LAMPRE-1 research reactor.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA-21

TA	Bldg	Haz Cat	Facility Name	Description	Categorization Basis	FOD
49	TA-49	2	TA-49 MDA AB NES	An underground, former explosive test site comprised of three distinct areas, each with a series of deep shafts used for subcritical testing.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA-21
50	50-009	2	TA-50 MDA C NES	A former Material Disposal Area consisting of pits and shafts that were used for burial of chemical waste, uncontaminated classified materials, and radioactive waste.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA-21
53	TA-53	2	TA-53 Resin Tank NES	An inactive underground tank associated with the former radioactive liquid waste system at TA-53. The tank (Structure 53-59) contains spent ion exchange resin.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA-21
54	54-004	3	TA-54 MDA H NES	An inactive Material Disposal Area located on Mesita del Buey containing nine shafts that were used for disposal of classified materials.	"Documented Safety Analysis for Surveillance and Maintenance of Nuclear Environmental Sites at Los Alamos National Laboratory", NES-ABD-0101, R.1.0, June, 2007	TA-21
15	EF Site	3	EF Site	An inactive site where experiments utilizing depleted uranium was historically conducted.	"EF Site Study Phase A", ENREGS Report LANL-07-1	WFO

Appendix D: Less-than-Hazard-Category-3 Nuclear Facilities List

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LISTING OF LOS ALAMOS NATIONAL LABORATORY LESS-THAN HAZARD CATEGORY 3 NUCLEAR FACILITIES

Safety Basis Technical Services	Date
Safety Basis Division Leader	Date
Associate Director, NHHO	Date

Record of Document Revisions

Revision Record		
Revision	**Date**	**Summary**
0	April 2009	Original Issue.

1 SCOPE

Department of Energy Standard, DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, provides a methodology to develop the hazard categorization of a nuclear facility based only on the quantities of radioactive material in the facility. This document lists the less-than-hazard category 3 (HC-3) nuclear facilities that must comply with requirements in 10CFR830, Nuclear Safety Management, Subpart A, "Quality Assurance Requirements", as well as the appropriate safety management programs necessary based on their non-nuclear facility categorization. These facilities do not have to comply with the requirements in Subpart B of 10CFR830.

2 PURPOSE

This document provides the enumeration of less-than HC-3 nuclear facilities at the Laboratory. These facilities are also known as "Radiological Facilities", however that term has no precise definition if the Code of Federal Law, Department of Energy Directives, nor Department of Energy Standards.

The list will be revised, as appropriate, to reflect changes in facility status resulting from final hazard categorization or movement, relocation, or final disposal of radioactive inventories.

3 APPLICABILITY

This document is intended for use by Laboratory personnel, any contractors who support Laboratory functions, DOE/NNSA personnel, and any other persons interested in nuclear safety management at the Laboratory.

4 REFERENCES

4.1 10 CFR 830, Title 10, *Code of Federal Regulations*, Part 830, "Nuclear Safety Management."

4.2 DOE-STD-1027-92, Change 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, USDOE, 9/97.

4.3 49 CFR 173.469, Title 49, *Code of Federal Regulations,* Part 173 "Shippers - General Requirements for Shipments and Packagings."

4.4 ANSI N43.6, American National Standards Institute (ANSI) N43.6, "American National Standard for General Radiation Safety—Sealed Radioactive Sources, Classification".

5 RADIOLOGICAL FACILITIES LIST

Table 1 lists the less-than HC-3 nuclear facilities at the Los Alamos National Laboratory. These facilities have been categorized based on criteria in DOE-STD-1027-92, Change 1. Site, zone or area, building number, name, and dominant hazard category identifies each facility. The dominant hazard category is determined by identifying the highest hazard category for multi-process facilities. Buildings, structures, and processes addressed by a common safety basis document have been designated as a single facility. DOE-STD-1027-92, Change 1, permits exclusion of sealed radioactive sources from a radioactive inventory of the facility if the sources were fabricated and tested in accordance with 49 CFR 173.469 or ANSI N43.6.

In addition, material contained in U.S. Department of Transportation (DOT) Type B shipping containers may also be excluded from radioactive inventory. Facilities containing only material tested or stored in accordance with these standards do not appear in the list and tables that follow.

6 LANL LESS-THAN HAZARD CATEGORY-3 NUCLEAR FACILITIES SUMMARY TABLES

Table 1: Less-than HC-3 Nuclear Facility Categorization Information

	TA-Bldg	FOD	RAD	Facility	Description	Inventory Document Either delete or change to Haz Cat Document
1.	TA-03-0016	IFCS		Ion Beam Facility	Radiological contamination	
2.	TA-03-0032	STO	ADEPS	Superconduc. Tech Center(STC)	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0
3.	TA-03-0034	STO	ADEPS	Cryogenics Bldg "B"	Various	MST-AB-FOM-ALL-04-0002, rev.0
4.	TA-03-0035	STO	ADEPS	Press Bldg	U-235, Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
5.	TA-03-0039	STO	ADEES	Manufacturing Shops	Contamination; possible DU storage	
6.	TA-03-0040	STO	ADEPS	Physics Bldg, office and lab	Sealed sources*, various	TRPFOD-OPS-SORD-011.0
7.	TA-03-0065	IFCS		Source Storage Bldg	Radiation effect Lab.	
8.	TA-03-0066	STO	ADEPS	Sigma	U-235, Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
9.	TA-03-0102	STO	ADEES	Tuballoy Machine Shop	Depleted Uranium	
10.	TA-03-0130	IFCS		Source Storage Bldg	Co-60	
11.	TA-03-0141	STO	ADEES	BTF	Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
12.	TA-03-0159	STO	ADEPS	Forming Bldg	Th-232; DU	PRO-0010-MCFO-AB-SIG RAM
13.	TA-03-0215	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
14.	TA-03-0216	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
15.	TA-03-0218	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
16.	TA-03-0169	STO	ADEPS	Warehouse	Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM

	TA-Bldg	FOD	RAD	Facility	Description	Inventory Document Either delete or change to Haz Cat Document
17.	TA-03-0317	STO	ADEES	BTF - Graphite Storage	Depleted Uranium	PRO-0010-MCFO-AB-SIG RAM
18.	TA-03-0451	STO	ADEPS	Sigma Office	None	
19.	TA-03-0494	STO	ADEPS		Sealed sources*, various	TRPFOD-OPS-SORD-011.0
20.	TA-03-0541	STO	ADEPS	Sigma Storage Shed		PRO-0010-MCFO-AB-SIG RAM
21.	TA-03-1698	STO	ADEPS	Material Science Lab	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0
22.	TA-03-1819	STO	ADEPS	Experimental Material Science	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0
23.	TA-03-2002	STO	ADEPS	X-Ray Machine Lab	Depleted Uranium	MST-AB-FOM-ALL-04-0002, rev.0
24.	TA-03-2132	STO	ADEPS	Sigma Safety Storage Shed		PRO-0010-MCFO-AB-SIG RAM
25.	TA-03-2322	STO	ADTR	NISC	Sealed Source Work* and Radiography	N-OP-PLN-0010.3
26.	TA-08-0022	WFO	ADEES	X-Ray Facility	Depleted Uranium	ESA-WOI-OP-41.0, R.1
27.	TA-08-0023	WFO	ADEES	Betatron Bldg	Depleted Uranium	ESA-WOI-OP-41.0, R.1
28.	TA-08-0065	WFO	ADEES	Sealed Sources	Depleted Uranium	ESA-WOI-OP-41.0, R.1
29.	TA-08-0070	WFO	ADEES	Non Destructive Testing	Depleted Uranium	ESA-WOI-OP-41.0, R.1
30.	TA-08-0120	WFO	ADEES	Radiography	DU	ESA-WOI-OP-41.0, R.1
31.	TA-11-0002	WFO	ADWP	Vibration Test	Depleted Uranium	ESA-WOI-OP-41.0, R.1
32.	TA-11-0025	WFO	ADWP		Depleted Uranium	ESA-WOI-OP-41.0, R.1
33.	TA-11-0030	WFO	ADWP	Vibration Test Bldg	Depleted Uranium	ESA-WOI-OP-41.0, R.1
34.	TA-11-0036	WFO	ADWP	HE Magazine		
35.	TA-11-0065	WFO	ADWP	Burn Pit	Depleted Uranium	ESA-WOI-OP-41.0, R.1
36.	TA-15 DART Firing Site	WFO		Firing Site (R307)	DU contamination	
37.	TA-15-R183	WFO		Vault	Depleted Uranium	
38.	TA-16-0202	WFO	ADEES	Laboratory	DU,	ESA-WOI-OP-42.0, R.1

	TA-Bldg	FOD	RAD	Facility	Description	Inventory Document Either delete or change to Haz Cat Document
39.	TA-16-0207	WFO	ADWP	Component Testing	DU	ESA-WOI-OP-41.0, R.1
40.	TA-16-0260	WFO	ADWP		Depleted Uranium	ESA-WOI-OP-41.0, R.1
41.	TA-16-0261	WFO	ADWP		DU	ESA-WOI-OP-41.0, R.1
42.	TA-16-0263	WFO	ADWP		DU	ESA-WOI-OP-41.0, R.1
43.	TA-16-0267	WFO	ADWP		DU, legacy cont.	ESA-WOI-OP-41.0, R.1
44.	TA-16-0280	WFO	ADWP	Inspection Building	DU	ESA-WOI-OP-41.0, R.1
45.	TA-16-0281	WFO	ADWP	Rest House	DU	ESA-WOI-OP-41.0, R.1
46.	TA-16-0283	WFO	ADWP	Component Storage	DU	ESA-WOI-OP-41.0, R.1
47.	TA-16-0285	WFO	ADWP	Component Storage	DU	ESA-WOI-OP-41.0, R.1
48.	TA-16-0300	WFO	ADWP	Component Storage	DU/Th-232	ESA-WOI-OP-41.0, R.1
49.	TA-16-0301	WFO	ADWP	Component Storage	Depleted Uranium	ESA-WOI-OP-41.0, R.1
50.	TA-16-0302	WFO	ADWP	Component Storage Training	DU	ESA-WOI-OP-41.0, R.1
51.	TA-16-0332	WFO	ADWP	Component Storage	Depleted Uranium	ESA-WOI-OP-41.0, R.1
52.	TA-16-0410	WFO	ADWP	Assembly Building	Depleted Uranium	ESA-WOI-OP-41.0, R.1
53.	TA-16-0411	WFO	ADWP	Assembly Building	Depleted Uranium	ESA-WOI-OP-41.0, R.1
54.	TA-16-0413	WFO	ADWP	Component Storage	Depleted Uranium	ESA-WOI-OP-41.0, R.1
55.	TA-16-0414	WFO	ADWP	Storage Building	Depleted Uranium	ESA-WOI-OP-41.0, R.1
56.	TA-16-0415	WFO	ADWP	Component Storage	DU	ESA-WOI-OP-41.0, R.1
57.	TA-16-0955	WFO	ADWP			
58.	TA-18 ALL	IFCS		60 facilities		
59.	TA-21-0005	IFCS		Laboratory Bldg	Radiological contamination	
60.	TA-21-0089	IFCS				
61.	TA-21-0150	IFCS		Molecular chemistry	Radiological contamination	
62.	TA-21-0152	IFCS		Laboratory	Legacy Contamination	ESA-WOI-OP-41.0, R.1
63.	TA-21-0155	IFCS		TSTA Facility	Radioactive-mixed contamination	
64.	TA-21-0209	IFCS		Labs. & Offices, TSFF	Tritium, DU, Pu	ESA-WOI-FSP-TSFR, Rev 0

	TA-Bldg	FOD	RAD	Facility	Description	Inventory Document Either delete or change to Haz Cat Document
65.	TA-21-0213	IFCS		Lab Supply Warehouse	Radiological contamination	
66.	TA-21-0257	EWMO		RLWT	Treatment of radioactive liquid waste, Analysis of volume measurement	Development stage
67.	TA-21 MDA B NES	EWMO		MDA B NES	An inactive Material Disposal Area consisting of four major pits, a small trench, and miscellaneous small disposal sites.	
68.	TA-35-0002	STO	ADTR	Nuclear Safeguards Research Bld.	Sealed Sources, various other	TRPFOD-OPS-SORD-011.0
69.	TA-35-0027	STO	ADTR	Nuclear Safeguards Lab.	Sealed Sources, various other	TRPFOD-OPS-SORD-011.0
70.	TA-35-0034	STO	ADTR	Nuclear Safeguards Research Bld.	Sealed Sources, various other	TRPFOD-OPS-SORD-011.0
71.	TA-35-0087	STO	ADTR		Sealed Sources, various other	TRPFOD-OPS-SORD-011.0
72.	TA-35-0124	STO	ADEPS	Antares Target Hall	Pu-239	MST-AB-FOM-ALL-04-0002, rev.0
73.	TA-35-0125	STO	ADEPS	Atlas Bldg	NHMFL, Pu-239, Am-241	MST-AB-FOM-ALL-04-0002, rev.0
74.	TA-35-0126	STO	ADEPS	Mechanical Bldg	Pu-239, Np-237	MST-AB-FOM-ALL-04-0002, rev.0
75.	TA-35-0189	STO		Trident Laser Lab	Used Pu-239 sealed source	TRPFOD-OPS-SORD-011.0
76.	TA-35-0213	STO	ADEPS	Target Fabrication Facility	Various	MST-AB-FOM-ALL-04-0002, rev.0
77.	TA-35-0374	STO	ADTR		Contaminated Hoods	TRPFOD-OPS-SORD-011.0
78.	TA-36-0001	IFCS		Lab and Offices	Radiological contamination	
79.	TA-36-0214	IFCS		Central HP Calibration Facility	Calibrate Rad Prot. Inst.	ESH4-RIC-SOP-06,RI
80.	TA-37-0010	WFO	ADWP	Storage Magazine	Depleted Uranium	ESA-WOI-OP-41.0, R.1
81.	TA-37-0016	WFO		Storage Magazine	Depleted Uranium, Fixed Cont.	ESA-WOI-OP-41.0, R.1

	TA-Bldg	FOD	RAD	Facility	Description	Inventory Document Either delete or change to Haz Cat Document
82.	TA-39-0002	STO	ADTR	Lab/Office Building	Contamination	MST-AB-FOM-ALL-04-0002, rev.0
83.	TA-41-0001	STO	ADTR	Underground Vault	Depleted Uranium	TRPFOD-OPS-SORD-011.0
84.	TA-41-0006	STO	ADTR	Laboratory	Tritium contamination	TRPFOD-OPS-SORD-011.0
85.	TA-43-0001	STO	ADTR	Health Research Lab	Various	TRPFOD-OPS-SORD-011.0
86.	TA-43-0028	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
87.	TA-43-0047	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
88.	TA-43-0049	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
89.	TA-43-0061	STO	ADTR		Various	TRPFOD-OPS-SORD-011.0
90.	TA-46-0001	STO	ADCLES	Laboratory/Office	Various	MST-AB-FOM-ALL-04-0002, rev.0
91.	TA-46-0024	STO	ADCLES	Laboratory/Office	Various	MST-AB-FOM-ALL-04-0002, rev.0
92.	TA-46-0025	STO	ADCLES	Engineering Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
93.	TA-46-0030	STO	ADCLES	Electronics Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
94.	TA-46-0031	STO	ADCLES	Test Building #2	Various	MST-AB-FOM-ALL-04-0002, rev.0
95.	TA-46-0041	STO	ADCLES	Laser Isotope Support Facility	Various	MST-AB-FOM-ALL-04-0002, rev.0
96.	TA-46-0154	STO	ADCLES	Physical Chemistry Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
97.	TA-46-0158	STO	ADCLES	Laser Induced Chemistry Lab	Various	MST-AB-FOM-ALL-04-0002, rev.0
98.	TA-46-0208	STO	ADCLES	FEL Lab Building	Various	MST-AB-FOM-ALL-04-0002, rev.0
99.	TA-46-0416	STO	ADCLES	Morgan Shed	Various	MST-AB-FOM-ALL-04-0002, rev.0
100.	TA-48-0001	STO	ADCLES	RC-1	Radiochemistry	PRO-C-DO-007.5
101.	TA-48-0008	STO	ADCLES	Isotope Separator BLDG	Various	PRO-C-DO-007.5

	TA-Bldg	FOD	RAD	Facility	Description	Inventory Document Either delete or change to Haz Cat Document
102.	TA-48-0017	STO	ADCLES	Assembly & Checkout BLDG	Various	PRO-C-DO-007.5
103.	TA-48-0026	STO	ADCLES	Office BLDG	Various	PRO-C-DO-007.5
104.	TA-48-0027	STO	ADCLES	Transportable	Various	PRO-C-DO-007.5
105.	TA-48-0028	STO	ADCLES	Adv Analytical Devel BLDG	Various	
106.	TA-48-0033	STO	ADCLES	Transportable	Various	PRO-C-DO-007.5
107.	TA-48-0038	STO	ADCLES	Metal BLDG	Various	PRO-C-DO-007.5
108.	TA-48-0039	STO	ADCLES	Metal BLDG	Various	PRO-C-DO-007.5
109.	TA-48-0045	STO	ADCLES	Clean Chemistry/Mass Spec	Various	
110.	TA-48-0063	STO	ADCLES	Transportainer	Various	
111.	TA-48-0107	STO	ADCLES	Weapons Analytical Chemistry	Various	
112.	TA-48-0111	STO	ADCLES	Transportainer	Various	PRO-C-DO-007.5
113.	TA-48-0168	STO	ADCLES	Chem-Stor BLDG	Various	PRO-C-DO-007.5
114.	TA-48-0180	STO	ADCLES	Chem-Stor BLDG	Various	PRO-C-DO-007.5
115.	TA-48-0181	STO	ADCLES	Chem-Stor BLDG	Various	
116.	TA-48-0215	STO	ADCLES	Transportainer	Various	PRO-C-DO-007.5
117.	TA-48-0236	STO	ADCLES	Walk-in Cooler	Various	PRO-C-DO-007.5
118.	TA-50-0037	EMWO		Arctic	No SNM except for holdup in ventilation system duct work, Pu-239	None
119.	TA-53-0945	LANSCE		Liq. Waste Treatment Facility	Rad Liq. Treatment Facility	SOP-RLW-002.R.3
120.	TA-53-0954	LANSCE		Rad Liq. Waste basins	Evaporation Basins	SOP-RLW-002.R.3
121.	TA-54, Area L	EWMO		Liquid hazardous waste treatment & storage	Liquid hazardous waste treatment & storage	AP-SWO-002, Data Management of CWDRs and WPFs
122.	TA-54-0412	EWMO		DVRS	Decontamination & volume reduction system	Development stage

	TA-Bldg	FOD	RAD	Facility	Description	Inventory Document Either delete or change to Haz Cat Document
123.	TA-54-1009	EMWO		Decontamination Facility	Decontamination Facility	PS-Policy-001, project support acceptance criteria
124.	TA-59-0001	IFCS		Occupational Health Lab	Analytical-Environmental	FSP-C-OPS-71-03.2

Appendix E: DOE 2008 Pollution Prevention Awards for LANL

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In January 2008 the Los Alamos National Laboratory won two Best-in-Class Pollution Prevention awards and six Environmental Stewardship awards from NNSA. The competition for these awards had more entries this year than ever before from across the NNSA complex, and the Laboratory won more of these awards than it has during any previous year.

The following projects won Best-in-Class awards:

Ultrapure Carbon and Carbon-Nitride Nano-Materials

New solvent-free methods were developed to prepare ultrapure carbon and carbon-nitride nano-particles. The new methods are faster, involve less purification, and eliminate the need for high temperatures and pressures so that the preparation work is safer for employees. These very useful materials can now be produced without generating hazardous fumes or waste in the process. The groups involved are DE-1 and DE-6.

Wastewater Recycling at LANL Saves Over $1 Million Annually

The Radioactive Liquid Waste Treatment Facility reduced the amount of reverse osmosis concentrate (ROC) that needs treatment by the evaporator. Instead of sending all of the ROC directly to the evaporator, it was recycled to an intermediate storage tank before being recycled and blended with influent. The amount of ROC that is wasted was reduced fourfold, and total cost savings exceed $1.3 million per year. The groups involved are RLW, CAO-PMCI, EWMO-RLW, and EWMO-21.

The following projects won Environmental Stewardship awards:

Over $900,000 Saved with Steam Generator Optimization

This project eliminated approximately half of the low-level liquid waste produced at the Plutonium Facility for a waste reduction of over 500,000L and a cost avoidance of over $900,000 annually. This was accomplished by changing the operation of the steam generators so that they only run as needed instead of non-stop. The groups involved are C-CSE and PMT-2.

Perchloric Acid Exhaust System Saves $750,000 Annually

Activities involving perchloric acid were consolidated at TA-48 so that just one exhaust system could be used for this work instead of the original four separate exhaust systems. This project is expected to eliminate the generation of about 500,000L per year of low-level liquid waste since fewer ducts require washing and also avoid costs of approximately $1 million annually. The groups involved are C-NR, PE-DO, FIRP-PGIU, C-CSE, and FMO-STO.

Recycling of Soil, Asphalt, and Mulch Saves $1.7 Million

The Chemistry and Metallurgy Research Replacement Project reused soil, asphalt, and mulch from vegetation instead of paying for their disposal. Approximately 207,000 cubic yards of soil and 486 cubic yards of asphalt will be used at the Laboratory and at the Los Alamos county landfill. Trees and other vegetation will be turned into mulch to help with dust suppression. Total cost avoidance could be up to $1,735,000. The groups involved are ENV-RCRA and Austin Commercial.

Mixed Office Paper Recycle Program

The new mixed office paper recycle program simplifies collection of paper at the Laboratory while addressing safety and security concerns. The combined collection is more efficient and user-friendly because all unclassified paper can be recycled together. The program reduces the amount of sanitary waste disposed and alleviates previous environmental impacts and security issues related to using out-of-state recyclers. The groups involved are ENV-RRO, PS-2, OCI-OFF, and WDP-HWMO.

Integrating Safety and Security into the Environment Management System Life-cycle: A Body-contact Sport

Full integration of Environmental Management Systems (EMS) with Integrated Safety Management Systems (ISMS) is required by DOE Order 450.1 and Executive Order. However, such integration depends on sustained effort and the cumulative effect of many individual steps to assure that meaningful results are demonstrated at the worker level of the organization. In FY07, the Laboratory executed efforts at every stage of the EMS life-cycle to continuously improve such integration. This effort was headed by ENV-RRO and involved all groups at the Laboratory.

The Uninterruptible Power Supply Project

The Uninterruptible Power Supply (UPS) project was an educational, electrical safety, pollution prevention, waste reduction, and environmentally preferable purchasing initiative. Unnecessary UPSs were removed, and workers were educated about the proper uses of UPSs. This project will help avoid future legacy waste materials and assist in Laboratory clean up efforts. The groups involved are ENV-RRO, ENV-RCRA, and WDP-HWMO.

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To obtain a copy of the SWEIS Yearbook – 2008, contact Marjorie Wright
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This 2008 Yearbook is available on the web through the
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