



Sandia National Laboratories

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# LONG-TERM STEWARDSHIP IMPLEMENTATION PLAN

(FOR LEGACY SITES)

September 2006



United States Department of Energy  
Sandia Site Office  
Environmental Restoration Project  
Environmental Management Department

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.



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## ACRONYMS AND ABBREVIATIONS

amsl	above mean sea level
AOC	Area of Concern
ASER	Annual Site Environmental Report
CAB	Citizens' Advisory Board
CAC	Corrective Action Complete
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CME	Corrective Measures Evaluation
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
Consent Order	Compliance Order on Consent
CRIO	Community Resource Information Office
CSS	CWL Sanitary Sewer
CWL	Chemical Waste Landfill
D&D	Decontamination and Decommissioning
DBA	Database Administration
DOE	U.S. Department of Energy
EDD	electronic data deliverable
EGIS	Environmental Geographic Information System
EM	Environmental Management
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ERDMS	Environmental Restoration Data Management System
ES&H	Environmental, Safety, and Health
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
GRM	Groundwater Reporting Module
HE	high explosive(s)
HQ	Headquarters
HRS	Hazard Ranking System
HSWA	Hazardous and Solid Waste Amendments
IC	institutional control
IM	information management
IMS	Information Management System
IRT	Inactive Record Transfer
ISMS	Integrated Safety Management System
KAFB	Kirtland Air Force Base
km	kilometer(s)
KTF	Kauai Test Facility
LE	Landfill Excavation
LTES	Long-Term Environmental Stewardship
LTS	Long-Term Stewardship
LWDS	Liquid Waste Disposal System
MCL	maximum contaminant level
MNA	monitored natural attenuation

## ACRONYMS AND ABBREVIATIONS (Concluded)

MOU	memorandum of understanding
MWL	Mixed Waste Landfill
NARA	National Archives and Records Administration
NFA	no further action
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NPL	National Priority List
PCCP	Post-Closure Care Plan
PSL	Primary Subliner
QA	quality assurance
QAPP	Quality Assurance Program Plan
QC	quality control
RC	Records Center
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
Sandia	Sandia Corporation
SMO	Sample Management Office
SNL	Sandia National Laboratories
SNL/CA	Sandia National Laboratories/California
SNL/NM	Sandia National Laboratories/New Mexico
SON	Sandia Open Network
SRN	Sandia Restricted Network
SSO	Sandia Site Office
SWMU	Solid Waste Management Unit
TA	Technical Area
TAG	Tijeras Arroyo Groundwater
TCE	trichloroethene
TSD	Task Scope Documentation
TTR	Tonopah Test Range
UECA	Uniform Environmental Covenants Act
USAF	U.S. Air Force
USFS	U.S. Forest Service
VCM	Voluntary Corrective Measure
VOC	volatile organic compound
VSA	Vertical Sensor Array
VZMS	Vadose Zone Monitoring System
WM	Waste Management

## EXECUTIVE SUMMARY

The purpose of this Implementation Plan is to describe the actions necessary to implement Sandia National Laboratories (SNL) Long-Term Stewardship (LTS) for legacy sites, which is scheduled to begin in Fiscal Year (FY) 2007. It complements the 2001 Long-Term Environmental Stewardship (LTES) Plan (SNL/NM August 2001), which was developed in conjunction with the U.S. Department of Energy (DOE), SNL, various governmental agencies, and the public. Chapter 6.0 of this document identified technical and administrative issues that were updated in 2003 and 2006. This LTS Implementation Plan describes current and future activities to support the general objectives outlined in the 2001 LTES Plan, as well as the more specific objectives that have been or will be defined by regulatory requirements as part of site closures. Combined with the 2001 LTES Plan and detailed scope and budget, this Implementation Plan provides the basis for LTS for legacy sites at SNL. The National Nuclear Security Administration, Sandia Site Office is scheduled to take responsibility for the LTS for legacy sites at SNL at the end of FY06.

The environmental impacts associated with ongoing SNL operations and the cleanup activities of currently active sites are being addressed by an LTES Program. LTS for legacy sites is a component of LTES. LTES is being developed within the precepts of the Environmental Management System (EMS) at Sandia National Laboratories/New Mexico (SNL/NM). The EMS at SNL/NM provides for proactive management to ensure the protection and sustainable use of natural and cultural resources affected by ongoing SNL operations. The scope of the SNL EMS encompasses all activities, products, and services that have the potential to interact with the environment at SNL/NM, SNL/California, Kauai Test Facility, and Tonopah Test Range. In compliance with DOE Order 450.1, "Environmental Protection Program" (DOE January 2003), Sandia will implement EMS as part of its Integrated Safety Management System. LTES is defined by DOE Order 450.1 as activities and processes that ensure the long-term protection of a site's natural and cultural resources throughout its operational, closure, and post-closure life. Hence the LTES Program at SNL is composed of both legacy as well as ongoing operations. More detail about the SNL EMS is contained in the SNL EMS Program Manual PG470222 (SNL/NM November 2005a). This Implementation Plan addresses only LTS activities associated with the legacy sites. Other SNL EMS-related plans are being developed to address LTES activities associated with ongoing operations. Together, the ongoing and legacy activities comprise the SNL LTES Program.

For the purpose of this Implementation Plan, LTS applies to the legacy sites and is defined as the physical controls, institutions, information, and other mechanisms necessary to ensure protection of people and the environment at sites where the DOE has completed or plans to complete cleanup (e.g., landfill closures, remedial actions, removal actions, and facility stabilization). The concept includes land-use controls, monitoring, maintenance, and information management. SNL performs LTS for its legacy sites by continued mitigation of risk from residual hazardous and radioactive contaminants still present at Environmental Restoration Project sites, as well as compliance with regulatory and DOE requirements to confirm protection of human health and the environment. An information management function will be maintained to manage the information developed for LTS for legacy sites. Administration and management processes will be implemented to effectively coordinate these activities and ensure that the objectives of LTS are being met at SNL. Continued mitigation of risk is achieved by ensuring that the residual hazardous and radiological constituents do not migrate from the controlled sites. The comprehensive monitoring program currently in place will be continued to demonstrate and verify that the contaminants have not migrated. For some sites, mitigation of

the risk will be accomplished by land use and access restrictions to the sites. This will be the primary function of institutional controls. An important component of LTS is an effective public outreach program that keeps the general public and potentially affected parties informed. Meetings and presentations will be conducted to inform the public and other stakeholders of the progress of LTS for legacy sites and to request feedback on program policies and changes.

## 1.0 INTRODUCTION

The environmental impacts associated with ongoing Sandia National Laboratories (SNL) operations and the cleanup of currently active sites are being addressed by a Long-Term Environmental Stewardship (LTES) Program. This program will also cover newly discovered sites. Long-Term Stewardship (LTS) for legacy sites is a component of LTES. LTES is being developed within the precepts of the Environmental Management System (EMS). The EMS Program at SNL provides for proactive management to ensure the protection and sustainable use of natural and cultural resources affected by ongoing SNL operations. The scope of the SNL EMS encompasses all activities, products, and services that have the potential to interact with the environment at Sandia National Laboratories/New Mexico (SNL/NM), Sandia National Laboratories/California (SNL/CA), Kauai Test Facility (KTF), and Tonopah Test Range (TTR). In compliance with U.S. Department of Energy (DOE) Order 450.1, "Environmental Protection Program" (DOE January 2003), Sandia will implement EMS as part of its Integrated Safety Management System (ISMS). LTES is defined by DOE Order 450.1 as activities and processes that ensure the long-term protection of a site's natural and cultural resources throughout its operational, closure, and post-closure life. Hence, the LTES Program at SNL is composed of both legacy as well as ongoing operations. More detail about the SNL EMS is contained in the SNL EMS Program Manual PG470222 (SNL/NM November 2005a). This Implementation Plan addresses only LTS activities associated with the legacy sites. Other SNL EMS-related plans are being developed to address LTES activities associated with ongoing operations at all four SNL locations.

For the purposes of this document, LTS for the legacy sites is defined as the physical controls, institutions, information, and other mechanisms necessary to ensure protection of people and the environment at sites where the DOE has completed or plans to complete cleanup (e.g., landfill closures, remedial actions, removal actions, and facility stabilization). The concept includes land-use controls, monitoring, maintenance, and information management (IM). Legacy contamination at the SNL/NM, SNL/CA, and KTF sites was identified and remediated to levels required by the applicable regulatory agencies and DOE Orders. Legacy contamination at TTR is still in the cleanup phase, and has not yet entered the LTS phase. Despite this cleanup effort, residual contamination levels above unrestricted use criteria remain at some sites. The purpose of the proposed SNL LTS sub-program is to continue risk mitigation from the residual hazardous and radioactive contaminants present at Environmental Restoration (ER) Project sites and to meet regulatory/DOE requirements to ensure protection of human health and the environment. This LTS sub-program will track ER sites where operations are ongoing.

The DOE accomplished the first two steps for establishing an integrated LTS sub-program at SNL by preparing a draft LTES Plan and setting up a programmatic budget. The 2001 draft LTES Plan (SNL/NM August 2001) addresses the LTES goals and objectives and was developed in conjunction with the DOE, SNL, various governmental agencies, and the public. The purpose of this LTS Implementation Plan is to describe current and future activities to support the general objectives of the 2001 LTES Plan, as well as the more specific objectives that have been or will be defined by regulatory requirements as part of site closures. The scope of this Implementation Plan is to compare current SNL activities with the 2001 LTES Plan objectives; prioritize, optimize, and improve activities that support the objectives; and, ultimately, measure how successfully those LTS activities meet the goals and objectives for the protection of human health and the environment. As further requirements are identified, additional specific plans will be developed to address the details, as necessary. The LTS Implementation Plan is

one of the supporting documents for the development of the LTS budget request to DOE Headquarters (HQ). Combined with the 2001 LTES Plan, this Implementation Plan provides the basis for LTS for legacy sites at SNL. The National Nuclear Security Administration (NNSA), Sandia Site Office (SSO) is scheduled to take responsibility for SNL LTS for legacy sites at the end of Fiscal Year (FY) 2006. This plan identifies modifications to existing operations that will enable the DOE and SNL to meet the 2001 LTES Plan objectives.

The SNL LTS sub-program for legacy sites will continue to mitigate the risk from residual hazardous contaminants still present at former ER Project sites. Continued mitigation is achieved by ensuring that the residual hazardous and radioactive contaminants do not migrate from the controlled sites. A comprehensive monitoring program will demonstrate and verify that the contaminants have not migrated. For most sites, mitigation of the risk will be accomplished by land-use restrictions and limited access to the sites. This will be the primary function of institutional controls (ICs). An important component of LTS is an effective public outreach program to keep the general public and potentially affected parties informed. An IM and outreach effort will be maintained to manage and disseminate the information about SNL LTS. Administration and management processes will be implemented to effectively coordinate these activities and to ensure that the objectives of LTS are being met at SNL.

Chapter 2.0 describes the SNL/NM facility, history, and the sites that will be included in SNL LTS for legacy sites and summarizes the preceding ER Project activities. The SNL/CA facility description, ER history, and proposed LTS information is presented in Appendix A. Information for the KTF and TTR is included in Appendices B and C, respectively. Chapter 3.0 addresses the regulatory, DOE, and SNL Environmental, Safety, and Health (ES&H) requirements that pertain to LTS at SNL/NM. Chapter 4.0 provides the general scope and assumptions guiding the development of SNL LTS for legacy sites. The current status of all sites located at SNL/NM, SNL/CA, KTF, TTR, and off site is discussed. The transition from the cleanup and characterization phases of work to an LTS phase is presented. These chapters describe the context of SNL LTS for legacy sites.

Chapter 5.0 is divided into sections that describe the work that has been accomplished and work yet planned for LTS for SNL/NM legacy sites. Section 5.1, Management, describes the organizations involved in LTS planning and implementation, schedules, reports, and other items that constitute "deliverables" to various stewards and stakeholders, as well as budget issues. Section 5.2, Information Management, provides an overview of SNL's plans for IM associated with LTES. Section 5.3 explains the SNL monitoring, inspection, and maintenance approach, which is the key to ensuring that sites containing residual contaminants do not pose a threat to human health or the environment. Section 5.4 addresses the need for IC measures at the sites. Section 5.5, LTS Outreach and Public Participation Activities, details the outreach program public participation activities that will be part of SNL LTS for legacy sites.

## **2.0 SNL/NM FACILITY DESCRIPTION AND ENVIRONMENTAL RESTORATION HISTORY**

SNL is a government-owned, contractor-operated facility overseen by the DOE NNSA through the SSO. Sandia Corporation (Sandia), a wholly-owned subsidiary of Lockheed Martin Corporation, operates SNL under contract for the DOE. SNL's four main facilities are located in Albuquerque, New Mexico; Livermore, California; Kauai, Hawaii; and at the TTR, Nevada. SNL/NM information is discussed in the following sections. The SNL/CA facility description and ER history are presented in Appendix A. Appendices B and C describe the KTF and the TTR, respectively.

### **2.1 General Setting of SNL/NM**

SNL/NM is headquartered in Albuquerque, New Mexico, and employs more than 7,600 full-time employees. SNL/NM designs all nonnuclear components for the nation's nuclear weapons, conducts a wide variety of energy research and development projects, and performs research that responds to national security threats, both military and economic.

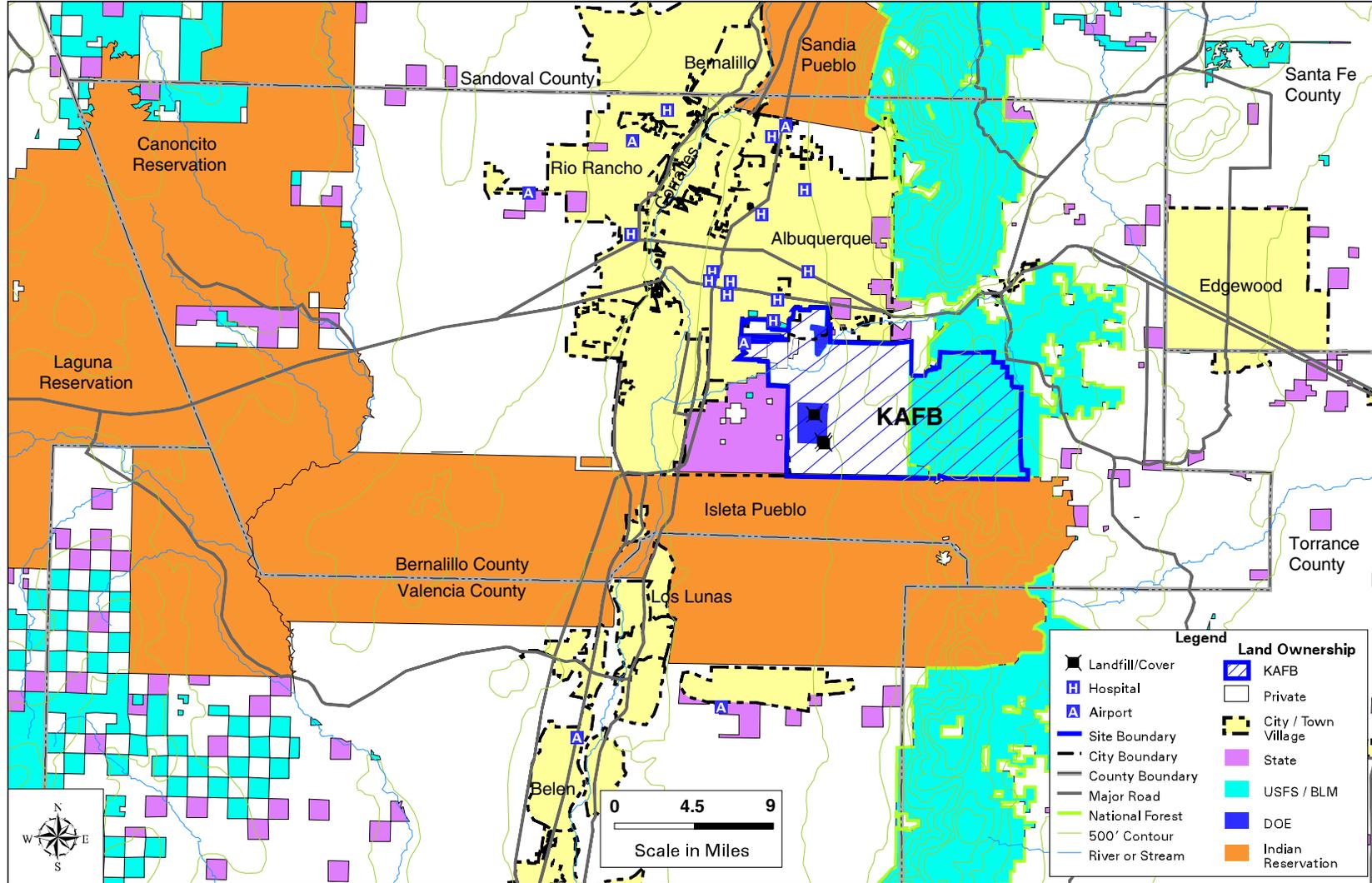
SNL/NM is located on Kirtland Air Force Base (KAFB) in Bernalillo County. KAFB encompasses approximately 52,223 acres southeast of Albuquerque and contains the facilities and infrastructure of the DOE, the U.S. Air Force (USAF), and more than 100 other tenants. KAFB is bounded on the north and northwest by the growing City of Albuquerque, on the east by the Cibola National Forest, on the south by the Pueblo of Isleta, and on the west by land owned by the State of New Mexico and Albuquerque International Sunport. The population of the city is expected to continue to increase, with the result that development is beginning to encroach upon KAFB (Figure 2.1-1). Because SNL/NM facilities are located on KAFB, a number of stakeholders, including the U.S. Department of Agriculture and U.S. Department of Defense, nearby tribes, government agencies, regulators, and citizen groups, are interested in environmental stewardship.

SNL/NM operations are conducted on both DOE-owned property within KAFB assigned for SNL/NM use and non-DOE-owned property permitted from other federal agencies. SNL/NM sites located on DOE-owned property comprise 2,937 acres and include five Technical Areas (TAs). The sites located on non-DOE-owned property include 5,648 acres of land permitted from the USAF, a portion of which are on land withdrawn from the U.S. Forest Service (USFS). Additionally, there are 4,595 acres that DOE withdrew directly from the USFS.

The majority of KAFB land is owned by the USAF. An area of the Manzano Mountains in the eastern portion of KAFB has been withdrawn from the USFS for the exclusive use of the USAF and DOE. SNL/NM ER Project sites are located on land that has varying use permits, as shown in Figure 2.1-2.

KAFB is located on a high, arid mesa about 5 miles east of the Rio Grande. The mesa is cut by the east-west-trending Tijeras Arroyo, which drains into the Rio Grande. The east side of KAFB to the north of Tijeras Arroyo is bounded by the southern end of the Sandia Mountains and to the south of Tijeras Arroyo by the Manzanita Mountains (foothills of the Manzano Mountains). Most of the area is relatively flat, sloping gently westward toward the Rio Grande. However, the

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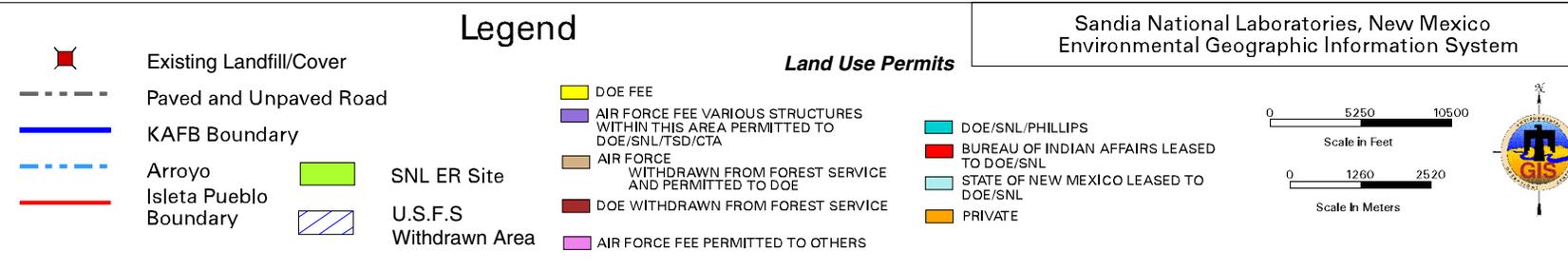
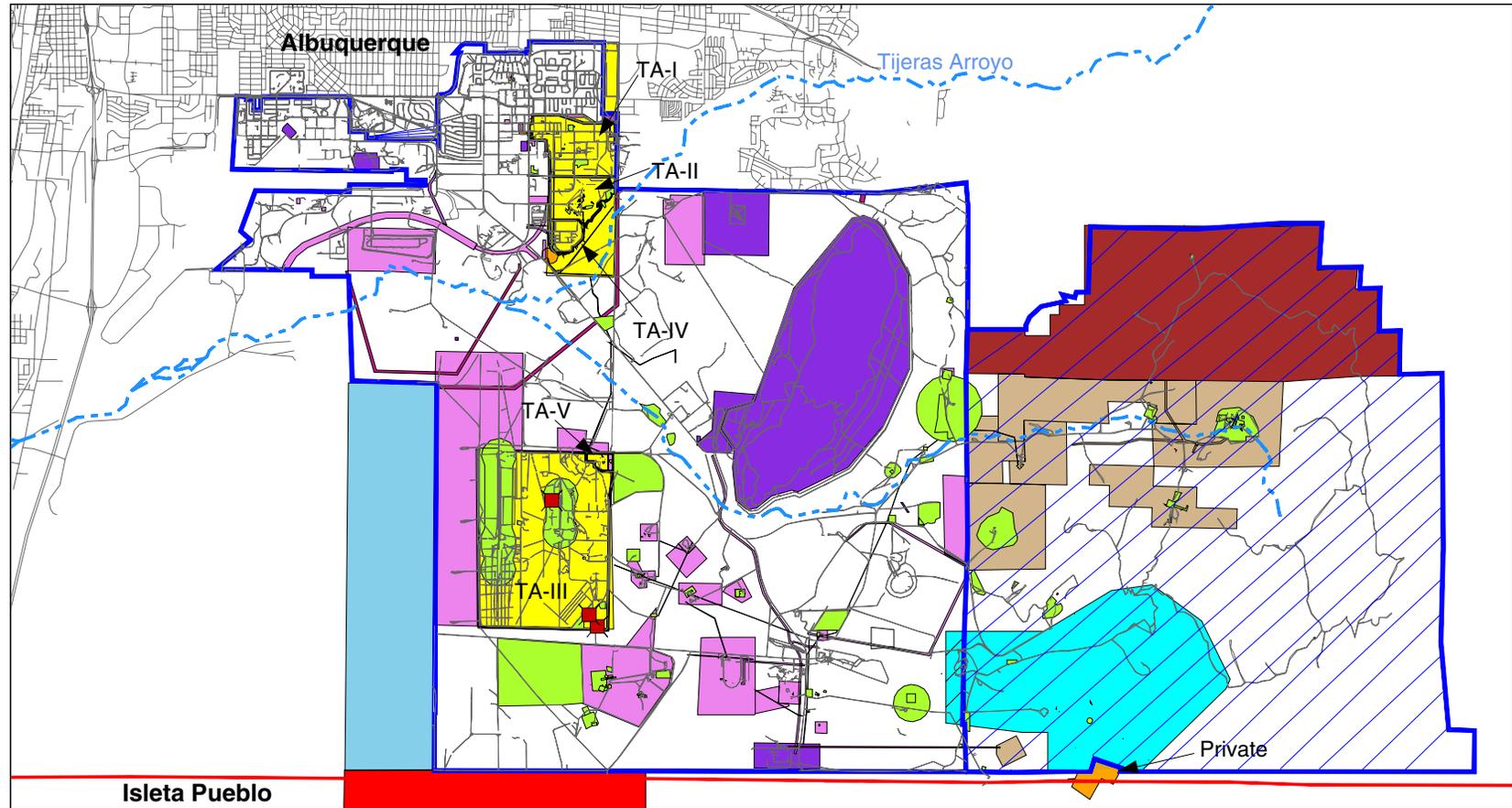
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UTM Zone 13 NAD27 Meters  
Spheroid Clarke 1866

Sandia National Laboratories, New Mexico  
Environmental Geographic Information System  
D. Helfrich October 2, 2003

Figure 2.1a. Regional physical and surface interface - current state

Figure 2.1-1  
Kirtland Air Force Base (KAFB) and Surrounding Lands





**Figure 2.1-2**  
**Land use Permits on Kirtland Air Force Base (KAFB)**  
**as of 10/24/03**



eastern portion of the complex extends into the canyons of the Manzanita Mountains. The western slope of the Manzanita Mountains facing KAFB is precipitous and rough with numerous arroyos. The mean elevation of KAFB is 5,384 feet above mean sea level (amsl), and the maximum elevation of KAFB is 7,988 feet amsl at the Manzano Lookout Tower in the Manzano Mountains.

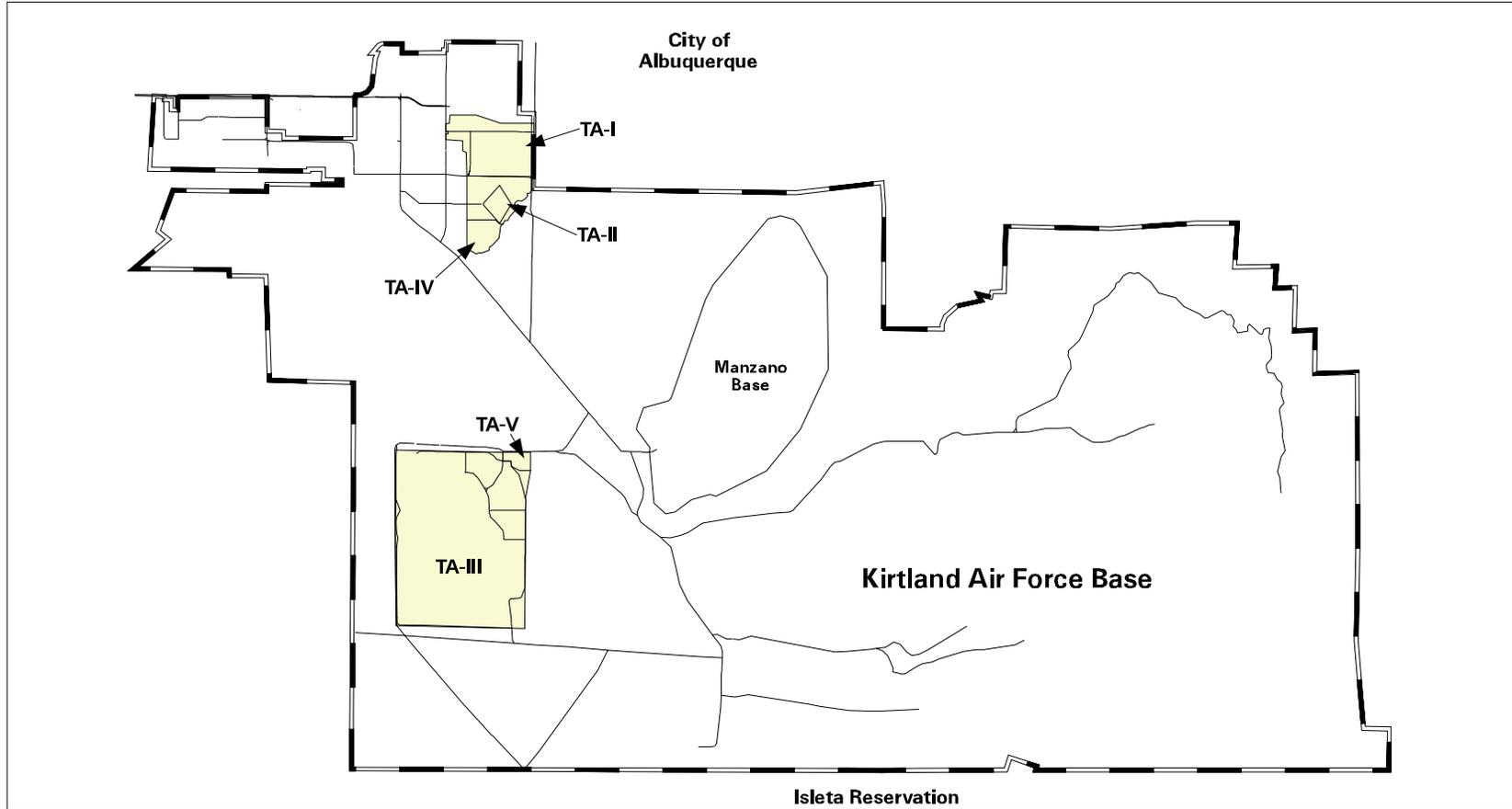
## **2.2 General History and Overview of SNL/NM**

In 1945, during the Manhattan Project, a division of the Los Alamos National Laboratory was established to provide engineering, design, production, assembly, and field testing of the nonnuclear components of nuclear weapons. This division was located near Albuquerque, New Mexico, and later became SNL. SNL became an independent national security laboratory on November 1, 1949, and opened its facilities in Livermore, California, in 1956. Since 1949, SNL has expanded into new areas of research and development as national security requirements changed. This expansion resulted in the development of numerous and varied test sites on KAFB and around the country. The primary ongoing mission of SNL is to ensure that the U.S. nuclear arsenal is safe, secure, and reliable. There continues to be significant federal investment in both infrastructure and programs at KAFB and SNL/NM. The SNL/NM TAs and program areas are briefly described in this section.

SNL/NM consists of five TAs, shown in Figure 2.2-1, and several additional test areas. Each area has its own distinctive operations. The following provides a description of each TA and the associated potential hazards:

- TA-I has an employee population of approximately 5,000, the largest at SNL/NM. This area is dedicated primarily to the design, research, and development of weapon systems, limited production of weapon system components, and energy programs. TA-I consists primarily of laboratories and staff offices. The administrative offices of SNL/NM are located within TA-I. Eighteen ER sites are located in this area.
- TA-II is a 45-acre (1.8-square-kilometer [km<sup>2</sup>]) facility that was established in 1948 for the assembly of chemical high-explosive (HE) main charges for nuclear weapons and later for production-scale assembly of nuclear weapons. These functions no longer exist at SNL/NM. Currently, facilities at TA-II consist of a small radioactive material decontamination and storage facility (Building 906) and a storage facility designed to temporarily hold polychlorinated biphenyl-contaminated material to be transported to a U.S. Environmental Protection Agency (EPA)-licensed disposal facility. An inactive low-level waste disposal site and a classified waste landfill have been remediated. Eighteen ER sites are located in this area.
- TA-III, located 5 miles (8 km) south of TA-I, is composed of approximately 20 extensive test facilities, including sled tracks, centrifuges, and a radiant heat facility, which simulate a variety of extreme environmental conditions. There are 37 ER sites located in this area, including the Chemical Waste Landfill (CWL) and Mixed Waste Landfill (MWL). The Corrective Action Management Unit (CAMU) is also located in TA-III.

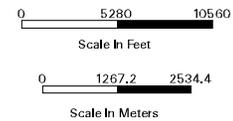
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**Legend**

- Technical Area**
- Kirtland Boundary**
- Major Roads**

Sandia National Laboratories, New Mexico  
Environmental Geographic Information System



**Figure 2.2-1**  
**Location of Kirtland Air Force Base, SNL/NM Technical Areas**



- TA-IV, located 2 miles south of TA-I, consists of several inertial confinement fusion research and pulsed power research facilities. There are no ER sites located in TA-IV.
- TA-V houses several electron beam accelerators, three research reactors in two reactor facilities, an intense gamma irradiation facility, and a hot cell facility. Eight ER sites are located in this area.

SNL/NM has operational test areas outside of the five TAs. These areas are located south and east of TA-III and in the canyons on the west side of the Manzano Mountains. Thunder Range and Coyote Canyon Test Field are two such areas.

### **2.3 History of SNL/NM Environmental Restoration Project**

This section presents a brief summary of ER Project activities. A more comprehensive summary is provided in Appendix D of this plan.

The majority of the ER sites requiring restoration represent a legacy of activities conducted in the past at a variety of test sites. These test sites and their associated infrastructures have been the focus of the environmental characterization and remediation efforts at SNL/NM since the mid-1980s. The sites investigated under this project include various types of firing sites, explosive test sites, burn sites, and other test sites such as rocket sled tracks and aerial cable drop sites. In addition to the test sites, several landfills and numerous dumps, burial sites, disposal pits, and oil spills required investigation and potential remediation. Potentially contaminated infrastructure associated with these sites included numerous storm drains, waste lines, and septic systems. A complete list of ER sites, which contains site characteristics for stewardship, is provided in Appendix D.

In 1987, SNL/NM sites were evaluated by the EPA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Hazard Ranking System (HRS), a risk-based system for prioritizing site cleanups (DOE September 1987). Based upon the HRS ranking, no SNL/NM sites on KAFB qualified for cleanup under the CERCLA National Priority List (NPL). For federal facilities that are not listed on the NPL, CERCLA requires compliance with state laws concerning removal and remedial actions.

In 1990, the DOE began to fund SNL/NM to conduct ER investigations for all locations for which Sandia might be responsible. When the ER Project was formally established in 1992, the work was projected to be completed by 2020; 117 sites at SNL/NM had been identified for attention. As the ER Project began, minor scoping sampling had been conducted at a few sites, and several groundwater monitoring wells had been installed at two landfill locations. The number of sites to be addressed increased to 268 (203 Solid Waste Management Unit [SWMUs] and 65 Areas of Concern [AOCs] that were included on SNL/NM's Resource Conservation and Recovery Act [RCRA] permit) (EPA August 1993). Three SWMUs in active use are not scheduled for immediate cleanup.

RCRA Facility Investigation (RFI) work plans detailing the characterization required at groups of sites were first written and most were approved by the EPA and New Mexico Environment Department (NMED). Sampling was conducted at the sites in accordance with these plans, and subsequent Voluntary Corrective Measures (VCMs) were conducted based upon the results. Plans for these voluntary cleanups were coordinated with the NMED and presented to the public

before fieldwork began. Proposals for risk-based, no further action (NFA) were submitted when either the RFI sampling or VCM confirmatory sampling indicated that the site required no further cleanup.

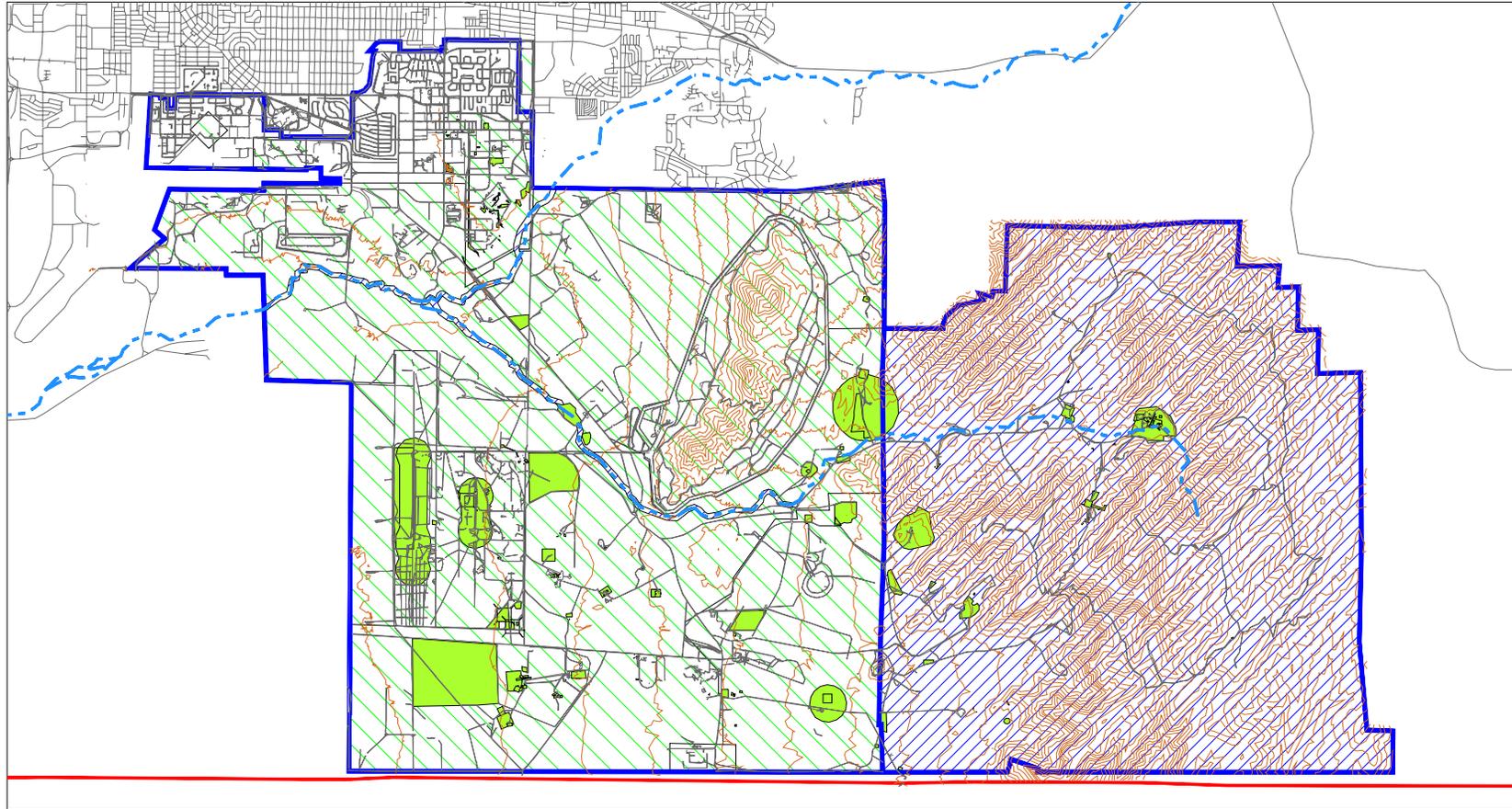
The ER Project constructed the first CAMU in the DOE complex in order to facilitate site remediation operations at the CWL. The ER Project established a CAMU Working Group in 1995, with membership from SNL/NM, the DOE, EPA, NMED, and representatives of numerous stakeholder groups. This group recommended construction of a CAMU. CAMU construction began in December 1997 and the CAMU began accepting waste in January 1999. Post-closure care of the CAMU began on October 7, 2003.

Public outreach began with quarterly public meetings in 1992, which continue to be conducted. The ER Project also extended invitations to individuals and groups to tour the ER sites and to participate in citizens' groups on specific topics. As the ER Project matured, the national setting for public participation in environmental matters moved toward Site-Specific Advisory Boards, to include members from regulatory agencies, local governments, and citizen stakeholders. The implementation of this concept for SNL/NM was the Citizens' Advisory Board (CAB), which was created in the spring of 1995. The CAB, the membership of which varied from 15 to 20 individuals, served as a sounding board for many ER activities between 1995 and the fall of 2000, and provided valuable insight into community values and preferences associated with ER Project activities at SNL/NM. The CAB evolved into the Community Resource Information Office (CRIO) that serves as coordinator and clearinghouse for topic-specific citizens groups so that they can continue to provide input for the ER Project and LTES planning.

By 1997, future land-use designations were developed for all ER sites located on land owned by KAFB (including the land withdrawn from the USFS) by a stakeholders group that included representatives of SNL/NM, the DOE, USAF, USFS, and EPA, as well as local government officials and citizens. This group considered the issues, opportunities, and constraints of all KAFB tenants and formalized their agreement in a Baseline for Future Use Options Handbook (Keystone Environmental & Planning Incorporated 1995), which fully describes the end state and future land use, as well as the use of risk assessment for cleanup end states. The map in Figure 2.3-1 depicts the future land uses for the entire site. The tables in Appendix D list the current regulatory status of all the ER sites and their characteristics for stewardship, including future land-use designations.

The ER Project has addressed the vast majority of the sites, is currently in the process of finalizing regulatory post-closure requirements for many sites, and is planned to be completed by the end of FY06. All sites have been characterized, as have four areas of low-concentration groundwater contamination. Four major landfills and numerous smaller sites have been remediated, and the MWL is awaiting NMED approval of the Corrective Measures Implementation (CMI) Plan and vegetative cover design. Remediation is complete at all AOCs. A listing of key activities for the ER Project is presented in Appendix E.

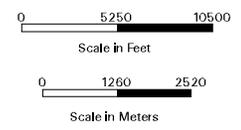
As of March 2006, NFA proposals were submitted to the NMED for 263 of the 264 sites utilizing the NFA process. As of July 2006, the NMED has approved 204 of these, and the other 59 (risk-based) NFA proposals are at various stages in the regulatory review and approval process. In 2003, a Compliance Order on Consent (Consent Order) was negotiated with the NMED to establish a fixed schedule for completion of regulatory activities including definition of groundwater requirements and submittal of regulatory documentation associated with



- |  |                        |  |                              |
|--|------------------------|--|------------------------------|
|  | Landfill/Cover         |  | Recreational Future Land Use |
|  | 100' Contour           |  | Industrial Future Land Use   |
|  | Paved and Unpaved Road |  | Solid Waste Management Unit  |
|  | KAFB Boundary          |  |                              |
|  | Arroyo                 |  |                              |
|  | Isleta Pueblo Boundary |  |                              |

**Legend**

Sandia National Laboratories, New Mexico  
Environmental Geographic Information System



**Figure 2.3-1  
Future Land Use Designations on Kirtland Air Force Base (KAFB)**



completion of the corrective action process for all SWMUs and AOCs managed by the ER Project (NMED April 2004). The CWL closure is regulated under an interim status closure plan; post-closure conditions will be imposed through the SNL/NM RCRA permit. CAMU post-closure conditions will also be contained in the SNL/NM RCRA permit.

The LTES Plan, drafted in 2001 (SNL/NM August 2001) with citizen input, was revised in 2003 to update the status and incorporate citizen recommendations into Chapter 6.0 (SNL/NM October 2003). Chapter 6.0 of the LTES Plan was revised again in September 2006 to address the current status of issues raised by stakeholders and is included as Appendix F. The ER Project has begun to implement the LTES Plan in order to ensure an efficient transition to LTS after the ER Project is completed at the end of FY06.

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### 3.0 REQUIREMENTS FOR LTS AT SNL/NM

#### Summary of ER Project and LTS Key Regulatory Requirements

The ER Project site cleanup activities at SNL/NM and subsequent stewardship activities are subject to several key regulatory requirements including, but not limited to, the following:

- Module IV of Hazardous Waste Permit NM5890110518-1, issued by the EPA (August 1993) with authority delegated to the NMED
- DOE Memorandum, "Long-Term Stewardship Responsibility" (DOE January 2001)
- DOE Order 450.1 "Environmental Protection Program" (approved January 2003; changed January 2005 [DOE January 2003])

LTES responsibilities arise from the environmental statutes and regulations that govern cleanup of contaminated properties. Because SNL/NM is a permitted facility for hazardous waste management, cleanups are regulated under the RCRA. The RCRA cleanup regulations are general in nature and do not specify LTS requirements. Rather, necessary stewardship requirements are identified as site investigations and cleanups are performed under the SNL/NM Consent Order. These requirements are then enforced by defining specific conditions in the SNL/NM RCRA Permit.

The EPA issued Module IV of Permit NM5890110518-1 to the DOE and Sandia in 1993, under the authority of the Hazardous and Solid Waste Amendments (HSWA) to the RCRA. HSWA authority was transferred from the EPA to the NMED in 1996, and SNL/NM corrective actions are now regulated under the New Mexico Hazardous Waste Act. The current permit continues to be in effect until a renewed permit is issued by the NMED. Module IV (the HSWA Module) contained a list of SWMUs to be investigated. Since that time, additional SWMUs have been added to the list, along with AOCs. The scope of the RCRA regulations is limited to hazardous waste and hazardous constituents and does not include radiological waste and constituents.

The HSWA Module contains a structured process defining the steps for investigation (RFI) and remedy selection (Corrective Measures Study [CMS]) for SWMUs and AOCs. The HSWA Module also contains a provision that allowed for performance of voluntary corrective actions at SNL/NM. The DOE and Sandia grouped SWMUs into Operable Units for efficiency in the investigation process. Many SWMUs and AOCs have been successfully investigated/ remediated and have received determinations of NFA from the NMED. These sites were then removed from the Permit through a Class 3 permit modification process, allowing public review and comment on the determinations.

In April 2004, the NMED entered into the Consent Order with the DOE and Sandia, establishing a distinct corrective action process designed to complete all ER Project activities by the end of FY06 (NMED April 2004). The Consent Order process supersedes that of the HSWA Module, but the site lists are maintained in the Module and a permit modification is required to make changes to the site lists. The site lists are categorized as "Corrective Action Complete [CAC] without Controls" and "CAC with Controls." If a site is listed as "CAC with Controls," some restrictions apply to future use of the site. The necessary controls will be defined in the HSWA Module and will be implemented through the SNL LTS sub-program for legacy sites.

Although the structure of the Consent Order corrective action process is essentially the same as the HSWA Module, different terminology is used. For example, a CMS is now a Corrective Measures Evaluation (CME) and an NFA determination is now a CAC (with or without controls) determination. In addition, the Consent Order added new areas to be investigated based upon groundwater contamination and defined a rigorous schedule.

Two SNL/NM sites within the ER Project fall outside the Consent Order. First, the CWL is not a SWMU; it was operated under RCRA interim status. It has been remediated and is undergoing closure. The CAMU is a newly constructed, engineered unit that was designed to treat and contain wastes excavated from the co-located CWL. The CAMU is now closed with wastes in place in the containment cell. The CAMU and CWL will be the subject of post-closure care provisions under the SNL/NM RCRA Permit. Post-closure care provisions (which include long-term maintenance and monitoring) will be implemented in accordance with the permit conditions through the SNL LTS sub-program for legacy sites.

In addition to the Consent Order and permit requirements for completing the ER Project, performing post-closure care, and maintaining controls at the sites, the DOE requires that each facility such as SNL/NM develop an LTS program and plan for implementing LTS activities, which include physical and institutional controls, IM, and other measures to ensure protection of human health and the environment after cleanup activities are completed.

The DOE requirements are described in two memoranda and policies that are applicable to activities at SNL. DOE's Order 450.1 (DOE January 2003; changed January 2005 [DOE January 2003]) requires the DOE and Sandia to "promote the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life cycle."

These DOE requirements are consistent with both the regulatory requirements discussed and the DOE-imposed requirements related to radioactive contamination. Because radioactive contamination at SNL is regulated solely by the DOE, cleanup standards and operating practices have been established in DOE Order 5400.5 (DOE 1993). The DOE requirements for management, monitoring, ICs, and public outreach are discussed in more detail in Chapter 5.0. The SNL LTS sub-program for legacy sites presented in this Implementation Plan meets the requirements of the HSWA Module and DOE policies.

## 4.0 SCOPE OF PROPOSED SNL LTS FOR LEGACY SITES

SNL LTS for legacy sites is a sub-program of the LTES Program. The LTES Program includes, and is responsible for, environmental stewardship of ongoing operations and will track all active test facilities (only some of which are also on the ER site list.) If a test facility closes and characterization and/or cleanup are required, it will be the responsibility of the LTES Program. The “active ER sites” (test facilities included in the original ER scope and on the ER site list) will also continue to be tracked/listed in the LTS database, which is a subset of the LTES Information Management System (IMS). The LTES Program will also have responsibility for “newly discovered legacy sites.”

SNL LTS focuses on the activities necessary for the long-term protection of human health, the environment, and natural and cultural resources from hazards associated with residual radioactive and chemical contamination at former ER Project sites. Sites located on KAFB that are the responsibility of the USAF are not included in SNL LTS for legacy sites.

The process of documenting and dealing with newly discovered sites is presented in the SNL/NM ES&H Manual (SNL/NM August 2005a). This process will be updated to reflect the roles of the SNL LTES Program, which includes LTS for legacy sites.

### 4.1 Programmatic Assumptions

SNL LTS for legacy sites is based upon the following assumptions:

- The U.S. Congress will provide adequate funding to implement the LTS requirements
- Land use and access restrictions will remain unchanged.
- The DOE NNSA/SSO will continue to be the oversight federal agency for SNL as it is for other laboratories and facilities throughout the nuclear weapons complex. However, should the oversight authority change, stewardship responsibilities would continue regardless of an administrative process change.
- Regulatory requirements that apply to SNL LTS will not change significantly.
- The layered and redundant approach to ICs will be effective.
- Remedies will remain protective of human health and the environment.
- Engineered controls will perform within design parameters.
- Wastes generated by the program can be disposed of as planned.
- If KAFB were to close in the distant future, the LTES Program would include planning to achieve a smooth transition of responsibilities for land-use transfers.

- SNL LTS will not be responsible for future remediation of new potential release sites, Decontamination and Decommissioning (D&D), or active SWMUs (when they become inactive).
- The SNL permitting process to control remediated sites will be effective.
- For sites that have low levels of groundwater contamination, there will be no unexpected changes in the level of contamination.
- The MWL will not be excavated.

## 4.2 Sites Included in Program Scope

SNL LTS for legacy sites will entail, at a minimum, IM activities at the SNL/NM, SNL/CA, and KTF facilities, as well as off-site locations. Because remedial action at the TTR has not been completed, no LTS activities for TTR will be included in this Implementation Plan. Appendices A, B, and C present more information on the SNL/CA, KTF, and TTR facilities, respectively.

### 4.2.1 Status of Off-Site Locations

Off-site locations, where various testing activities occurred at sites outside of KAFB, have been evaluated by the SNL Environmental Management (EM) department. Of the 178 off-site locations originally in the ER Project scope, only 7 may require additional research and investigation; another 42 sites were recommended for long-term tracking in case site ownership or conditions should change. All 178 off-site locations will be entered into the IMS (Section 5.2) for recordation and possible tracking.

### 4.2.2 Status of Remaining ER Project Activities at SNL/NM

The ER Project has addressed the majority of its 268 sites (203 SWMUs and 65 AOCs), and is currently in the process of finalizing regulatory post-closure requirements for many sites. The ER Project is planned for completion at the end of FY06, depending upon budget levels and NMED approval, although work will remain after FY06. All sites have been characterized, including four areas with groundwater contamination. Three SWMUs that are in active use are not scheduled for immediate cleanup. Four major landfills and numerous smaller sites have been remediated. As of March 2006, NFA/CAC proposals have been submitted to the NMED for 263 of the 264 inactive sites that are subject to the NFA process. As of July 2006, the NMED has approved 204 of these. The other 59 (risk-based) NFA proposals are at various stages in the regulatory review and approval process. The CWL is regulated under a closure plan that requires alternative closure documentation.

Of the NFA sites, 204 have been removed from the HSWA Permit as of July 2006. The regulatory status of the 264 sites is depicted in the flowchart (Figure D-2) in Appendix D. Table D-1 in Appendix D lists the individual sites that fall into each of the four categories in the flowchart. Because the CWL requires alternative closure documentation, it is not included in the table.

Three categories of environmental hazards remain from past operations at SNL/NM and include: 1) the materials or residual contamination in three engineered units, 2) the low levels of contamination detected in four groundwater areas, and 3) the residual contaminants at the NFA sites that were cleaned up to industrial or recreational risk levels but did not meet the residential risk criteria. Risks to human health or the environment from these hazards are minimal. Details of these sites and other issues are discussed in Section 5.3 (LTS Monitoring, Inspection, and Maintenance).

The three engineered units consist of the CWL, the MWL, and the CAMU. All three units are located in TA-III and are shown in Figure 4.2.2-1. Four groundwater areas found to have groundwater contamination above the EPA maximum contaminant level (MCL) are shown in Figure 4.2.2-1 and include the following:

- The CWL
- Tijeras Arroyo
- TA-V
- Burnsite Area

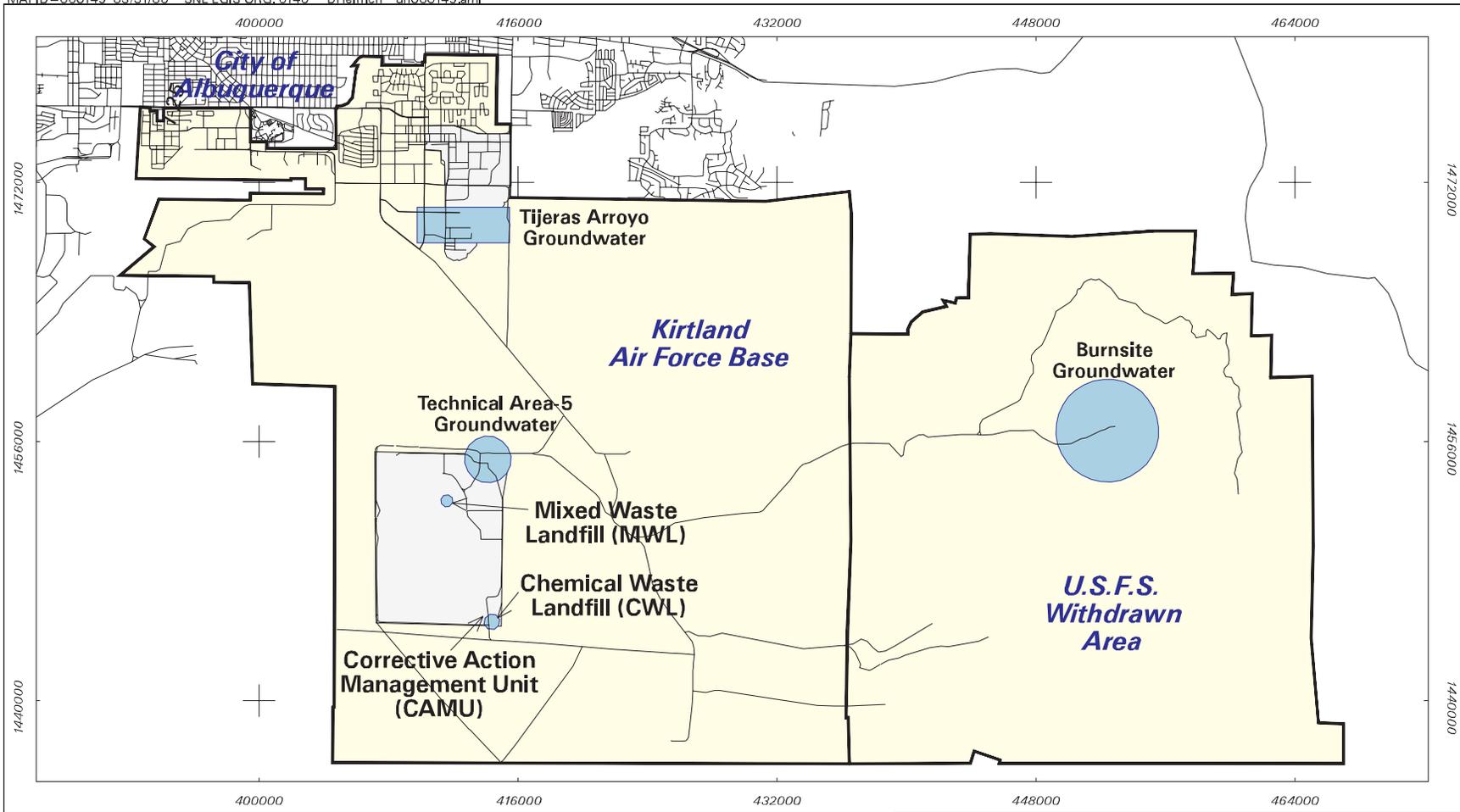
Although the MWL does not have groundwater contamination above the EPA MCL, long-term groundwater monitoring will be conducted. All sites that underwent remediation were cleaned up to comply with either the industrial or recreational risk levels; the sites may have been cleaned up to residential risk level, but have industrial land use as the future land-use designation. The SNL/NM ER Project has 29 NFA sites that are known to not meet the residential risk criteria. Another 36 NFA sites will have risk assessments performed under the new guidance from the NMED. All NFA sites (SWMUs and AOCs) are listed in Appendix D, which provides the status and risk level attained. Detailed risk information is contained in the NFA proposals for each site, which are currently available to the public at the Zimmerman Library of the University of New Mexico Government Information Desk and on the SNL website.

At most of the ER Project sites, radioactive contamination was remediated to acceptable levels, as were other contaminants. These sites were approved by the DOE for unrestricted radiological release, based upon criteria found in DOE Order 5400.5, "Radiation Protection of the Public and the Environment" (DOE 1993). The DOE is the responsible authority for radioactivity at SNL, whereas hazardous contaminants of concern are regulated by the State of New Mexico.

Five ER Project sites have not received unrestricted radiological release status from the DOE. The following lists each site and provides a brief description of its current status:

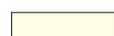
- ER SWMU 87 (Building 9990 Firing Site)—A residual amount of buried depleted uranium is present from former projectile testing at the site. It is not practical to remove the buried material because the depleted uranium presents only minimal risk. In addition, because of the steep terrain, severe environmental damage would result if remediation were attempted. This site will be tracked through LTS ICs and monitored to verify that conditions do not require further action.
- ER SWMU 76 (MWL)—This landfill, which contains radioactive and mixed waste, will be capped with a vegetative cover and protected with a combination of physical barriers and ICs from future disturbance. It also will be tracked through LTS ICs and monitored to verify that conditions do not require further action. The monitoring requirements will be specifically listed in the long-term monitoring and maintenance plan, which will be prepared after the cover is installed.
- ER SWMU 83 (Long Sled Track)—This is an active test site that must be logged and tracked under both LTES and LTS ICs.

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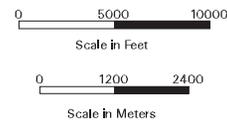
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### Legend

-  Groundwater Area of Concern
-  Kirtland Air Force Base / U.S.F.S. Withdrawn Area
-  SNL Technical Area
-  Road

Sandia National Laboratories, New Mexico  
Environmental Geographic Information System

**Figure 4.2.2-1**  
**Long Term Stewardship**  
**Areas of Concern**





- ER SWMU 84 (Gun Facilities)—This is an active test site that must be logged and tracked under both LTES and LTS ICs.
- ER SWMU 240 (Short Sled Track)—This is an active test site that must be logged and tracked under both LTES and LTS ICs.

### 4.3 Transition to the SNL/NM ES&H and Emergency Management Center

During the early planning stages for LTS for legacy sites at SNL, it was determined that at the conclusion of the ER Project, LTS responsibilities would transfer to the SNL/NM ES&H and Emergency Management Center. This Center operates 20 ES&H Programs that help ensure safety, health, and environmental protection during ongoing operations. The LTES Program also resides under this Center. The Center assists in the application of the ES&H regulations that pertain to daily work at SNL.

The logic for placing the LTS sub-program under the oversight of the Emergency Management Center is to facilitate operational efficiencies. The following chapters of this LTS Implementation Plan describe some of the planning and other activities directly related to the transition of the LTS sub-program to the SNL/NM ES&H and Emergency Management Center.

This Center also contains two departments, the Environmental Planning Department and the Environmental Compliance and Assurance Department, which already have various environmental monitoring and surveillance programs in place. They are responsible for maintaining the environmental protection program for SNL/NM, which includes compliance, permitting, monitoring, and reporting in accordance with applicable laws, regulations, and DOE Orders.

The primary environmental goals of the ES&H and Emergency Management Center are as follows:

- Provide management and maintenance of the EMS.
- Ensure that SNL complies with the requirements of DOE Order 450.1, “Environmental Protection Program” (DOE January 2003), and all applicable federal, state, and local environmental regulations.
- Provide guidance to SNL/NM line organizations regarding the regulatory and DOE requirements pertaining to the environmental impacts of their respective operations, as well as *ad hoc* technical support to maximize cost-effective operational processes that exceed baseline compliance regimes.
- Work with the line organizations to eliminate, reduce, or control environmental risks and impacts and ensure compliance.

The Environmental Planning Department and the Environmental Compliance and Assurance Department strive to exceed mere compliance and are engineering all program areas to support SNL/NM’s “Best-in-Class” goal. Therefore, the Environmental Planning Department and the Environmental Compliance and Assurance Department employ Best-in-Class management strategies that foster continual improvement in SNL line operations and integrate systematic and iterative reductions in potential risks and environmental impacts from SNL/NM operations. This requires close work with the SNL line organizations. These goals are achieved by following the processes and objectives inherent to EMS/ISMS principles.

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## **5.0 CURRENT STATUS AND DESCRIPTION OF SNL/NM LTS ACTIVITIES PLANNED FOR FY07 AND BEYOND**

### **5.1 Management**

#### **5.1.1 Introduction**

This section describes the management tools and controls that will be used to ensure that the SNL LTS sub-program for legacy sites is executed in accordance with all requirements. It addresses the regulatory and DOE requirements that govern the goals the program must accomplish. The roles and responsibilities of the DOE, Sandia, the regulators, the affected or interested Native American pueblos, and other stakeholders are summarized. This section also describes the internal communications process between the various groups responsible for LTS at SNL/NM. In addition, this section briefly discusses performance assessment for the program and a process for program changes and documentation. The project controls system is described, which includes scope, schedule, and cost, and the deliverables and reports that are to be generated as a result of LTS are also addressed.

#### **5.1.2 Requirements**

The general requirements for SNL LTS are discussed in Chapters 1.0 through 4.0. Chapter 3.0 covers such requirements as HSWA Permit Module IV (EPA August 1993), DOE Order 450.1 (DOE January 2003), and DOE Order 5400.5 (DOE 1993). This section, however, deals with the requirements that apply to the SNL LTS sub-program management in the performance of day-to-day activities. These requirements include those for the administration of personnel, financial controls, and contracts, as well as for ES&H.

Financial control is an important function for management of SNL LTS for legacy sites. Costs must be planned so that the required funds will be available at the appropriate time. Costs must also be controlled. This planning and control are accomplished using a Project Control system. SNL LTS for legacy sites has a budget of \$2 to \$3 million/year, and will use a Project Control system for planning, tracking, or reporting, as required. These requirements are captured in documents such as DOE M 413.3-1 ("Project Management for the Acquisition of Capital Assets") (DOE March 2003) and various SNL financial documents, for which a budget coordinator will be responsible.

The SNL/NM ES&H Manual (SNL/NM August 2005a) lists all ES&H requirements for all operations at SNL. The EMS and DOE Order 450.1 (DOE January 2003) also provide guidance for the requirements that SNL LTS management must follow in the ES&H area. These areas of guidance are particularly important for a program that deals actively with environmental and safety issues. Related to ES&H is the EMS which is to be incorporated into the existing ISMS. The ISMS/EMS is a continuing cycle of planning, implementing, and evaluating to achieve environmental goals.

In accordance with the CERCLA Five-Year Review or other review requirements, the SNL LTS sub-program for legacy sites will be reevaluated every five years. This will include examining

assumptions for remediation technologies currently in use (for example, how well is monitored natural attenuation [MNA] working?) and reassessing the effectiveness of the MWL vegetative cover in accordance with the MWL CMS report requirements (SNL/NM May 2003a) (is it providing the degree of protection required?). This five-year reevaluation is an excellent opportunity to examine trends and to ensure that the needs of the regulators and the stakeholders are being addressed. Where issues are identified, adjustments can be made to ensure that the LTS sub-program for legacy sites remains viable and successful over the long term.

Figure 5.1.2-1 shows a hierarchy of projects to be included in SNL LTS for legacy sites. These categories include the engineered units such as the CWL, MWL, and CAMU, the groundwater units, and the NFA/CAC sites with and without controls. The figure represents an increase in the level of activities for the different types of sites, as engineered units will require more stewardship activities and responsibilities. The LTES Program will continue to track all active facilities (active ER Project sites are a sub-category of this group) through the EMS process, such as annual environmental risk analysis for active sites by site owners, until such time that these sites may require cleanup or other remedial actions.

### 5.1.3 Roles and Responsibilities

#### 5.1.3.1 *U.S. Department of Energy National Nuclear Security Administration*

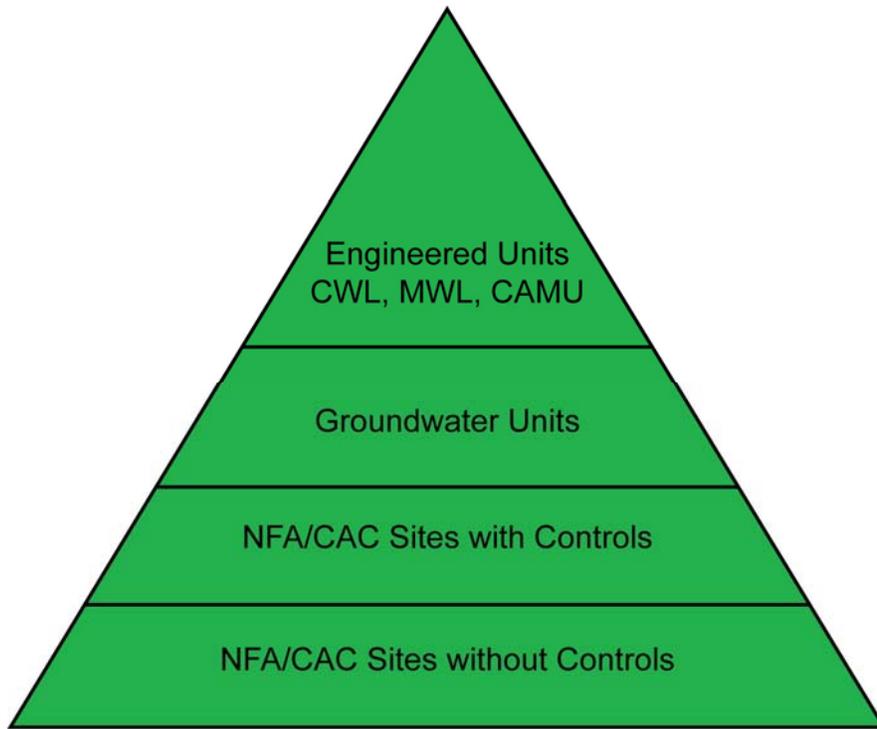
If the DOE NNSA ultimately takes responsibility for SNL LTS for legacy sites, then it must ensure that LTS activities are adequately funded. DOE HQ is responsible for the identification of national policies related to LTES and will coordinate with the appropriate field organizations, congressional representatives, and national stakeholder groups to develop policy directions and guidance. DOE HQ also provides leadership for the program, bringing focus and impetus to the collective development of the overall budget required for successful LTS for legacy sites.

#### 5.1.3.2 *DOE NNSA/Sandia Site Office*

The DOE NNSA/SSO provides oversight and guidance to SNL in performance of stewardship activities based upon policies and guidance established by DOE HQ. The SSO formally oversees the LTES and LTS activities at SNL to ensure, through surveillances, reviews, assessments, and other types of evaluations, that the work is done appropriately and safely. SSO personnel interact with local stakeholders, regulators, local municipal governments and the local Native American tribes. The DOE is also responsible for management of the land that it owns and land under permits from the USAF.

#### 5.1.3.3 *Sandia National Laboratories/New Mexico*

Sandia is responsible for planning, managing, and conducting LTES and LTS activities at SNL/NM. Sandia and its contractors will perform these tasks efficiently and in full compliance with all applicable DOE and regulatory requirements. Sandia prepares work plans detailing the specific tasks necessary to follow the direction the DOE NNSA/SSO has provided. It is the responsibility of Sandia to provide the SSO with budget estimates and staffing requirements for



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Figure 5.1.2-1  
Types of Long-Term Stewardship Projects



LTS work. The SSO will then use the estimates to develop an overall budget request for the SNL LTS sub-program for legacy sites to be submitted to DOE HQ. Sandia must provide resources consistent with available funding to perform LTS activities as directed by the DOE NNSA/SSO.

#### *5.1.3.4 Regulators*

The primary regulator for SNL/NM LTS is the NMED. The regulator is responsible for ensuring the safety and health of the New Mexico public and environment. The NMED works directly with the DOE and Sandia to develop the scope and schedules for cleanup and performance monitoring. The State of New Mexico has primacy for regulating cleanup of hazardous, nonradioactive contaminants under the RCRA. The NMED negotiates cleanup agreements with the DOE and Sandia, reviews the cleanup activities while underway and when completed, and requires that the DOE provide various types of data and information to validate that the cleanup remedies protect human health and the environment. The NMED is also responsible for ensuring that long-term monitoring and other applicable SNL LTS activities are conducted in accordance with applicable regulations. Additional regulators associated with LTES include the EPA for the National Pollutant Discharge Elimination System, the City of Albuquerque for air emissions and waste water, and the DOE for radioactive constituents.

#### *5.1.3.5 U.S. Air Force (Kirtland Air Force Base)*

KAFB contains land owned by both the USAF and DOE. KAFB land, owned by the USAF, includes various SNL/NM facilities and programs that operate within land-use areas permitted from the USAF. Generally, DOE and Sandia activities are permitted by the USAF for DOE and SNL/NM uses. It is the responsibility of the DOE and SNL/NM to secure the appropriate approvals for required uses of USAF land. Additionally, KAFB, the DOE, and Sandia share various types of information, including groundwater data.

#### *5.1.3.6 U.S. Forest Service*

A portion of the land used by SNL/NM is located in areas withdrawn from the USFS to the USAF and subsequently permitted to the DOE for SNL/NM use. In addition, approximately 5,000 acres are withdrawn from the USFS directly to the DOE. The USFS has memoranda of understanding (MOUs) with both the DOE and the USAF defining shared responsibilities for land in the withdrawn areas. These MOUs allow for joint administration of the land within the withdrawn area, including shared responsibilities such as fire protection. It is the responsibility of the USFS to assist the USAF and DOE in ensuring the appropriate administration of the withdrawn area.

#### *5.1.3.7 Local Pueblos*

Several nearby Native American pueblos have interests in SNL/NM. Examples include the Pueblo of Isleta, which borders KAFB to the south, and the Pueblo of Sandia, which borders northeastern Albuquerque.

#### 5.1.3.8 *Local Municipal Governments*

The local government officials in the surrounding communities are responsible, in representing their constituents, to be informed about the progress of SNL/NM LTS for legacy sites. The DOE is responsible for informing local governments about SNL/NM land-use planning and regional economic impacts. Local governments can assist the DOE in managing the regional impact of LTS at SNL/NM by taking advantage of information opportunities, providing feedback to the DOE regarding the management and effects of LTS on their local communities, and regularly participating in planning when appropriate.

#### 5.1.3.9 *Other Stakeholders*

The neighboring communities, environmental advocacy organizations, and the general public have similar roles in that they act as overseers of the DOE's work. In addition, the NMED Oversight Bureau has oversight responsibilities for SNL LTS for legacy sites. By staying informed of the DOE's LTS activities and management of the program, these stakeholders can assist the DOE in addressing their concerns and helping to ensure the success of the program.

#### 5.1.4 *Internal Processes and Communications*

Figure 5.1.4-1, Internal Processes and Communication, is a representation of the various interactions associated with LTES functional areas within the SNL/NM departments responsible for implementing LTS. Each area is discussed briefly in the following sections.

##### 5.1.4.1 *Environmental Planning Department and Environmental Compliance and Assurance Department*

The mission of the Environmental Planning Department and the Environmental Compliance and Assurance Department is to support SNL/NM line organizations in complying with applicable environmental laws and regulations. The Environmental Compliance and Assurance Department collects a variety of environmental data to assess the impact of SNL/NM operations on the environment. Management staff of the two departments is responsible for the appropriate internal communication with all the relevant SNL organizations.

#### Institutional Management (ES&H)

The Sandia corporate ES&H policy is "to protect and preserve the environment, and to ensure the safety and health of its employees, contractors, visitors, and the public, while maintaining the corporate vision and mission."

Sandia's ES&H Program cuts across all organizational and project lines. This program applies to all facilities, operations, and activities, and to all SNL employees, including contractors at Sandia-controlled premises. It is incumbent upon the Environmental Planning Department and the Environmental Compliance and Assurance Department to ensure effective communication and to provide clear guidelines and processes to facilitate the compliance with ES&H policies and requirements for all operations.

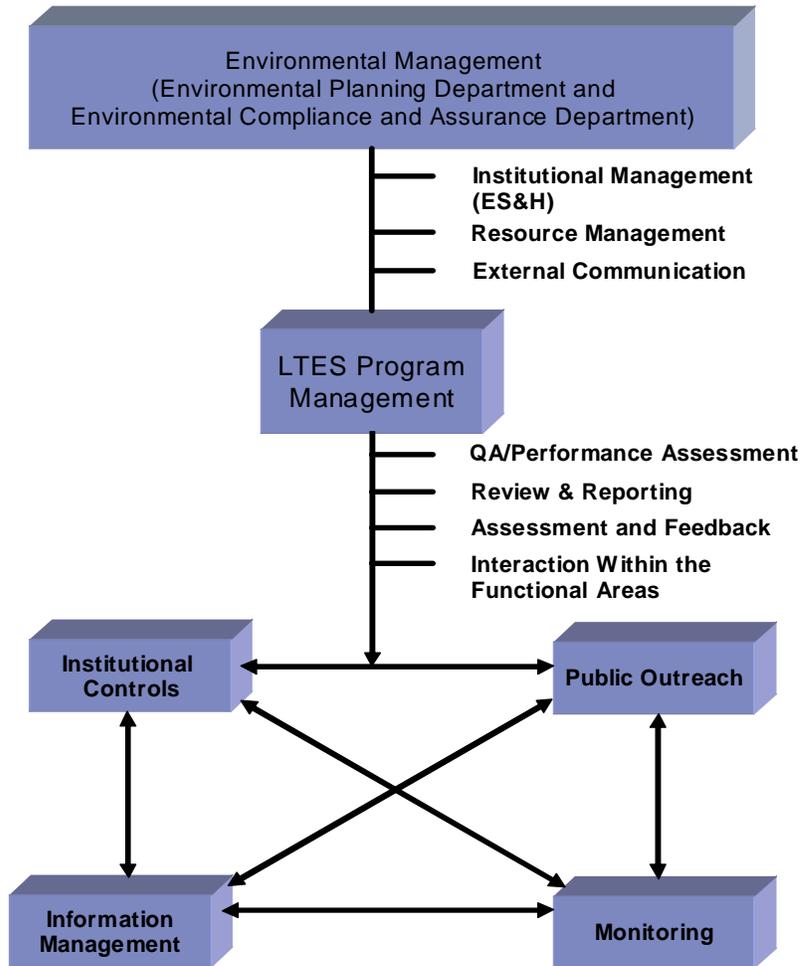


Figure 5.1.4-1  
Internal Processes and Communication



## Resource Management

The Environmental Planning Department and the Environmental Compliance and Assurance Department are responsible for ensuring appropriate management of personnel resources, as well as natural and cultural resources. An effective resource management program requires internal communication among various functional areas.

## External Communication

Communication with external groups such as various Sandia corporate entities, as well as the DOE NNSA/SSO, is an aspect of the SNL LTS sub-program in conjunction with the DOE. External communication with regulators, local municipalities, and the public will generally be the direct responsibility of the DOE NNSA/SSO. However, under certain circumstances, such as discussing technical issues, Sandia directly communicates with the regulators, the public, and various stakeholders.

### *5.1.4.2 SNL LTS for Legacy Sites*

SNL LTS for legacy sites will be composed of several functional areas. The five key functional areas described in this section consist of Program Management, ICs, Public Outreach, IM, and Monitoring, Inspection, and Maintenance. These functional areas are part of, and integrated with, the programmatic goals of the LTES and requirements of the EMS. It is the responsibility of the program managers to ensure that effective communication and coordination are maintained among the various LTS functional areas, and also with the overall LTES Program and EMS.

#### *5.1.4.2.1 Program Management*

An aspect of SNL LTS for legacy sites comprises various tasks for both fiscal and physical projects. It is the responsibility of the LTS sub-program for legacy sites management personnel to effectively communicate and oversee the following project elements of the program.

## Performance Assessment

Two types of metrics for assessing performance will apply to SNL LTS for legacy sites: regulatory compliance and DOE performance measures. Regulatory compliance is the key indicator of adequate performance, as measured by the conduct of required monitoring and reporting to the NMED and/or EPA. Performance measures negotiated with the DOE and based upon requirements in the applicable DOE policy, orders, and guidance comprise the other metric for LTS. LTS will follow corporate quality assurance (QA) protocols for the EMS.

## Review and External Reporting

LTS will perform review and reporting to external entities, which include Sandia corporate entities, such as management review at the ES&H and Emergency Management Center, as well

as the DOE NNSA/SSO, NMED, and the public (see Section 5.5). The reporting and management reviews will document the effectiveness of SNL LTS for legacy sites.

### Assessment and Feedback

Assessment and feedback are important for refining internal communication procedures regarding the effectiveness of LTS for legacy sites. Internal reports and assessments will be used to gauge the performance of both LTS in general and the specific functional areas of the sub-program. A variety of processes will be used to accomplish this including lessons learned, information sharing, various types of feedback evaluations, assessments, and possible corrective action. Sandia routinely conducts self-assessments to ensure that required documentation is generated and compliance with applicable laws is achieved. External assessments (e.g., SSO programmatic assessments) may also be performed.

#### *5.1.4.2.2 Institutional Controls*

The IC function is required to coordinate not only with all the other functional areas of SNL LTS for legacy sites, but also with the overall programmatic IC goals and requirements developed and implemented for all appropriate SNL activities and operations. The LTS IC function will track changes in regulations, land use, IC reporting, and various issues or concerns that need to be communicated to management and coordinated with LTS and recommend responses. Interaction with Public Outreach is necessary to inform the public and other interested parties about the ICs in place at SNL and to communicate changes in the status of ICs. Communication and coordination with the LTS monitoring function is necessary to ensure that required ICs defined by the regulator are appropriately carried out and any enforcement issues are identified. Internal communication with the IM function is critical to ensure that the appropriate data are tracked both at the LTS level and as part of the overall use of ICs at SNL under the LTES and EMS requirements. Finally, communication with the program management function is vital so that management staff can perform independent reviews of IC activities to help ensure ICs are implemented, monitored, and enforced effectively.

#### *5.1.4.2.3 Public Outreach*

The Public Outreach function provides an effective mechanism to obtain feedback from the public and other interested parties and communicate it to the other LTS functional areas that support the program. The outreach function communicates the effectiveness of the external program to all stakeholders and assists in making necessary modifications to the other functional areas for possible program improvement or changes. The outreach function will be responsible for keeping the other functional areas informed of community and workforce issues and concerns. For example, the outreach function could provide information to the public on the types and status of ICs, including the layering strategy identified for particular sites, which is discussed in more detail in Section 5.4.

#### *5.1.4.2.4 Information Management*

IM is a support function for the entire SNL LTES Program, responsible for effectively communicating the complex system interactions. IM relies upon the SNL LTES IMS, which is a

functional database that enables the input of new data, stores existing data, handles record retention and retrieval, and generates tables, reports, and maps (Section 5.2). The IM function ensures that necessary modifications are implemented when necessary. The IM function is required to communicate with the other LTS functional areas as to the effectiveness of the IMS and recommend changes necessary to the system, particularly relating to internal and external records management and retention.

#### 5.1.4.2.5 *Monitoring, Inspection, and Maintenance*

The monitoring function is a key aspect of regulatory compliance, responsible for conducting required monitoring and communicating the results of the various monitoring, inspection, and maintenance activities for SNL LTS for legacy sites to the other LTS functional areas. Effective internal communication by the monitoring function is critical in ensuring a robust LTS sub-program for legacy sites. As such, it is important to keep the other functional areas informed as to the effectiveness of the various monitoring activities, including data collection and reporting results, which then need to be effectively communicated to the program management function and various external entities.

#### 5.1.5 *Scope, Schedule, and Costs*

SNL LTS scope, schedule, and costs have been developed using a “bottoms-up” approach. Each task is defined in scope and identifies the resources that are required to implement it. The length of time required to complete the task is then estimated, based upon the designated resources and/or requirements. This process is documented in a Task Scope Documentation (TSD) form.

The TSD, referenced in the NNSA Service Center Environmental Protection Department Project Control Handbook, Section 2.5, is the basis for defining scope, schedule, and cost. A typical LTS TSD, represented in Appendix G, provides sections for the following information:

- Task summary and justification, required deliverables, and the start and end dates of the task
- The cost content and the estimate method used
- A general task description with a breakdown of the overall scope

The TSD then addresses the overall scope in more detail, with a section for each of the various subtasks. Additionally, the TSD lists all the assumptions that were made, as well as risks to the project.

Once all TSDs are completed, essential pieces of information are then extracted and entered into a project management software program, such as the Primavera Project Planner. This program organizes the data and links it according to the characteristics of each task. The outcome of this process is a variety of reports displaying information relating to scope, schedule, and cost.

Additionally, Appendix G presents an example of a Gantt-style schedule for monitoring activities, as referenced in Section 2.5 of the Project Control Handbook, which shows the following:

- Description of each activity
- Duration (in working days) and the corresponding expected start and finish dates
- Budgeted cost of each activity and how each activity is scheduled in relationship to each other

Another level might provide the details beneath the basic levels (e.g., subtasks of monitoring), also included in Appendix G, and the estimated costs per year. This is beneficial for determining cost plans by FY, at any level of detail, particularly if funding fluctuations occur by year.

The following is the current budget (as of March 2006) for SNL LTS for legacy sites for FY07 to FY11:

- FY07—\$2,958,000
- FY08—\$2,997,000
- FY09—\$2,917,000
- FY10—\$3,189,000
- FY11—\$2,897,000

Funding will be provided as required beyond FY11, but is anticipated to be approximately \$3 to \$5 million.

### 5.1.6 Deliverables and Reports

Reports and deliverables for SNL LTS for legacy sites will be scaled to a size that preserves LTS resources for project tasks and fieldwork, but will meet necessary regulatory, DOE, and public outreach requirements. LTS data will be summarized in the Annual Site Environmental Report (ASER). The ASER is a DOE document that summarizes all environmental monitoring and surveillance activities at SNL/NM.

A second type of report to be produced by the LTS sub-program for legacy sites will be technical in nature and submitted to the regulators. Because the DOE and Sandia are still conducting discussions with the regulators regarding reporting requirements and the frequency of these requirements, it is uncertain whether one report or multiple reports will be required. Nevertheless, the report or reports will contain data and results for such projects as monitoring of the CWL, CAMU, MWL, groundwater sites, and NFA/CAC sites with controls. It will include data obtained at all intervals (such as quarterly or annual samples) and any other information required by the regulators.

Other information, such as project control or financial information, will be generated as needed and not on a recurring basis. Additionally, a five-year review will be conducted, possibly starting in 2012. This review will examine the status, performance, and issues of the various functional areas within the SNL LTS sub-program for legacy sites. Potential modifications to the LTS sub-program for legacy sites will be considered during this review.

## 5.2 Information Management

### 5.2.1 Introduction and Purpose

The purpose of this section is to describe the SNL LTES IMS together with processes that meet the IM needs for LTES. The SNL LTS sub-program relies on the LTES IMS for all aspects of IM. Hence, there is not a separate LTS IMS. The purpose of the LTES IMS is to provide a functional system that enables the input of new data, stores existing data, handles records retention and retrieval, generates tables and reports, and creates maps. An explanation of how the IMS will be built upon existing ER, Sandia corporate, and DOE information systems to meet long-term needs is provided in this section. The LTES IM processes encompass both historical (archival) information and current (or newly generated) information; this includes electronic and hard copy document management. IM requirements are determined by the work being performed by the other LTES functional areas. Examples of data include the following: field data measurements, sample chain-of-custody tracking, analytical and spatial data, site inspection information, and quality control (QC) practices. The roles and responsibilities for implementation and maintenance of the IMS and the overall IM processes will be identified along with the other LTES functional interfaces. Additionally, all work to date, as well as the IM scope for FY07 and beyond, will be discussed.

### 5.2.2 Requirements

SNL LTES information will be maintained and managed in order to meet the applicable statutes, regulations, executive orders, and federal requirements (e.g., National Archives and Records Administration [NARA] regulations) for LTES. Included are DOE policies, orders, and guidelines. Appendix H provides a comprehensive list of DOE IM guidance. The following lists some of the documents that are specific to information and records management:

- DOE Order 200.1, "Information Management Program" (DOE September 1996)
- DOE Order 241.1A, "Scientific and Technical Information Management" (DOE April 2001)
- DOE Order HQ1324.1A, "Records Management" (DOE June 1987)
- "DOE Records Schedule for Environmental Records" (DOE March 1999)

These documents provide guidelines and DOE requirements that improve the quality, reliability, and usability of the information. These requirements establish responsibilities that ensure that information is identified, processed, disseminated, and preserved in a safe and accessible manner. The records retention schedule is used for the disposition of DOE records created to comply with, or needed to support, compliance with federal environmental laws and implementing regulations.

### 5.2.3 Roles and Responsibilities

The primary role of the SNL LTES IM function is to implement and maintain the IMS and IM processes required to support LTES activities for SNL/NM. SNL/CA has similar systems and processes in place to support California activities. The applicable LTS data and information from SNL/CA will be accessible through the SNL IMS. Effective communication and strong interfacing with LTES monitoring, ICs, and public outreach is the responsibility of the LTES IM function in order to establish effective tracking, archiving, and reporting for LTES management. It is the responsibility of the IM function to provide support for the external web and community outreach.

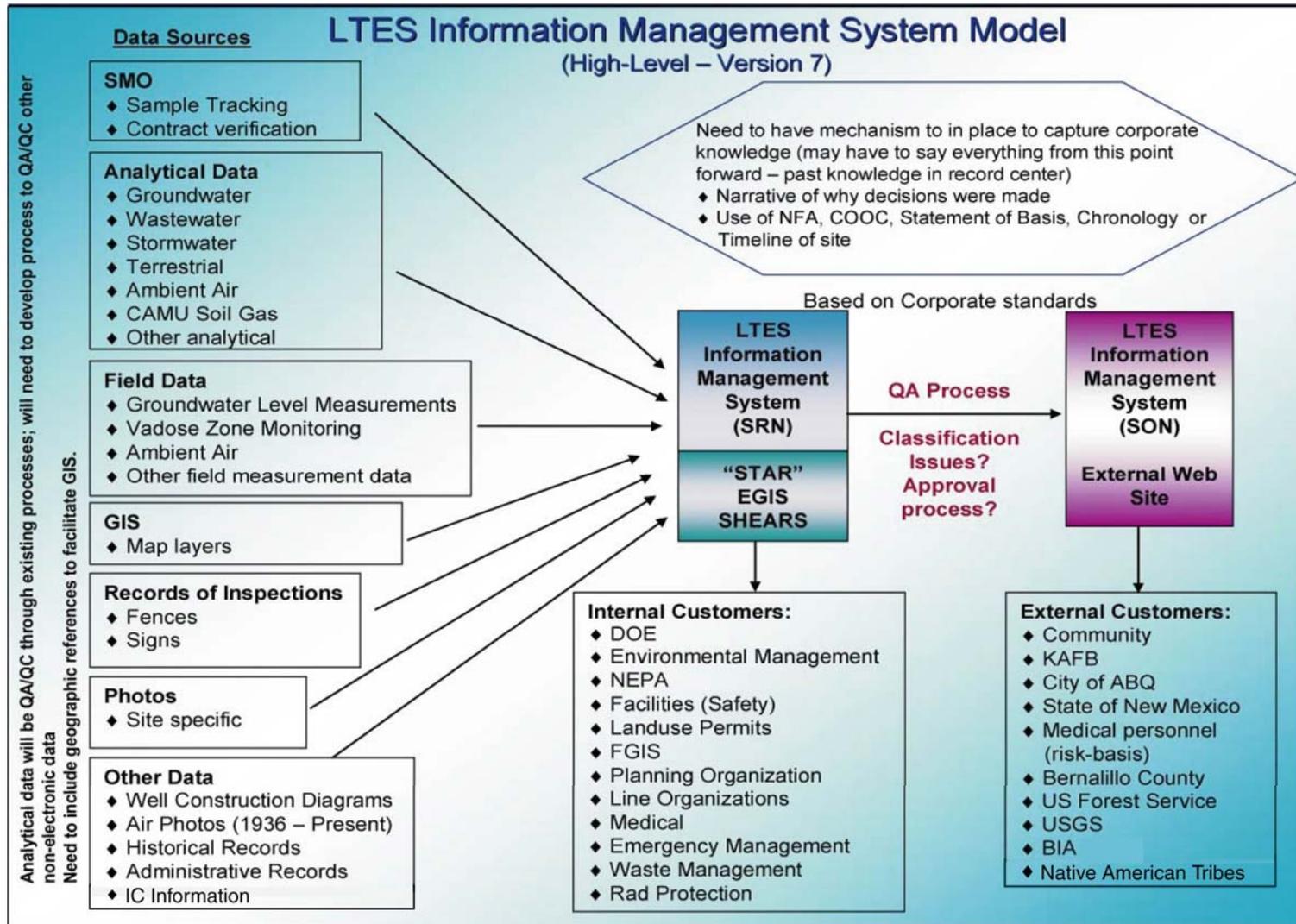
### 5.2.4 Planning and Development

The SNL LTES IMS team was created to ensure that all requirements for a functional IMS were included in the proposed system. This effort consisted of interacting with the other functional areas established for LTES as well as gathering input from the LTES IMS team. During the development of the IM approach, the LTES IMS team addressed five major tasks: 1) developing the LTES IMS model, 2) performing a gap analysis of existing ER and EM information systems and processes as compared to the LTES IMS model, 3) developing a process for identifying necessary tasks to be performed in preparation for moving existing databases into the LTES IMS, 4) planning and interfacing with Bernalillo County, and 5) interfacing with the Records Center (RC) and evaluating current and future LTES records management support.

First, a high-level conceptual IMS model was developed that established the necessary data to be included, as well as key customers and processes for making the data available to all stakeholders. Second, a gap analysis was performed to identify tasks that needed to be performed working with existing ER Project, EM, and Sample Management Office (SMO) systems in order to integrate the systems into the LTES IMS and potentially migrate the system to Sandia Corporate Systems management. This gap analysis was then presented to SNL/NM management to determine a path forward. Third, a sub-team was formed to determine a process for transferring data into the LTES IMS. A data documentation identification scheme was developed to allow individuals accessing the information to know the level of documentation associated with each data set for analysis and future usability purposes. Fourth, a sub-team was formed to work with the Bernalillo County Geographic Information System (GIS) Manager to evaluate the feasibility of making some LTES information available through the Bernalillo County website. Finally, the team evaluated the current support level for records management and identified resources needed to support SNL LTS for legacy sites.

#### 5.2.4.1 SNL LTES IMS Model

The SNL LTES IMS Model (Figure 5.2.4-1) is a high-level, conceptual model that was developed to capture which data sources are to be included under LTES, who the customers (both internal and external) are that need to be supported, as well as what type of architecture needs to be utilized.



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Figure 5.2.4-1  
Long-Term Environmental Stewardship Information Management System Model



The architecture of the system is two-fold: internal customers would access the data through the Sandia Restricted Network (SRN), while external customers would access the information through the Sandia Open Network (SON). The application to utilize the LTES IMS on the SRN should conform to Sandia computing standards. Currently, the applications under consideration use Oracle to store the data and a GIS application to display the data geographically. Data would go through a classification/approval process prior to being accessed on the SON.

The SNL LTES IMS Model is used to define the high-level points of the IMS. Its purpose is to remind the team what data needs to be captured, who will be accessing the information, and how that information will be presented to the LTES IM customers.

#### 5.2.4.2 *Gap Analysis*

The purpose of the gap analysis was to determine the scope of integrating existing ER, EM, and SMO databases (Oracle and ESRI ArcInfo) in order to create a system with the functionality of the SNL LTES IMS model. In addition, the gap analysis identified the necessary tasks to be performed in order to transfer the system to Sandia Corporate Systems management. The analysis was generated with help from the existing system administrators as well as assistance from Corporate Database Administration (DBA) and Corporate Systems.

The current ER Project and SMO systems are comprised of:

- STAR—an Oracle database used by the SMO to track samples, data deliverables, and corrective actions and to perform cost accounting. The STAR database has extensive QC practices in place to assure data quality. This system is maintained by SMO and funded by all SMO customers. It tracks cost and billing information as well as Chain-of-Custody information for the ER Project as well as other SMO customers such as EM, SNL/NM D&D, and Waste Management (WM). Historically, the ER Project has been the largest user of the STAR database. Approximately 80 percent of all records in the database are from ER Project samples.
- Environmental Restoration Data Management System (ERDMS)—an Oracle database used to store analytical results, data validation qualifiers, and field data. This system can also be used to create well diagrams. The ERDMS also contains applications to load the analytical data into the database and generate end-user tables in Microsoft Word and Excel. The ERDMS and STAR are interdependent. These databases share data and cannot be isolated from each other. Like the STAR, the ERDMS has extensive QC practices in place to assure data quality. The ERDMS is maintained by the ER Project.
- Environmental Geographic Information System (EGIS)—a geographic information system used to create, analyze, display and maintain all digital spatial ER data using ESRI products primarily. EGIS creates maps and posters to supplement the ER fieldwork and all phases of documentation. EGIS is capable of global 3-D visualization and powerful statistical and spatial data analysis and modeling. EGIS uses a professional-grade Trimble Global Positioning System (GPS) capable of accuracy within 10 centimeters for sample and site feature collection and relocation.

The STAR/ERDMS data management process includes electronic data load check programs, multi-functional querying capabilities, and data table customized report generation. The ERDMS and STAR are linked by shared tables ensuring data accuracy, standardization, sample integrity, data quality, and efficiency.

Information utilized by the EM Department is served through the GEMS ArcView interface so that multiple users can navigate through a subset of map layers at their desktops. The GEMS interface is a highly customizable approach to integrating widely dispersed and heretofore unconnected data sources. GEMS integrates EM data of the following two primary types:

- Geographic Map Data—this type of data includes visual maps of specific data sources. Examples include Buildings, ER Sites, Archeological Sites, Biological Survey Locations, and Plant & Wildlife Locations.
- Nongeographic Data—this can include databases, document collections, spreadsheets, websites, photos, and other electronic data sources.

The data that GEMS integrates are located in many places within the SNL network and are owned/created by many different organizations. Many map layers, databases, and document collections reside on a specific GEMS network drive owned by the EM Department. Some data sources are owned by other groups, but reside on the special GEMS network drive owned by the EM Department. Other sources are owned by the EM Department but reside on other network drives (e.g., Plant & Wildlife databases and location maps). Other data sources are owned by different organizations and reside on their own network drives or database servers. The National Environmental Policy Act, Version 4 database is on a corporate database server on the SRN. The data managed by the EM Department is contained within numerous Microsoft Access databases, some of which are accessible through GEMS.

At the conclusion of the gap analysis, the SNL LTES IM Team recommended initially implementing a phased approach that includes the following:

- Phase 1—Combine ERDMS and STAR into one Oracle database (the new STAR) with the functionality of the two existing databases. It was determined that this would be a fairly simple process to accomplish. The resulting database would eventually be managed by Sandia Corporate Systems. During this phase, take the opportunity to incorporate some of the EM Microsoft Access databases and import their data into the Oracle database so there is only one database for analytical data.
- Phase 2—Convert all GIS data to a geodatabase served from either a departmental server and/or the GEMS shared drive. GEMS can still use the data with no additional effort. ArcInfo can still edit and create data with no additional effort. ArcIMS (web interface to replace/enhance GEMS) could be developed that would use this geodatabase.
- Phase 3—Upgrade GIS from a personal geodatabase to an ArcSDE geodatabase that is eventually served from the corporate Oracle system and is tied functionally to the new STAR.

### 5.2.4.3 *Technical Working Group*

The SNL LTES IM team commissioned a smaller group of strictly technical personnel to look at specific database issues and to identify potential process improvements regarding data processing and archiving for future data sets. The group worked through many issues, which are listed as follows:

- Identifying which existing EM Microsoft Access databases should be included in the future LTES IMS. A list of nine databases, currently owned by the EM Department, was created. The databases were identified for inclusion into the LTES IMS.
- Determining the means to place a data documentation indicator on each data set that will become part of the LTES IMS, so that future data users have some sense of the level of documentation and data defensibility aspects associated with each data set. This task was based upon the fact that, historically, analytical data were generated by many different laboratories with varying reporting capabilities. A data documentation indicator scheme has been proposed, and plans are being formulated for applying the scheme to the data in the STAR. This scheme will be used for present and future data sets as well.
- Identifying what tasks needed to be performed in order to prepare the existing ERDMS and STAR for the database merger.
- Exploring the possibility of using the EGIS Quality Assurance Program Plan (QAPP) as the LTES IMS GIS. The decision was made to revise the EGIS QAPP to reflect requirements of an LTES IMS GIS QAPP, as well as edit the EGIS GPS Operating Procedure to include EM GPS activities and data. Also, plans for integrating the various GIS data sources into a few geodatabases were considered, so that the data may be verified.

### 5.2.4.4 *Planning with Bernalillo County*

The SNL/NM ER Project collaborated with Bernalillo County in 2003 and 2004 to further the development of LandTrek. In 2004, during meetings with the Bernalillo County IM Department, it was discovered that the Bernalillo County LandTrek System will no longer be supported and was considered to be only a pilot project. Although the LandTrek website is still in operation, it will not be updated or maintained in the future. Plans were made to provide the Bernalillo County GIS team with GIS data layers that represent the closure status of each ER site and will direct users to the public LTES website [www.sandia.gov/ltes](http://www.sandia.gov/ltes). The public will be able to access this data at <http://ims.bernco.gov/website/gisopen/>. Plans have been made to update this information in 2007.

### 5.2.4.5 *Records Management Support*

The SNL Department of Recorded Information Management consists of the ES&H and Security RC. The RC has supported the ER Project since the beginning of site cleanup. A Site Closure Index is being generated for each ER site and included in the SHEARS database. The RC

maintains all SWMU records from ER site closures. The RC will also maintain all new SNL LTES records.

## 5.2.5 Scope of Work for FY07 and Beyond

Sharing information is essential for an effective SNL LTS sub-program for legacy sites. The goal of the IM function in FY07 and beyond is to support the IM needs of the other LTES functional areas. IM requirements will be met through fully functional IMS and IM processes. All information must be retained and archived in such a way that retrieval and reporting can be done efficiently. QA procedures and QC processes will be maintained for overall quality and reliability of the systems and data.

### 5.2.5.1 *Information Management System*

The IMS will provide information to meet the needs of current and future stewards for adequate evaluation of site status to foster the ongoing protection of human health and the environment. The SNL LTES IMS will provide information necessary for integrating the many activities of LTES operations and ICs. It will be a key component for establishing responsible stewardship that preserves information, ensures its accessibility, and educates future generations.

The LTES information system will be complementary to existing Sandia and DOE information systems to meet essential, long-term needs. Rather than create a new information infrastructure, the LTES IMS will be built upon already established information systems. The advantage here is that the existing systems have established protocols, operating procedures, and a history of IM. Figure 5.2.5-1 demonstrates how the LTES IMS is built upon existing information systems at SNL, with the Sandia Corporate Recorded Information Management System providing the foundation. These multiple repositories and custodians will help ensure that information remains current, accurate, and available to both internal and external customers.

The IMS will be a functional system that enables the input of new data, stores existing data, generates reports, and creates maps. The IMS will be key in producing required deliverables in support of the ASER and public outreach program. It will provide the necessary information to meet the needs of current and future city, county, state, and federal stakeholders, specifically regarding any future property transactions where property might be transferred from federal land ownership status to public land ownership. The IMS will make historic and current site-specific environmental contamination and cleanup information available on the Internet. The following sections describe the major components that will make up the LTES IMS.

### 5.2.5.2 *The New STAR Database*

The STAR Oracle database will be the resulting database formed by the merger of the old SMO tracking system and the ERDMS. The STAR database will continue to track environmental samples and the associated analytical data and costs. It will also be the database that stores

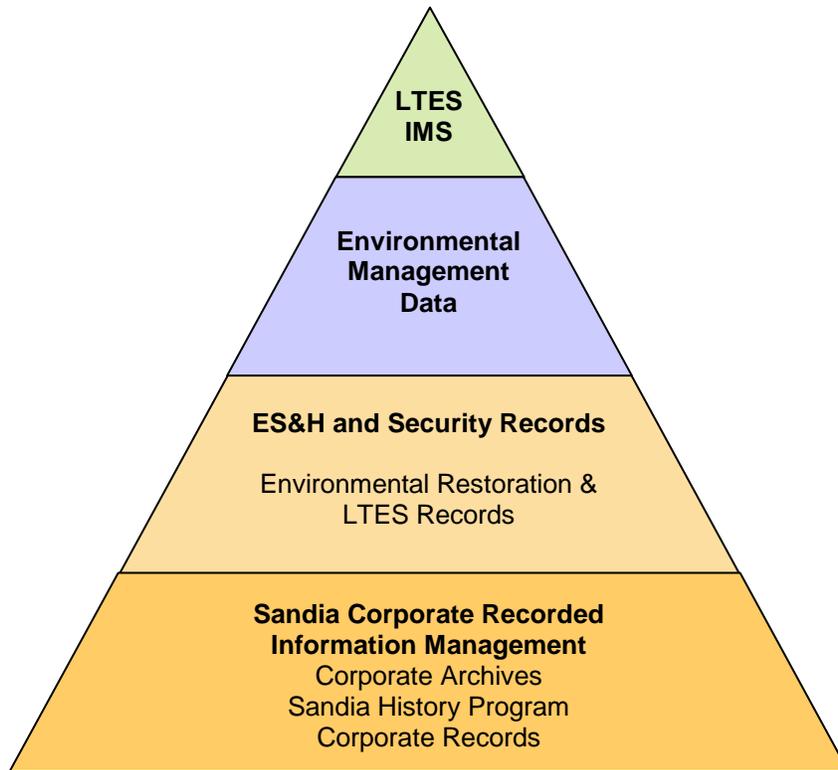


Figure 5.2.5-1  
Long-Term Environmental Stewardship Information Management System Pyramid



and processes the associated analytical and field data sets from LTES monitoring and sampling events. The STAR database will meet the data management objectives and access requirements for the LTES initiatives by providing an accurate computerized record that can be used to trace the possession and handling of discrete samples from collection to document submittal into the RC. Analytical and field data will be accessible with data validation qualifiers and data quality indicators.

The STAR database will contain tracking information for all samples that are processed by the SMO. The SMO will coordinate and ship samples for several environmental sampling projects at SNL/NM including EM, WM, Facilities, and SNL LTS for legacy sites. Only the environmental analytical and field data sets will be stored in the STAR database. The other projects that SMO supports will be responsible for their own data management.

All data residing in the STAR database will be reviewed for accuracy meeting QC requirements. Documentation sources for the STAR database will include: Chain of Custody, field logs, well completion logs, data validation reports, and analytical data packages from on- and off-site analytical laboratories. The analytical laboratories will continue to generate a hard copy data package and an electronic data deliverable (EDD) of the analytical results. The EDD will continue to be verified against the hard copy report to maintain the highest level of data quality. After the QC check is completed and discrepancies are identified and resolved, the data will be stored in the STAR database. Data quality indicators will then be assigned to the analytical results based upon known documentation, regulatory compliance, and data defensibility.

The STAR database will contain sample tracking data from October 1994 forward from both on- and off-site analytical laboratories used by the ER Project and for EM groundwater surveillance. Data types include: analytical data, field data measurements, ER Chemistry Laboratory IMS data, ER waste tracking data, well completion log information, groundwater level measurements, and KAFB groundwater data. The analytical results include both sample results and QC data for matrix spikes, field duplicates, laboratory replicates, and field blanks.

The STAR system will continue to be an Oracle-based system. The components of the STAR system will be procedures, the database, and an information system. The procedural component will include documentation of the development and operation of the system, the definition of the database, the processes of data management, and interactions with STAR database users. The database component will include the design, maintenance, and testing of the database. The information system component will include application development and modification of user interfaces, including query menus, and will provide primary user support.

The data will continue to be retrieved from the STAR database and the data will be retrievable in order to meet individual project needs most often using standardized formats for input into the NFA report generator, the Groundwater Reporting Module (GRM), and Risk Assessment. The GRM will be used to generate tables for the Annual Groundwater Monitoring Report. The NFA report generator will be used to generate Microsoft® Word or Excel tables for CAC documents submitted to the NMED.

### 5.2.5.3 *Geographic Information System and GEMS*

A GIS is a special type of system that uses location, such as an X, Y coordinate or latitude and longitude, to identify information. The EGIS is the database system that houses this spatial data. EGIS provides environmentally related scientific data support and analysis through the

implementation of integrated GIS, relational database management system, and associated analytical software. The system contains more than 2,800 cartographic data layers representing the environmental and physical characteristics of entities within the Kirtland Federal Complex area and within other areas for which Sandia has responsibility. The EGIS creates maps that portray environmental and cleanup site data with respect to the topographic and environmental setting and such themes as geology, soil types, vegetation, wells, sampling locations, and contaminant sources. These maps are created in standard or custom map formats.

The EGIS will be maintained by the EM Department at the start of FY07. The data will split into a body of archival data (approximately 70 percent) with the remaining core LTES GIS data having been converted and transferred to an Oracle/ArcSDE Geodatabase. Customized applications for ArcView users can be created to automate individual tasks or enrich their output. ArcInfo will allow the EM Department to create, edit, and manage custom spatial data for ICs and custom layouts, map, and poster production for Public Outreach. Sample data, GPS data, or any data with spatial reference, will be directly linked through Oracle to the GIS application for easy data management and 3-D visualization, modeling, and tracking.

#### *5.2.5.4 Records Center*

The SNL ES&H and Security RC will continue to support environmental records management including all SNL LTES records. The SHEARS database will continue to be the electronic indexing and records imaging repository for long-term internal use. The hard copy record will continue to be listed on an Inactive Record Transfer (IRT) Request form and submitted to the SNL/NM's inactive storage organization for long-term maintenance. The SHEARS database will be updated with the inactive storage box location code, so future searchers will know which box to ask for once the records have been stored. The IRT form will serve as a physical index of the contents; hard copies of these forms will be maintained by the RC.

Sandia's Records Retention and Disposition Schedule is mapped directly to the DOE Records Schedule (DOE O 200.1, "Information Management Program") (DOE September 1996) and the NARA General Records Schedules.

#### *5.2.5.5 Data Flow/Dependencies/Interactions*

Figure 5.2.5-2 shows the data flow and dependencies/interactions for the new STAR database. The flow of LTES information is shown in Figure 5.2.5-3.

Foundations of the future LTES IMS will utilize expanded data links. These links will enable users to extract information more efficiently and completely from data repositories residing throughout the SNL network. Then, by utilizing LTES IMS applications, data can be incorporated to create specific reports and deliverables (Figure 5.2.5-4).

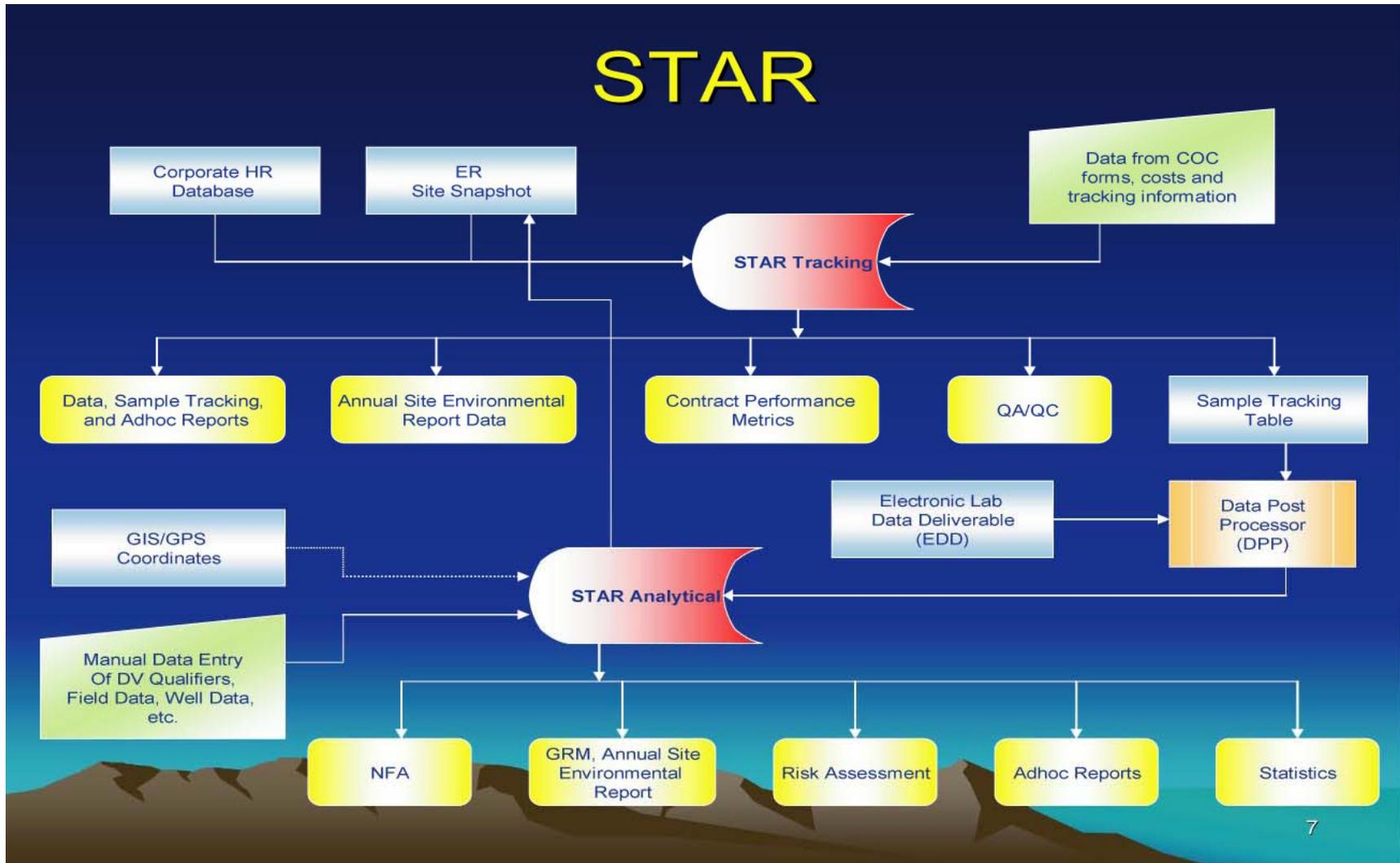


Figure 5.2.5-2  
Data Flow and Dependencies/Interactions for the New STAR Database



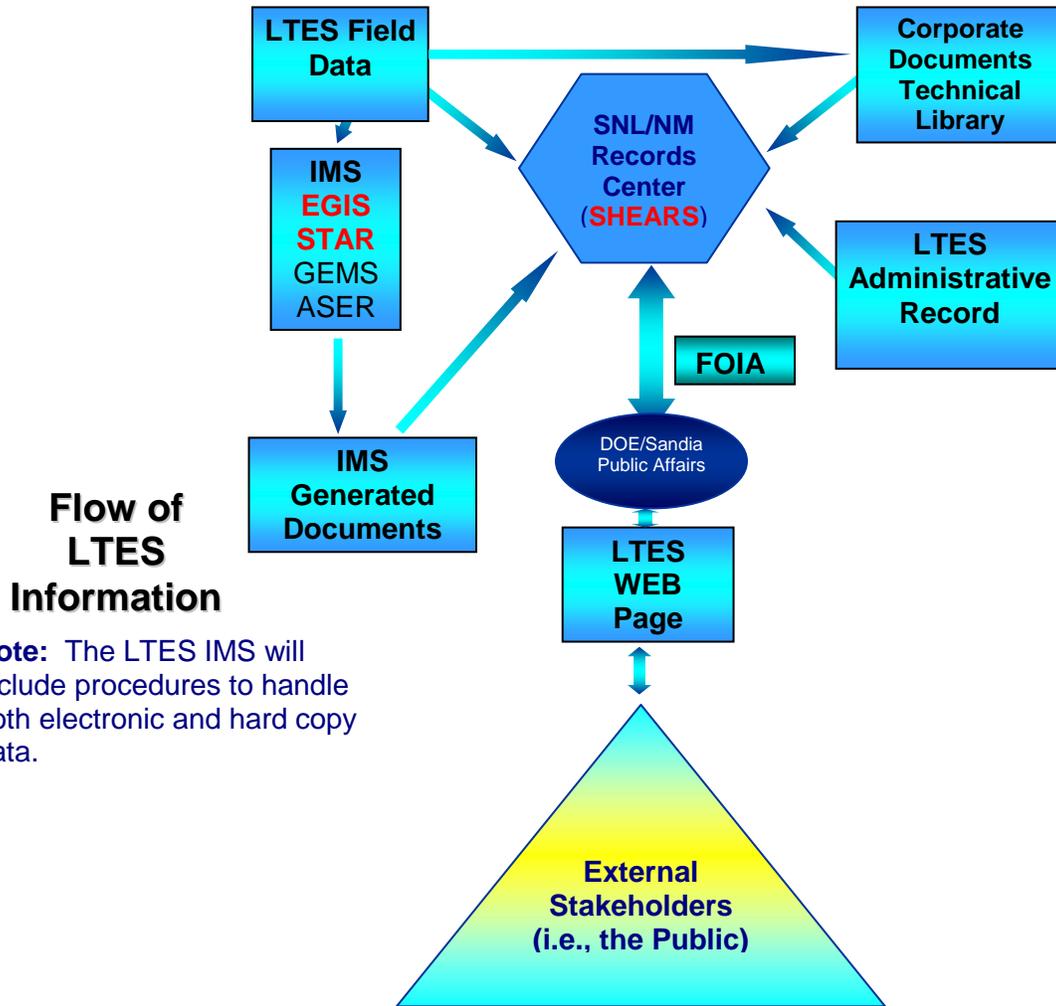


Figure 5.2.5-3  
Flow of Long-Term Environmental Stewardship Information



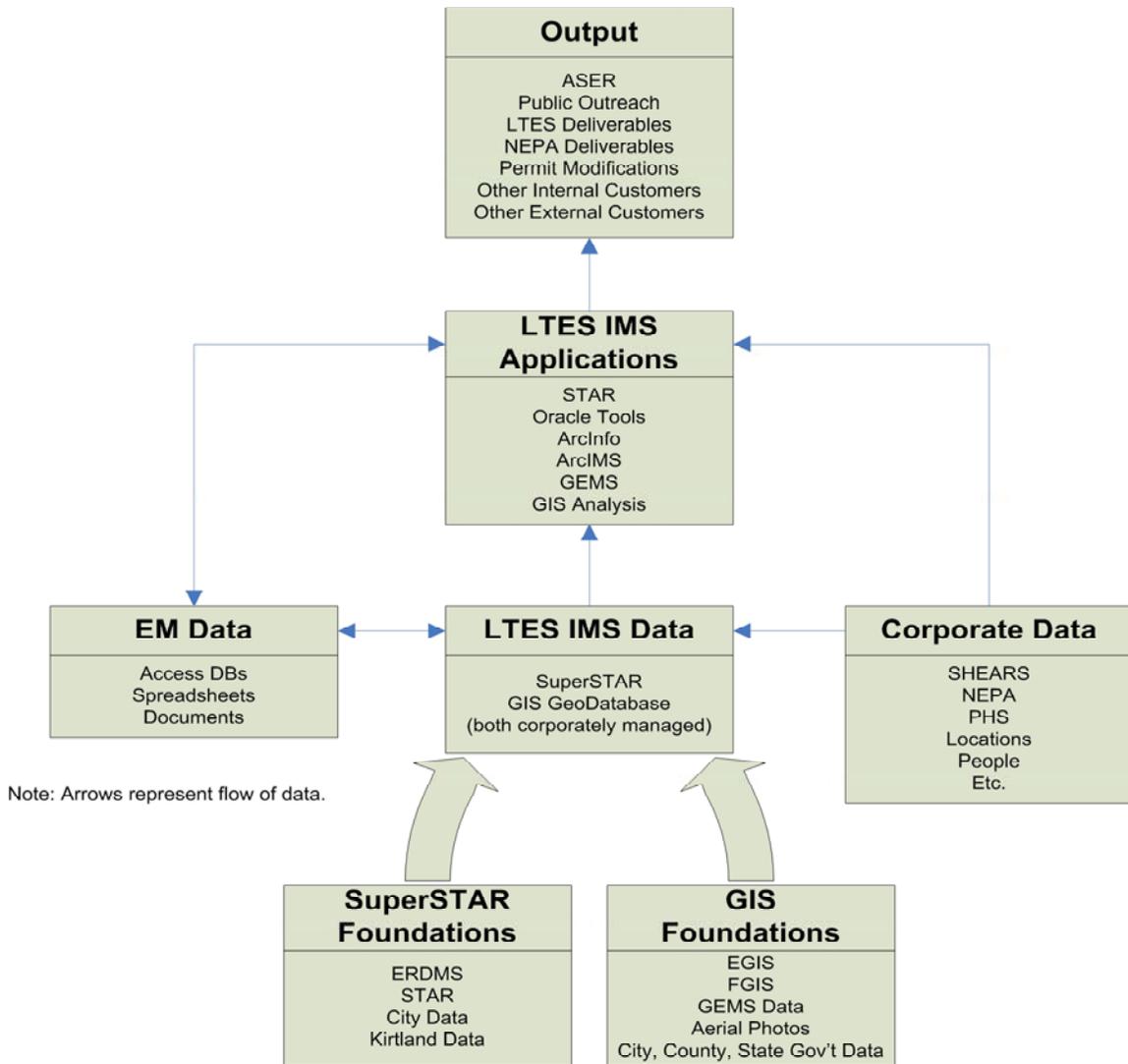


Figure 5.2.5-4  
 Foundations of the Future Long-Term Environmental Stewardship  
 Information Management System



#### 5.2.5.6 *System Maintenance*

Routine maintenance of the IMS will be required to prevent undocumented changes and to guard against unfavorable consequences from system failure or accidental corruption. The roles and responsibilities of system maintenance will be a coordinated effort between the GIS Developer, GIS DBA, STAR DBA, and Corporate DBA. Corporate DBA will perform tasks that relate to the server, Oracle Upgrades, space allocation, and security. An SNL LTES IMS Maintenance and Operation Plan will be created. The plan will outline the roles and responsibilities as they pertain to the various system maintenance tasks.

#### 5.2.5.7 *System Review*

System review will be an ongoing task using performance metrics to evaluate the system. Process improvements, deficiencies, evolving user requirements, and metrics will provide the basis for system review. Continual interface with the corporate system will insure the software and tools are compatible with the current configuration.

### **5.3 LTS Monitoring, Inspection, and Maintenance**

#### 5.3.1 Introduction

This section of the SNL LTS Implementation Plan discusses the monitoring, inspection, and maintenance activities of the LTS sub-program for legacy sites being implemented at SNL/NM. The monitoring being conducted at SNL/CA is described in Appendix A. These specific activities are designed to demonstrate the ongoing containment of the residual contamination at these facilities. The monitoring activities will collect, analyze, and report data on the continuing performance and integrity of the engineered structures and remedial processes as approved by the regulatory authorities to minimize the risk to the public and the environment.

Specific sites where hazardous waste or contamination remains are identified, and the specific measures applied to contain the waste and or/remediate the hazard are discussed. Containment systems will be inspected and maintained as required by the site-specific post-closure care plans to ensure that the intended functions are preserved over time.

The remedial strategies that rely on natural degradation of hazardous contaminants in groundwater will be monitored to verify that these processes are occurring within the prescribed criteria and are reducing the contaminant concentrations at the anticipated rates. The process for managing the laboratory analysis, data interpretation, and reporting of sampled environmental media is discussed. At sites where the NMED has determined that no further remedial actions are required but land use must be restricted to industrial or recreational activities to minimize exposure to residual hazardous or radioactive waste, regular inspections will be conducted to ensure that the appropriate restrictions, such as signs and fences, are effective and not degraded. When necessary, the signs and fences will be repaired. If applicable, periodic sampling of the soil or the collection of surface-water samples may be conducted to determine whether use restrictions should be increased, relaxed, or removed. The monitoring data collected from the various sites will be analyzed and documented in a report for the DOE and NMED. Summaries of the data will be posted on the LTES websites.

### 5.3.2 Purpose

The primary purpose of SNL LTS monitoring, inspection, and maintenance is to ensure regulatory compliance and that disposal sites, groundwater sites, and NFA/CAC sites with controls continue to be managed to protect public health and the environment. Monitoring is also needed to limit DOE and Sandia liability associated with LTS sites.

### 5.3.3 Regulatory Requirements

As previously discussed in Chapter 3.0, the ER Project site cleanup activities at SNL/NM are regulated under the HSWA to the RCRA, as implemented by the NMED. The NMED entered into a Consent Order with the DOE and Sandia, establishing a process designed to achieve a completion goal of all ER Project activities by the end of FY06 (NMED April 2004). Two sites within the SNL/NM ER Project fall outside the Consent Order. The CAMU and CWL will be the subject of post-closure care provisions under the SNL/NM RCRA Permit. Figure 5.3.3-1 summarizes the regulatory approval process for selected LTS sites.

### 5.3.4 Roles and Responsibilities

The monitoring function is responsible for conducting the required monitoring in order to ensure regulatory compliance. Monitoring, inspection, and maintenance activities will be coordinated by the SNL LTS sub-program for legacy sites. Activities will include all fieldwork, data management, data interpretation, and reporting. In addition, KAFB and Sandia share information related to KAFB Installation Restoration Program sites and ER Project sites. This information may include analytical data or process knowledge of the site. Both communication and shared information are requested and exchanged on an informal basis.

### 5.3.5 Planning and Development

Beginning in October 2006, long-term monitoring, inspection, and maintenance for the SNL LTS sub-program for legacy sites will be implemented at SNL/NM. These activities have already begun at SNL/CA. Separate requirements and site-specific monitoring plans will be developed and detailed in associated program plans. These program plans are contingent upon regulatory approval of CMEs, post-closure care provisions, long-term monitoring and maintenance plans, and other regulatory procedures.

Each program plan will include the task objective, types of monitoring, types of analysis, location and frequency, equipment and monitoring procedures, sample management, waste management, health and safety requirements, and reporting requirements.

The ER Project is currently in the process of finalizing long-term monitoring and maintenance requirements for many sites in accordance with the Consent Order and HSWA/RCRA requirements. In preparation, Sandia has initiated the development of transition plans to coordinate and integrate selected ER monitoring activities into the LTS process. Sandia is currently preparing transition plans for field support services including sample and data management; requirements for personnel, equipment, training, and space; early transition of

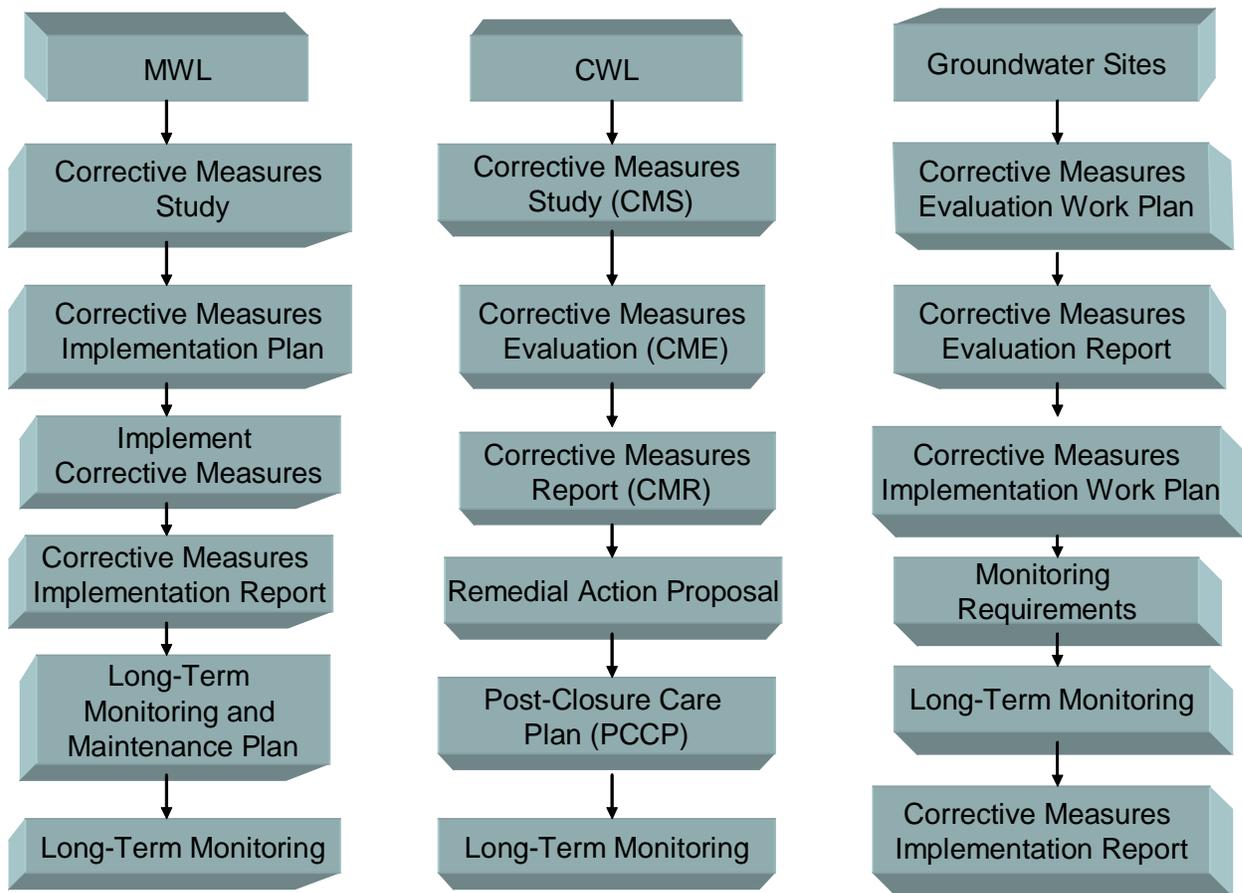


Figure 5.3.3-1  
Regulatory Approval Process for Selected Long-Term Stewardship Sites



groundwater monitoring and water level measurement tasks; and monitoring and reporting requirements associated with post-closure care operations. Sandia is also revising field operating procedures and documents to support LTS field activities.

### 5.3.6 Scope of Work for FY07 and Beyond

The following section discusses the scope of work for FY07 and beyond for the SNL/NM engineered units and groundwater units, as well as sites with controls, active sites, and unknown sites. A discussion of how samples will be managed during SNL LTS monitoring activities is also presented.

#### 5.3.6.1 *Engineered Units*

##### CAMU

The CAMU containment cell is a 3.8-acre site located in TA-III at SNL/NM (Figure 4.2.2-1). The fully-lined cell contains RCRA-regulated hazardous wastes (soil) generated during ER Project remediation of the CWL. Prior to placement in the cell, most of the soil was treated to remove and/or stabilize some of the contaminants. Low-temperature thermal desorption was used to remove volatile organic compounds (VOCs) from the soil. Portland cement was used to stabilize metals found in the soil.

Performance of the containment cell is currently monitored by the Vadose Zone Monitoring System (VZMS) that was installed during construction of the cell. The VZMS consists of the following subsystems:

- Primary Subliner (PSL)—The PSL is the primary component of the VZMS and is the most direct indicator of the cell liner integrity. It monitors soil moisture content and VOC soil-gas concentrations directly below the cell liner at the base of the containment cell.
- Vertical Sensor Array (VSA) —The VSA provides soil temperature data, VOC soil-gas concentrations, and soil moisture content beneath the perimeter of the cell liner. The soil moisture and soil-gas data help determine whether there are any sources adjacent to the cell that might impact PSL data.
- CWL Sanitary Sewer (CSS)—The CSS is located between the cell and a sanitary sewer line that runs along the east side of the cell. The CSS is designed to detect leaks from the sanitary sewer line that could impact the PSL or VSA data. It also monitors the influence of distal VOC soil-gas concentrations emanating from the remediated CWL site.

The VZMS monitoring and reporting requirements are proposed in Appendix D of the Class III Permit Modification Request for the “Management of Hazardous Remediation Waste in the Corrective Action Management Unit, Technical Area III,” September 1997, Reprinted June 2002 (SNL/NM September 1997). A permit modification was initiated in July 2003, containing the “Post-Closure Care Plan [PCCP] for the Corrective Action Management Unit” (SNL/NM March 2004). The plan also details CAMU site inspection and maintenance requirements. Biota

intrusion monitoring are proposed to ensure animal burrows and vegetative root systems are not affecting cover integrity. The post-closure care requirements for the CAMU will be determined by the NMED in the SNL Part B Permit renewal. A draft of the permit is slated for public release in the spring of 2006.

Post-closure care of the CAMU will continue for a minimum of 30 years. Periodic review of post-closure care monitoring data from the CAMU VZMS may result in a proposal to change the monitoring protocol currently established by the NMED.

## CWL

The CWL is a 1.9-acre disposal site located in the southeastern corner of TA-III at SNL/NM (Figure 4.2.2-1). From 1962 until 1981, the CWL was used for the disposal of chemical waste generated by SNL/NM research activities. From 1982 through 1985 only solid waste was disposed of at the CWL, and after 1985 all waste disposal ended. The CWL was also used as a hazardous waste drum storage facility from 1981 to 1989. The CWL was excavated as part of the Landfill Excavation (LE) VCM from September 1998 through February 2002 (SNL/NM April 2003). More than 52,000 cubic yards of contaminated soil and debris were removed during excavation activities, and risk-based cleanup standards assuming an industrial land-use scenario were achieved. The LE VCM Final Report included a final risk assessment that was approved by the NMED in December 2003 (Moats December 2003).

The final corrective measures alternative proposed for the CWL in the CMS Report (SNL/NM December 2004) consists of a final engineered cover, long-term VOC soil-gas and groundwater monitoring, surveillance and maintenance, institutional and physical controls, post-closure care reporting, and post-closure care reassessment. During April 2004, SNL/NM requested NMED approval to install the at-grade vegetative soil cover design originally presented in the May 2003 Remedial Action Proposal (SNL/NM May 2003b) as an interim measure while ongoing CMS Report issues were being resolved. On September 22, 2004, the NMED approved this request with conditions (Kieling September 2004). The conditions of approval were subsequently addressed in the revised CMS Report (SNL/NM December 2004), and cover installation was completed in September 2005. Approval of the CMS Report will make the at-grade vegetative soil cover, installed as an interim measure, the final engineered cover.

Long-term VOC soil-gas and groundwater monitoring, surveillance and maintenance of the cover; institutional and physical controls; and post-closure care reporting requirements are addressed in the CWL PCCP that was submitted to the NMED in September 2005 (SNL/NM September 2005). Details regarding these activities are proposed in the PCCP; however, because the PCCP has not yet been approved, they do not constitute NMED-approved post-closure care requirements. All requirements for the CWL post-closure care period will be formalized in the CWL post-closure care permit, which the NMED is currently developing from the September 2005 PCCP. The resulting CWL post-closure care permit will be subject to public comment along with the CMS Report prior to final approval and implementation. Final NMED approval of the CMS Report and post-closure care permit is expected in 2006. Until the CWL post-closure care permit is approved and implemented, only routine semiannual groundwater monitoring of the existing monitoring well network is required according to the CWL Closure Plan (SNL/NM December 1992) and associated NMED-approved revisions (Dinwiddie March 1998 and Bearzi May 2000). The existing groundwater monitoring network consists of two upgradient and nine downgradient monitoring wells.

In addition to groundwater and VOC soil-gas monitoring, post-closure care requirements are expected to include routine inspection and maintenance to ensure the integrity of the final landfill cover, site fencing, site signage, and monitoring well network. Activities will include inspections of the cover for signs of disturbance, subsidence, and revegetation; maintenance of the cover as required based upon inspections; inspections and maintenance of perimeter fencing and signs; and inspection and maintenance of the monitoring well network. The criteria for, and frequency of, inspection and maintenance activities will be formalized in the post-closure care permit.

ICs relevant to the CWL focus on land-use designation and land-use restriction issues. ICs will be formalized in the post-closure care permit. Currently, the following general restrictions apply to the CWL:

- The elevation of the surface of the former landfill must not be lowered.
- The final cover surface and surrounding area must not be altered such that drainage and infiltration are negatively affected.
- Excavation, drilling, or construction involving intrusive activities are prohibited during the post-closure care period.

### MWL

The MWL is located 4 miles south of SNL/NM's central facilities and 5 miles southeast of Albuquerque International Sunport. The landfill is a fenced, 2.6-acre compound in the north-central portion of TA-III (Figure 4.2.2-1). The MWL was established in 1959 as a disposal area for low-level radioactive and mixed waste generated by SNL/NM research facilities. The landfill accepted low-level radioactive and minor amounts of mixed waste from March 1959 through December 1988. Approximately 100,000 cubic feet of low-level radioactive and mixed waste containing approximately 6,300 curies of activity were disposed of in the landfill.

On October 11, 2001, the NMED directed the DOE and Sandia to conduct a CMS for the MWL. The purpose of the CMS was to identify, develop, and evaluate corrective measures alternatives and recommend the corrective measure(s) to be taken at the MWL. The CMS was completed and the CMS Report was submitted to the NMED on May 21, 2003 for technical review and comment (SNL/NM May 2003a). Based upon detailed evaluation and risk assessment using guidance provided by the EPA and NMED, the DOE and Sandia recommended that a vegetative soil cover be deployed as the preferred corrective measure for the MWL.

The NMED held a public comment period for the CMS and the proposed remedy from August 11 to December 9, 2004. In addition, a public hearing was held in December 2004 to discuss the CMS and proposed remedy. On May 26, 2005, the Secretary of the NMED selected a vegetative soil cover with bio-intrusion barrier as the final remedy for the MWL. The Secretary requested that a CMI Plan incorporating the remedy be developed within 180 days.

In November, 2005, the DOE and Sandia submitted a CMI Plan documenting the plans for construction of a cover for the MWL (SNL/NM November 2005b). The cover design consists of a 3-foot-thick, vegetated soil cover overlying a 1-foot-thick bio-intrusion barrier composed of rock and up to 40 inches of subgrade. The design will rely upon soil thickness and evapotranspiration to provide long-term performance and stability. The CMI Plan also

presented the results of a comprehensive fate and transport model that was used to assess the performance of the MWL cover design, and provided monitoring triggers for future action. The triggers identify and detail specific monitoring results that would initiate an evaluation process to determine whether corrective action was necessary.

The cover meets the intent of RCRA Subtitle C regulations in that 1) water migration through the cover is minimized by evapotranspiration; 2) maintenance is minimized by using a monolithic soil layer; 3) cover erosion is minimized by using erosion control measures; 4) subsidence is accommodated by using a “soft” design; and 5) the permeability of the cover is less than or equal to that of natural subsurface soil present.

The NMED Remedy Decision and Class 3 Final Permit Modification for the MWL requires Sandia to submit a Long-Term Monitoring and Maintenance Plan, which will include monitoring requirements and physical controls and ICs to be implemented. The plan will contain contingency procedures to be implemented if the remedy selected fails to be protective of human health and the environment. The plan is scheduled for completion in 2008.

#### *Sandia’s Preliminary Long-Term Monitoring Recommendations for the MWL*

Sandia’s preliminary long-term monitoring recommendations for the MWL have been developed based upon recommendations from the NMED provided at the MWL Public Hearing in December 2004. These preliminary recommendations are listed as follows. Additional details will be presented in the MWL’s Long-Term Monitoring and Maintenance Plan to be developed in collaboration with the NMED.

- Groundwater Monitoring—Annual groundwater monitoring at the MWL will continue. Analytes may include tritium, uranium, gross alpha/beta activity, gamma spectroscopy, metals, and VOCs.
- Vadose Zone Monitoring—Vadose zone monitoring may be conducted beneath the MWL for VOCs, tritium, and moisture content. The sampling locations and frequency will be determined based upon collaboration with the NMED and will be addressed in the MWL Long-Term Monitoring and Maintenance Plan.
- Surface Soil—Tritium in soil moisture at locations around the MWL perimeter will be monitoring annually as part of the ongoing environmental monitoring program. This data will provide an early indication of changing conditions that may require further investigation.
- Biota Monitoring—Vegetation monitoring for tritium may be continued by SNL/NM’s EM Department. Biota intrusion monitoring may be conducted to ensure animal burrows and vegetative root systems are not affecting cover integrity.
- Air Monitoring—Radon concentrations in air at the MWL perimeter may be monitored using Track-Etch detectors.
- Reporting—SNL/NM will report monitoring results, maintenance work, and other issues for the NMED annually. Electronic copies of the report will be made available to the public via SNL/NM’s LTES website [www.sandia.gov/ltes](http://www.sandia.gov/ltes).

- **Reevaluation of Landfill Cover**—An in-depth review will be conducted every five years as to whether the MWL remedy continues to be protective. The purpose of the five-year review is to evaluate the applied remedy to ensure that it is protecting human health and the environment. The five-year review includes evaluating routine reports of operation and maintenance, assessing ICs and related data from environmental surveillance, and monitoring with a view toward remedial action objectives and goals. These reviews will continue throughout the long-term monitoring period for the site. Based upon the findings of the review, recommendations will be made to the regulators to continue or modify the monitoring protocols at the MWL.
- **Maintenance and Contingency Procedures**—Landfill cover maintenance and contingency procedures will be addressed in depth in the MWL Long-Term Monitoring and Maintenance Plan, currently scheduled for completion in 2008.

### 5.3.6.2 *Groundwater Units*

SNL/NM and SNL/CA have groundwater areas of concern that will require monitoring under the LTS sub-program. This section discusses SNL/NM's monitoring activities; SNL/CA's monitoring activities are discussed in Appendix A.

The SNL/NM ER Project has reported concentrations of trichloroethene (TCE) and/or nitrate (reported as nitrate or nitrate plus nitrite) exceeding the corresponding EPA MCL in groundwater at areas identified as Tijeras Arroyo Groundwater (TAG), TA-V, and the Burnsite Groundwater Area. In addition to the regional system, groundwater occurs in a perched system in the TAG Study Area. Since the initial discovery of TCE and nitrate in groundwater, the ER Project has voluntarily undertaken various activities to determine the nature and extent of groundwater contamination, particularly to identify potential sources for this contamination. The current state of knowledge of these investigations has been documented in SNL/NM investigation and conceptual model reports (SNL/NM November 2005c, SNL/NM April 2004, SNL/NM June 2004). The Consent Order contains requirements for investigation and CMEs of the groundwater sites.

#### 5.3.6.2.1 *TAG Area*

The TAG area encompasses approximately 40 square miles (25,600 acres) centered on the northwestern corner of KAFB. SNL/NM has three technical areas within the TAG Study Area, including TA-I, TA-II, and TA-III. Together, the three TAs encompass approximately 641 acres. KAFB controls facilities and properties with a variety of land uses along the north, west, south, and southeast boundaries of TA-I, TA-II, and TA-IV. Sandia has identified two potential TCE and three potential nitrate sources within the TAG area. Wastewater discharge, septic water discharge, and possible leaking sewer lines are believed to be the primary SNL/NM-related sources for TCE and nitrate contamination in the groundwater in the TAG area. Currently, the groundwater monitoring network is comprised of 21 monitoring wells.

#### 5.3.6.2.2 TA-V

TA-V is a secured, 35-acre, research and testing area located in the northeastern corner of TA-III at SNL/NM. The facilities at TA-V have been operating since the 1960s and are used for research and development of advanced nuclear reactors, simulation sources, reactor safety, energy-related programs, and nuclear weapons systems. Former wastewater disposal facilities at TA-V are believed to be the primary sources for low levels of TCE contamination in the groundwater in this area. These former facilities included drainfields and surface impoundments of the Liquid Waste Disposal System (LWDS) and TA-V seepage pits. The LWDS was used for the disposal of reactor cooling process water from the SNL/NM Engineering Reactor Facility and liquid wastes from other reactor support facilities in TA-V. The LWDS drainfield was operated from 1963 until it collapsed in 1967, receiving a total volume of 6,486,000 gallons of wastewater. The existing TA-V groundwater monitoring network is comprised of 13 monitoring wells.

#### 5.3.6.2.3 Burnsight Groundwater Area

The SNL/NM Burnsight Groundwater Area is associated with an operational test facility located in Lurance Canyon within the Manzanita Mountains, approximately 7 miles east of the main SNL/NM TAs. Groundwater nitrate concentrations are attributed to nonpoint sources derived from either nitrate disseminated from open detonation of HE from 1967 until the early 1980s or naturally concentrated nitrate present in rainwater that has been evaporated or transpired from alluvial deposits in Lurance Canyon. Nitrate concentrations over time indicate that a nitrate pulse in groundwater has moved downgradient across the Canyons Area since 1995. The existing Burnsight Groundwater Area monitoring network is comprised of six monitoring wells.

#### 5.3.6.2.4 Corrective Measures

The final corrective measure for the groundwater units has yet to be determined but is anticipated to involve long-term monitoring, surveillance and maintenance, institutional and physical controls, reporting, and reassessment. The CME reports for TA-V and TAG (SNL/NM July 2005, SNL/NM August 2005b) include the technical rationale for the selected remedy. The CME report for the Burnsight Groundwater Area, anticipated to be available in March 2008 or shortly thereafter, will also include the technical rationale for the selected remedy.

Groundwater monitoring will be required to address the uncertainty of future impacts of the VOC and nitrate contamination on groundwater. Specific wells within the TAG, TA-V, and Burnsight areas will be proposed for long-term monitoring in their respective CMI plans. The CMI Plan for the Burnsight is scheduled for submission to the NMED in FY09, and the CMI plans for the TAG and TA-V areas are scheduled for submission to the NMED in FY06. Based upon discussions with the NMED, Sandia anticipates that MNA will be part of the selected remedy for each of these groundwater sites. Careful characterization and thorough monitoring are essential to ensure that sufficient attenuation will take place to comply with all regulatory requirements. This characterization is the difference between MNA and groundwater monitoring because groundwater monitoring makes no attempt to verify pathways of natural attenuation or to predict contaminant transport and degradation. Compliance requirements and well locations selected will be defined in CMI plans and approved by the NMED for long-term monitoring.

Routine inspection and maintenance will be implemented to ensure the integrity of the monitoring well networks. Activities will include inspections for signs of disturbance, maintenance, plugging and abandonment, and replacement of wells. The criteria and frequency of surveillance and maintenance will be formalized in the associated CMI plans. ICs, reporting, reassessment, and contingencies will also be developed and presented in the associated CMI plans.

#### 5.3.6.3 *Sites with Controls*

Until regulatory agreements are in place and specific requirements for long-term care established, it is assumed that some land-use-restricted sites will need periodic samples collected to support site risk reassessments.

These sites will be inspected periodically as defined by the NMED. Site inspections will evaluate fences, signs, structures, barriers, and drainage as appropriate. The frequency of the inspections will be in accordance with PCCPs, CMI plans, and other requirements that are identified.

Additionally, a few sites, such as SWMU 87, may not fall within regulation by the NMED. This site has been remediated, but above-background levels of depleted uranium are still present in the soil and continue to weather out of the steep hillside. It is expected that this process will continue for some time into the future. Until this process has been determined to have ceased, SWMU 87 will require long-term surveillance to track the progress of this natural weathering process and determine whether, or when, this surveillance should be terminated or whether remediation is necessary. The status of this surveillance will be updated via the SNL LTES website and possibly other reporting venues.

Additionally, multimedia site-wide sampling is performed on a regular basis through the EM Department. Media includes soil, vegetation, sediment, surface water, and storm water. Many site-wide monitoring points are in the vicinity of the SNL LTS management units; additional site-wide monitoring points will be incorporated as necessary within the LTES scope.

#### 5.3.6.4 *Active ER Sites*

There are several active ER sites at SNL/NM where ongoing operations have resulted in soil contamination. Complete characterization and remediation of these active ER sites will occur under the LTES Program, if necessary, when operations are completed. Subsequent to any remediation, monitoring of these sites may be part of the SNL LTS sub-program for legacy sites.

#### 5.3.6.5 *Unknown Sites*

Unknown sites not identified during the ER Project will be addressed as appropriate. Chapter 10 of the SNL/NM ES&H Manual (SNL/NM August 2005a) describes the process for documenting newly discovered sites. Newly discovered sites will be handled by the LTES program.

### 5.3.6.6 *Sample Management*

Environmental samples collected during SNL LTS monitoring activities will be handled in accordance with established SMO processes and procedures. (SNL/NM March 2003, SNL/NM December 2003a, 2003b, 2003c, 2003d, 2003e). Applicable EPA and DOE requirements are incorporated into the SMO procedures. SMO processes include the following:

- Laboratory contract procurement and performance, compliance management
- Sample packaging, shipping, and tracking
- Data management, contract verification review, and problem resolution
- Data validation by an independent contractor
- Environmental sampling project coordination
- General analytical technical support services

The SMO maintains contracts with laboratories certified by the National Environmental Laboratory Accreditation Program national accrediting organization and the State of Utah. All off-site contract laboratories are selected based upon performance objectives and appraisal (pre-award audit) as described in the QAPP for the SMO (SNL/NM December 2003d). All laboratories must employ EPA test methods (EPA November 1986) wherever possible; if not available, other suitable and validated test procedures are used. Laboratory instruments must be calibrated in accordance with established procedures, methods, and the SMO Statement of Work (SNL/NM March 2003). All calibrations and detection limits must be verified before sample analysis and data reporting. Once a laboratory has passed the initial appraisal and has been awarded a contract, the SMO is responsible to ensure laboratories are audited annually and meet contractual requirements.

## 5.4 **Institutional Controls**

### 5.4.1 Introduction

This section discusses the planning and use of ICs in the context of SNL LTES programmatic responsibilities and the requirements of LTS to identify and implement ICs for legacy sites in the short term. The discussion addresses the guidance and requirements for SNL in response to both the EPA guidance for identifying, evaluating, and selecting ICs (EPA 540-F-00-005 [EPA 2000]) together with the DOE policy and guidance for the use of ICs (DOE P 454.1 [DOE April 2003] and DOE G 454.1-1 [DOE October 2005]). This section also addresses coordinating and integrating the more extensive LTES programmatic requirements of using ICs within the EMS with the more immediate processes for establishing, maintaining, and providing for the enforcement of effective ICs for LTS needs. Included in the discussion are descriptions of the roles and responsibilities of Sandia, the DOE, and other relevant governmental and nongovernmental players who may be involved in the development and implementation of ICs. The section also discusses the use of a "Defense-in-Depth" concept recommended by the DOE, and consistent with EPA "layering" guidance, providing redundancy in offering protection to the environment and the surrounding population from any remaining contaminants left in place. This section presents a summary of work accomplished to date and details the scope of IC tasks planned for FY07 and beyond.

## 5.4.2 Requirements

Overall LTES use of ICs, together with the development of ICs for LTS will be maintained and managed in order to meet the applicable statutes, regulations, and executive orders for LTES. Included are DOE policies, orders, and guidelines that can be found through the following URL: <http://lts.apps.em.doe.gov/center/stewlink0.asp>. Listed are some of the documents that are specific to environmental protection and ICs:

- DOE Policy, "Use of Institutional Controls," DOE P 454.1 (DOE April 2003)
- DOE G 454.1-1, "Institutional Controls Implementation Guide for Use with DOE P 454.1, Use of Institutional Controls" (Draft) (DOE October 2005)
- DOE Order 450.1, "Environmental Protection Program" (DOE January 2003)
- DOE G 450.1, "Implementation Guide for Use with DOE 450.1 Environmental Protection Program" (DOE March 2005)
- DOE O 430.1B, "Real Property Asset Management" (DOE September 2003)
- EPA 540-F-00-005, "Institutional Controls: A Site Manager's Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups" (EPA March 2000)

These DOE and EPA requirements and guidance documents provide flexible processes for the identification, application, maintenance, and enforcement of ICs in the broader context of environmental protection. In some cases, they identify specific roles and responsibilities to ensure that ICs are applied to provide a defense-in-depth, layered level of protection. One key element of the DOE guidance is the requirement that the use of ICs is integrated with overall SNL EMS activities to ensure a programmatic approach for the entire site, which follows the four steps of the EMS development process of planning, implementation, correction, and management review. This guidance is discussed later in more detail.

During the 2005 session of the New Mexico legislature, a bill to enact the Uniform Environmental Covenants Act (UECA) was introduced, reported from committee, and passed by the state House of Representatives. The session ended, however, before the bill could be considered by the state Senate.

This legislation, which is essentially the same as the UECA model law proposed by the National Conference of Commissioners on Uniform State Laws, would provide state and local governments clear authority to enforce land-use restrictions for the protection of human health and the environment. The law would provide for the long-term enforcement of restrictions (ICs) that would be binding on subsequent purchasers and tenants of a property and would be listed in local land records.

The NMED supported passage of this legislation indicating that the law would provide the state authority to enforce land-use restrictions for human and environmental health and safety.

If the UECA were passed into law in New Mexico, it would not be expected to establish specific requirements that would apply to property under the federal jurisdictions. However, the land-use planning and management associated with UECA could be expected to influence state

planning concepts and public expectations on environmental ICs. In the short term, the UECA would not be expected to have direct legal impact or effect on LTS activities, but may have to be factored into LTES contingency planning for a possible time when federal lands might be transferred to private holdings.

### 5.4.3 Institutional Controls Defined

Both the EPA and DOE have defined ICs, along with their application, to include methods designed to appropriately limit access to, or uses of, land and facilities, to protect cultural and natural resources, to maintain physical security of DOE facilities, and to prevent or limit inadvertent human and environmental exposure to residual contamination. The EPA definition limits ICs to administrative and legal controls, while the DOE definition is broader and encompasses the physical controls including methods to preserve knowledge and to inform current and future generations of hazards and risks (EPA 2000, DOE March 2003).

In its guidance on the use of ICs, the DOE acknowledged that the IC use policy:

*. . . does not intend to alter the definition of 'institutional controls' in existing laws, regulations or guidance documents, but instead to emphasize that: 1) diverse uses, requirements and definitions of institutional controls exist; 2) institutional controls may overlap and differ, and 3) institutional controls need to be integrated effectively on a site-wide basis (DOE October 2005).*

Regardless of the inconsistent definition of ICs by the EPA and DOE, the difference becomes less significant by the acknowledgment in each agency's guidance that ICs, even if they are limited to administrative and legal controls, must be integrated with engineered or physical controls to limit migration of contamination from a site.

To formalize the consistent application of ICs, the DOE policy on the use of ICs recognized that ICs should provide the following four major environmental protections and restrictions:

- Appropriately limit access to, or uses of, land, facilities, and other real and personal properties
- Protect the environment (including cultural and natural resources)
- Maintain the physical safety and security of DOE facilities
- Prevent or limit inadvertent human and environmental exposure to resident contaminants and other hazards (DOE April 2003)

### 5.4.4 Integration of the LTES Site-Wide and LTS IC Requirements

The DOE requires that development of processes for the use of ICs follow a site-wide approach consistent with LTES and EMS processes (DOE Order 450.1 [DOE January 2003]), while at the same time addressing the shorter term needs of LTS. In fact, the guidance is explicit in recommending a site-wide approach to the use of ICs:

*Since institutional controls can be used by, or affected by, any operating facility or activity, implementation of the site's ISMS/EMS should provide a consistent, systematic means to ensure that all efforts related to the use of institutional controls for mission and operational activities at DOE sites are integrated within a single, site-wide program (DOE October 2005).*

The development and application of ICs for LTS must follow the same steps that would govern the development of a site-wide approach to the use of ICs under the EMS process, which provides an emphasis on continuous improvement of environmental management at the site. The EMS program development process follows four development phases:

- Phase I—Planning and environmental aspects identification
- Phase II—Implementation and operation
- Phase III—Checking and corrective action
- Phase IV—Management review and system maintenance

As LTS development and application of ICs will occur earlier than the more comprehensive SNL site-wide approach to the use of ICs, following the four development phases of the EMS process will help ensure that ICs for both LTES and LTS are consistent and that these program guidelines are integrated into the site-wide use of ICs under EMS.

#### Phase 1—Planning for an IC Program

*Current IC Experience at SNL/NM.* To benefit from the experience already gained during the remediation of ER sites, LTS planning will include a survey of the ICs and other controls that have been used in both the ER Project and other relevant programs at SNL/NM. Because SNL/NM is located within the boundaries of KAFB and has remained under government ownership, Sandia's experience with ICs at SNL/NM has been largely governmental-controlled ICs.

*Types of ICs Available.* From previous experience with CERCLA and RCRA activities, an extensive menu of ICs has been identified that can be applied for environmental protection and access restriction to particular sites and locations. Sandia can draw from this experience in identifying the types of ICs to apply to LTS sites. Working with LTES, the LTS sub-program staff will create a list of potential ICs, which can be assigned to various categories of LTS sites. Once a list is identified, the DOE IC guidance calls for using a graded approach of assigning ICs based upon the level of environmental risks associated with particular sites. The guidance provides a summary of various categories of ICs.

The following classifications used to describe ICs are not mutually exclusive. For example, a permit condition to maintain certain records about a site would be a government control that could have both active (e.g., data collection and reporting) and passive (e.g., records maintenance) aspects. Similarly, structural controls such as surface covers and monuments may be considered passive controls while fences and gates may be active controls. Individual control functions may span several types. For example, excavation permits could be categorized as both land and groundwater management. The appropriateness of access controls should be considered when establishing criteria. The mix of restrictions in place often will vary across a given DOE site to reflect risks and costs associated with maintaining restrictions.

- Government controls use federal, state, or local authority to impose restrictions. Examples include federal ownership, notations on federal ownership records, zoning restrictions, restrictions on use of groundwater and land (e.g., state-regulated well drilling regulations), building and other permits, issuance of advisories warning of potential risk, and hazardous waste site registries.
- Proprietary controls are based upon private property law and are designed to restrict or limit use. Proprietary controls can be listed in the property's chain of title and can be transferred from one owner to the next. Proprietary controls include easements, covenants, real estate use licenses/permits, and MOUs. These types of controls would come into play if and when federal properties are transferred to private holdings.
- Structural controls include features constructed to control access (e.g., fences, gates, engineered covers) and physical devices (e.g., signs and monuments to warn of dangers or restrictions).
- Nonstructural controls include mechanisms that rely on legal and administrative initiatives (e.g., security, preventive maintenance, inspections, excavation permits, vegetative buffer zones, materials labeling, materials handling improvements, hunting licenses or permits, and best management practices).
- Active controls rely on a significant amount of personnel to fulfill safeguard and maintenance responsibilities (e.g., security guards to monitor and control site access; personnel to monitor airspace restrictions; field staff to conduct environmental sampling activities to monitor contaminant migration and control or clean up site releases; staff to monitor disposal system performance, waste packaging, and storage facilities; and personnel to perform equipment inspections and maintenance).
- Passive controls are designed to warn and inform future generations about the nature and location of site hazards without significant human intervention (e.g., permanent markers and monuments; barriers such as earthen berms; public records and archives; government ownership; land or resource use regulations; preservation of knowledge to warn future generations of site hazards to minimize inadvertent human exposure) (DOE October 2005).

A key element of selecting and assigning appropriate ICs is the development of a list of various administrative and physical controls that together act as:

*. . . essential components of a defense-in-depth strategy that uses multiple, relatively independent layers of safety to protect human health and the environment (including natural and cultural resources) . . . DOE will use a graded approach to determine what types and levels of protective measures (e.g., physical, administrative, etc.) should be used (DOE April 2003).*

*Selecting ICs for SNL/NM.* The first step in this process is to identify appropriate ICs that address the remaining risks associated with specific categories of ER Project sites while these sites remain under DOE control. Contingency planning must be conducted to address what would be required should the sites be transferred to other agencies or the private sector. Sites with remaining potential risks would require more extensive ICs and more layering than those

with little or no potential remaining risks. Sites where remediation has eliminated all contamination and risk would still require the preservation of information about the history of the site at a minimum for IC management. DOE IC guidance provides a checklist of issues to consider in the selection of ICs, which is included as Appendix I.

To successfully adapt ICs for SNL/NM's LTES, consistent with the DOE NNSA IC policy, LTS managers will find it useful to follow the more specific EPA guidance for identifying ICs for RCRA sites (EPA 2000). Under this guidance, program managers need to first determine IC objectives, then identify the mechanisms to achieve the objectives, including the timing and duration of applying the ICs, and finally assign the responsibility for maintaining and enforcing the ICs. This process can be summarized by the following steps:

- Objectives—What ICs are needed and best suited to provide the restrictions or protection required by the various categories of legacy sites?
- Mechanisms—How will the ICs be implemented and integrated with LTES and EMS requirements for site monitoring, IM, public outreach, and other existing controls such as excavation permits? Implementation of ICs would include consideration of their timing and duration.
- Responsible Parties—Who will assume responsibility for any IC maintenance and enforcement requirements and how would this responsibility be transferred with land ownership, if that becomes the case?

In order to provide for the management and enforcement of this process, the LTS sub-program managers will prepare IC plans specific to particular site risk categories. Generally, the higher the potential environmental risks associated with the site, the more extensive the layering of ICs would be for the site. Figure 5.4.4-1 provides examples of how ICs would be layered for a defense-in-depth application.

An IC task plan will describe the inspection methods, implementation requirements, management, enforcement, and reporting aspects of the ICs. Because future ownership and management of remediated lands may vary greatly, the DOE and Sandia will develop a graded approach in applying ICs to determine, implement, and maintain future use restrictions and controls for remediated ER Project sites.

The costs of implementing ICs must account for the potential annual or periodic costs of maintaining and enforcing ICs over the long term, including the costs of remedying any IC that proves to be unsatisfactory and must be replaced by new ICs. IC plans will be updated as requirements change, as the need for ICs changes, or if the responsibility for the property is transferred to another government agency or private owner. This IC plan will integrate all previous plans required by individual NFAs, the Consent Order, and the HSWA Module, as well as consolidate the inspection and reporting requirements and functions into a single program. This approach will also include contingency planning to address the need to revise ICs as more experience is gained in the years to come. A more specific list of IC examples and objectives, as well as a list of who the ICs would protect, is included in Appendix J.

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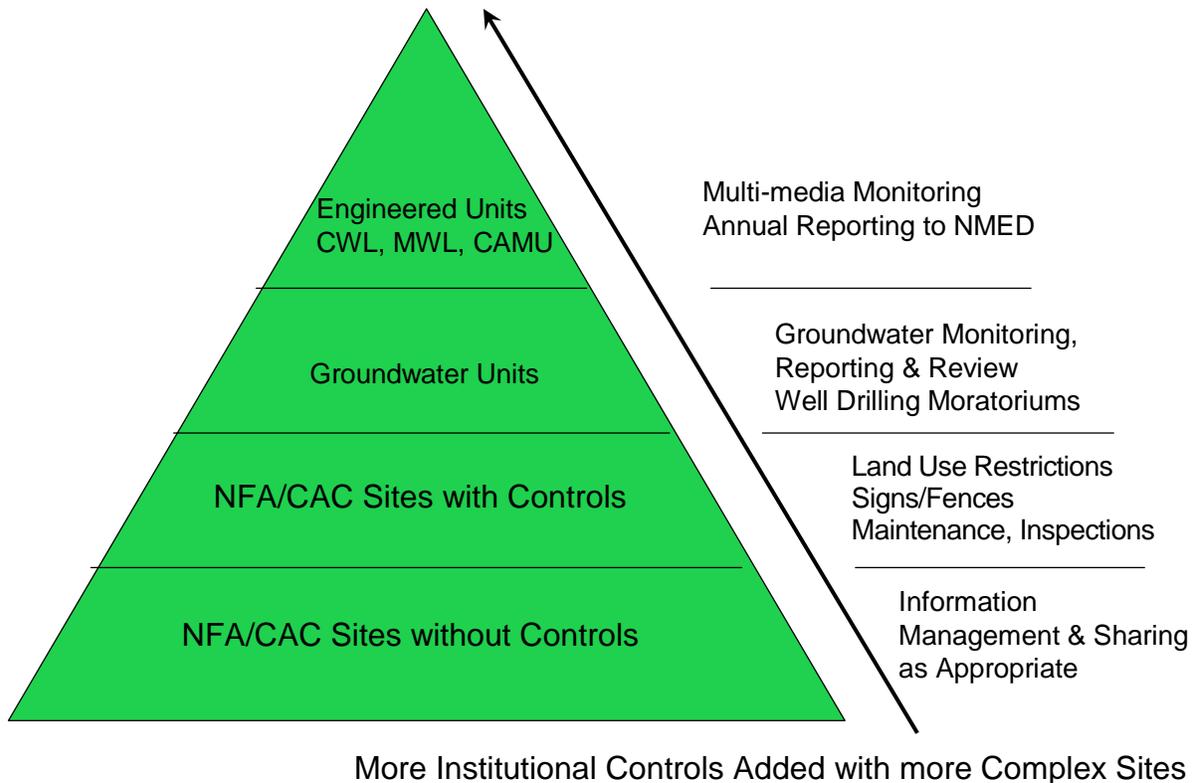


Figure 5.4.4-1  
Examples of Institutional Controls Layered for Sites Requiring Increasing Controls



## Phase 2—Identification, Implementation, and Operation of an IC Program

In implementing an LTS IC plan that would be integrated with LTES programmatic responsibilities, the following steps will be followed while maintaining consistency with the DOE policy for the use of ICs (DOE April 2003):

- Identify possible appropriate ICs for SNL/NM ER Project sites
  - Develop agreement in IC definitions and methodologies
  - Develop agreement in the IC planning/management assumptions
- Determine IC roles/responsibilities
  - Sandia (integration, maintenance, and enforcement roles/responsibilities)
  - DOE NNSA/SSO Oversight
  - State (NMED)/local government involvement
- Establish and apply a graded approach for SNL/NM ER Project sites
  - Use risk-based approach to identify ICs
  - Establish a defense-in-depth strategy for layering ICs
  - Identify IC maintenance and enforcement issues
  - Verify cost estimate for implementing, maintaining, and enforcing ICs
- Coordinate all planning and operational IC activities with other key LTS activities:
  - Management
  - IM
  - Monitoring, Inspection, and Maintenance
  - Public Outreach

The defense-in-depth of “IC layering” and the timing of when ICs would be required will be discussed both during DOE and Sandia maintenance and post-governmental maintenance time periods. This phase includes information on the issues that would have to be resolved to support the implementation of various ICs. Figure 5.4.4-1 shows how ICs could be layered in a graded defense-in-depth strategy, increasing the number of applied ICs as the potential environmental risks or requirements increase.

## Phase 3—Checking and Corrective Action

*Follow up Evaluation.* Once ICs are identified, selected, and put into place, a period of compiling information and feedback follows to assess how well ICs are working and determine whether adjustments need to be made to the ICs assigned to specific sites. It is important that the IC planning team follow an approved process to assess the performance of ICs in the initial years of their application; the LTES Program would assume responsibility for assessing IC application once the LTS sub-program completes its legacy goals.

It is expected that the LTS and LTES IC planning teams would develop a standard performance review checklist to assess ICs, which could include, but is not limited to, the following issues:

- Where multiple ICs are layered for an LTES site, ensure that all ICs continue to be required and continue to be integrated in cost-effective and protective defense-in-depth system.
- Determine whether the IC strategy continues to support the long-term site stability, keeping maintenance requirements as reasonable as practical.
- Document and make available to appropriate audiences any decisions to increase, reduce, or terminate specific ICs as appropriate.
- Ensure that maintenance of properties that DOE may not own, but for which it may be responsible, is being conducted.
- Report the progress, benefits, and issues associated with IC performance annually during the first three years of program operation and at least every five years following.

#### Phase 4—Management Review and System Maintenance

Management review is an ongoing process during each of the previous three phases of IC planning, implementation, and correction, providing oversight and guidance as to how ICs are developed, maintained, and enforced. Another essential contribution provided by management review would be assistance in the application of ICs with other LTS elements to help ensure a seamless coordination of responsibilities and work tasks.

Management review will provide a vital role in helping to assess the performance of ICs over the long term and in adjusting IC application as it becomes evident that ICs may not be performing to planned expectations. Any revisions or adjustments to the IC strategy would be discussed and coordinated through the management review process.

#### 5.4.5 Planning and Development

During the preliminary planning and development stage, the IC planning function developed the basic IC program structure. The structure included selecting and applying appropriate ICs specific to the various categories of LTES sites at SNL/NM, developing a layered defense-in-depth strategy based upon the level of environmental risk and requirements for particular LTES sites, identifying a proposed maintenance schedule, and determining what enforcement requirements are available to ensure that ICs are applied and maintained.

Another important aspect of LTES for ER Project sites is the design of processes to maintain these controls over the long term. To accomplish this, appropriate review and verification schedules and methods were considered to ensure the enforcement of controls through the various potential stages of ownership changes. Ongoing activities include identifying ICs and tailoring a maintenance and enforcement process specific to Sandia and DOE NNSA/SSO requirements.

To the extent possible and appropriate, the development and assignment of ICs for specific LTES sites will be coordinated with the NMED to encourage a consensus of which ICs should be selected and how they will be used to protect the public and restrict encroachment on the

sites. As appropriate and timely, the list of active ICs, layered to provide the defense-in-depth redundancy, would be included in site closure plans approved by the NMED.

During FY05, the LTES IC team reviewed and verified the status of ICs for ER Project sites located outside the boundaries of KAFB. This work entailed identifying environmental risks or liabilities remaining at these off-site locations through a records search, documenting as much as possible the current status of any remaining contamination. This research included, but was not limited to, the following activities:

- Reviewing the activities performed at the off-site locations, determining whether hazardous materials were involved, reviewing the roles of both the DOE and Sandia in the research, and determining, to the extent possible, the final disposition of site ownership and the status of any cleanup (if site contamination occurred).
- Providing the DOE NNSA/SSO with a risk-ranked list of sites that may require further investigation, together with those sites that may need to be tracked for future changes in ownership or disposition, and those sites that represent so low a risk as to require only documentation of the activities that occurred at the site. Of the 178 off-site locations, only 7 may require additional research and investigation; another 42 sites were recommended for long-term tracking in case site ownership or conditions should change.
- Planning to work with the LTES IM and Outreach teams to establish appropriate records for verifying and documenting any final IC responsibilities or requirements associated with the final determinations for these off-site ER sites and to develop outreach processes to communicate the final status information to the appropriate audiences.

#### 5.4.6 Roles and Responsibilities

The various roles/responsibilities shared by the DOE and Sandia and possibly other agencies, such as the USAF and the USFS, for managing ICs are briefly outlined in Section 5.1.3 of this LTS Implementation Plan. Activities conducted by the LTS sub-program managers, including planning, implementation, maintenance, and enforcement, must be coordinated with the LTES Program.

The DOE has a policy that establishes responsibility for LTES sites that may be transferred from direct DOE ownership to:

*... determine whether responsibility for required institutional controls on transferred property can be maintained by subsequent owners consistent with applicable law. If this implementation responsibility cannot be reliably assured, then DOE will retain necessary responsibility and authority for the institutional controls, including continued ownership of the property if necessary (DOE April 2003).*

The primary responsibility of the LTES and LTS collaboration is to identify a graded list of ICs that includes layered protections for each site within the LTS sub-program and to provide for

maintenance and enforcement of ICs over the long term. This responsibility requires close coordination of IC activities with the following elements of LTS for legacy sites:

- **LTES Management**—Keep program managers aware of the benefits, issues, and problems that may be associated with the application, maintenance, and enforcement of ICs for specific sites. ICs could be revised, added, or discontinued to maintain the defense-in-depth strategy developed for sites under LTES.
- **IMS**—Work with LTES and LTS to coordinate development of an effective system that records, tracks, and reports the status of specific ICs linked to specific sites and locations. Also important would be coordination with the IMS RC for the maintenance of historical information and data on the ICs linked to sites and the distribution of such information to appropriate audiences, including local, state, and tribal governments.
- **Monitoring**—For those sites requiring more extensive management, coordinate the use of monitoring reports as a part of the defense-in-depth layers integrated with the specific LTS and overall IC requirements for IC use.
- **Public Outreach**—Coordinate with the Public Outreach team of LTS to communicate the use of ICs and the defense-in-depth strategy to public audiences and to obtain useful feedback on public interests in the use of ICs.

To perform the necessary functions in supporting the IC activities, the following roles and responsibilities are identified:

- **IC Task Leader**—The IC Task Leader is responsible for the operations and activities associated with reviewing, maintaining, and providing enforcement of IC restrictions as defined by the environmental risks associated with specific LTS legacy sites.
- **IC Information Coordinator**—The IC Information Coordinator is responsible for assisting the IC Task Leader to ensure that IC planning and implementation activities are coordinated with other IC program elements and with the overall requirements of the LTES and EMS program activities.

#### 5.4.7 Scope of Work for FY07 and Beyond

It is expected that the initial ICs will be identified and assigned to LTS legacy sites by the NMED by the end of FY06, either as part of the SNL/NM HSWA Permit or within the post-closure care documents for individual engineered units. The LTS sub-program managers will implement physical controls or conduct monitoring of physical controls at specific sites, as required in these regulatory documents. An assessment of IC effectiveness may be conducted in conjunction with these inspections. The NMED may require an annual report detailing the inspection of sites with ICs. IC information for specific sites will be integrated into the LTES IMS, such as internal databases and websites.

LTES activities involving ICs in FY07 and beyond will essentially focus on refinements to, and adjustments of, the LTS ICs, based upon review of how effectively the ICs are achieving the objectives. LTES activities will also incorporate current developments for IC maintenance and

enforcement promulgated by the EPA, DOE, and other agencies with relevant responsibilities into LTS for contaminated sites.

#### *5.4.7.1 IC Performance Assessments*

Based upon the information and data compiled on the effectiveness of ICs in place and information obtained from the experience at other DOE sites and from other agencies, the selection and application of the existing LTS ICs will be revised to meet new requirements resulting from changes in land ownership, new remediation technologies, or other factors that may require new planning initiatives. This assessment of ICs will include a detailed review of at least a representative sample of LTS sites using a graded set of performance criteria appropriate for the type of ICs in place.

It is expected that an IC performance assessment will encompass a review of examples where the defense-in-depth strategy of layered ICs may have demonstrated the success of redundant ICs that prevented either the spread of potential contamination from the site or intrusion into the site by either workers or the public.

#### *5.4.7.2 Annual IC Reports*

For the first three years of IC program activities, it is expected that an annual IC report will be issued summarizing successes, issues, and problems encountered with ICs during the year. If required, the report will include updates and revisions to ICs for LTS legacy sites. After these initial annual reviews and reports, it is expected that scheduled reviews and reports would follow a five-year cycle consistent with the LTS reviews.

During FY07 and for the next three years, the IC program will benchmark the use of ICs with those of similar DOE sites and other agencies. This comparison will identify and apply any "lessons learned" or other relevant experience gained regarding the successful application, maintenance, or enforcement activities associated with ICs. This will include a review of changes in the responsibilities local and state government agencies have had in past issues that require long-term land-use management and stewardship, and factor this experience into revising the possible roles and responsibilities local and state governments may have in implementing ICs if DOE or USAF lands are transferred to private ownership.

### **5.5 LTS Outreach and Public Participation Activities**

#### **5.5.1 Introduction and Purpose**

Outreach and public participation activities are a critical component of SNL LTS. This was recognized early in stewardship planning, by the intent of the ER Project to actively inform and involve stakeholders in early stewardship development processes. Recent outreach and public participation included continued stakeholder involvement in quarterly participatory stewardship meetings, stakeholder involvement in student environmental outreach, and stakeholder presentations to the greater community. LTES outreach and public participation functions are being implemented as a component of the corporate EMS communication process. An EMS

Outreach and Public Participation Strategy is currently being developed and will provide additional framework for future LTS outreach and public participation activities.

The purpose of LTS Outreach and Public Participation is to inform stakeholders of ongoing LTS activities and involve stakeholders in certain stewardship efforts to ensure that issues and concerns are heard and responded to as appropriate. The LTS Outreach and Public Participation team will actively nurture the trust that is built with the community. This team will disseminate information to be shared with the community (website, newsletters, meetings, etc.), respond to media and community group data requests, participate in presentations and learning opportunities supported by communities and schools, and listen to and acknowledge community concerns and issues related to LTS.

LTS Outreach and Public Participation is responsible for providing stakeholders with the opportunity to voice their ideas regarding LTS, as well as to participate in an ongoing dialogue with DOE and Sandia professionals regarding the continued monitoring and maintenance of legacy sites and natural and cultural resources.

### 5.5.2 Requirements

The DOE and Sandia recognize the importance of public outreach and communications. DOE Policy P 141.2, "Public Participation and Community Relations" (DOE May 2003), states that "DOE will actively seek, consider, and respond to views of its stakeholders." This policy is fully implemented at SNL. DOE Order 450.1, "Environmental Protection Program" (DOE January 2003), provides guidance for the EMS and LTES and discusses informing the public of site activities.

As a best management practice, LTES work group documents and the LTES Plan (SNL/NM September 2006) are being considered community feedback documents.

### 5.5.3 Roles and Responsibilities

The success of LTS Outreach is dependent upon the roles and responsibilities within SNL LTS for legacy sites. These roles and responsibilities, with respect to outreach, are listed in Table 5.5.3-1.

### 5.5.4 Planning and Development

Public outreach regarding the SNL/NM ER Project began with the DOE's quarterly public meetings in 1992, which continue to be conducted. In the early years of the ER Project, as environmental concerns associated with SNL/NM achieved higher visibility, attention from the media and public became more frequent. In response, the ER Project extended invitations to individuals and groups to tour the ER sites and to participate in citizens' groups on specific topics. Early success with involving the stakeholders was achieved through two of these citizen groups—one focused on site prioritization and one convened to define future land use.

Table 5.5.3-1  
LTS Roles and Responsibilities with Respect to Outreach

Role	Responsibilities
DOE/NNSA HQ	Responsible for providing guidance on LTES, LTS, and Public Participation to field offices.
DOE/SSO	Responsible for working in conjunction with the LTS Outreach Team on stakeholder issues and appropriate DOE guidance as necessary. Also provides outreach approval (including signature approving external products).
SNL/NM Community Involvement Department	Responsible for working in conjunction with LTS Outreach Team on stakeholder issues and integrating community outreach functions that are suitable for LTES stakeholders. Potentially responsible for co-maintenance of LTES Information Office at Research Park.
SNL/NM Media Relations	Responsible for working in conjunction with LTS Outreach Team on communication processes that reach out to the community at large, including news media information requests and public meeting notifications.
LTS Outreach Team	Responsible for informing the public of activities occurring in LTS, including relevant activities in each of the subtasks. At some points in the process, it will be necessary to have community involvement to obtain feedback on SNL/NM LTS processes and activities.  LTS Outreach Team is responsible for keeping the LTS functional areas informed of community and workforce issues and concerns. Any additional community involvement will be discussed with management staff.
LTS Management Team	Responsible for the reporting of information that will go to the public and providing relevant information on program changes, regulatory changes, issues, and concerns to the LTS Outreach Team to be relayed to the external community and members of the SNL/NM workforce.
LTS Monitoring Team	Responsible for providing relevant information on new activities, regulatory changes, monitoring results, reporting, and issues/concerns to the LTS Outreach Team to be relayed to the external community and relevant members of the SNL/NM workforce.
LTS IC Team	Responsible for providing any changes in land-use definitions (ICs, land use), regulatory changes, necessary reporting, and issues/concerns that need to be relayed to the public and members of the SNL/NM workforce.
LTES Information Management Team	Responsible for providing the system foundation for information that will be relayed to the public. This includes maintenance of systems and, on occasion, modifications to the system to make necessary data and information easily retrievable. Also maintains records and a data repository that can be made available to the public in accordance with proper channels.
External Community	Responsible for communicating their needs and values to LTS teams.

DOE/NNSA HQ = U.S. Department of Energy/National Nuclear Security Administration Headquarters.  
DOE/SSO = U.S. Department of Energy/Sandia Site Office.  
IC = Institutional control.  
LTES = Long-Term Environmental Stewardship.  
LTS = Long-Term Stewardship.  
SNL/NM = Sandia National Laboratories/New Mexico.

A stakeholders' group worked with members of the SNL/NM ER Project to study preliminary site information and rank sites according to risk-based criteria. The site cleanup schedule was then developed based upon the results, with higher risk sites given priority.

Future land-use designations for all ER sites located on land owned by KAFB (including the land withdrawn from the USFS) were developed by 1997 by a stakeholders group which included representatives of SNL/NM, the DOE, USAF, USFS, and EPA, as well as local government officials and citizens. These future land-use designations were formalized in the Baseline for Future Use Options Handbook (Keystone Environmental & Planning Incorporated 1995). This was the first of several successful stakeholder groups convened by the ER Project.

Public participation played a critical role in the eventual permitting under RCRA and construction of the first CAMU in the DOE Complex. In 1993, the EPA issued the "CAMU Rule," which established the option of using a CAMU to facilitate remediations that were hampered by the existing time limits for off-site waste disposal. The ER Project quickly grasped the potential of this rule and, in 1995, established a CAMU Working Group with membership from SNL/NM, the DOE, EPA, NMED, and representatives of numerous stakeholder groups. This group met monthly for almost a year, establishing a set of group values, debating the pros and cons of various on- and off-site waste disposal options, and ultimately reaching agreement on a recommendation to pursue permitting and construction of a CAMU. The CAMU began accepting waste in January 1999.

As the ER Project matured, the national setting for public participation on environmental matters moved toward Site-Specific Advisory Boards, to include members from regulatory agencies, local governments, and citizen stakeholders. The implementation of this concept for SNL/NM was the CAB, which was created in the spring of 1995. The CAB, the membership of which varied from 15 to 20 individuals, served as a sounding board for many ER activities between 1995 and the fall of 2000, and provided valuable insight into community values and preferences associated with ER Project work at SNL/NM. The CAB evolved into the CRIO that serves as coordinator and clearinghouse for topic-specific citizens groups to continue to provide input to the ER Project.

A series of stakeholder meetings were held during 2000 and 2001 to obtain citizen input on LTES concerns. Task groups were formed to focus specifically on three areas of LTES: management, monitoring, and ICs/IM.

A draft LTES Plan was written in 2001 (SNL/NM August 2001) with citizen input and revised in 2003 to update the status and incorporate citizen recommendations into Chapter 6.0 (SNL/NM October 2003). Chapter 6.0 was revised again in September 2006 to address the current status of issues raised by stakeholders and is included as Appendix F. This general plan captured stakeholder concerns and served as a planning document to begin development of SNL LTS for legacy sites. The document also identified technical and administrative issues that needed to be resolved.

Subsequent to the draft 2001 LTES Plan, a number of stakeholder meetings were held to give the public an opportunity to determine and prioritize potential outreach projects. The group decided to collaborate with the Waste Management, Education, and Research Consortium and sponsor a Summer Environmental Academy to allow 50 high school students and their teachers to explore the topic of LTES. This week-long, hands-on workshop included tours of SNL/NM ER Project sites, simulated monitoring activities, and presented basic training on radiation topics. Teachers attending generated LTES curricula suitable for use in the classroom. Citizens then

voiced a preference for funds being spent to develop an LTES website, generate a more formalized LTES curricula for use in schools, and produce an exhibit to be placed in the National Atomic Museum.

A public-accessible website has been established at [www.sandia.gov/ltes](http://www.sandia.gov/ltes) for delivery of LTES and LTS information as a component of the public outreach program. The main purpose of the website is to educate the public about the DOE's LTES initiative and explain SNL LTS for legacy sites. This website provides an avenue for the public to provide input and advertises events and activities that allow the public to provide input. This website contains details of all SNL/NM ER Project sites, including decision documents, maps, and photos. If ongoing, long-term monitoring is being conducted at any of the ER Project sites, this website will either provide links to, or display, updated monitoring information. This website also links to other pertinent websites to assist the user in obtaining further information about LTES.

Sandia worked with a team of stakeholders to create an LTES Educational Curriculum, which was sent to 60 local teachers who requested it at the Teachers' Open House. Twenty more curriculum packets were distributed at the Youth Conference on the Environment. A traveling exhibit board providing an overview of SNL's LTES Program was created and presented at a number of conferences. Ongoing outreach activities include the generation of an interactive LTES exhibit for the National Atomic Museum and materials and training for citizens who want to conduct presentations on the LTES topic at community meetings.

#### 5.5.5 Information Sharing and Community Feedback

Meetings and presentations will be conducted to inform, and receive feedback from, the public regarding updates on LTS progress and changes in the program. Stakeholders will have a forum to voice their concerns and issues. In order to continue to share and listen to a variety of community voices, these meetings and presentations will be held at a variety of venues throughout the region. This includes presentations for the community at large, SNL/NM, KAFB, Bernalillo County, City of Albuquerque, and the USFS. Presentations and community meetings will also be established for document reviews and regulatory changes. As is the case with the current community outreach structure, task groups will be formed to provide feedback when relevant issues/concerns present themselves. It is anticipated that additional meetings will be held during the five-year review being conducted by SNL LTS for legacy sites.

Outreach materials, presentations, and the National Atomic Museum Exhibit will be updated on a regular basis for use during these meetings, and new materials will be created, as needed, to inform the community of program changes (additional requirements, ICs, and associated monitoring information). Additionally, the LTES website that was developed will continue to serve as a focal point for archived information, program updates, contact information, document additions, and a schedule of events.

During the many public meetings mentioned in Section 5.5.4, stakeholders suggested the creation of a community checklist that they could easily access. A checklist will be developed based upon the issues discussed in Appendix F. The community checklist will be available electronically on the LTES website and in hard copy at the LTES resource office. This checklist can be used in conjunction with program updates available in the ASER and Summary Pamphlet. The checklist will also provide the opportunity for additional feedback directly through the website or through the hard copy questionnaire.

It is vital that the community continue to be involved in the information sharing process regarding LTS. By incorporating community ideas and identifying issues on an ongoing basis, a proactive relationship can be developed and sustained to minimize any adverse actions that might occur if community concerns are not identified early in the process. The community also holds a wealth of knowledge and experiences that, coupled with Sandia's scientific expertise, will increase the success of SNL LTS for legacy sites.

#### 5.5.6 Scope of Work for FY07 and Beyond

LTS Outreach and Public Participation will continue to provide information to stakeholders regarding LTS activities and involve the community at large through interactive meetings and other events. SNL/NM's EM Department has an existing Environmental Outreach Program; LTS Outreach and Public Participation will be incorporated within that program. This program interfaces with the Sandia Community Involvement Department.

A valuable resource during the ER Project was the CRIO. During LTS, a similar resource office will be established with public access. This resource office will continue to function as a clearinghouse for ER- and LTS-related documentation, outreach materials, and assistance. The coordinator at the office will continue to receive community input and feedback. It is this type of input and feedback that will assist Sandia in understanding public concerns and issues, as well as provide a trigger for potential task group meetings. This type of resource is valuable to the continued communication between Sandia and local stakeholders. The use and need for this resource will be evaluated on an annual basis.

Performance measures will be developed as the program matures and will be used to determine the efficacy of the process and to provide a mechanism to implement suggested feedback.

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## 7.0 GLOSSARY

**Aquifer** – Rock or sediment in a formation, group of formations, or part of a formation which is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.

**CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act)** – Federal law that establishes a program to identify, evaluate, and remediate sites where hazardous substances may have been released (leaked, spilled, or dumped) to the environment.

**Cultural Resources** – Include but are not limited to (1) prehistoric, historic, and ethnohistoric archaeological materials (artifacts) and sites on the ground surface or buried beneath it, (2) standing structures and associated components more than 50 years old or of importance because they represent a major historical theme or era, (3) cultural and natural places, select natural resources, and sacred objects important to Native Americans and other ethnic groups, and (4) American folk life traditions and arts.

**End State** – Physical condition when cleanup actions are complete.

**Groundwater** – Water that soaks into the ground and percolates downward through rock or soil until an impermeable layer stops it. Natural sources are rainfall, snowmelt, and water that seeps into the ground beneath streams, rivers, and lakes. Other sources can include irrigated fields, canals, wastewater drain fields, injection wells, leaking pipes, and industrial cooling ponds.

**Hazardous Waste** – Waste regulated under Resource Conservation and Recovery Act (RCRA) Subtitle C. A solid waste or combination of solid wastes that, because of quantity, concentration, or physical or chemical characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

**Institutional Controls** – Generally includes all nonengineered restrictions on activities or on access or exposure to land, groundwater, surface water, waste and waste disposal areas, and other areas or media. Some common examples of tools to implement institutional controls include restrictions on use or access, zoning, governmental permitting, public advisories, and installation master plans. Institutional control commitments are necessary at sites where contamination levels prevent unrestricted and unlimited use and are labeled “Corrective Action Complete with Controls.”

**ISMS (Integrated Safety Management System)** – Systematically integrates safety into management and work practices at all levels so that missions are accomplished while protecting the worker, the public, and the environment.

**Long-Term Environmental Stewardship** – Activities and processes that ensure the long-term protection of a site’s natural and cultural resources affected by SNL operation and support organizations throughout its operational, closure, and post-closure life cycle.

**Long-Term Stewardship** – Physical controls, institutions, information, and other mechanisms necessary to ensure protection of people and the environment at sites where the U.S. Department of Energy has completed or plans to complete cleanup (e.g., landfill closures, remedial actions, removal actions, and facility stabilization).

**Mixed Waste** – Waste that contains both radioactive and hazardous waste components.

**Perched Water** – Water that collects above a layer of relatively impermeable material, such as clay, and then slowly moves downward to the aquifer; perched water zones are often present beneath reservoirs and industrial facilities, but disappear when the surface-water source is eliminated.

**Radioactive Waste** – Solid, liquid, or gaseous material that contains radionuclides regulated under the Atomic Energy Act of 1954, as amended, and is of negligible economic value considering recovery costs.

**RCRA (Resource Conservation and Recovery Act)** – Federal waste management law. Its regulations govern the management (transportation, treatment, storage, and disposal) of solid waste and the generation, accumulation, recycling, and handling of hazardous waste. RCRA waste includes material listed on one of the EPA's hazardous waste lists or material that meets one or more of EPA's four characteristics: ignitability, corrosivity, reactivity, or toxicity.

**Remediation** – Process of cleaning up to an acceptable level of risk a site where a hazardous or radioactive substance has been released.

**Residual Contamination** – Amount of a hazardous or radioactive pollutant remaining in the environment after a natural or technological remediation process.

**Vadose Zone** – Unsaturated layers of rock and soil extending from the ground surface down to the water table, or aquifer. Contaminants move at different rates through the vadose zone depending on how they react with the rock and sedimentary material.

**APPENDIX A**  
**SNL/CA LTS Information**

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## ACRONYMS AND ABBREVIATIONS

AOC	area of concern
ASER	Annual Site Environmental Report
CEARP	Comprehensive Environmental Assessment and Response Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
EMS	Environmental Management System
ES&H	Environmental Safety and Health
FOS	Fuel Oil Spill
LLNL	Lawrence Livermore National Laboratory
LTES	Long-Term Environmental Stewardship
LTS	Long-Term Stewardship
NLF	Navy Landfill
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RWQCB	Regional Water Quality Control Board
Sandia	Sandia Corporation
SCO	Site Cleanup Order
SNL	Sandia National Laboratories
SNL/CA	Sandia National Laboratories, California
SNL/NM	Sandia National Laboratories/New Mexico
SSO	Sandia Site Office
SWMU	Solid Waste Management Unit
TARS	Trudell Auto Repair Shop
VSI	visual site inspection

## 1.0 SNL/CA LTS INFORMATION

This appendix is a supplement to the Sandia National Laboratories (SNL's) Long-Term Stewardship (LTS) Implementation Plan for Legacy Sites, and provides a discussion of the setting, history, history of Environmental Restoration, requirements and scope of LTS activities at Sandia National Laboratories/California (SNL/CA). Proposed management, information management, monitoring, institutional controls, and outreach activities at SNL/CA are also included in this appendix. SNL's Long-Term Environmental Stewardship (LTES) programmatic assumptions and context are explained in the main body of the Implementation Plan, thus this appendix should not be assumed to be a stand-alone document. Further information about SNL/CA can be found in the Site Environmental Report for 2004, Sandia National Laboratories/California (SNL/CA June 2005).

### 1.1 General Setting of SNL/CA

SNL/CA is located approximately 40 miles east of San Francisco, near the City of Livermore in eastern Alameda County. Figure A-1 shows the regional location of the site. SNL/CA occupies 410 acres. The main campus (134 acres) is surrounded on the east, south and west by undeveloped land (Figure A-2). To the north of SNL/CA are East Avenue and Lawrence Livermore National Laboratories (LLNL). Land use to the east and south of the site is agricultural and low-density residential. To the west of SNL/CA, construction continues on a residential development that began in 2003.

The site lies at the western base of the Altamont Hills on relatively flat terrain with low relief sloping gently northwest and north. The site ranges in elevation from 615 feet above mean sea level at the northwest corner of the property to 849 feet at the southern end. Surface soils and arroyo sediments cover the SNL/CA site. Groundwater in the SNL/CA area occurs within saturated unconsolidated geologic material. Depth to groundwater varies from less than 20 feet on the eastern portion of the site to 126 feet on the west side of the site.

There are no perennial streams or natural surface-water bodies at SNL/CA. The Arroyo Seco, an intermittent stream, diagonally traverses the site from southeast to northwest. The arroyo typically flows continuously only in very wet years, and for short periods of time during heavy storms. A seasonal wetland that is wet well into June, and sometimes July, is located in the stream bed along the eastern part of the arroyo. Storm water runoff at SNL/CA is conveyed to Arroyo Seco through a system of storm drains and channels.

Two manmade ponds, encompassing approximately 2.7 acres, are located in the west outer perimeter area at SNL/CA. These ponds were constructed by LLNL in 1989 and served as a recharge basin for their groundwater treatment program. Between 1989 and 2003, treated water from the LLNL site was routinely discharged to the recharge basin ponds. However, LLNL's program requirements changed during 2003, reducing the need to discharge water to the ponds. Although treated water has not been discharged to the ponds since July 2003, LLNL continues to maintain them as a backup location for discharge of treated water.



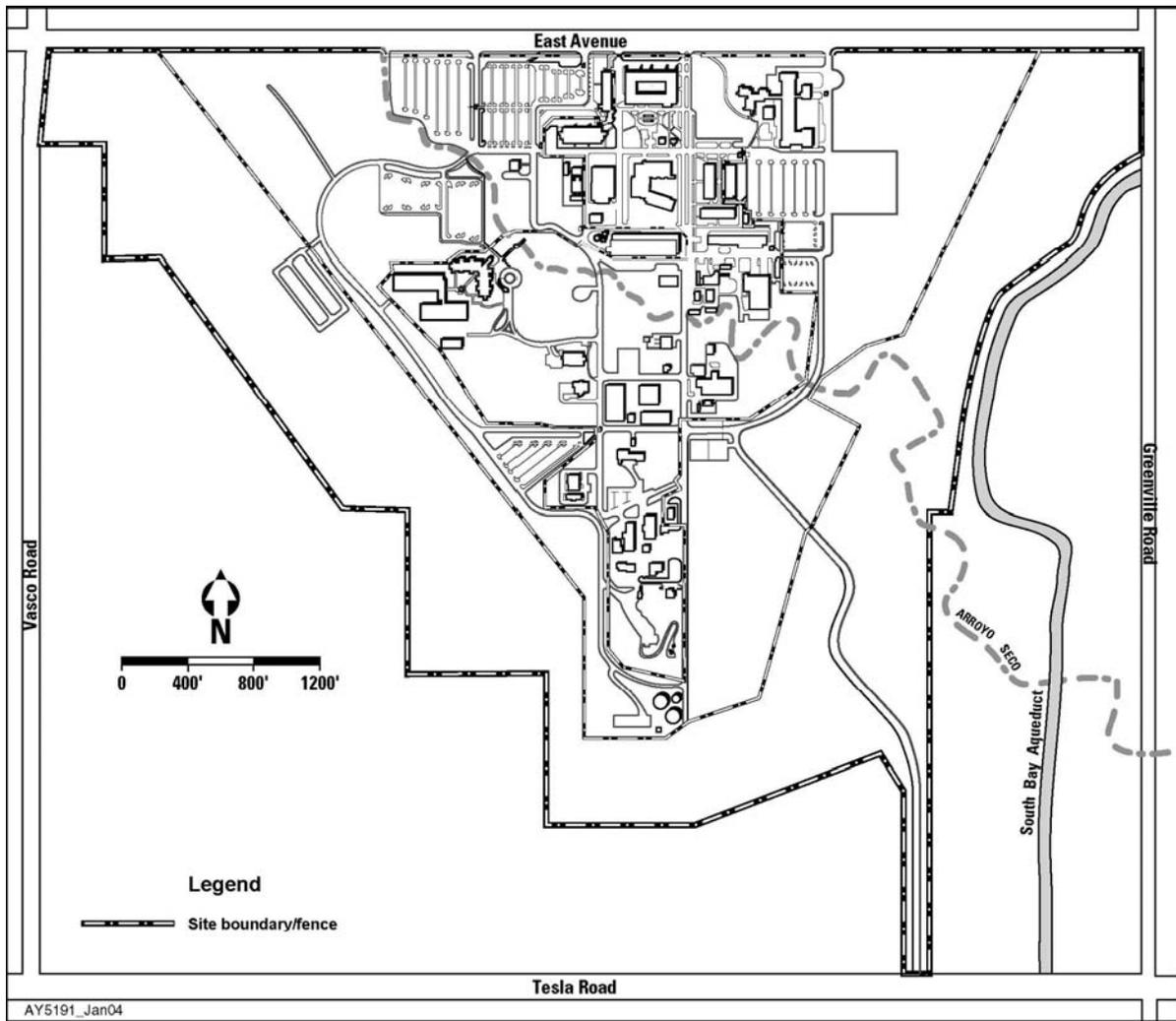


Figure A-2  
SNL/CA Site Map

SNL/CA is located in a seismically active region. The major fault systems in the area are the San Andreas Fault system and the much older Coast Range thrust fault system. Any seismic activity in the Livermore Valley would probably result from movement on the San Andreas Fault, a fault system trending northwest-southeast, extending from Point Arena to the Gulf of California.

Additional information can be found in the "Final Site-wide Environmental Assessment of the Sandia National Laboratories/California" (DOE January 2003a).

## **1.2 General History and Overview of SNL/CA**

SNL/CA was established in 1956 by Sandia Corporation (Sandia) to provide a closer relationship with LLNL and their nuclear weapons design work. The SNL/CA facility evolved into an engineering research and development laboratory by the early 1960s, and into a multi-program engineering and science laboratory during the 1970s. As international arms control efforts increased in the late 1970s and throughout the 1980s, the United States emphasized treaty monitoring, safety, security, and control of the national nuclear weapons stockpile.

Sandia National Laboratory Livermore is a research and development laboratory dedicated to the design and testing of components of nuclear weapon systems. Major research activities include work with tritium, arming, fusing and firing systems, and aerodynamics and structural elements used in nuclear warheads.

SNL/CA is a government owned/contractor operated laboratory. The SNL/CA workforce is comprised of approximately 1000 employees. The contractor workforce fluctuates throughout the year depending on program staffing needs. The site, the buildings, and the equipment are owned by the government; while Sandia Corporation, a Lockheed Martin Company, operates the laboratory for the U.S. Department of Energy's (DOE) National Nuclear Security Administration. The DOE/Sandia Site Office (SSO) oversees the operations at the site, using Sandia Corporation as a management and operating contractor.

## **1.3 History of SNL/CA Environmental Restoration Activities**

Between 1984 and 1986, DOE investigated the SNL/CA site under their Comprehensive Environmental Assessment and Response Program (CEARP) to identify and assess potential environmental problems (DOE 1986). The CEARP investigation evaluated compliance with major federal environmental laws, including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA established liability compensation, cleanup, and emergency response for hazardous substances released to the environment. During the CEARP investigation, two potential CERCLA sites were identified at SNL/CA, the Fuel Oil Spill (FOS) Site and the Navy Landfill (NLF). A Hazard Ranking System study was performed for each site to determine if either qualified for listing on the National Priorities List. Hazard Ranking System scores for both sites fell below 28.5, the qualifying score for listing. Since completion of the CEARP investigation, there have been no hazardous substance releases or contaminated sites found at SNL/CA that warranted CERCLA investigation or a Hazard Ranking System study.

Since 1985, environmental restoration and monitoring activities at SNL/CA have been conducted in compliance with site clean-up orders issued by the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region under provisions established in the California Water Code (California RWQCB 1989). The RWQCB issued a Site Cleanup Order (SCO) for SNL/CA to perform a number of tasks. Some of them included (1) identify the location of all potential sources of hazardous material disposed of, or discharged to, the SNL/CA's facility, and determine if a discharge to soil or ground water has occurred; (2) define the horizontal and vertical extent of all soil and ground water pollution; (3) define local and regional hydrogeologic conditions in the areas of and contiguous to identified pollution; and (4) identify and properly seal or abandon all wells within the legal boundaries of the facility which may have been, or threaten to be, conduits for the spread of ground water pollution.

A Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed to identify and evaluate solid waste management units (SWMUs) and areas of concern (AOCs) at SNL/CA. The RFA utilized a records review, data evaluation, interviews, and visual site inspection (VSI) to evaluate past and potential releases of hazardous constituents from SWMUs and AOCs identified during the assessment. There were 23 SWMUs identified at this facility. All of the SWMUs were under oversight of the RWQCB. A VSI was conducted in April, 1991. The VSI included inspection of identified SWMUs and of the majority of the operating facilities.

The SCO covered specifically the FOS Area (SWMU #1), NLF solid waste disposal site (SWMU #3); and the Trudell Auto Repair Shop (TARS) Site (SWMU #21). At FOS site (SWMU #1), and TARS (SWMU #21), fuel oil had spilled into the ground. In situ bioremediation was recommended for bench and pilot testing. The RWQCB provided oversight on the cleanup of these fuel oil spills. Contamination at the TARS (SWMU #21) had not migrated deeper than 5 feet (TARS-FS 1990). The RWQCB determined that SNL/CA has completed Provisions 2a and 2b of SCO. SNL/CA submitted the NLF site (SWMU #3) SWAT Investigation Report (SWAT-R 1990) and determined that there is no contamination source and no contaminants have migrated from this site.

SNL/CA has submitted various reports in order to meet the requirement of the SCO. Those are (1) Environmental Survey Preliminary Report (ES-PR 1988), SNL/CA, January 1988; (2) TARS, Feasibility Study Report, SNL/CA, September 1990; (3) NLF SWAT Proposal, SNL/CA, August, 1988; (4) NLF SWAT Report, SNL/CA, June 1990; (5) FOS, Remedial Investigation Report, SNL/CA, April 1989; (6) Miscellaneous Sites, Reconnaissance Sampling Plan, SNL/CA, December 1990; and (7) Miscellaneous Sites, Reconnaissance Investigation Report, SNL/CA, October 1991.

SNL/CA submitted a report "Miscellaneous Sites Reconnaissance Investigation, October 1991" (MS-RIR 1991). No organic, inorganic, or radiological contaminants of concern were identified in the soils in quantities requiring remedial actions at these sites. SNL/CA recommended that no further actions be taken and the sites be considered closed under existing laws and regulations.

Although there are no active remediation sites at SNL/CA, groundwater monitoring is ongoing at two locations, the FOS Site and the NLF. SNL/CA currently samples three groundwater monitoring wells for residual contamination: two at the FOS Site; and one at the NLF.

## 2.0 REQUIREMENTS FOR LTS AT SNL/CA

SNL/CA operates in compliance with the applicable federal, state, and local environmental laws and regulations. Additionally, as a DOE facility, the site is subject to DOE directives (DOE orders), and to presidential executive orders.

### Regulatory Requirements include:

California RWQCB 1989, Order No. 89-184, Revision of Site Cleanup Order, Sandia Corporation and U.S. Department of Energy, Livermore, December 1989.

### DOE requirements include:

- DOE Memorandum “Long-Term Stewardship Responsibility” (DOE January 2001)
- DOE Order 450.1 “Environmental Protection Program” (approved January 2003; changed January 2005 [DOE January 2003b])

*DOE Order 450.1, Environmental Protection Program* outlines the basic strategy for environmental compliance at DOE facilities, including SNL/CA. The objectives of Order 450.1 are to implement sound environmental stewardship practices, and to meet or exceed compliance with environmental, public health, and resource protection laws, regulations, and DOE requirements (DOE January 2003b). The order requires DOE sites to meet these objectives through an environmental management system (EMS) that integrates environment, safety, and health into work planning and execution.

Sandia has committed to implementing an institutionalized EMS by December 2005, the DOE established deadline. In 2004, SNL/CA established a site-specific EMS team to support corporate-wide EMS development and implementation. As part of this effort, the SNL/CA EMS team identified site-specific objectives and targets for use in measuring environmental consequences (positive and negative) of site operations. The SNL/CA team also began preparation of an EMS Program document to define the elements of the EMS program as they relate to the SNL/CA site, and to describe the mechanics of implementation on a site level.

## 3.0 SCOPE OF PROPOSED SNL/CA LTS

### 3.1 Management

Historically, environmental management at SNL focused on a requirements-driven program that mandated compliance with environmental laws, regulations, DOE directives, and internal policies. As a result, SNL/CA has a well-defined Environmental Safety and Health (ES&H) program that addresses all aspects of the environmental regulatory arena. Corporate policies, an ES&H compliance manual, environmental programs, and ES&H councils, committees, and teams support environmental management at SNL.

Over the past few years, Sandia's focus has shifted from a compliance-based program to a program that looks beyond compliance towards stewardship. A continuing cycle of planning, implementing, evaluating, and improving processes and actions is being implemented through Sandia's EMS in order to reduce potential adverse environmental effects and enhance environmental stewardship. SNL/CA maintains a site-specific EMS that tiers from the corporate program but is tailored to the environmental risks applicable to California operations.

### **3.2 Information Management**

Information from the SNL/CA environmental cleanup is housed in the SNL corporate record center, and is available internally through the SHEARS on the internal web site and other shared computer resources. The databases containing the monitoring data are being linked to the Sandia National Laboratories/New Mexico (SNL/NM) LTES Information Management System. Historical information, as well as monitoring data as reported in the SNL/CA Annual Site Environmental Report (ASER) will be made available to the public on SNL's external web site.

### **3.3 Monitoring**

As of December 2005, SNL/CA had two areas requiring remedial actions: ) 1) the Navy landfill, and 2) the fuel oil spill site. Corrective actions have been completed at the TARS and the NLF. No active remediation is being performed at the fuel oil spill site, but the site is monitored to ensure that the spill does not migrate. In addition, one well at the NLF continues to be monitored due to intermittent carbon tetrachloride detections.

The California RWQCB has indicated that groundwater monitoring will be required to ensure that volatile organic compound and petroleum hydrocarbon contamination in groundwater does not spread further. SNL/CA compliance requirements and well locations selected are defined in SNL/CA Groundwater Protection Management Program Plan and approved by the California RWQCB for long-term groundwater monitoring. Currently groundwater monitoring is performed at SNL/CA for carbon tetrachloride and diesel.

Routine inspection and maintenance will be implemented to ensure the integrity of the monitoring well networks. Activities will include inspections for signs of disturbance and well maintenance. The criteria and frequency of surveillance and maintenance will comply with the Site Cleanup Order. Institutional Controls (ICs), reporting, reassessment, and contingencies will also be performed in accordance with the SCO and the associated SNL/CA Groundwater Protection Management Program Plan.

### **3.4 Institutional Controls**

IC activities for SNL/CA will meet the requirements outlined in DOE P 454.1, Use of Institutional Controls (DOE 2005) and, as appropriate, follow the guidance included in DOE G 454.1-1, Institutional Controls Implementation Guide for Use with DOE P 454.1, Use of Institutional Controls (DOE 2005). In addition, the development and implementation of an IC strategy will be coordinated with the SNL/NM IC group to ensure compliance and consistency.

### 3.5 Outreach

SNL/CA's environmental outreach includes annual publication of the ASER, which includes monitoring data from the 3 wells included in LTS. An annual meeting to explain the ASER to the public had been held, but was discontinued due to lack of participants. The corporate LTES web site will contain SNL/CA site information to preserve the results of the regulatory decisions which affected those sites. General LTES brochures generated by SNL/NM will be made available for SNL/CA use.

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**APPENDIX B**  
**Kauai Test Facility Information**

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## ACRONYMS AND ABBREVIATIONS

ASER	Annual Site Environmental Report
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
EA	environmental assessment
EIS	environmental impact statement
ER	Environmental Restoration
FTU-1	Flight Test Unit 1
KTF	Kauai Test Facility
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
PMRF	Pacific Missile Range Facility
SNL/KTF	Sandia National Laboratories, Kauai Test Facility
SSO	Sandia Site Office
STARS	Strategic Targeting System

## 1.0 KAUI TEST FACILITY INFORMATION

The Kauai Test Facility (KTF) is operated by Sandia Corporation as a rocket preparation, launching, and tracking facility for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA), as well as in support of other U.S. military agencies. Sandia National Laboratories, Kauai Test Facility (SNL/KTF) refers to the facilities at KTF. SNL/KTF is owned by the DOE/NNSA and managed by the Sandia Site Office (SSO) in Albuquerque, New Mexico. SNL/KTF exists as a facility within the boundaries of the U.S. Department of Defense (DoD) Pacific Missile Range Facility (PMRF). SNL/KTF is located on the island of Kauai at the north end of the PMRF, near Nohili Point (Figure B-1). Further information about the KTF can be found in the "Calendar Year 2004 Annual Site Environmental Report [ASER] for Tonopah Test Range, Nevada and Kauai Test Facility, Hawaii" (SNL/NM September 2005). The ASER summarizes data and the compliance status of the environmental protection and monitoring programs at SNL/KTF.

### 1.1 Facilities and Operations

SNL/KTF has been an active rocket-launching facility since 1962. The KTF and Remote Range Interfaces Department, under Sandia Corporation, manages and conducts the rocket-launching activities at SNL/KTF. The site is primarily used for testing rocket systems with scientific and technological payloads, advanced development of maneuvering re-entry vehicles, scientific studies of atmospheric and exoatmospheric phenomena, and Missile Defense Agency programs. Nuclear devices have never been launched from SNL/KTF, nor have radiological materials been used at SNL/KTF.

The first facilities at KTF were constructed in the early 1960s to support the National Readiness Program. The most recent construction, completed in 1994, added four buildings to support DOE and Strategic Defense Initiative launches. From 1992 to 2004, there have been 20 launches.

The KTF launcher field was originally designed to accommodate 40 launch pads, but only 15 pads were constructed. Of these, 11 have had their launchers removed. Beyond the implementation of portions of the original plan, two additional launch pads were constructed: Pad 41 at Kokole Point, and Pad 42, the Strategic Targeting System (STARS) launch pad. The launcher field site has a number of permanent facilities used to support rocket operations. In addition to rocket launch pad sites, SNL/KTF facilities include missile assembly areas, data acquisition and operations facilities, a maintenance shop, and a trailer compound for administration and technical support personnel. Other features at SNL/KTF include extensive radar tracking and worldwide radio communication access to other DoD facilities.

The administrative area of SNL/KTF, known as the Main Compound, is located within a fenced area near the North Nohili access road from PMRF. Inside the fenced compound, a number of trailers and vans are connected together with a network of concrete docks and covered walkways. The majority of these temporary facilities are used during operational periods to support the field staff at SNL/KTF. During nonoperational periods, general maintenance continues and dehumidifiers remain in operation (to protect equipment). Additionally, there are a number of permanent buildings, most of which are in use year-round to support and maintain SNL/KTF facilities.

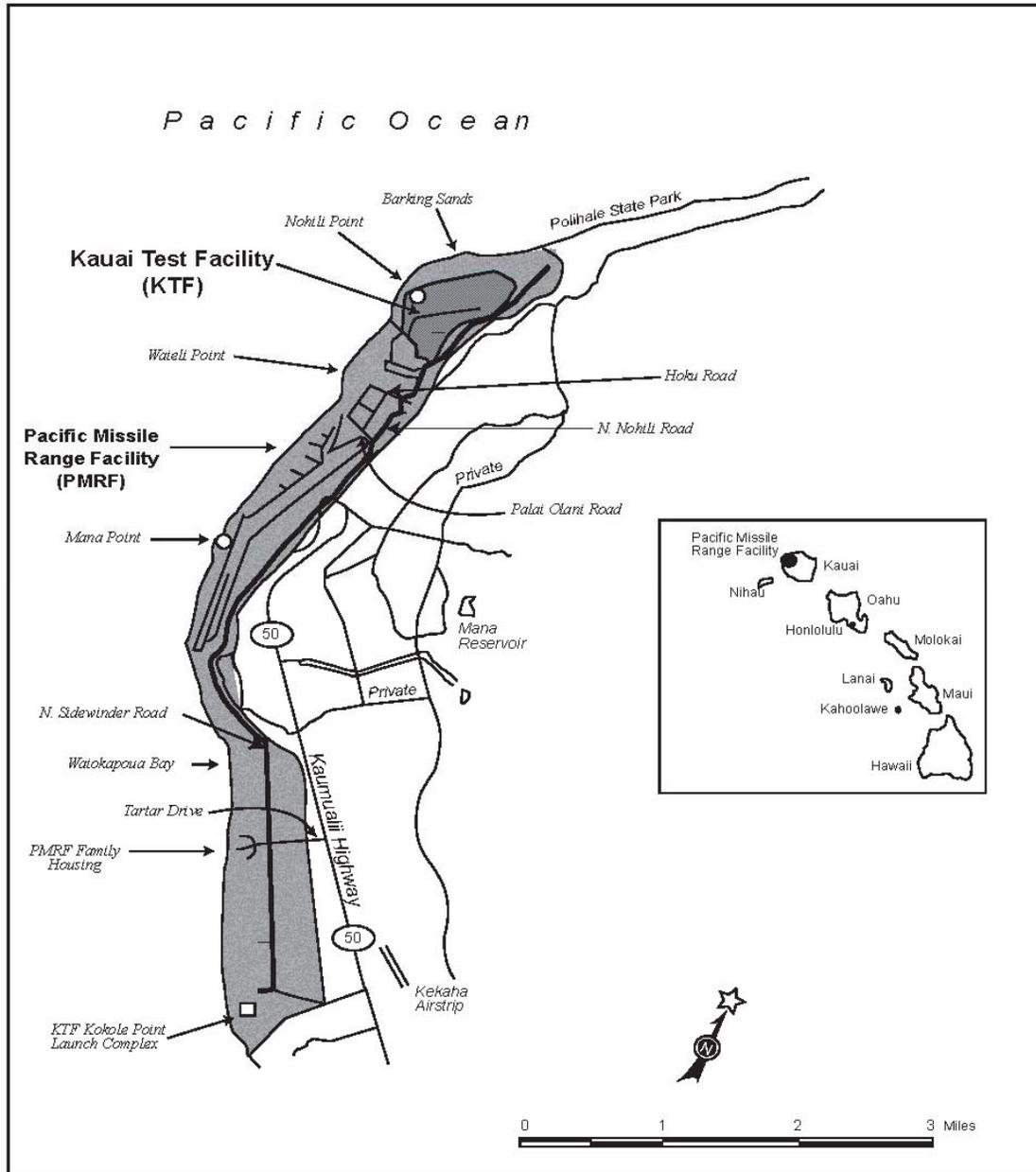


Figure B-1  
 Map of the Pacific Missile Range Facility (PMRF) and the  
 Adjacent Area (The Kauai Test Facility (KTF) is to the north, near Nohili Point)

## **1.2 Demographics**

There are 13 permanent on-site personnel at SNL/KTF. During operational periods when rocket launches occur, an additional 15 to 130 persons from the U.S. mainland are brought to SNL/KTF (DOE 1992). The closest population center to SNL/KTF is the town of Kekaha (population 3,300), which is eight miles from the site.

## **1.3 Environmental Program Activities**

This section describes three environmental programs: the National Environmental Policy Act (NEPA) Program, the Environmental Restoration (ER) Project, and the Spill Prevention Program.

### **1.3.1 NEPA Program Activities**

In accordance with NEPA, a comprehensive Sitewide Environmental Assessment (EA) was completed for SNL/KTF in 1992 (DOE 1992), which resulted in a Finding of No Significant Impact, issued on July 17, 1992. This EA is the current NEPA document covering all rocket-launching activities at SNL/KTF. Additionally, an environmental impact statement (EIS) specific to the STARS Program is in place for rocket launches of this type (DoD December 1998).

Prior to Sandia Corporation beginning any proposed action that may potentially affect sensitive species or habitats, a NEPA Checklist is submitted to DOE/NNSA/SSO for a determination. As it is applicable, DOE/NNSA/SSO must consult with the following agencies:

- U.S. Fish and Wildlife Service
- State of Hawaii Department of Land and Natural Resources

In 2004, Sandia National Laboratories/New Mexico NEPA staff completed one NEPA compliance review for proposed actions at SNL/KTF. This review referenced existing NEPA documentation for KTF.

### **1.3.2 ER Project Activities**

Three ER sites were identified at SNL/KTF in 1995. On September 30, 1996, the EPA decided that no further action was warranted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for these three ER sites. This confirmed that SNL/KTF met all CERCLA requirements, and no additional sampling or remediation would be necessary in the three areas. However, the EPA may reevaluate the SNL/KTF site if additional information becomes available that impacts the status of the no further action decision.

## **1.4 Environmental Surveillance and Monitoring Activities**

### **1.4.1 Wastewater Monitoring**

Sandia Corporation's activities at SNL/KTF produce only sanitary sewage, which is directed into five wastewater systems—three septic tanks and two French drains—in accordance with Hawaii Underground Injection Control regulations. The septic systems are periodically pumped by licensed state-certified contractors and inspected by state officials. The limited quantity of sewage released does not impact any protected waters and, as noted earlier, there are no drinking water wells in the area of SNL/KTF. Currently, septic tanks do not require permitting or sampling. As a best management practice, Sandia Corporation periodically performs sampling. No contaminants were identified above the reporting limits from past sampling events.

### **1.4.2 Air Emission Monitoring**

Based upon effluent air monitoring results of the STARS Flight Test Unit 1 (FTU-1) in February 1993 and the CDX rocket launch in the summer of 1992 (Stocum 1992), it was determined that rocket launches at SNL/KTF were not a significant source of air pollutants. Launches are infrequent and emissions recorded did not exceed federal and state standards. Because the STARS type rocket produces the greatest air emissions and remained within acceptable limits, it can be assumed that future launches of this type will also be within acceptable limits. Therefore, no further air emission monitoring is planned at this time. If a new rocket type is launched from SNL/KTF that differs in emission substance from the STARS rocket, or air emission requirements change, future monitoring may be considered.

### **1.4.3 Meteorological Monitoring**

On-site meteorological instruments are used during test periods to characterize atmospheric transport, diffusion conditions, and stability classes. Due to the infrequency of launches, no formal meteorological monitoring plan is in place for SNL/KTF. Climatic information representative of SNL/KTF is obtained from the PMRF.

### **1.4.4 Noise Monitoring**

In accordance with the Quiet Communities Act of 1978, noise monitoring was conducted in February 1993 during the STARS FTU-1 launch to confirm the determination made in the STARS EIS that noise produced from the largest launch would be below maximum acceptable levels (Swanson 1993). Data collected in the nearest town of Kekaha indicated that levels were no louder than noise generated from passing vehicles on a nearby highway.

### **1.4.5 Terrestrial Surveillance**

Terrestrial surveillance sampling of soil is conducted every five years.

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**APPENDIX C**  
**Tonopah Test Range Information**

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## ACRONYMS AND ABBREVIATIONS

DOE	U.S. Department of Energy
ER	Environmental Restoration
NAFB	Nellis Air Force Base
NNSA	National Nuclear Security Administration
NSO	Nevada Site Office
NTS	Nevada Test Site
NTTR	Nevada Test and Training Range
SSO	Sandia Site Office
TTR	Tonopah Test Range
USAF	U.S. Air Force

## 1.0 TONOPAH TEST RANGE INFORMATION

Sandia Corporation's Tonopah Test Range (TTR) is located on approximately 280 square miles (179,200 acres) within the boundaries of the Nevada Test and Training Range (NTTR) withdrawal and is used to support U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA) and U.S. Air Force (USAF) activities and missions. TTR is owned by the DOE/NNSA, and is managed by the Sandia Site Office (SSO) in Albuquerque, New Mexico. Westinghouse Government Service performs most environmental program functions on behalf of Sandia Corporation, including environmental media sampling, wastewater effluent and drinking water monitoring, spill response, and waste management operations. Westinghouse Government Service also supports TTR during tests by operating optics equipment, recovering test objects, and performing radiography.

### 1.1 TTR History and Operations

In 1940, President Roosevelt established the "Las Vegas Bombing and Gunnery Range" (now referred to as NTTR), which is part of the Nellis Air Force Base (NAFB) Complex. The NAFB Complex, located eight miles north of Las Vegas, Nevada, includes several auxiliary small arm ranges, and the NTTR—divided into a North Range and a South Range (Figure C-1). The Nevada Test Site (NTS) is located between these two ranges. The entire NAFB Complex is comprised of approximately three million acres. TTR is located 32 miles southeast of Tonopah, Nevada.

#### 1.1.1 TTR Site Characteristics

The topography at TTR is characterized by a broad, flat, valley bordered by two north and south trending mountain ranges: the Cactus Range to the west (occurring mostly within the boundaries of TTR) and the Kawich Range to the east. Cactus Flat is the valley floor where the main operational area of TTR is located. An area of low hills outcrops in the south. Elevations within TTR range from 5,347 feet at the valley floor to 7,482 feet at Cactus Peak. The elevation within the town of Tonopah is 6,030 feet.

#### 1.1.2 TTR Site Selection

TTR was selected as a bombing range after similar facilities at the Salton Sea Test Base in California, as well as Yucca Flat on the NTS, became inadequate. By the mid-1950s, the atmosphere at the Salton Sea Test Base became permeated with haze, which limited visibility and hampered photography. Nevada's Yucca Flat site also became inadequate due to the increasing emphasis on low-altitude approaches and deliveries that required flat terrain and a long approach corridor. The TTR site was located in the northwest corner of the then Las Vegas Bombing and Gunnery Range. The site, which was approximately seven times the size of the Salton Sea Test Base, was well suited because it had immense areas of flat terrain needed for the increasing use of rockets and low-altitude, high-speed aircraft operations. The area was withdrawn in 1956 and TTR became operational in 1957 to operate and test new weapon systems. In the years following World War II, facilities that were built at TTR were

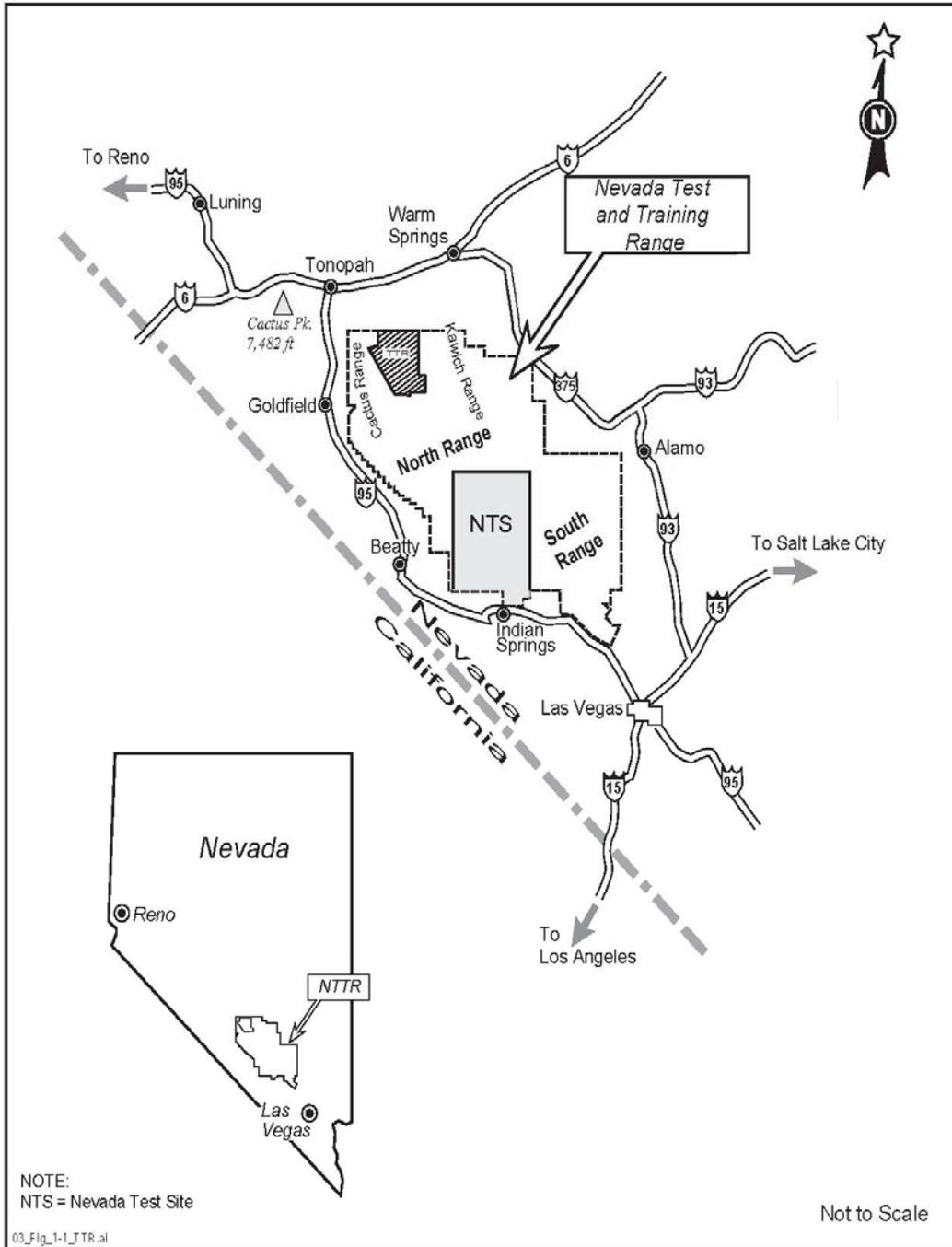


Figure C-1  
 Location of the Tonopah Test Range (TTR), Within the  
 Boundaries of the Nevada Test and Training Range (NTR), Nevada

originally designed and equipped to gather data on aircraft delivered inert test vehicles under U.S. Atomic Energy Commission cognizance (now DOE). Over the years, the facilities and capabilities at TTR were expanded to accommodate tests related to the DOE/NNSA's Weapons Ordnance Program.

### 1.1.3 Operations Control Center

The Main Compound in Area 3 is the heart of the test range activities. The Operations Control Center controls and coordinates all test functions and affords a 360-degree view of the site. During test operations, the test director, range safety officer, test project engineer, camera controller, and range communicator operate the consoles in the Operations Control Center to control and coordinate all test functions.

### 1.1.4 TTR Activities

Principal DOE activities at TTR include stockpile reliability testing; research and development testing support of structural development; arming, fusing and firing systems testing; and testing nuclear weapon delivery systems. No nuclear devices are tested at TTR.

TTR is instrumented with a wide array of signal tracking equipment including video, high-speed cameras, radar tracking devices used to characterize ballistics, aerodynamics, and parachute performance on artillery shells, bomb drops, missiles, and rockets.

In recent years, specific test activities at TTR have consisted of the following:

- Air drops (trajectory studies of simulated weapons);
- Gun firings;
- Ground-launched rockets (study of aeroballistics and material properties);
- Air-launched rockets (deployed from aircraft);
- Explosive testing (e.g., shipping and storage containers);
- Static rocket tests (related to the Trident Submarine Program); and
- Ground penetrator tests.

These activities require a remote range for both public safety and to maintain national security. The majority of test activities at TTR occur within Cactus Flat, a valley with almost no topographical relief flanked by mountains and hills.

### 1.1.5 Site Responsibility

On October 1, 1997, a Memorandum of Agreement was signed between DOE/SSO and the DOE/Nevada Site Office (NSO) in regards to operational test activities at TTR (DOE 1994). It was determined that DOE/SSO is responsible for the oversight of TTR; however, DOE/NSO will continue with the oversight of Environmental Restoration (ER) activities at TTR. Environmental program management is a joint effort between Sandia Corporation's TTR and Sandia National Laboratories, New Mexico employees and contractors with oversight from DOE/SSO. In April 2002, a Land-Use Permit was signed between the USAF and NNSA entitled, "Department of the Air Force Permit to the National Nuclear Security Administration To Use Property Located On

The Nevada Test and Training Range, Nevada.” The current size of TTR is approximately 280 square miles (179,200 acres). Prior to the April 2002 lease agreement, the footprint was 335,655 acres.

## **1.2 Site Description and Demographics**

TTR is located within the NTTR at the northern boundary. The area north of the TTR boundary is sparsely populated public lands administered by both the U.S. Bureau of Land Management (BLM) and the U.S. Forest Service (USFS). The land is currently used to graze cattle. There is a substantial irrigated farming operation to the north of the range as well. To the east of TTR, and within the NTTR, is the Nevada Wild Horse Range, which is also administered by the BLM.

The nearest residents are located in the town of Goldfield (population 659), approximately 22 miles west of the site boundary. The town of Tonopah (population 4,400) is approximately 30 miles northwest of the site (DOC 2005). Las Vegas, Nevada is 140 miles from TTR. The total population within a 50-miles radius around TTR is approximately 7,000, which includes the potential population at TTR if all housing units at the site were occupied.

The ER Project, the Waste Management Program, and the National Environmental Policy Act Program are some of the programs and activities Sandia Corporation’s TTR utilizes to meet compliance with various state and federal regulations, Executive Orders, and DOE Orders. Terrestrial surveillance, drinking water, wastewater, and air quality programs are discussed in Chapter 4 of the “Calendar Year 2004 Annual Site Environmental Report for Tonopah Test Range, Nevada and Kauai Test Facility, Hawaii” (SNL/NM September 2005).

## **1.3 ER Project Activities**

The ER Project at TTR began in 1980 to address contamination resulting primarily from nuclear weapons testing and related support activities. In late 1992 and early 1993, an agreement was reached between DOE Headquarters, the DOE/NNSA Service Center and the DOE/NSO regarding the management of ER activities at TTR. The decision was made to designate the responsibility of all ER sites to DOE/NSO. Further information about TTR can be found in the “Calendar Year 2004 Annual Site Environmental Report for Tonopah Test Range, Nevada and Kauai Test Facility, Hawaii” (SNL/NM September 2005).

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**APPENDIX D**  
**Comprehensive Summary of the SNL/NM Environmental Restoration Project**

## **APPENDIX D**

### **Comprehensive Summary of the SNL/NM Environmental Restoration Project**

The Sandia National Laboratories/New Mexico (SNL/NM) Environmental Restoration (ER) Project is responsible for the assessment and, if necessary, the remediation of inactive waste sites. This assessment began formally in 1984 for SNL/NM when the U.S. Department of Energy (DOE) Albuquerque Operations Office initiated the Comprehensive Environmental Assessment and Response Program (CEARP) to identify, assess, and remediate potentially hazardous waste sites. The project was designed to comply with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Phase I of the CEARP, "The Installation Assessment" (DOE September 1987a) identified 117 sites at SNL/NM and was submitted to the U.S. Environmental Protection Agency (EPA) by SNL/NM in September 1987.

A similar investigation was conducted by EPA Region 6 in April 1987 during the Resource Conservation and Recovery Act (RCRA) Facility Assessment (EPA April 1987). These programs ultimately defined a working inventory of Solid Waste Management Units (SWMUs) to be investigated during the course of the ER Project at SNL/NM.

In 1987, SNL/NM sites were evaluated by the EPA under the EPA's CERCLA Hazard Ranking System (HRS), a risk-based system for prioritizing site cleanups (DOE September 1987b). Based upon the HRS ranking, no SNL/NM sites qualified for cleanup under the CERCLA National Priority List (NPL). For federal facilities that are not listed on the NPL, CERCLA requires compliance with state laws concerning removal and remedial actions.

In 1990, the DOE began to fund SNL/NM to conduct ER investigations for all locations for which SNL/NM might be responsible. When the ER Project was formally established in 1992, the work was projected to be completed by 2020; 117 sites had been identified for attention. As the ER Project began, minor scoping sampling had been conducted at a few sites, and several groundwater monitoring wells had been installed at two landfill locations. The number of sites to be addressed grew to 268 (203 SWMUs and 65 Areas of Concern [AOCs] that were included on SNL/NM's RCRA permit) (EPA August 1993). Table D-1 lists the regulatory status of 264 sites that will go through the no further action (NFA)/corrective action complete (CAC) process. Three SWMUs in active use are not scheduled for immediate cleanup. It is also noted that the CAMU and groundwater areas, which all have regulatory requirements, are not included in the site count.

In 1991, the ER Project initiated a study to determine whether an Environmental Assessment (EA) or an Environmental Impact Study was appropriate for the ER Project activities. The ER Project began work on an ER-specific EA in 1994; the EA was approved and issued in March 1996 (DOE March 1996). Coincident with this effort, a Program Implementation Plan (SNL/NM February 1994) was developed, which included an evaluation of the similarities and differences of RCRA and CERCLA and identification and evaluation of all laws and statutes that needed to be considered as Applicable or Relevant and Appropriate Requirements for all SNL/NM ER sites. The need for definition of any environmental constraints (because of the requirements of the National Environmental Protection Act) was identified.

A number of major site-wide surveys and cleanups were conducted prior to and during site investigations. Biological and cultural-resource surveys were conducted in 1991 and 1995, respectively (Hoagland and Della-Russo February 1995). An Unexploded Ordnance (UXO) Survey and Cleanup was conducted in 1993 (SNL/NM September 1994) to ensure no UXO hazard would be present at the sites during investigations. A site-wide Surface Gamma Radiation Survey and Cleanup (RUST Geotech December 2004, SNL/NM September 1997) was conducted from 1993 through 1997 to ensure no radiological hazard would be present at the sites during investigations. A Site-Wide Hydrogeologic Characterization Project was conducted from 1991 to 1997 to develop a realistic conceptual model of the local hydrogeologic framework on Kirtland Air Force Base (KAFB), and completed definition of the geologic, structural, and hydrologic setting in 1997 (SNL/NM February 1998a).

Off-site locations, where various testing activities took place at sites outside KAFB, have been evaluated. For each of the 41 off-site locations, a reasonable justification for no further work was apparent. Most sites reverted back to the control of the federal agency that was the land owner at the site (Copland March 2005).

The ER Project constructed the first Corrective Action Management Unit (CAMU) in the DOE complex in order to facilitate site remediation operations, such as excavation of the Chemical Waste Landfill (CWL), that were hampered by the existing time limits for off-site waste disposal. The ER Project established a CAMU Working Group in 1995, with membership from SNL/NM, the DOE, the EPA, the New Mexico Environmental Department (NMED), and representatives of numerous stakeholder groups. This group recommended construction of a CAMU. CAMU construction began in December 1997 and the CAMU began accepting waste in January 1999.

Public outreach began with quarterly public meetings in 1992, which continue to be conducted. The ER Project also extended invitations to individuals and groups to tour the ER sites and to participate in citizens' groups on specific topics. As the ER Project matured, the national setting for public participation on environmental matters moved toward Site-Specific Advisory Boards, to include members from regulatory agencies, local governments, and citizen stakeholders. The implementation of this concept for SNL/NM was the Citizens' Advisory Board (CAB), which was created in the spring of 1995. The CAB, the membership of which varied from 15 to 20 individuals, served as a sounding board for many ER activities between 1995 and the fall of 2000, and provided valuable insight into community values and preferences associated with ER work at SNL/NM.

Although clean closure (no contaminants exceeding established background levels) has been achieved at many sites, the majority of the other sites were proposed for NFA/CAC under a risk-based scenario dependent upon established future land-use designations (DOE et al. September 1995). The future land-use designations form the key assumption for determining the risk-based cleanup levels at these ER sites. The future land use, plus the definition of regulator-approved background concentrations of naturally occurring constituents, provides essential information for conduct of risk assessments.

Future land-use designations were developed by 1997 for all ER sites located on land owned by KAFB (including the land withdrawn from the U.S. Forest Service [USFS]) by a stakeholders group that included representatives of SNL/NM, the DOE, the U.S. Air Force, the USFS, and the EPA, as well as local government officials and citizens. This group formalized their agreement in a Baseline for Future Use Options document (Keystone Environmental & Planning, Inc. 1995), which fully describes the end state and future land use, as well as the use of risk assessment for cleanup end states. The map in Figure D-1, Future Land Use Designations on

Kirtland Air Force Base, depicts the future land uses for the entire site. Table D-2 lists the current status of all the ER sites and their characteristics for stewardship, including future land-use designations.

Background concentrations of all naturally occurring contaminants, definition of the hydrogeologic framework, and an agreed-upon risk assessment methodology (requiring the definition of future land use) were required for use in support of risk-based NFA proposals. Work on each of these was initiated during 1992 and 1993. Agreement on the suite of naturally occurring contaminants for both soil and groundwater was reached with the NMED by 1994, and a formally documented set of background concentrations for all of these materials was complete by 1997.

The SNL/NM ER Project negotiated an approved risk assessment methodology with the NMED and EPA for both human health and ecological risk, as well as for both radiological and nonradiological contaminants. Agreement on human health risk assessment was achieved in 1997. In 1997, the ecological risk assessment methodology consistent with risk assessment guidance was developed in accordance with EPA and NMED guidance (EPA 1997, EPA 1998; IT July 1998), with agreement from the NMED in 1999. Another key SNL/NM risk assessment methodology document was developed and approved by the NMED during this same time period. The "RESRAD Input Parameter Assumptions and Justification" (SNL/NM February 1998b) summarized all of the exposure parameters used to evaluate the human health radiological risk for implementation into the RESRAD computer code. Thus, all components required to evaluate risk once a site was characterized were established. More detail about future land use and the risk basis for ER site cleanups can be found in the SNL/NM ER Project "Final End State Vision" document (SNL/NM December 2004).

The ER Project has addressed the vast majority of the sites, is currently in the process of finalizing regulatory post-closure requirements for many sites, and is planned for completion in 2006. All sites have been characterized, as have four areas of low-concentration groundwater contamination. Four major landfills and numerous smaller sites have been remediated. Remediation is complete at all AOCs. A complete chronology of major ER Project activities is presented in Appendix E of this document.

NFA/CAC proposals have been submitted to the NMED for 263 of the remaining 264 sites as of March 2006. The NMED has approved 177 of these, and the other 86 (risk-based) NFA/CAC proposals are at various stages in the regulatory review and approval process. Figure D-2 presents a flowchart of ER sites proposed for NFA/CAC as of March 2006. The CWL is regulated under a closure plan that requires alternative closure documentation. In 2003, a Compliance Order on Consent (Consent Order) was negotiated with the NMED to establish a fixed schedule for completion of regulatory activities including definition of groundwater requirements and submittal of regulatory documentation associated with completion of the corrective action process for all SWMUs and AOCs managed by the ER Project (NMED April 2004).

The Long-Term Environmental Stewardship (LTES) Plan was written in 2001 (SNL/NM August 2001) with citizen input. The CAB evolved into the Community Resource Information Office that serves as coordinator and clearinghouse for topic-specific citizens groups to continue to provide input to the ER Project and LTES planning. The ER Project has begun to transition compliance responsibilities to SNL/NM's Environmental Management Department in order to ensure an efficient transition to long-term stewardship after the ER Project is completed at the end of Fiscal Year 2006.

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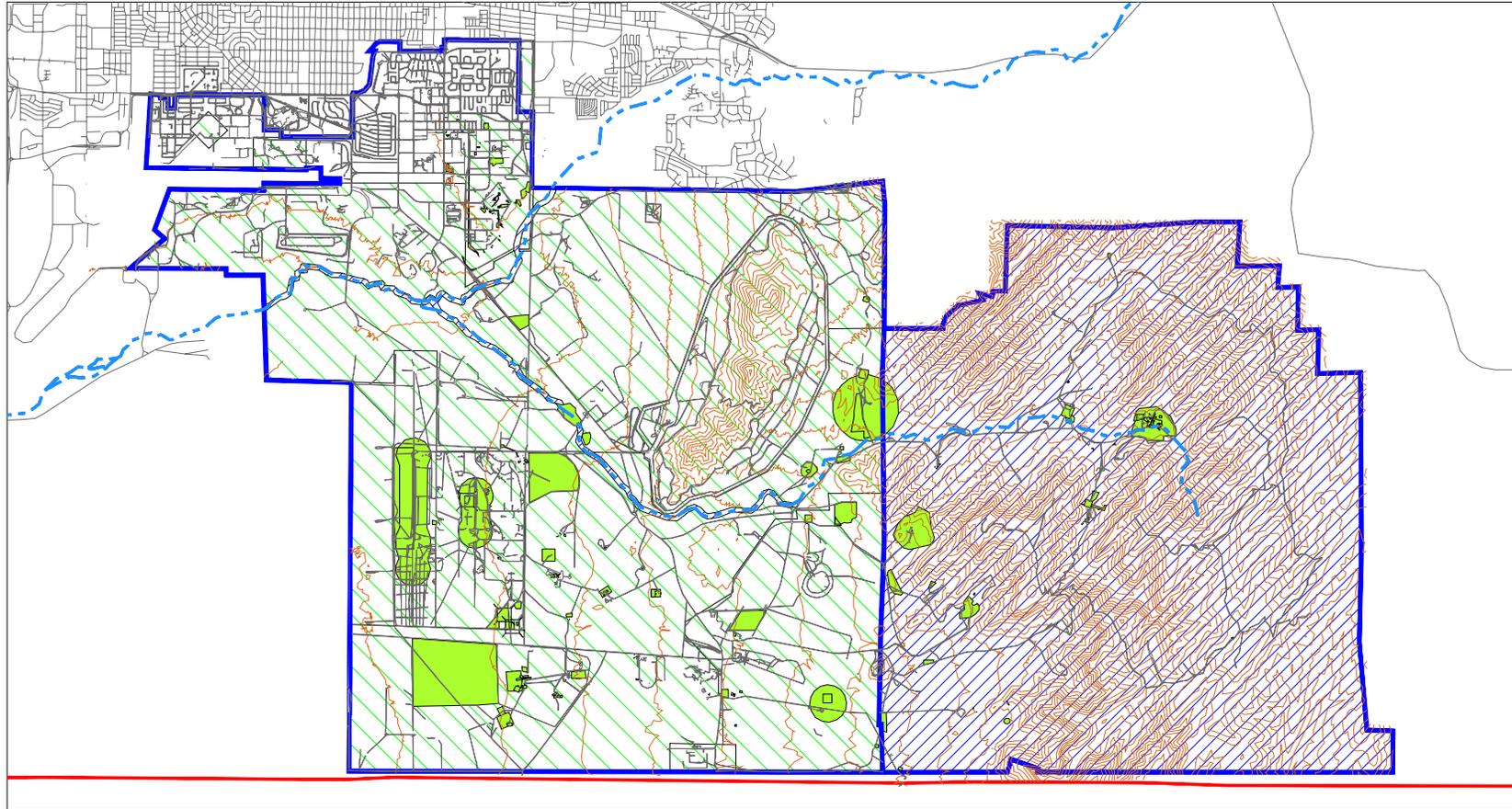
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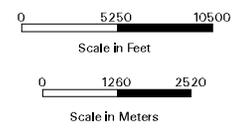
## FIGURES



- |   |                        |   |                              |
|---|------------------------|---|------------------------------|
|  | Landfill/Cover         |  | Recreational Future Land Use |
|  | 100' Contour           |  | Industrial Future Land Use   |
|  | Paved and Unpaved Road |  | Solid Waste Management Unit  |
|  | KAFB Boundary          |   |                              |
|  | Arroyo                 |   |                              |
|  | Isleta Pueblo Boundary |   |                              |

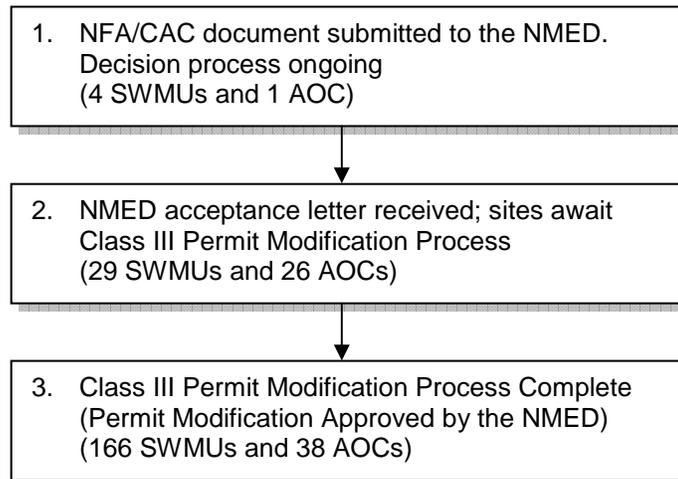
**Legend**

Sandia National Laboratories, New Mexico  
Environmental Geographic Information System



**Figure D-1**  
**Future Land Use Designations on Kirtland Air Force Base (KAFB)**

SNL/NM ER Sites Proposed for NFA/CAC as of July 2006<sup>a</sup>  
(SWMUs and AOCs)



Note: Three sites are not included because they are deferred active mission sites and are not currently scheduled for remediation. One additional site, the Chemical Waste Landfill, is subject to a Closure Plan and is not included.

<sup>a</sup>See Table D-1 for individual site listings.

AOC = Area of Concern.  
CAC = Corrective Action Complete.  
ER = Environmental Restoration.  
NFA = No Further Action.  
NMED = New Mexico Environment Department.  
SNL/NM = Sandia National Laboratories/New Mexico.  
SWMU = Solid Waste Management Unit.

Figure D-2  
Regulatory Status of 264 Environmental Restoration Sites Proposed for NFA/CAC  
Sandia National Laboratories/New Mexico

## TABLES

Table D-1  
Regulatory Status of 268 Environmental Restoration Project Sites at SNL/NM  
(As of July 2006)

Status		Sites	
Deferred active mission sites not scheduled for remediation		3 SWMUs	83, 84, 240
Sites not going through NFA/CAC Process		1 SWMU	74 (Chemical Waste Landfill is subject to a Closure Plan)
NFA/CAC document not yet submitted to NMED		0 SWMUs	NA
		0 AOCs	NA
SNL/NM Submitted NFA/CAC Proposal	Awaiting Initial NMED Response	1 SWMU	105
		0 AOCs	NA
	Received Request for Supplemental Information: SNL/NM Action Required	2 SWMUs	58 76 (submit CMI Report 10/29/2007)
		0 AOCs	NA
Received and Answered Request for Supplemental Information: NMED Action Required	1 SWMU	28-2	
	1 AOC	1101	
SNL/NM Submitted NFA/CAC Proposal; Received NMED Acceptance Letter		29 SWMUs	1, 3, 4, 5, 8, 45, 46, 49, 52, 68, 78, 91, 101, 116, 137, 138, 140, 146, 147, 148, 149, 150, 152, 153, 154, 161, 196, 233, 234
		26 AOCs	276, 1004, 1031, 1034, 1035, 1036, 1052, 1078, 1079, 1080, 1081, 1084, 1087, 1090, 1092, 1094, 1095, 1098, 1102, 1104, 1113, 1114, 1115, 1116, 1117, 1120
Class III Permit Modification Process Complete (Permit Modification Approved by NMED)		<u>SWMUs</u> 14 With Controls	2, 48, 54, 87, 94B, 94F, 96, 98, 135, 136, 190, 226, 227, 229,
		<u>AOCs</u> 3 With Controls	94H, 1029, TNT Site
		<u>SWMUs</u> 152 Without Controls	6, 6A, 7, 9, 10, 11, 12A, 12B, 13, 14, 15, 16, 17A-H, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28-1, 28-3, 28-4, 28-5, 28-6, 28-7, 28-8, 28-9, 28-10, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 47, 50, 51, 53, 55, 56, 57A, 57B, 59, 60, 61A, 61B, 61C, 62, 63A, 63B, 64, 65A, 65B, 65C, 65D, 65E, 66, 67, 69, 70, 71, 72, 73, 77, 81A, 81B, 81C, 81D, 81E, 81F, 82, 85, 86, 88A, 88B, 89A-C, 90, 92, 93A-C, 94A, 94C, 94D, 94E, 94G, 100, 102, 103, 104, 107, 108, 109, 111, 112, 113, 114, 115, 117, 139, 141, 142, 143, 144, 145, 151, 155, 159, 160, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 178, 179, 180, 181, 186, 187, 188, 191, 192, 193, 194, 195, 211, 228A, 228B, 230, 231, 232, 235, 241, 275
		<u>AOCs</u> 35 Without Controls	277, 278, 1001, 1003, 1006, 1007, 1008, 1009, 1010, 1014, 1015, 1020, 1024, 1025, 1026, 1027, 1028, 1030, 1032, 1033, 1072, 1073, 1077, 1082, 1083, 1086, 1089, 1091, 1093, 1096, 1105, 1108, 1110, 1111, 1112

- AOC = Area of Concern.
- CAC = Corrective Action Complete.
- CMI = Corrective Measure Implementation.
- DOE = U.S. Department of Energy.
- NA = Not applicable.
- NFA = No further action.
- NMED = New Mexico Environment Department.
- RSI = Request for Supplemental Information.
- SNL/NM = Sandia National Laboratories/New Mexico.
- SWMU = Solid Waste Management Unit.
- TNT = 2,4,6-Trinitrotoluene.

Table D-2  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
1	Radioactive Waste Landfill	II	0.30	5,421	520		Industrial	7/19/2005	VCM/Confirmatory Sampling/Risk-Based (September 1997)	TBD	TBD	RMMA; abolished 7/31/2000.
2	Classified Waste Landfill	II	1.93	5,418	320	Radionuclides, Metals, PCBs, HE, VOCs	Industrial	6/2/2006	VCM/Confirmatory Sampling/Risk-Based (September 2001)	TBD	TBD	RMMA; abolished 4/19/2004.
3	Chemical Disposal Pits	II	0.30	5,421	520		Industrial	7/19/2005	VCM/Confirmatory Sampling/Risk-Based (September 1997)	TBD	TBD	RMMA; abolished 7/31/2000.
4	LWDS Surface Impoundments	III, V	0.84	5,410	480	Radionuclides, Organics, Metals, PCBs	Industrial	2/20/2006	Confirmatory Sampling/Risk-Based (September 1995)	TBD	TBD	RMMA; abolished 8/14/2003.
5	LWDS Drainfield	III, V	0.11	5,430	480	Radionuclides, Organics, Metals, PCBs	Industrial	2/20/2006	Confirmatory Sampling/Risk-Based (September 1995)	None	None	RMMA; abolished 8/19/2003.
6	Gas Cylinder Disposal Pit (Bldg. 9966)		0.03	5,402		None	Industrial	11/19/2001	VCM/Confirmatory Sampling (October 1996)	None	None	
6A	Gas Cylinder Disposal Pit		1.37	5,402		None	Industrial	11/19/2001	VCM/Confirmatory Sampling (October 1996)	None	None	
7	Gas Cylinder Disposal (Arroyo del Coyote)		7.03	5,466	500	None	Recreational	9/15/2000	Administrative (June 1995)	None	None	
8	Open Dump (Coyote Canyon Blast Area)		30.10	5,920	40-60	Metals, DU, HE, Asbestos, JP-4, Th, H-3	Industrial	6/6/2005	VCM/Confirmatory Sampling/Risk-Based (April 2005)	None	None	RMMA; abolished 9/27/2000.
9	Burial Site/Open Dump (Schoolhouse Mesa)		1.86	5,848		DU, HE, Metals, SVOCs	Industrial	4/6/2005	Confirmatory Sampling/Risk-Based (September 2000)	None	None	RMMA; abolished 1/27/2000.
10	Burial Mounds (Bunker Area North of Pendulum Site)		2.86	6,175	180	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (September 1998)	None	None	RMMA; abolished 1/18/2000.
11	Explosive Burial Mounds		1.01	5,720	88	Metals, SVOCs	Industrial	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (September 1997)	None	None	RMMA; abolished 9/27/1996.
12A	Burial Site/Open Dump: Open Dump (Lurance Canyon)		0.26	6,358	130	None	Recreational	9/15/2000	Confirmatory Sampling (May 1997)	None	None	RMMA; abolished 8/28/2000.
12B	Burial Site/Open Dump: Buried Debris in Graded Area		0.35	6,340	130	Metals, HE, VOCs, SVOCs	Recreational	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (September 1998)	None	None	RMMA; abolished 1/18/2000.
13	Oil Surface Impoundment (Lurance Canyon Burn Site)		0.49	6,348	115	None	Recreational	7/21/2000	Confirmatory Sampling/Risk-Based (August 1997)	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
14	Burial Site (Bldg. 9920)		1.25	5,454	347	None	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (June 1998)	None	None	RMMA; abolished 1/24/2000.
15	Trash Pits (Frustration Site)		2.44	6,275		None	Recreational	9/29/1997	Confirmatory Sampling (August 1995)	None	None	
16	Open Dumps (Arroyo del Coyote)		25.36	5,540	500	None	Recreational	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (September 1999)	None	None	RMMA; abolished 1999.
17A	Scrap Yards/Open Dump (Thunder Range)		0.42	5,419	167	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
17B	Scrap Yard/Open Dump (Thunder Range)		2.11	5,409	167	DU, Pb	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
17C	Scrap Yard/Open Dump (Thunder Range)		8.04	5,502	167	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
17D	Scrap Yard/Open Dump (Thunder Range)		0.32	5,476	167	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
17E	Scrap Yard/Open Dump (Thunder Range)		0.06	5,417	167	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
17F	Scrap Yard/Open Dump (Thunder Range)		0.02	5,417	167	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
17G	Scrap Yard/Open Dump (Thunder Range)		0.67	5,467	167	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
17H	Scrap Yard/Open Dump (Thunder Range)		1.86	5,427	167	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	TBD	TBD	RMMA; abolished 2000.
18	Concrete Pad	III, V	1.13	5,387	470	DU, HE, PCBs, Metals (Cd, Cr, Zn, others)	Industrial	4/6/2005	VCM/Confirmatory Sampling/Risk-Based (August 1997)	None	None	RMMA; abolished 2002.
19	TRUPAK Boneyard Storage Area (Northwest end of Old Aerial Cable)		1.85	6,150	400	Radionuclides, Metals	Recreational	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (September 1997)	This site is fenced.	None	RMMA; abolished 1999.
20	Schoolhouse Mesa Burn Site		0.16	5,802		None	Industrial	12/31/1995	Administrative (August 1994)	None	None	
21	Metal Scrap (Coyote Springs)		0.98	5,849	15	None	Industrial	9/15/2000	Administrative (August 1994); Confirmatory Sampling/Risk-Based (September 1997)	None	None	RMMA; abolished 6/29/1995.
22	Storage/Burn (west of SOR)		0.07	5,890	55	None	Industrial	7/21/2000	Confirmatory Sampling (June 1995)	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
23	Disposal Trenches (near Tijeras Arroyo)		16.10	5,336	290	None	Industrial	7/21/2000	Administrative (June 1995)	None	None	RMMA; abolished 10/6/2000.
26	Burial Site (west of TA-III)	III, V	167.12	5,328		Metals, DU	Industrial	4/6/2005	Administrative (June 1996)	None	None	RMMA; abolished 3/20/2002.
27	Bldg. 9820 - Animal Disposal Pit (Coyote Springs)		0.57	6,040	160-200	Radionuclides, VOCs, SVOCS, Metals, Pesticides, Herbicides, HE	Recreational	7/21/2000	Confirmatory Sampling (August 1995); VCM/Confirmatory Sampling/Risk-Based (June 1998)	None	None	RMMA; abolished 2000.
28A	Mine Shafts, Mine & Spoil Pile 28-1		0.11	6,200	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	Cable net installed at entrance to prevent entry.	None	RMMA; abolished 2001.
28B	Mine Shafts, 28-2, MS-B, 2 Shafts		0.04	6,570	40-80	Metals, HE, radionuclides	Recreational	NA	VCM/Confirmatory Sampling/Risk-Based (April 2004)	Entrance to mineshaft was backfilled.	Yes	RMMA; abolished 1/24/2000.
28C	Mine Shafts, 28-3, MS-C		0.02	6,342	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	The mineshaft was backfilled with clean soil.	None	RMMA; abolished 2001.
28D	Mine Shafts, RW-50, 28-4, MS-D		0.30	6,273	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	The site is fenced.	None	RMMA; abolished 2001.
28E	Mine Shafts, MS-E, 28-5		0.02	6,430	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	None; only tailings pile is present.	None	RMMA; abolished 2001.
28F	Mine Shafts, MS-F, 28-6		0.02	6,213	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	The mineshaft was backfilled with clean soil.	None	RMMA; abolished 2001.
28G	Mine Shafts, MS-G, 28-7		0.02	6,238	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	None, the entrance to the mineshaft has no barrier.	None	RMMA; abolished 2001.
28H	Mine Shafts, 28-8, MS-H		0.02	6,243	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	None; only a small depression or prospecting pit exists.	None	RMMA; abolished 2001.
28I	Mine Shafts, 28-9, MS-I		0.02	7,310	40-80	None	Recreational	9/29/1997	Confirmatory Sampling/Risk-Based (August 1995)	None; the entrance to the mineshaft has no barrier.	None	RMMA; abolished 2001.
28J	Mine Shafts, 28-10, MS-J		0.15	6,201	40-80	Metals	Recreational	11/19/2001	VCM/Confirmatory Sampling/Risk-Based (August 2001)	The mineshaft was backfilled with tailings and soil.	None	RMMA; abolished 2001.
30	PCB Spill (Reclamation Yard)	I	6.58	5,428	280	PCBs, Organics, Metals	Industrial	4/6/2005	VCM/Confirmatory Sampling/Risk-Based (September 2001)	None	None	
31	Electrical Transformer Oil Spill	III, V	0.01	5,415		PCBs, Mineral based transformer oil	Industrial	11/19/2001	Confirmatory Sampling (June 1996)	None	None	
32	Steam Plant Oil Spill	I	0.22	5,405	275	Petroleum hydrocarbons	Industrial	12/31/1995	Administrative (August 1994)	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
33	Motor Pool Oil Spill	I	2.32	5,429	275	Petroleum hydrocarbons, Organic solvents, Metals	Industrial	4/6/2005	Confirmatory Sampling (October 1996)	None	None	
34	Centrifuge Oil Spill	III, V	0.16	5,433	480	Mineral based transformer oil, PCBs	Industrial	11/19/2001	Confirmatory Sampling (June 1996)	None	None	
35	Vibration Facility Oil Spill	III, V	0.02	5,404	480	Oil, PCBs	Industrial	4/6/2005	Confirmatory Sampling (June 1996)	None	None	
36	Oil Spill - HERMES	III, V	0.05	5,436	480	Oil, PCBs	Industrial	11/19/2001	Confirmatory Sampling (June 1996)	None	None	
37	PROTO Oil Spill	III, V	0.55	5,439	480	Mineral based transformer oil	Industrial	11/19/2001	Confirmatory Sampling (June 1996)	None	None	
38	Oil Spills (Bldg. 9920)		0.01	5,459	496	None	Industrial	7/21/2000	Confirmatory Sampling (June 1996)	None	None	
39	Oil Spill - Solar Facility		0.02	5,587		None	Industrial	9/29/1997	Administrative (June 1995)	None	None	
40	Oil Spill (6000 Igloo Area)		0.02	5,230	400	None	Industrial	9/29/1997	Confirmatory Sampling (June 1995)	This site is fenced.	TBD	
41	Bldg. 838 Mercury Spill	I	0.14	5,414	275	Hg	Industrial	12/31/1995	Administrative (August 1994)	None	None	
42	Acid Spill Water Treatment Facility	I	0.46	5,430	300	Acids, Bases, Metals	Industrial	9/15/2000	Confirmatory Sampling/Risk-Based (May 1997)	None	None	
43	Radioactive Material Storage Yard	II	0.11	5,410	320	Metals, Radionuclides	Industrial	9/15/2000	Administrative (August 1994)	None	None	RMMA; abolished 2000.
44A	Decontamination Site & Uranium Calibration Pits	II	0.01	5,414	520	Radionuclides (especially U), Metals	Industrial	7/21/2000	Confirmatory Sampling (August 1994); VCM/Confirmatory Sampling/Risk-Based (September 1997)	None	None	RMMA; abolished 2000.
44B	Decontamination Site & Uranium Calibration Pits	II	0.03	5,415	520	Radionuclides (especially U), Metals	Industrial	7/21/2000	Confirmatory Sampling (August 1994); VCM/Confirmatory Sampling/Risk-Based (September 1997)	None	None	RMMA; abolished 2000.
45	Liquid Discharge	IV	0.78	5,406	350	Metals	Industrial	3/2/2005	Confirmatory Sampling/Risk-Based (September 1997)	None	None	
46	Old Acid Waste Line Outfall (Tijeras Arroyo)	IV	1.16	5,383	300	VOCs, SVOCs, PCBs, Metals, Radionuclides	Industrial	3/1/2006	Risk-Based (June 1995)	TBD	TBD	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
47	Unmanned Seismic Observatory		1.02	5,980		None	Recreational	12/31/1995	Administrative (August 1994)	None	None	
48	Bldg. 904 Septic System	II	0.46	5,410		Organics, HE, Radionuclides, Inorganics, Metals	Industrial	6/2/2006	Confirmatory sampling (June 1995)	TBD	TBD	RMMA; abolished 1/27/2000.
49	Bldg. 9820 Drains		0.04	6,060	100	VOCs, SVOCs	Recreational	9/13/2005	Confirmatory Sampling/Risk-Based (June 1996)	None	None	RMMA; abolished 11/6/2000.
50	Old Centrifuge Site (Tijeras Arroyo)	IV	0.39	5,405	280	None	Industrial	9/15/2000	Risk-Based (June 1995)	None	None	
51	Bldg. 6924 Pad, Tank, Pit	III, V	0.15	5,416	480	VOCs, SVOCs, Metals, HE, Radionuclides	Industrial	11/19/2001	Confirmatory Sampling (June 1996)	None	None	
52	LWDS Holding Tanks	III, V	0.58	5,420	480	VOCs, SVOCs, Radionuclides, Metals	Industrial	11/2/2005	Confirmatory Sampling (September 1995)	None	None	RMMA; abolished 11/11/2003.
53	Bldg. 9923 Storage Igloo		0.00	5,459		Radionuclides, Organic solvents, Heavy metals	Industrial	9/29/1997	Administrative (June 1995)	None	None	
54	Pickax Site (Thunder Range)		445.69	5,358	480	HE	Industrial	7/21/2000	Confirmatory Sampling (October 1996)	TBD	TBD	
55	Red Towers Site (Thunder Range)		13.26	5,405	300	DU	Industrial	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (June 1999)	None	None	RMMA; abolished 2000.
56	Old Thunderwells (Thunder Range)		0.08	5,415	480	None	Industrial	7/21/2000	Confirmatory Sampling (October 1996)	None	None	
57A	Workman Site: Firing Site		4.22	5,706	88	Metals, SVOCs, HE, PCBs	Industrial	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (September 1998)	None	None	
57B	Workman Site: Target Area		11.12	5,952	125-220	Metals	Recreational	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (September 1997)	None	None	RMMA; abolished 2/12/1999.
58	Coyote Canyon Blast Area		254.60	5,940	40-60	HE, Metals, Organics, Argon, Radionuclides	Industrial Part-Recreational	NA	VCM/Confirmatory Sampling/Risk-Based (April 2005)	TBD	TBD	RMMA; abolished 2000.
59	Pendulum Site		0.20	6,129	180	None	Industrial	7/21/2000	Administrative (August 1995); Confirmatory Sampling (September 1997)	None	None	
60	Bunker Area (north of Pendulum Site)		0.01	6,181		DU, Metals	Industrial	11/19/2001	VCM/Confirmatory Sampling/Risk-Based (September 2000)	None	None	RMMA; abolished 10/23/2002.

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
61A	Schoolhouse Mesa Test Site		33.93	5,876	95	Metals, HE, SVOCs, VOCs, Radionuclides	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (September 1998)	None	None	RMMA; abolished 3/2/2000.
61B	Schoolhouse Mesa Test Site: Cratering Area		41.80	5,716	50	This site was transferred to KAFB in May 1995	Industrial	12/5/1996	NA	None	None	Transferred to KAFB
61C	Schoolhouse Mesa Test Site: Schoolhouse Bldg.		4.49	5,798	95	Metals, VOCs, SVOCs, HE	Industrial	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (June 1999)	None	None	RMMA; abolished 1/24/2000.
62	Greystone Manor Site		6.43	5,854		None	Industrial	12/31/1995	Administrative (August 1994)	None	None	
63A	Balloon Test Area: PDSP Site		4.08	6,165	320	None	Recreational	9/15/2000	Administrative (August 1995); Confirmatory Sampling (September 1997)	None	None	RMMA; abolished 5/3/1999.
63B	Balloon Test Area: Balloon/Helicopter Site		9.25	6,173	320	None	Recreational	7/21/2000	Confirmatory Sampling (September 1997)	None	None	RMMA; abolished 5/3/1999.
64	Gun Site (Madera Canyon)		1.61	6,500	150	None	Recreational	9/15/2000	Administrative (August 1995); Confirmatory Sampling (September 1997)	None	None	
65A	Lurance Canyon Explosive Test Site: Small Debris Mound		0.02	6,363	115	None	Recreational	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (September 1999)	None	None	RMMA; abolished 1/24/2000.
65B	Lurance Canyon Explosive Test Site: Primary Detonation Area		3.39	6,348	115	None	Recreational	9/15/2000	Confirmatory Sampling/Risk-Based (September 1999)	None	None	RMMA; abolished 1/24/2000.
65C	Lurance Canyon Explosive Test Site: Secondary Detonation Area		1.33	6,355	115	None	Recreational	9/15/2000	Confirmatory Sampling/Risk-Based (September 1999)	None	None	RMMA; abolished 1/24/2000.
65D	Lurance Canyon Explosive Test Site: Near Field Dispersion Area		7.98	6,325	115	None	Recreational	9/15/2000	Confirmatory Sampling/Risk-Based (September 1999)	TBD	Soil Disturbance Restrictions	RMMA; abolished 1/24/2000.
65E	Lurance Canyon Explosive Test Site: Far Field Dispersion Area		76.85	6,365	115	DU	Recreational	7/21/2000	Confirmatory Sampling/Risk-Based (September 1998)	None	None	RMMA; abolished 6/1/1999.
66	Boxcar Site		3.91	5,980		Metals, VOCS	Recreational	4/6/2005	Confirmatory Sampling (October 1996)	None	None	RMMA; abolished 1/28/2002.
67	Frustration Site		0.01	6,350		None	Recreational	11/19/2001	Administrative (August 1995)	Metal door and cable mesh installed to prevent entry.	None	This site is also a Mine Shaft.

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
68	Old Burn Site		6.48	5,862	115–125	Metals, VOCs, SVOCs, Radionuclides	Industrial	10/26/2005	VCM/Confirmatory Sampling/Risk-Based	None	None	RMMA; abolished 4/29/2004.
69	Old Borrow Pit		0.97	5,952		None	Industrial	12/31/1995	Administrative (August 1994)	None	None	
70	Explosives Test Pit (Water Towers)		0.23	5,730	73	Metals	Industrial	9/15/2000	Confirmatory Sampling/Risk-Based (September 1997)	None	None	
71	Moonlight Shot Area		83.11	5,864	115–125	DU, Metals	Industrial	7/21/2000	Administrative (August 1994); Confirmatory Sampling/Risk-Based (September 1998)	None	None	RMMA; abolished 3/2/2000.
72	Operation Beaver Site		0.41	7,855	300	None	Recreational	7/21/2000	Administrative (June 1995); Confirmatory Sampling (October 1996);	None	None	
73	Bldg. 895 Hazardous Waste Repackaging/Storage	I	0.36	5,418	300	RCRA Chemicals	Industrial	12/31/1995	Administrative (August 1994)	None	None	
74	Chemical Waste Landfill	III	1.90	5,421	505	VOCs, Metals	Industrial	NA	Post-closure permit in progress	This site will be fenced and monitored per post-closure requirements	Yes	RMMA; abolished 9/8/2003.
76	Mixed Waste Landfill	III	5.00	5,381	470	H-3	Industrial	NA	Under CMS/CMI	This site will have an engineered cover, fencing, and long-term monitoring.	Yes	Current RMMA
77	Oil Surface Impoundment (Tijeras Arroyo)	IV	0.17	5,388	260	None	Industrial	7/21/2000	Confirmatory Sampling (June 1995)	None	None	
78	Gas Cylinder Disposal Pit	III, V	0.46	5,427		Toxic, Corrosive, Reactive and flammable gases, Radionuclides, Metals, HE	Industrial	7/19/2005	VCM/Confirmatory Sampling (June 1996)	None	None	RMMA; abolished 1/5/2004.
81A	New Aerial Cable Site: Catcher Box/Sled Track		2.39	6,465	150	None	Recreational	11/19/2001	Confirmatory Sampling/Risk-Based (September 2000)	None	None	
81B	New Aerial Cable Site: Impact Pad		4.07	6,393	150	None	Recreational	11/19/2001	Confirmatory Sampling/Risk-Based (September 2000)	None	None	
81C	New Aerial Cable Site: Former Burial Location		0.12	6,445	150	Metals, HE, SVOCs, VOCs	Recreational	9/15/2000	Confirmatory Sampling/Risk-Based (June 1999)	None	None	RMMA; abolished 4/6/1998.

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
81D	New Aerial Cable Site: Northern Cable Area		4.28	6,345	150	None	Recreational	11/19/2001	Confirmatory Sampling/Risk-Based (September 2000)	None	None	
81E	New Aerial Cable Site: Gun Impact Area		0.11	6,433	150	None	Recreational	11/19/2001	Confirmatory Sampling/Risk-Based (September 2000)	None	None	
81F	New Aerial Cable Site: Scrap Yard		1.29	6,435	150	None	Recreational	11/19/2001	Confirmatory Sampling/Risk-Based (September 2000)	None	None	
82	Old Aerial Cable Site Scrap		22.02	6,230	449	VOCs, SVOCs, TPH, Metals, HE, radionuclides	Recreational	11/19/2001	VCM/Confirmatory Sampling/Risk-Based (September 2000)	None	None	RMMA; abolished 7/26/1999.
83	Long Sled Track	III, V	233.35	5,335		Metals, HE, Radionuclides, DU	Industrial	NA	Active Site	TBD	TBD	RMMA. This site is an active site.
84	Gun Facilities	III, V	1.41	5,351		Metals, HE, Radionuclides	Industrial	NA	Active Site	TBD	TBD	RMMA. This site is an active site.
85	Firing Site (Bldg. 9920)		0.94	5,454	347	DU, Metals (Be, Li, Pb), HE, Cadmium sulfide, Manganese dioxide	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (September 1998)	None	None	RMMA; abolished 2/17/2000.
86	Firing Site (Bldg. 9927)		1.60	5,470		DU, Be, Pb, HE	Industrial	11/19/2001	VCM/Confirmatory Sampling (January 1997)	None	None	RMMA; abolished 2/17/2000.
87	Bldg. 9990 Firing Site		97.46	6,140	232	Metals, DU, HE	Recreational	6/2/2006	VCM/Confirmatory Sampling/Risk-Based (April 2003)	TBD	Soil Disturbance Restrictions	This site will remain as an RMMA.
88A	Firing Site: Ranchhouse		1.14	5,814		None	Industrial	12/31/1995	Administrative (August 1994)	None	None	
88B	Firing Site: Instrumentation Pole		15.34	5,816	50	Metals, HE	Industrial	9/15/2000	Confirmatory Sampling/Risk-Based (September 1997)	None	None	RMMA; abolished 1/27/2000.
89A	Shock Tube Site (Thunder Range)		0.78	5,416	480	None	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (August 1997)	None	None	RMMA; abolished 3/27/2000.
89B	Shock Tube Site (Thunder Range)		0.72	5,423	480	None	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (August 1997)	None	None	RMMA; abolished 3/27/2000.
89C	Shock Tube Site (Thunder Range)		1.84	5,422	480	None	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (August 1997)	None	None	RMMA; abolished 3/27/2000.
90	Beryllium Firing Site (Thunder Range)		0.34	5,474	300	None	Industrial	9/15/2000	Confirmatory Sampling (January 1997)	TBD	TBD	RMMA; abolished.

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
91	Lead Firing Site (Thunder Range)		21.19	5,411	300	Pb	Industrial	9/13/2005	VCM/Confirmatory Sampling/Risk-Based	TBD	TBD	RMMA; abolished 9/27/1996.
92	Pressure Vessel Test Site (Coyote Canyon Blast Area)		6.12	6,000		None	Industrial	9/29/1997	Administrative (August 1995)	None	None	
93A	Madera Canyon Rocket Launcher Pad A		0.08	6,378	300	None	Recreational	7/21/2000	Administrative (June 1995); Confirmatory Sampling (October 1996)	None	None	
93B	Madera Canyon Rocket Launcher Pad B		0.16	6,170	200	None	Recreational	7/21/2000	Administrative (June 1995); Confirmatory Sampling (October 1996)	None	None	
93C	Madera Canyon Rocket Launcher Pad C		0.17	6,205	200	None	Recreational	7/21/2000	Administrative (June 1995); Confirmatory Sampling (October 1996)	None	None	
94A	Lurance Canyon Burn Site: Aboveground Tanks		0.75	6,370	115	None	Recreational	7/21/2000	Confirmatory Sampling/Risk-Based (September 1998)	None	None	RMMA; abolished 1/18/2000.
94B	Lurance Canyon Burn Site: Debris/Soil Mound Area		0.57	6,330	115	VOCs, SVOCs, HE, Metals, Radionuclides	Recreational	4/6/2005	VCM/Confirmatory Sampling/Risk-Based (September 2001)	TBD	TBD	RMMA; abolished 10/23/2002.
94C	Lurance Canyon Burn Site: Bomb Burner Area and Discharge Line		0.24	6,343	115	None	Recreational	11/19/2001	VCM/Confirmatory Sampling/Risk-Based (March 2001)	None	None	RMMA; abolished 1/28/2002.
94D	Lurance Canyon Burn Site: Bomb Burner Discharge Pit		0.02	6,333	115	None	Recreational	9/15/2000	Confirmatory Sampling/Risk-Based (June 1999)	None	None	RMMA; abolished 1/24/2000.
94E	Lurance Canyon Burn Site: Small Surface Impoundment		0.17	6,338	115	None	Recreational	9/15/2000	Confirmatory Sampling/Risk-Based (September 1999)	None	None	RMMA; abolished 1/24/2000.
94F	Lurance Canyon Burn Site: LAARC Discharge Pit		0.03	6,348	115	JP-4, VOCs, SVOCs, HE, Metals, Radionuclides	Recreational	4/6/2005	VCM/Confirmatory Sampling/Risk-Based (September 2001)	TBD	TBD	RMMA; abolished 6/3/1999.
94G	Lurance Canyon Burn Site: Scrap Yard		3.23	6,345	115	None	Recreational	11/19/2001	VCM/Confirmatory Sampling/Risk-Based (March 2001)	None	None	RMMA; abolished. 10/23/2002.
94H	Fuel Spill at Open Pool Test Area, Lurance Canyon Burn Site							4/6/2005	VCA/Risk Based (September 2002)	TBD	TBD	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
96	Storm Drain System	I	24.00	5,420	300	Radionuclides, Metals, PCBs, Organics, Inorganics	Industrial	6/2/2006	Confirmatory Sampling/Risk-Based (May 1997)	TBD	TBD	
98	Bldg. 863 TCA Photochemical Releases	I	0.37	5,419	300	VOCs, Acids, Bases, Ag	Industrial	11/9/2005	Confirmatory Sampling/Risk-Based (September 2000)	TBD	TBD	
100	Bldg. 6620 HE Sump/Drain	III, V	0.05	5,424		HE	Industrial	11/19/2001	Administrative (June 1996)	None	None	
101	Explosive Contaminated Sumps, Drains (Bldg. 9926)		0.13	5,460	515	VOCs, SVOCs, Cn, Metals (Cr)	Industrial	9/13/2005	VCM/Confirmatory Sampling/Risk-Based (June 1996)	None	None	RMMA; abolished 11/6/2000.
102	Radioactive Disposal (east of TA-III)	III, V	155.54	5,476		Radionuclides	Industrial	11/19/2001	VCM/Confirmatory Sampling (June 1996)	None	None	RMMA; abolished 12/1/2000.
103	Scrap Yard (Bldg. 9939)		3.34	5,612	290-330	Pb, DU	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (June 1998)	None	None	RMMA; abolished 1/24/2000.
104	PCB Spill, Computer Facility	I	0.02	5,423	300	PCBs	Industrial	12/31/1995	Administrative (August 1994)	None	None	
105	Mercury (Bldg. 6536)	III					Industrial	NA	Administrative (August 1994)	TBD	TBD	Investigation complete; report to be submitted by 6/30/2006.
107	Corrective Action Management Unit	III	22.73	5,407	475	DU, HE, Heavy metals	Industrial	4/6/2005		CAMU is located on Site 107. CAMU post-closure requirements in effect.	Yes	RMMA; abolished 6/3/1999.
108	Firing Site (Bldg. 9940)		0.39	5,530	530	DU, HE, Cr	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (June 1998)	None	None	RMMA; abolished 1/24/2000.
109	Firing Site (Bldg. 9956)		0.27	5,486	530	None	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (August 1997)	TBD	TBD	
111	Bldg. 6715 Sump/Drains	III, V	0.01	5,393		HE, Ag, VOCs, SVOCs	Industrial	11/19/2001	Confirmatory Sampling (June 1996)	None	None	
112	Explosive Contaminated Sump (Bldg. 9956)		0.00	5,483	300	None	Industrial	9/15/2000	Confirmatory Sampling (May 1997)	None	None	RMMA; abolished 3/27/2000.
113	Area II Firing Sites	II	0.34	5,424	320	HE, Metals	Industrial	11/19/2001	Confirmatory Sampling (August 1994); Confirmatory Sampling (June 1996);	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
114	Explosive Burn Pit	II	0.00	5,409	320	HE, TNT, RDX, HMX	Industrial	4/6/2005	VCM/Confirmatory Sampling (June 1996)	None	None	
115	Firing Site (Bldg. 9930)		6.13	5,546	300	None	Industrial	9/15/2000	Confirmatory Sampling (January 1997)	None	None	RMMA; abolished 6/6/2000.
116	Bldg. 9990 Septic System		0.06	6,107		VOCs, Cn	Recreational	9/13/2005	VCM/Confirmatory Sampling (June 1996)	None	None	RMMA; abolished 1/27/2000.
117	Trenches (Bldg. 9939)		2.73	5,690		DU, Sodium	Industrial	11/19/2001	VCM/Confirmatory Sampling/Risk-Based (September 2000)	None		RMMA; abolished 11/6/2000.
135	Bldg. 906 Septic System	II	0.03	5,415	320	Metals, Radionuclides, VOCs, PCBs, HE	Industrial	6/2/2006	Confirmatory Sampling (August 1994)	TBD	TBD	RMMA; abolished 1/27/2000.
136	Bldg. 907 Septic System	II	0.47	5,420	320	HE, Cleaning solvents, Metals, Radionuclides	Industrial	6/2/2006	Confirmatory Sampling (June 1995)	TBD	TBD	RMMA; abolished 1/27/2000.
137	Bldg. 6540/6542 Septic System	III, V	0.63	5,403		VOCs, Metals (Ag, Cr), SVOCs, Cn	Industrial	5/3/2005	VCM/Confirmatory Sampling/Risk-Based (January 1997)	None	None	RMMA; abolished 1/27/2000.
138	Bldg. 6630 Septic System	III, V	0.27	5,409		VOCs, SVOCs, Metals (Ag, Ni)	Industrial	9/13/2005	VCM/Confirmatory Sampling (June 1996)	None	Soil Disturbance Restrictions	RMMA; abolished 1/27/2000.
139	Bldg. 9964 Septic System		0.03	5,474	214	None	Industrial	12/31/1995	Administrative (August 1994)	None	None	
140	Bldg. 9965 Septic System		0.08	5,487	227	VOCs, SVOCs, Metals (Se)	Industrial	12/29/2005	VCM/Confirmatory Sampling (January 1997)	None	None	RMMA; abolished 1/27/2000.
141	Bldg. 9967 Septic System		0.01	5,515	255	VOCs, Metals (Se)	Industrial	11/19/2001	VCM/Confirmatory Sampling (June 1996)	None	None	RMMA; abolished 1/27/2000.
142	Bldg. 9970 Septic System		0.06	5,678	130	VOCs, SVOCs, Metals (Pb, Se)	Industrial	9/15/2000	Confirmatory Sampling (August 1995)	None	None	RMMA; abolished 1/27/2000.
143	Bldg. 9972 Septic System		0.11	5,679	119	VOCs, Metals (Ag, Ba)	Industrial	9/15/2000	Confirmatory Sampling (August 1995)	None	None	RMMA; abolished 1/27/2000.
144	Bldg. 9980 Septic System		0.40	5,590	111	VOCs, Metals (Pb), Radionuclides (U-234, U-238)	Industrial	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (May 1997)	None	None	RMMA; abolished 1/27/2000.
145	Bldg. 9981/9982 Septic Systems		0.45	5,590	140	VOCs, SVOCs, Cn, Metals (Pb, Ba)	Industrial	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (May 1997)	None	None	RMMA; abolished 1/27/2000.
146	Bldg. 9920 Drain System		0.03	5,459	515	VOCs	Industrial	5/3/2005	Confirmatory Sampling (August 1995)	None	None	RMMA; abolished 1/27/2000.

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
147	Bldg. 9925 Septic Systems		0.92	5,701	50	VOCs, SVOCs, Metals (Pb, Ba)	Industrial	12/29/2005	VCM/Confirmatory Sampling/Risk-Based (May 1997)	None	None	RMMA; abolished 1/27/2000.
148	Bldg. 9927 Septic System		0.05	5,490	370	VOCs, Metals, DU, SVOCs, Inorganics	Industrial	5/3/2005	Confirmatory Sampling (August 1995)	None	None	RMMA; abolished 6/3/1999.
149	Bldg. 9930 Septic System		0.11	5,570	340	VOCs	Industrial	9/13/2005	VCM/Confirmatory Sampling/Risk-Based (June 1996)	None	None	RMMA; abolished 11/6/2000.
150	Bldg. 9939/9939A Septic Systems		0.15	5,635	315	VOCs	Industrial	12/29/2005	VCM/Confirmatory Sampling (January 1997)	None	None	RMMA; abolished 1/27/2000.
151	Bldg. 9940 Septic System		0.13	5,535	435	VOCs, Metals (Ba)	Industrial	11/19/2001	VCM/Confirmatory Sampling/Risk-Based (June 1996)	None	None	RMMA; abolished 11/6/2000.
152	Bldg. 9950 Septic System		0.08	5,495	545	VOCs	Industrial	5/3/2005	VCM/Confirmatory Sampling (January 1997)	None	None	RMMA; abolished 1/27/2000.
153	Bldg. 9956 Septic Systems		0.17	5,485	538	VOCs, Cn, Metals (Pb, Cr)	Industrial	5/3/2005	VCM/Confirmatory Sampling (January 1997)	None	None	RMMA; abolished 1/27/2000.
154	Bldg. 9960 Septic Systems		0.15	5,510	300	HE, Metals, Phenols	Industrial	3/1/2006	Confirmatory Sampling/Risk-Based (August 1997)	TBD	TBD	RMMA; abolished.
155	Bldg. 6597 25,000-Gallon UST	V	0.17				Industrial	5/1/1994	LUST	None	None	
159	Bldg. 935 Septic System	II	0.03	5,409			Industrial	6/2/2006	Confirmatory Sampling (June 1995)	None	None	RMMA; abolished 1/27/2000.
160	Bldg. 9832 Septic System		0.12	6,230	200	VOCs, Cn, Metals (Cr, Ag, Ba)	Recreational	11/19/2001	Confirmatory Sampling (June 1996)	None	None	RMMA; abolished 1/27/2000.
161	Bldg. 6636 Septic System	III, V	0.16	5,383	470	VOCs, Cn, Metals (Ag)	Industrial	9/13/2005	VCM/Confirmatory Sampling (June 1996)	None	None	RMMA; abolished 1/27/2000.
165	Bldg. 901 Septic System	II	1.16	5,408			Industrial	6/2/2006	Confirmatory Sampling (August 1994)	None	None	RMMA; abolished 1/27/2000.
166	Bldg. 919 Septic System	II	0.06	5,415			Industrial	6/2/2006	Confirmatory Sampling (June 1995)	None	None	RMMA; abolished 1/27/2000.
167	Bldg. 940 Septic System	II	0.07	5,409			Industrial	6/2/2006	Confirmatory Sampling (June 1995)	None	None	
168	Bldg. 901 UST	II					Industrial	5/1/1994	LUST	None	None	
169	Bldg. 910 UST	II					Industrial	5/1/1994	LUST	None	None	
170	Bldg. 911 UST	II					Industrial	5/1/1994	LUST	None	None	
171	Bldg. 912 UST	II					Industrial	5/1/1994	LUST	None	None	
172	Bldg. 888 UST	I	0.10			None	Industrial	5/1/1994	LUST	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
173	Bldg. 6525 UST	III	0.00			None	Industrial	5/1/1994	LUST	None	None	
174	Bldg. 6581 UST	IV	0.01			None	Industrial	5/1/1994	LUST	None	None	
175	Bldg. 6588 UST	IV	0.00			None	Industrial	5/1/1994	LUST	None	None	
176	Bldg. 605 UST	I	0.10			None	Industrial	5/1/1994	LUST	None	None	
178	Bldg. 6587 UST	III	0.10			None	Industrial	5/1/1994	LUST	None	None	
179	Bldg. 7570 UST		0.10			None	Industrial	5/1/1994	LUST	None	None	
180	Bldg. 6503 UST	III	0.10			None	Industrial	5/1/1994	LUST	None	None	
181	Bldg. 6500 UST	V	0.10			None	Industrial	5/1/1994	LUST	None	None	
186	Bldg. 859 TCE Disposal	I	0.24	5,422	300	TCE and other VOCs	Industrial	9/15/2000	Confirmatory Sampling (October 1996)	None	None	
187	TA-I Sanitary Sewer Lines	I	24.00	5,420	300	Radionuclides, Metals, VOCs, SVOCs, PCBs	Industrial	6/2/2006	Confirmatory Sampling/Risk-Based (May 1997)	TBD	TBD	
188	Bldg. 6597 Above Ground Containment Spill Tank	V					Industrial	12/31/1995	Administrative (August 1994)	None	None	
190	Steam Plant Tank Farm	I	2.95	5,398	275	Petroleum hydrocarbons	Industrial	6/2/2006	Confirmatory Sampling/Risk-Based (September 2002)	TBD	TBD	
191	Equus Red		3.58	5,398		DU	Industrial	11/19/2001	VCM-Based (January 1997)	None	None	RMMA; abolished 2/17/2000.
192	Waste Oil Tank	I	0.19	5,457	570	Petroleum hydrocarbons, Metals, VOCs, SVOCs	Industrial	7/21/2000	Confirmatory Sampling (October 1996)	None	None	
193	Sabotage Test Area		0.63	5,470	350	None	Industrial	7/21/2000	VCM/Confirmatory Sampling/Risk-Based (August 1997)	None	None	RMMA; abolished 1/24/2000.
194	General Purpose Heat Source Test Area		0.31	5,414		None	Industrial	9/29/1997	Administrative (August 1995)	None	None	RMMA; abolished 3/27/2000.
195	Experimental Test Pit							11/9/05				RMMA; abolished 12/1/2000.
196	Bldg. 6597 Cistern	III, V	0.04	5,438	480	Oil, Metals, PCBs	Industrial	2/20/2006	Confirmatory Sampling (June 1996)	None	None	
211	Bldg. 840 Former UST 840-1	I	0.02	5,416	300	Chlorinated solvents, Metals, Coolant oil, PCBs	Industrial	9/15/2000	Confirmatory Sampling (October 1996)	None	None	
225	AEC Storage Facility/KAFB	Off Site						NA	Site Transferred to KAFB 12/05/96	None	None	
226	Old Acid Waste Line	I	1.42	5,413	300	Metals, VOCs, SVOCs, PCBs, Radionuclides	Industrial	6/2/2006	Confirmatory Sampling/Risk-Based (May 1997)	TBD	TBD	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
227	Bunker 904 Outfall (Tijeras Arroyo)	IV	0.07	5,400	300	Metals, VOCs, SVOCs, HE, Radionuclides	Industrial	6/2/2006	Risk-Based (June 1995)	TBD	TBD	RMMA; abolished 3/27/2000.
228A	Centrifuge Dump Site	IV	1.58	5,540	280	None	Industrial	9/15/2000	VCM/Confirmatory Sampling/Risk-Based (September 1999)	None	None	RMMA; abolished 1/14/2000.
228B	Centrifuge Dump Site	IV	6.55	5,540	280	None	Industrial	11/19/2001	Confirmatory Sampling/Risk-Based (March 2001)	None	None	RMMA; abolished 9/29/1998.
229	Storm Drain System Outfall	IV	0.16	5,374	300	Metals, VOCs, SVOCs, HE, Radionuclides	Industrial	6/2/2006	Risk-Based (June 1995)	TBD	TBD	
230	Storm Drain System Outfall	IV	0.02	5,346	300	None	Industrial	4/6/2005	Risk-Based (June 1995)	None	None	
231	Storm Drain System Outfall	IV	0.04	5,336	300	None	Industrial	4/6/2005	Risk-Based (June 1995)	None	None	
232	Storm Drain System Outfall	IV	0.03	5,338	260	Petroleum hydrocarbons	Industrial	4/6/2005	Confirmatory Sampling/Risk-Based (August 1997)	None	None	RMMA; abolished 1/24/2000.
233	Storm Drain System Outfall	IV	0.03	5,360	300	None	Industrial	11/2/2005	Risk-Based (June 1995)	None	None	
234	Storm Drain System Outfall	IV, KAFB	0.09	5,354	300	None	Industrial	11/2/2005	Risk-Based (June 1995)	None	None	
235	Storm Drain System Outfall		1.20	5,318	450	None	Industrial	9/15/2000	Confirmatory Sampling/Risk-Based (June 1995)	None	None	
240	Short Sled Track	III, V	165.18	5,390			Industrial	NA	Active Site	TBD	TBD	Current RMMA and active site.
241	Storage Yard	III, V	3.32	5,420		Metals, HE, Radionuclides	Industrial	4/6/2005	VCM/Confirmatory Sampling (June 1996)	None	None	RMMA; abolished 12/1/2000.
275	TA-V Seepage Pits	III, V	0.28	5,433	491	Metals, VOCs, SVOCs,	Industrial	7/21/2000	Confirmatory Sampling/Risk-Based (September 1998)	None	None	
276	Former Bldg. 829X Silver Recovery Sump (TA-I)	I		5410	555	Metals, VOCs, PCBs, Cyanide, Radionuclides	Industrial	5/5/2005	Confirmatory Sampling/Risk-Based (December 2004)	None	None	
277	New Firing Site East of Optical Range		3.05	6040	400	Metals and HE	Recreational	11/19/2001	Confirmatory Sampling/Risk-Based (September 2000)	None	None	
278	Building 828							4/6/2005		None	None	
1001	Bldg. 898 Septic System (TA-I)	I		5456	567	Metals, VOCs, SVOCs	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1003	Former Bldg. 915/922 Septic System (TA-II)	II		5423	545	Metals, SVOCs	Industrial	11/9/2005	Risk-Based (June 2003)	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
1004	Bldg. 6969 Septic System (Robotic Vehicle Range)			5473	555	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	None	None	
1006	Bldg. 6741 Septic System (TA-III)	III		5343	460	Metals, VOCs, SVOCs, Cyanide	Industrial	6/2/2006	Risk-Based (March 2004)	None	None	
1007	Bldg. 6730 Septic System (TA-III)	III		5355	465	Metals, PCBS, Cyanide, Radionuclides	Industrial	6/2/2006	Risk-Based (March 2004)	None	None	
1008	Bldg. 6750 Septic System (TA-III)	III		5353	460	Metals and Radionuclides	Industrial	11/9/2005	Risk-Based (June 2003)	None	None	
1009	Bldg. 6620 Internal Sump (TA-III)	III		5407	487	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1010	Bldg. 6536 Septic System and Seepage Pit (TA-III)	III		5407	487	Metals, PCBS, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	6/2/2006	Risk-Based (June 2004)	None	None	
1014	Former T-12, T-42 and T-43 Septic System (TA-V)	V		5419	496	Metals and VOCs	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1015	Former MO 231-234 Septic System (TA-V)	V		5419	496	Metals, VOCs, Cyanide, Radionuclides	Industrial	6/2/2006	Risk-Based (March 2004)	None	None	
1020	MO-146, Mo-235, and T-40 Septic System (TA-III)	III		5410	487	Metals, VOCs, PCBs, Cyanide	Industrial	6/2/2006	Risk-Based (March 2004)	None	None	
1024	MO-242-245 Septic System (TA-III)	III		5408	485	Metals, VOCs, PCBs, Cyanide	Industrial	6/2/2006	Risk-Based (March 2004)	None	None	
1025	Bldg. 6501 East Septic System (TA-III)	III		5439	514	Metals, SVOCs, Cyanide, Radionuclides	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1026	Bldg. 6501 West Septic System (TA-III)	III		5439	514	Metals, SVOCs, Cyanide, Radionuclides	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1027	Bldg. 6530 Septic System (TA-III)	III		5404	480	Metals, VOCs, PCBs, Cyanide, Radionuclides	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1028	Bldg. 6560 Septic System (TA-III)	III		5402	482	Metals, PCBS, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	6/2/2006	Risk-Based (June 2004)	None	None	
1029	Bldg. 6584 North Septic System (TA-III)	III		5404	482	Metals, VOCs, SVOCs, Cyanide	Industrial	6/2/2006	Risk-Based (March 2004)	TBD	TBD	
1030	Bldg. 6587 Septic System (TA-III)	III		5402	480	Metals, VOCs, PCBs	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
1031	Former Bldgs. 6589 and 6600 Septic System (TA-III)	III		5408	486	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	None	None	
1032	Bldg. 6610 Septic System (TA-III)	III		5421	500	Metals, VOCs, Radionuclides	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1033	Bldg. 6631 Septic System (TA-III)	III		5425	499	Metals, SVOCs, Cyanide, Radionuclides	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1034	Bldg. 6710 Septic System	III		5374	470	VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1035	Bldg. 6715 Septic System (TA-III)	III		5390	470	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1036	Bldg. 6922 Septic System (TA-III)	III		5413	490	Metals, VOCs, PCBs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1052	Bldg. 803 Seepage Pit (TA-I)	I		5408	552	Metals, VOCs, PCBs, SVOCs, Cyanide, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	None	None	
1072	Bldg. T-52 and Former Bldg. 6500 Septic System (TA-V)	V		5424	500	Metals, VOCs, PCBs	Industrial	11/9/2005	Risk-Based (June 2003)	None	None	
1073	Bldg. 6580 Seepage Pit (TA-V)	V		5430	506	Metals, VOCs, Radionuclides	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1077	Bldg. 6920 Septic System (TA-III)	III		5405	475	Metals, VOCs, Radionuclides	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1078	Bldg. 6640 Septic System (TA-III)	III		5399	476	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1079	Bldg. 6643 Septic System (TA-III)	III		5413	487	VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1080	Bldg. 6644 Septic System (TA-III)	III		5405	480	VOCs, SVOCs, PCBs, Cyanide, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	None	None	
1081	Bldg. 6650 Septic System (TA-III)	III		5400	480	Metals, VOCs, SVOCs, PCBs, Cyanide, Radionuclides	Industrial	5/3/2005	Risk-Based (March 2005)	TBD	TBD	
1082	Bldg. 6620 Septic System (TA-III)	III		5407	487	Metals and Radionuclides	Industrial	11/9/2005	Risk-Based (June 2003)	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
1083	Bldg. 6570 Septic System (TA-III)	III		5416	493	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	6/2/2006	Risk-Based (June 2004)	None	None	
1084	Bldg. 6570 Septic System (TA-III)	III		5433	508	Metals, VOCs, PCBs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1086	Bldg. 6523 Septic System (TA-III)	III		5414	492	Metals, VOCs, SVOCs, Cyanide, PCBs	Industrial	6/2/2006	Risk-Based (June 2004)	None	None	
1087	Bldg. 6743 Seepage Pit (TA-III)	III		5348	461	Metals, VOCs, SVOCs, Cyanide, PCBs, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	None	None	
1089	Bldg. 6734 Seepage Pit (TA-III)	III		5357	457	Metals, VOCs, Radionuclides	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1090	Bldg. 6721 Septic System (TA-III)	III		5373	473	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	TBD	TBD	
1091	Bldg. 6721 Septic System (TA-III)	III		NA	NA	NA	NA	11/9/2005	NA	NA	NA	Site does not exist.
1092	MO 228-230 Septic System (TA-III)	III		5410	488	Metals, VOCs, SVOCs, Cyanide, PCBs, Radionuclides	Industrial	5/3/2005	Risk-Based (March 2005)	None	None	
1093	Bldg. 6584 West Septic System (TA-III)	III		5404	483	Metals, VOCs, Cyanide	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1094	Live Fire Range East Septic System (Lurance Canyon)	Lurance Canyon		6000	110		Recreational	12/29/2005		None	None	
1095	Bldg. 9938 Seepage Pit (Coyote Test Field)	CTF		5640	340			12/29/2005		None	None	
1096	Bldg. 6583 Septic System (TA-III)	III		5403	482	Metals and VOCs	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1098	TA-V Plenum Rooms Drywell (TA-V)	V		5432	509	Metals, VOCs, SVOCs, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1101	Bldg. 885 Septic System (TA-I)	I		5432	560	Metals, SVOCs, Cyanide	Industrial	NA	Risk-Based (December 2003)	None	None	Investigation complete; report to be submitted by 6/30/2006.
1102	Former Bldg. 889 Septic System (TA-I)	I		5425	535	Metals, VOCs, PCBs, Cyanide, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	None	None	

Table D-2 (Continued)  
SNL/NM ER Site Characteristics for Stewardship

Site No.	Site Name	TA	Site Size (Acres)	Mean Elevation (ft)	Depth to Ground Water (ft)	COCs	Future Land Use	Regulatory Completion Date	NFA Type	Physical Control (Negotiated with NMED, if applicable)	Land Use Restrictions	Additional Information
1104	Bldg. 6595 Seepage Pit (TA-V)	V		5431	507	VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
1105	Bldg. 6596 Drywell (TA-V)	V		5437	512	Metals, VOCs, PCBs, SVOCs, Cyanide, Radionuclides	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1108	Bldg. 6531 Seepage Pits (TA-III)	III		5405	483	Metals, VOCs, PCBs, Cyanide, Radionuclides	Industrial	6/2/2006	Risk-Based (March 2004)	None	None	
1110	Bldg. 6536 Drain System (TA-III)	III		5404	480	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	6/2/2006	Risk-Based (March 2004)	None	None	
1111	Bldg. 6720 Drywell (TA-III)	III		5372	467	Metals, VOCs, Radionuclides	Industrial	11/9/2005	Risk-Based (September 2003)	None	None	
1112	Bldg. 6590 Reactor Sump Drywell (TA-V)	V		5434	510	Metals, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	11/9/2005	Risk-Based (December 2003)	None	None	
1113	Bldg. 6597 Drywell (TA-V)	V		5439	515	Metals, HE, VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/5/2005	Risk-Based (December 2004)	None	None	
1114	Bldg. 9978 Drywell (Coyote Test Field)			5705	40-60			12/29/2005		None	None	
1115	Former Offices Septic System (Solar Tower Complex)			5600	125?			12/29/2005		None	None	
1116	Bldg. 9981A Seepage Pit (Solar Tower Complex)			5620	125?			12/29/2005		None	None	
1117	Bldg. 9982 Drywell (Solar Tower Complex)			5600	125?		Industrial	12/29/2005		None	None	
1120	Bldg. 6643 Drywell (TA-III)	III		5409	483	VOCs, SVOCs, Cyanide, Radionuclides	Industrial	5/2/2005	Risk-Based (September 2004)	None	None	
TNT Site	TNT Site					HE	Industrial	4/6/2005		TBD	TBD	Adjacent and related to SWMU 54.

Table D-2 (Concluded)  
SNL/NM ER Site Characteristics for Stewardship

ADS	= Activity Data Sheet.	MO	= Mobile Office.
AEC	= Atomic Energy Commission.	NA	= Not applicable.
Bldg.	= Building.	NFA	= No further action.
CAC	= Corrective Action Complete.	NMED	= New Mexico Environment Department.
CMI	= Corrective Measures Implementation.	PCB	= Polychlorinated biphenyl.
CMS	= Corrective Measures Study.	PDSP	= Plutonium Dispersal Studies Project.
COC	= Constituent of concern.	RCRA	= Resource Conservation and Recovery Act.
CTF	= Coyote Test Field.	RDX	= 1,3,5-Trinitro-1,3,5-triazacyclohexane.
DU	= Depleted uranium.	RMMA	= Radiological Materials Management Area.
ER	= Environmental Restoration.	SNL/NM	= Sandia National Laboratories/New Mexico.
ft	= Foot (feet).	SOR	= Starfire Optical Range.
HE	= High explosive(s).	SVOC	= Semivolatile organic compound.
HERMES	= High Energy Radiation Megavolt Electron Source.	TA	= Technical Area.
HMX	= 1,3,5,7-Tetranitro-1,3,5,7-tetrazacyclooctane.	TBD	= To be determined.
HSWA	= Hazardous and Solid Waste Amendments.	TCA	= Trichloroethane.
JP-4	= Jet propulsion fuel grade 4.	TCE	= Trichloroethylene.
KAFB	= Kirtland Air Force Base.	TNT	= 2,4,6-trinitrotoluene.
LAARC	= Light Airtransport Accident Resistant Container.	UST	= Underground storage tank.
LUST	= Leaking underground storage tank.	VCM	= Voluntary Corrective Measure.
LWDS	= Liquid Waste Disposal System.	VOC	= Volatile organic compound.

**APPENDIX E**  
**Listing of Key Activities for the Environmental Restoration Project**

## **APPENDIX E**

### **Listing of Key Activities for the Environmental Restoration Project**

**Comprehensive Environmental Assessment and Response Program (CEARP):** In 1984, the assessment of the Sandia National Laboratories/New Mexico (SNL/NM) Environmental Restoration (ER) Sites began when the U.S. Department of Energy (DOE) Albuquerque Operations Office initiated the CEARP to identify, assess, and remediate potentially hazardous waste sites.

**Resource Conservation and Recovery Act (RCRA) Facility Assessment:** In 1987, an investigation, similar to the CEARP, was conducted at the SNL/NM ER sites to identify, assess, and remediate potentially hazardous waste sites.

In 1989, a groundwater monitoring well network was installed at the MWL.

In 1992, public outreach began with quarterly meetings that continue to be conducted.

**SNL/NM Site-Wide Unexploded Ordnance (UXO) Cleanup:** In 1993-1994, Kirtland Air Force Base (KAFB) Explosive Ordnance Disposal conducted site-wide walkovers at SNL/NM ER sites to survey and clean up the UXO and high explosives (HE).

**SNL/NM Site-Wide Radiological Cleanup:** From 1993-1996, RUST Geotech Inc., a contractor to SNL/NM, conducted site-wide walkovers at SNL/NM ER sites to survey and clean up radiologically contaminated soil.

**Cultural Resources Survey:** From 1994-1999, a historical and archeological survey was conducted on all SNL/NM ER sites to document any potential adverse effects from ER activities to sites eligible for inclusion in the National Register of Historic Places.

**Sensitive Species Survey:** From 1994-1999, sensitive species surveys were conducted on all SNL/NM ER sites to document the actual or potential occurrence, either permanent or transient, of sensitive species populations at ER sites.

**SNL/NM ER Environmental Assessment (EA):** In 1996, SNL/NM ER completed an EA to address the potential impacts from RCRA Facility Investigation/Voluntary Corrective Action activities.

**Site-Wide Hydrogeologic Characterization:** From 1992-1999, SNL/NM implemented the Site-Wide Hydrogeologic Characterization project to define the geologic, structural, and hydrologic setting of KAFB and to investigate hydrologic issues associated with ER sites.

**Establishment of Future Land-Use Designations:** In 1997, future land-use designations were attained for all of the land comprising KAFB (including the land withdrawn from the U.S. Forest Service). A stakeholders group determined the designations, which included representatives of SNL/NM, DOE, the U.S. Forest Service, and the U.S. Environmental Protection Agency, as well as local government officials and local citizens.

Remediation of Contaminated Sites: SNL/NM has conducted remediation activities at many ER sites at KAFB, including the Radioactive Waste Landfill, Classified Waste Landfill, and Chemical Waste Landfill (CWL). Various hazardous, radioactive, and mixed wastes have been removed including compressed toxic gases, metals, radionuclides, tritium, asbestos, UXO/HE, acids, bases, solvents, polychlorinated biphenyls, as well as classified items.

First RCRA-Permitted Corrective Action Management Unit (CAMU) in the DOE Complex: In 1995, the ER Project established a CAMU Working Group, and the CAMU was constructed to facilitate remediation of the CWL, that was hampered by the existing time limits for off-site waste disposal.

In 1999, a vegetative cover design for the MWL was submitted to the NMED. In November 2005, a mixed waste landfill (MWL) Corrective Measures Implementation Plan was submitted to the NMED; the plan documents the MWL cover design, presents the results from a comprehensive fate and transport model used to assess the performance of the MWL cover design, and provides monitoring triggers for future action.

Four groundwater areas have been identified to contain low-concentration groundwater contamination, above the maximum contaminant level, due to past activities by SNL/NM. These areas include the CWL, Tijeras Arroyo Groundwater, Technical Area V, and the Burnsite Groundwater Area. Characterization of the groundwater plumes will continue under the Long-Term Environmental Stewardship (LTES) program.

In 2004, the NMED entered into a Consent Order with the DOE and Sandia Corporation, establishing a process designed to complete all ER Project activities by the end of Fiscal Year 2006.

In 2001, an LTES plan was submitted to the DOE and was revised in 2003.

As of July 2005, SNL/NM has submitted 233 No Further Action/Corrective Action Complete proposals for the SNL/NM facility.

**APPENDIX F**  
**September 2006 Revision of Chapter 6.0 of the SNL/NM LTES Plan**

Appendix F contains the 2006 revision of Chapter 6.0 of the SNL/NM LTES Plan. This document was developed in 2001 with input from citizens, the New Mexico Environment Department, and other stakeholders. Only Chapter 6.0 was revised in 2003 and again in 2006 to update the status of actions taken to address issues raised by the stakeholders. The current status of these issues will continue to be tracked using the community checklist. Since 2001, several additional planning documents for environmental stewardship have been developed, which supersede this document. These can be viewed on Sandia National Laboratories' LTES website at [www.sandia.gov/ltes](http://www.sandia.gov/ltes).

**Environmental Restoration Project  
Sandia National Laboratories  
Albuquerque, New Mexico  
In Association with the  
U.S. Department of Energy,  
Kirtland Area Office**

**LONG-TERM ENVIRONMENTAL  
STEWARDSHIP PLAN  
August 2001**

**CHAPTER 6.0 REVISION  
SEPTEMBER 2006**

**Final**

This document was developed in 2001 with input from citizens, the New Mexico Environment Department, and other stakeholders. Only Chapter 6.0 was revised in 2003 and again in 2006 to update the status of actions taken to address issues raised by the stakeholders. The current status of these issues will continue to be tracked using the community checklist. Since 2001, several additional planning documents for environmental stewardship have been developed, which supersede this document. These can be viewed on Sandia National Laboratories' LTES website at [www.sandia.gov/ltes](http://www.sandia.gov/ltes).

## 6.0 MOVING THE LTES PLAN FORWARD

This chapter summarizes the concerns and recommendations listed in the “Issues” boxes in the earlier chapters of this document that need to be addressed. The status of these issues has been updated to reflect resolution by the stewardship team.

*The issue statements in the following sections are restated as they appear in the 2001 Plan. The current status as of September 2006, as well as citizen recommendations as of 2003, are presented in italics following each issue.*

### 6.1 LTES Monitoring

While SNL/NM is currently obligated to perform environmental surveillance in accordance with DOE Orders and permit requirements, there are no regulations specifically addressing LTM. Further, the existing legal framework offers no regulations specific to the vadose zone. Stakeholders have recommended state and federal legislation defining specific requirements for LTES monitoring and protection of the vadose zone and related potential pathways. Stakeholders believe that specific legislation will lead to more secure LTES funding.

Resolution of this issue would involve state legislators, with guidance from NMED and EPA regulators. SNL/NM and DOE can play an advisory role in this process, based on its positive monitoring experience. SNL/NM currently conducts vadose zone monitoring on its engineered units, such as the CAMU, in coordination with the EPA. Local governments, including city, county, and tribal, are also keenly interested in vadose zone monitoring.

#### Status Report

*SNL/NM and DOE currently conduct vadose zone monitoring on its engineered units, such as the CAMU, in compliance with existing regulations. The NMED regulates these units with the existing regulations. The CWL and MWL will have post-closure care permits and monitoring plans in place and approved by the regulators before the end-point of the project. This could include monitoring of the vadose zone, if the NMED deems necessary. SNL and DOE are obligated to provide funding for environmental monitoring that is required by the regulators. Long-term stewardship (LTS) Outreach and Public Participation will continue to provide information to stakeholders regarding LTS activities, such as monitoring, and involve the community at large through interactive meetings and other events.*

#### Recommendations

*The public needs to stay involved with long-term monitoring. Local governments, including city, county, and tribal, must also maintain a keen interest in vadose zone monitoring and include this concept in their Groundwater Protection Plans. No regulatory changes need to be made.*

### 6.2 Negotiating End-Point Decision Logic

Decision logic used to define an end-point for monitoring must be negotiated with the stewards and regulators prior to any discontinuance of monitoring at a site or group of sites. Currently, RCRA post-closure requirements would define the extent of monitoring and include the end-point when appropriate.

This is an issue for discussions between NMED, SNL/NM, and DOE representatives. In the future, city and county representatives may be included.

#### Status Report

*The frequency of monitoring, as well as the criteria for determining when monitoring can stop, is being defined in the closure agreements with NMED. The CWL Permit and various post-closure care plans for other sites address monitoring frequency and end-point definition. The frequency of monitoring and end-point determinations will be made on a site-by-site basis. The LTES website will allow city and county representatives to access site information.*

#### Recommendations

*DQO logic should be used to define the end-point, which is negotiated at an appropriate time in the NFA process. Public safety should also be taken into account when considering how long to continue monitoring and at what frequency. It is also absolutely necessary to inform city and county representatives as their interests are directly connected to this land; therefore, they need to understand the issues.*

### **6.3 Direct or Indirect Funding**

In the current operations approach, environmental surveillance programs at SNL/NM are funded from an "indirect," or corporate overhead account. Because "indirect" funding is generated as a percentage of direct-funded programs, the amount of indirect funds can be drastically impacted by funding cuts. Stakeholders have recommended that DOE and its successor organizations commit to specific, or "direct" funding for these programs.

This is an issue for DOE/HQ in coordination with local DOE offices. These discussions may be affected by stakeholder influence on federal legislative entities.

#### Status Report

*Funding will be provided by a federal agency, whether it is the National Nuclear Security Administration (NNSA), EM, or the agency that is ultimately responsible for the land. SNL and DOE are obligated to provide funding for environmental monitoring and LTS activities such as ICs, in accordance with permit requirements. This is an issue for DOE/HQ in coordination with local DOE offices. These discussions may be affected by stakeholder influence and/or federal legislators.*

#### Recommendations

*Citizens remain concerned about the stability of LTES funding. Whether funded by direct or indirect funds, they want assurance that LTES funding will remain a priority and not be cut. Stakeholders have recommended that DOE or its successor organizations commit to specific, or "direct," funding for these programs. Either direct or indirect sources require a good legal driver in order to succeed. It has also been recommended that SNL/NM looks into including the status of LTES funding in the Annual Site Environmental Report (ASER).*

### **6.4 Interagency Consultations**

SNL/NM is wholly contained within Kirtland Federal Complex, so many of the ICs will need to be established through interagency consultation. In January 2001, an initial "kick-off" meeting of

federal LTES stewards took place, with the goal to work through issues concerning ICs. Another challenge will be development of redundant planning capabilities for LTES participants. Participants are DOE, DOD, USFS, and BLM. At present, this group plans to meet quarterly.

#### Status Report

*ICs for former ER sites will be mandated as appropriate by the NMED as part of the most recent RCRA Permit revision. Additional controls may be established for sites with residual radiation or other safety concerns. The SNL IC group is currently evaluating the use of existing procedures to ensure that required information about the SNL ER sites and any restrictions are communicated to other tenants on KAFB. It is anticipated that existing procedures, such as dig permits and land-use permits, will be modified to accomplish site controls where necessary. Regular interagency meetings are currently being held.*

#### Recommendations

*The interagency groups have not been meeting on a quarterly basis. It is recommended that interagency meetings take place regularly, at least quarterly, to ensure that all pertinent LTES issues are addressed and, ideally, resolved. Also, if LTES were made a recurring issue at the current DOE/KAFB monthly business meetings, many issues could be resolved.*

### **6.5 DOD and DOE Access Agreements**

Current land-use permits between DOE and KAFB include language for environmental responsibilities. Sites that do not currently have land-use permits are covered under an agreement between DOE and the USAF (dated December 7, 1994). The agreement allows entry onto USAF lands to "conduct environmental surveys to determine to what extent, if any, the areas require environmental restoration." If long-term restoration is required at any of these sites, then a land-use permit will be established.

#### Status Report

*This issue has not yet been resolved. Of the 29 sites that are not located on DOE-owned or permitted land, 27 have gone through a Class III Permit Modification Process. These sites have been determined to not require controls and thus are not anticipated to have any IC requirements other than IM. One site that has gone through a Class III Permit Modification Process has been determined to require controls and thus is anticipated to have IC requirements in addition to IM. One site (SWMU 68) has not been through the Class III Permit Modification process.*

#### Recommendations

*Establishing full land-use permits may be very expensive and may be of limited value. However, during interagency meetings between the DOE and DOD, this issue should be resolved and end in the production of a permit, a document of understanding, or some other type of document before 2006.*

### **6.6 Sites Discovered After ER Project Closure**

The current SNL/NM process for reporting a potential legacy waste release site discusses what to do assuming there is an ER Project. This process should be modified to address the tracking and reporting of these discoveries after the project is completed.

This issue is best addressed by representatives of SNL/NM's Environmental Monitoring and ER departments in consultation with the ES&H Manual authors.

#### Status Report

*The current ES&H Manual describes an appropriate process for dealing with newly discovered legacy waste sites while the ER Project exists. At the end of the ER Project, the ES&H Manual will be updated to reference the new LTS organization; the process for reporting and dealing with newly found legacy waste sites will remain largely the same. The ES&H Manual will not be included as an appendix to the LTES Plan as this plan will not be updated.*

#### Recommendations

*The section on reporting newly discovered sites will eventually have to be rewritten (in late FY 2006), in order to be updated for LTES. An excerpt of this section of the manual will be included in the LTES plan in a new appendix.*

## **6.7 Information Management System and Its Relationship to ICs on Kirtland Federal Complex**

SNL/NM will be relying on an IMS to track the ICs for each of the sites. Currently, this IMS is not well defined. Stakeholders have recommended access to IC information via a publicly available website and hard copy in multiple public places – such as storefront information centers, libraries, or reading rooms. Currently, the public does not differentiate between KAFB, SNL/NM, and the DOE. Thus thought should be given to developing IC processes and IMSs that can be applicable to all tenants.

Information specialists from KAFB, SNL/NM, and DOE in conjunction with stakeholders can best address these requirements and issues.

#### Status Report

*The IMS for stewardship is in the process of being developed. IM is an important part of ICs. The LTES IMS processes encompass both historical (archival) information and current (or newly generated) information; this includes electronic and hard copy document management. SNL LTES information will be maintained and managed in order to meet the applicable statutes, regulations, executive orders, and federal requirements (e.g., National Archives and Records Administration [NARA] regulations) for LTES as well as DOE policies, orders, and guidelines. More detail on the IMS is provided in Section 6.9, as well as in the LTS Implementation Plan<sup>14</sup>.*

*A publicly accessible website containing information on all ER sites and updated LTES information, including IC information, where applicable, is available on the website at [sandia.gov/ltes](http://sandia.gov/ltes).*

*The SNL/NM ER Project collaborated with Bernalillo County in 2003 and 2004 to further the development of LandTrek. In 2004, during meetings with the Bernalillo County IM Department, it was discovered that the Bernalillo County LandTrek System will no longer be supported and was considered to be only a pilot project. Although the LandTrek website is still in operation, it will not be updated or maintained in the future. Plans were made to provide the Bernalillo County GIS team with GIS data layers that represent the closure status of each ER site and will direct users to the public LTES website [www.sandia.gov/ltes](http://www.sandia.gov/ltes). The public will be able to access this data at <http://ims.bernco.gov/website/gisopen/>.*

ICs will be mandated as appropriate by the NMED as part of the RCRA Permit. Additional controls may be established for sites with residual radiation or other safety concerns. The IC group is currently evaluating the use of existing procedures, including standing interagency meetings, such as the DOE monthly business meeting with KAFB, to ensure that required information about the SNL ER sites and any restrictions are communicated to other tenants on KAFB. It is anticipated that existing procedures, such as dig permits and land-use permits, will be modified to accomplish site controls where necessary. Because of different requirements for DOE and DOD, at present there has not been any discussion regarding a unified IC strategy for all the tenants on KAFB.

A spreadsheet in Appendix A, which was generated for this LTES Plan, was a one-time analysis of the potential for ER sites to be placed in an LTES IC category. Much of this information can be found in Appendix F of the LTS Implementation Plan<sup>14</sup>.

#### Recommendations

LandTrek or a similar geographic information system needs to be funded. IC status should also be updated for every site and the updates included in Appendix A. Also, meetings between SNL/NM and KAFB will help KAFB stay informed.

### **6.8 Involvement of Local Government in Recommendations for IC Systems**

Stakeholders have recommended that SNL/NM and DOE continue to work with local government to improve their federal knowledge and understanding of the local laws and other tools that may be used for LTES.

This issue can best be dealt with by consultation between legal and other representatives of DOE, SNL/NM, and local and tribal governments.

#### Status Report

Involvement of local governments would be more of a concern if KAFB were forced to close or excise land through a process such as BRAC. These processes have existing methods for communicating information, restrictions, etc., which will be utilized if, and when, the time comes for the federally held land to become privatized. The SNL/NM ER Project collaborated with Bernalillo County to provide information for posting on their website as described in Section 6.10.

#### Recommendations

Effort should continue to involve tribal and local governments and share current Institutional Controls information with them. An "as left environmental status" and "date of such status" should be made and noted on SNL's publicly accessible website, for all past and present ER sites, so that private citizens as well as institutions know the history and status of the land. Each site must have listed how it is classified (i.e., industrial, recreational, residential) and an exact definition explaining what that means and how it translates with the City/County land use restrictions. DOE/SNL must pursue this with the City/County as far as interpreting these classifications and add a section to their zoning codes to list these corresponding definitions.

## 6.9 Limited Access to Current ER Records

Current access to SNL/NM ER information is limited to internal customers, funding organizations, regulators, and external auditors. Stakeholders have recommended that the LTES IMS be built in a manner that enables public access to this system. Maintaining the LTES IMS on the internet was recommended.

Information specialists from DOE and SNL/NM, working in conjunction with stakeholders, can address this issue.

### Status Report

*ER Project documents are archived and can be accessed by the public at the following location:*

*Zimmerman Library  
Government Information Department  
University of New Mexico  
Albuquerque, NM 87131-1466  
Phone: 505-277-5441*

*A publicly accessible website containing information on all ER sites and updated LTES information, including IC information, where applicable, is available at [sandia.gov/ltes](http://sandia.gov/ltes). Numerous reports, such as NFA Proposals, Implementation Plans, and other pertinent documents, are available on the web. The content for this web is being input following the phased approach recommended by the 2002/2003 citizen task force and will include maps, photos, and site summary information, as well as programmatic documents. While this website is planned to be a complete repository for ER site and LTS monitoring information, additional information will be available to the public via the Freedom Of Information Act (FOIA) process. In addition to this website, the SNL/NM ER Project collaborated with Bernalillo County as described in Section 6.10.*

*The IMS for stewardship is in the process of being developed. The LTES IM processes encompass both historical (archival) information and current (or newly generated) information; this includes electronic and hard copy document management. SNL LTES information will be maintained and managed in order to meet the applicable statutes, regulations, executive orders, and federal requirements (e.g., NARA regulations) for LTES as well as DOE policies, orders, and guidelines.*

*The SNL ES&H and Security Records Center (formerly the ISS RC) will continue to support environmental records management including all SNL LTES records. The SHEARS database will continue to be the electronic indexing and records imaging repository for long-term internal use. The hard copy record will continue to be listed on an Inactive Record Transfer (IRT) Request form and submitted to the SNL/NM's inactive storage organization for long-term maintenance. The SHEARS database will be updated with the inactive storage box location code, so future searchers will know which box to ask for once the records have been stored. The IRT form will serve as a physical index of the contents; hard copies of these forms will be maintained by the Records Center. Records retention will follow environmental regulations and DOE requirements.*

*The IMS will support ongoing LTS activities, and will provide a functional system for internal use that enables the input of new data, stores existing data, generates tables and reports, and creates maps. The IMS will be built upon existing ER, Sandia corporate, and DOE information*

systems to meet long-term needs. Examples of data include the following: field data measurements, sample chain-of-custody tracking, analytical and spatial data, site inspection information, and quality control practices.

#### Recommendations

Citizens recommend that SNL come to a firm decision as to who the responsible party will be for the ER Information Repository before the end of September 2004. The external website should continue to be developed and populated. Use of LandTrek or other similar graphic site representation should be explored and funded.

### **6.10 Working with Bernalillo County on a Land Status Database**

The County of Bernalillo is working with DOE/Oakland to investigate the use of LANDTrek, a DOE database system designed to track land status. The Bernalillo County Environmental Health Department has asked SNL/NM to participate in the development of a publicly accessible internet database that would show contaminated sites and the current land status of each site. The stakeholders recommended SNL/NM and DOE consider the involvement of both local government and the Native American pueblos in the LTES process.

Real estate specialists and software experts from DOE, SNL/NM, and the county should be able to address this issue.

#### Status Report

The SNL/NM ER Project collaborated with Bernalillo County in 2003 and 2004 to further the development of LandTrek. In 2004, during meetings with the Bernalillo County IM Department, it was discovered that the Bernalillo County LandTrek System will no longer be supported and was considered to be only a pilot project. Although the LandTrek website is still in operation, it will not be updated or maintained in the future. Plans were made to provide the Bernalillo County GIS team with GIS data layers that represent the closure status of each ER site and will direct users to the public LTES website at [www.sandia.gov/ltes](http://www.sandia.gov/ltes). The public will be able to access this data at <http://ims.bernco.gov/website/gisopen/>. The SNL external LTES website that is in progress will also provide information to stakeholders.

#### Recommendations

SNL/NM and DOE should continue to work with Bernalillo County to develop a publicly accessible land status database to communicate ER Status and Institutional Controls information to tribal and local governments. SNL/NM and DOE should also strongly recommend that these governments get involved with LTES. Use of LandTrek, or other similar graphic site representation, should be explored and funded. Citizens recommend that interagency meetings between DOE/DOD/BLM/USFS etc. must include a real estate specialist to speak with them on the issue of land status.

### **6.11 IMS Long-Term Ownership and Maintenance**

Plans call for the current SNL/NM IMS to be modified to address LTES information. Among the issues that will need to be addressed are ownership and maintenance responsibilities for the IMS for stewardship; what software tools and formats will be used to present information; how

the IMS will be protected from data loss and accommodate evolving information technology; and LTES IMS funding.

Addressing this collection of considerations will involve a combination of managers and information technologists from SNL/NM, DOE, and KAFB.

#### Status Report

*The IMS for stewardship, which resolves data management issues, is in the process of being developed by appropriate entities. Funding for development, maintenance, and software and hardware upgrades has been obtained and will continue to be funded under the budget for LTS. A summary of the IMS is presented in Section 6.9, and the system is described in detail in the LTS Implementation Plan<sup>14</sup>. The LTS IMS will be part of the LTS Program; ownership is described in Section 6.12.*

#### Recommendations

*These are difficult issues with few easy solutions. Continue meetings between the appropriate entities (particularly ER staff and Environmental Management staff) until these issues are resolved.*

## **6.12 Transition from ER to Laboratory Services**

SNL/NM organizations have signed a MOU to begin discussion on how to transition LTES responsibilities from the ER Project to organizations within Laboratory Services. (See Appendix K for full MOU.) The goal of the discussions is to lead to a detailed plan for the orderly transition of LTES from the ER to the Laboratory Services organization(s). The plan will be developed over the next two to four years and may be attached to future versions of this LTES plan.

Additional organizations at SNL/NM should become involved in the LTES effort. This is an issue to be resolved internally at SNL/NM by management and staff from the affected groups, with coordination from the SNL/NM Leadership Team.

#### Status Report

*At the conclusion of the ER Project, LTS responsibilities, including IMS responsibilities, will now transfer to the SNL/NM ES&H and Emergency Management Center. This Center operates the ES&H programs that help ensure safety, health, and environmental protection during ongoing operations. The LTES Program also resides under this Center. The Center assists in the application of the ES&H regulations that pertain to operations at SNL.*

*The logic for placing the LTS sub-program under the oversight of the Emergency Management Center is to facilitate operational efficiencies. The LTS Implementation Plan<sup>14</sup> describes some of the planning and other activities directly related to the transition of the LTS sub-program to the SNL/NM ES&H and Emergency Management Center.*

#### Recommendations

*It has been suggested that the ER Project start to publicize sites that are entering LTES, such as the CAMU. That way, the public will be aware of the transition to the Environmental Management (EM) department.*

## 6.13 Varying Organizations and Lines of Regulatory Authority

There are a variety of organizations with varying regulatory authorities. Current planning for LTES should integrate communication across these entities. Currently the NMED's HWB has the regulatory authority for the HSWA and RCRA permit with DOE and SNL/NM. NMED's Groundwater Quality Bureau has regulatory authority over groundwater contamination. NMED's Surface Water Quality Bureau has regulatory authority over storm water from run-on and run-off. The EPA has regulatory authority over the CAMU. DOE Environmental, Safety and Health Division has authority for any radiological releases from sites based upon the requirements of DOE Order 5400.5, Radiological Protection of the Public and the Environment.

Because the regulatory picture is not likely to be simplified in the near term, the resolution of LTES issues lies with efforts of DOE and SNL/NM to continue to identify the appropriate regulatory group and other affected groups in its early considerations of any LTES issue.

### Status Report

*This issue has been largely resolved and clarified. There is currently one lead NMED Bureau authorized to regulate the ER process. The HWB of the NMED has authority over the NFA process, and the NMED now has authority over CAMU (previously under the EPA). The NMED HWB will coordinate internally with other NMED Bureaus as necessary to ensure that proper regulatory involvement occurs. The DOE LTES Initiative has no regulatory driver, but post-closure care at individual sites will be regulated through RCRA. The NMED Oversight Bureau will continue to have an on-site presence at SNL/NM.*

### Recommendations

*Citizens recommend that NMED maintain a presence on site to perform oversight and to coordinate DOE's regulatory compliance, as is common practice at major sites across the country. The NMED Oversight Bureau has an on-site presence at SNL/NM.*

## 6.14 Need for Dedicated Funding for Outreach

Stakeholders have recommended consistent outreach and education via a Stakeholder Outreach Working Group that will require dedicated funding and performance assurances. It will also require the cooperation of Albuquerque Public Schools and other local government entities to be successful.

A variety of stakeholders will be needed to address this issue. Funding considerations reach to DOE/HQ, while the working group itself will need to draw from a wide population of interested stakeholders.

### Status Report

*LTES outreach and public participation functions are being implemented as a component of SNL's corporate Environmental Management System (EMS) communication process. SNL/NM has an existing Environmental Outreach Program; LTS Outreach and Public Participation will be incorporated within that program. It routinely conducts environmental education outreach in the Albuquerque Public Schools and at a number of local special events. This program interfaces with the Sandia Community Involvement Department. LTS Outreach and Public Participation will continue to provide information to stakeholders regarding LTS activities, such as monitoring, and involve the community at large through interactive meetings and other events. Details of*

the public participation program are provided in Section 6.15 and can be found in the LTS Implementation Plan<sup>14</sup>.

### Recommendations

*Specific outreach funding is needed, as well as a specific clause in the LTES plan for dedicated outreach. Because of security concerns, there should also be a location off of KAFB where the public can learn about LTES.*

## **6.15 Details of a Public Participation Program**

Public input will be important in building an LTES program that has the trust of the interested stakeholder groups. Appendix D contains a plan for public participation in some detail. Determining how appropriate working groups would be triggered for formation and supported is evolving as discussions continue with the community.

Stakeholders have already expressed a great deal of interest and spent more than a year working with DOE and SNL/NM on LTES issues, including public participation. Utilization of a community office for a continuing dialog on what the LTES public participation program will look like seems an appropriate step. This issue can be resolved by discussion between the public, SNL/NM, and DOE/KAO.

### Status Report

*Subsequent to the draft 2001 LTES Plan, a number of stakeholder meetings were held to give the public an opportunity to determine and prioritize potential outreach projects. Citizens voiced a preference for spending limited available funds on the development of an LTES website, generation of a more formalized LTES curricula for use in schools, and production of an exhibit to be placed in the National Atomic Museum. These projects have been largely completed, as described below.*

*A public-accessible website has been established at [www.sandia.gov/ltes](http://www.sandia.gov/ltes) for delivery of LTES and LTS information as a component of the public outreach program. The main purpose of the website is to educate the public about the DOE's LTES initiative and explain SNL LTS for legacy sites. This website provides an avenue for the public to provide input and advertises events and activities that allow the public to provide input. This website contains details of nearly all SNL/NM ER Project sites, including decision documents, maps, and photos. Additional content for this website is being input following the phased approach recommended by the 2002/2003 citizen task force. This website also links to other pertinent websites to assist the user in obtaining further information about LTES.*

*Sandia worked with a team of stakeholders to create an LTES Educational Curriculum, which was sent to 60 local teachers. Twenty more curriculum packets were distributed at the Youth Conference on the Environment. The curriculum will continue to be distributed at various environmental conferences in the future.*

*An interactive permanent LTES exhibit was produced and is on display at the National Atomic Museum in Albuquerque. A traveling exhibit board providing an overview of SNL's LTES Program was also created and presented at a number of conferences.*

*An Environmental Outreach and Public Participation Strategy is currently being developed and will provide additional framework for future LTS outreach and public participation activities. Meetings and presentations will be conducted to inform, and receive feedback from, the public regarding updates on LTS progress and changes in the program. Stakeholders will have a forum to voice their concerns and issues. In order to continue to share and listen to a variety of community voices, these meetings and presentations will be held at a variety of venues throughout the region. This includes presentations for the community at large, SNL/NM, KAFB, Bernalillo County, City of Albuquerque, and the USFS. Presentations and community meetings will also be established for document reviews and regulatory changes. As is the case with the current community outreach structure, task groups will be formed to provide feedback when relevant issues/concerns present themselves. This includes development of a community checklist that will be used to track the status of the issues raised in this document and addressed in this chapter. It is anticipated that additional meetings will be held during the five-year review being conducted by SNL LTS for legacy sites.*

*The LTS Implementation Plan<sup>14</sup> presents further details about SNL's public outreach effort for LTS. The Implementation Plan was presented at the ER quarterly meeting, and public comments were requested.*

#### Recommendations

*More public outreach participation is recommended. The LTES Implementation plan should be reviewed by citizen groups and SNL/NM should allow for timely feedback from local citizens.*

## **6.16 LTES Funding Mechanism**

Stakeholders have recommended that DOE continue to study how to establish a stable funding commitment for LTES, by considering conventional and more creative mechanisms.

#### Status Report

*The DOE NNSA has the responsibility for LTS at NNSA sites (facilities such as SNL with ongoing missions). NNSA's responsibility for LTS was formalized in the Year 2007-2011 Program Budget Decision directed by the Assistant Secretary and reiterated in the October 27, 2005 memorandum, "Authority for Environmental Work at NNSA Sites" signed by EM and NNSA authorities. The DOE and SNL are obligated to provide funding for environmental monitoring and LTS activities, such as ICs, in accordance with permit requirements. Current funding has continued, and budgets for LTS will be developed and refined according to DOE processes.*

*SNL has developed a project baseline, which delineates LTS activities and estimates resources required to complete those activities, and has submitted budget requests to DOE. FY 2007 funding of approximately \$3 million has been obtained for LTS activities.*

#### Recommendations

*Stakeholders are concerned with getting long-term, continuous funding for the entire LTES package. DOE needs to look into funding mechanisms that are self-energizing and self-refinancing.*

## 6.17 Planning for LTES Performance Measures

Planning is still required to specify LTES deliverable goals depending upon what legislative course of action is taken. This must be resolved first by the regulators and then addressed by LTES managers.

### Status Report

*Reports and deliverables for SNL LTS for legacy sites will be scaled to a size that preserves LTS resources for project tasks and fieldwork, but will meet necessary regulatory requirements. LTS data will be summarized in the ASER. The ASER is a DOE document that summarizes all environmental monitoring and surveillance activities at SNL/NM.*

*A second type of report to be produced by the LTS sub-program for legacy sites will be technical in nature and submitted to the regulators. Because the DOE and Sandia are still conducting discussions with the regulators regarding reporting requirements and the frequency of these requirements, it is uncertain whether one report or multiple reports will be required. Nevertheless, the report or reports will contain data and results for such projects as monitoring of the CWL, CAMU, MWL, groundwater sites, and NFA/CAC sites with controls. It will include data obtained at all intervals (such as quarterly or annual samples) and any other information required by the regulators. A community checklist will be developed and used to track the status of the issues raised in this document and addressed in this chapter.*

### Recommendations

*Citizens want a checklist (like an LTES report card) in addition to state requirements that can be shared with the community in an annual meeting.*

**APPENDIX G**  
**Project Control Examples for the Long-Term Stewardship Program**

**TASK ID:** Long-Term Monitoring, Inspection and Maintenance

**WBS:** 1.01.02

**TASK SUMMARY:** This TSD covers the Monitoring, Inspection, and Maintenance sub task of Long Term Environmental Stewardship for FY07 and beyond.

**DELIVERABLES:** Reports as specified in the post closure care requirements required by the New Mexico Environment Department Hazardous Waste Bureau, Five Year Monitoring, Inspection and Maintenance Program Re-evaluation Report and contributions to the annual LTES reports.

**PERFORMANCE MEASURES:** Annual and Five Year Re-evaluation Reports

**START/END DATES:** See baseline activities list.

**COST CONTENT/COST ESTIMATE METHOD:** SNL cost categories include labor, direct costs, computer costs and loads. Direct costs include analytical costs, supplies, materials, equipment, contracts, and training.. The cost estimating method based on the experience and cost history gained in conducting similar activities for environmental remediation and facility surveillance monitoring..

#### **TASK DESCRIPTION AND SCOPE:**

This TSD covers the LTES Monitoring, Inspection and Maintenance activities associated with locations at SNL/CA and SNL/NM with residual contamination . The sites requiring monitoring are categorized as: sites with engineered controls, locations with groundwater contamination, and locations with restricted land use. The activities conducted at these sites include as appropriate:

Engineered Controls sites:

- Cover inspection and maintenance
- Vadose zone monitoring
- Groundwater monitoring
- General site inspection and maintenance

Groundwater contamination sites:

- Groundwater monitoring
- Monitor well inspection, maintenance, replacement, and plugging and abandonment

Land use restricted sites.

- Site inspection and maintenance

#### **SNL/CA**

The long-term monitoring in California is for groundwater at 4 locations: Fuel Oil Spill, Arroyo Seco, the former Navy Landfill, and the Buffer between LLNL and SNL/CA. Samples are collected from a total of 8 wells. Sampling is conducted at a biannual, annual, semi-annual, and quarterly frequency depending on location. Analytes are site specific and include VOCs, BTEX, CCR metals, CCR minerals, TPH diesel, and Tritium. All work, services, and management

conducted by SNL/CA personnel. This task is a continuation of the monitoring activities currently being funded by ER. Starting in FY07 this task will be transferred to the NNSA LTES Program.

Cost basis: annual

Analytical:

34 VOC Analyses (EPA 624)

34 BTEX Analyses (EPA 602)

4 CCR Metals

4 CCR Minerals

6 TPHD (SW 834 Method 8015)

4 Tritium

Labor

X SMTS - 40 hrs

Y FTech - 80 hrs

## SNL/NM

### Land Use Controlled Sites

#### Site Inspection and Maintenance

Site inspections will be made of fences, signs, structures, barriers and drainage. The frequency of the inspections will be in accordance with Post Closure Care Plans and Corrective Measures Implementation Plans and other requirements that are identified.

Cost basis: annual

Inspection and Maintenance

Materials: \$500/site/yr X( 6 land use restricted sites + 3 engineered sites + 3 GW sites

Labor: FTech, 8 hr/site X 12 sites

#### Site Sampling

Based on September 2004 preliminary conversations with the NMED/HWB, HWB does not expect soil sampling to be a permitted requirement. However, until regulatory agreements are in place, it is assumed that the approximately 6 land use restricted sites will need 1 - 2 samples annually to support periodic (5 yr) site risk re-evaluations discussed herein. Sites will be inspected quarterly.

Cost Basis: annual

Analytical:

10 metals, soil (6020),\

10 Gamma Spec

Labor:

FTech, 192 hrs

Maintenance Materials: \$ 6000

## MONITORING

Groundwater monitoring will occur at these areas of concern:

- 1) Canyons/Burn Site

- 2) Technical Area V/LWDS
- 3) Chemical Waste Landfill
- 4) Mixed Waste Landfill
- 5) Tijeras Arroyo (TAG)

The specific site monitoring requirements will be defined the closure plans for each site or area of concern as approved by the NMED. Since these plans still under development the level of effort for monitoring is an estimation based on the waste contained at the site or the nature of the groundwater contamination and the engineered controls for the landfill sites or the remedial strategies for the groundwater contamination locations. The total number of wells to be monitored is assumed at 51: CWL ( 5), TA-V (10), TAG (25), MWL (7), Canyons (4). The sampling frequency is assumed to be annual. The analytes will include VOCs, Tritium, nitrate, gross alpha, gross beta, gamma spectroscopy, general chemistry, and quality control samples as determined by the contaminants of concern at the monitored units.

Cost Basis: Annual

Analyses:

VOCs (TA-V, CWL, TAG, MWL)  
Tritium (MWL)

Metals (MWL)GammaSpec (MWL)  
General chemistry (anions, cations, alkalinity) (MWL)  
Gross alpha, gross beta (MWL)  
Gamma Spec (MWL)  
NPN (TA-V, TAG, Canyons)  
Sample Collection:

SMTS SME: Data review 120 hrs  
FSTech: 384 Hrs  
Contractor FTech: 1536 hrs  
FTech: Waste Mgt. 192 hr  
Field equipment and Sampling supplies: \$ 48 K  
Data Validation: 30% of sample analysis cost.

Other assumptions for groundwater sampling are:

- Post closure groundwater monitoring at the MWL will not start until FY08
- An off-site laboratory will be used.
- No radiological swipes or counting required on the sample container for sample release.
- Purge water volumes are on the order of those resulting from conventional sampling methods. 4 drums per well or 192 drums. It will always be possible to discharge the purge water to a nearby drain connected to a publicly owned treatment works (POTW).

**Monitor well inspection & maintenance:**

The groundwater monitoring wells will be inspected and maintained on an annual basis. Monitor well will be plugged and abandoned as the local water level approaches the bottom of the in the well screen and precludes the collection of a representative water sample. The abandoned well will be replaced on

a one-to-one basis with a new monitor well at the same location. Relevant well construction, inspection and maintenance data will be maintained in a well registry database. Waste produced as part of well installation including water produced during well development, drill cuttings, and drilling mud will be analyzed to determine the disposal pathway.

Cost Basis: annual

Analytical:

Well installation drilling waste: VOC, gamma spec, metals, NPN, gross alpha-beta, PCBs  
Development water: VOC, gamma spec. metals, PCBs, NPN, gross alpha-beta

Labor:

SMTS SME – Well installation, P&A: 0.1 FTE

FSTech – Well installation support –100 hrs

Contractor Geologist/hydrogeologist –600hrs

FTech- Well inspection, maintenance, well registry waste management: 0.2 FTE

Well Installation: 2 wells per year @ \$ 55 K / well

Well P&A: 2 wells per year @ 25 K/well

Well maintenance supplies: \$ 5K

### Vadoze Zone Monitoring

Vadose zone monitoring will consist of soil moisture measurement using portable neutron density probes and permanently emplaced Time Domain Reflectometry (TDR) instrumentation. Soil vapor collection will be required using Summa canisters and laboratory analysis using EPA TO-14 VOC analysis. Soil moisture measurement will be required at the CAMU and the MWL. Soil vapor sampling will be required at the CWL, MWL, and the CAMU. The CAMU is the only engineered facility currently operating in the post closure monitoring mode. The CAMU is being monitored under a draft Post Closure Care Plan. It is assumed that the other engineered units, the MWL and CWL will be require to follow a similar monitoring protocol.

Cost basis: annual

Analytical:

VOC (by TO-14) CAMU, MWL , CWL

Tritium, aqueous, MWL

Labor

SMTS SME : monitoring coordination, reporting :  $60 \times 3 = 180$  hrs

FTech moisture monitoring, soil gas sampling:  $600 \text{ hr} \times 2 \text{ techs} = 1200 \text{ hrs}$  (CAMU)  $\times 3 \text{ sites} = 3600$  hrs

FSTech – data management, review, and reporting:  $200 \text{ hr} \times 3 = 600$

Other assumptions are:

- CAMU will have neutron moisture, TDR and temperature measurements on a quarterly frequency.
- CAMU SUMMA canisters will be used to sample existing vapor wells some are annual and some quarterly (125 total annual).

- MWL will measure for moisture quarterly with neutron probe access tubes in three angled boreholes.
- Assume vapor sampling for VOCs and tritium will be collected from these three boreholes quarterly
- The CWL will have 6 soil vapor sampling locations, sampled annually

#### COVER MONITORING & SITE MAINTENANCE

Each of the land fill units, MWL, CAMU, and CWL is covered by an engineered, evapotranspiring, vegetative, soil cover to prevent moisture infiltration in the buried waste or contaminated soil. The cover vegetation will require quarterly inspection and maintenance for the initial five years to allow the native vegetation to reach mature coverage. Periodic maintenance including weeding and re-seeding may be required. After the initial five years the inspection and maintenance can be reduced to an annual frequency. In addition the site drainage will require quarterly inspection and maintenance to ensure effective precipitation run off to avoid moisture infiltration that can compromise vadose zone monitoring data. Soil and vegetation from the MWL cover will be sampled annually for tritium content. Annual air monitoring of the MWL cover will be conducted.

Cost basis: annual

Analytical:

Tritium: MWL Soil & Biota

Gamma spec - sample swipes RSPD

Labor:

SMTS Inspection and maintenance coordination: 100 hrs

FTech – quarterly inspection and maintenance: 200 hr

Tumble Weed removal (semiannual) \$ 6000

Biologist – quarterly inspection; 12 hr/ qtrter x 4 qtrters x 3 units = 144 hrs

Drainage system maintenance, PO contract: \$ 6000

Air Monitoring PO (gamma spec, gross alpha/beta, and tritium): \$ 5100

Other assumptions are:

- MWL Soil & veg annual 10 soil moisture content, 14 each veg & soil gamma spec and tritium
- The design of the cover is based on the assumption that no additional moisture will migrate through.

#### SAMPLE MANGEMENT, LABORATORY CONTRACTS, AND DATA VALIDATION

Sample management is required for all sampling activities. This includes laboratory contract procurement and management, packaging, shipping, tracking, , receiving and verifying that analyses met contract requirements, , , and general analytical methods technical support services. This activity includes the sample management requirements for all monitoring including soil and groundwater.

Cost Basis: annual

Sample Preparation, Packaging & Shipping: FTech 0.3 FTE

Laboratory Contracts, Laboratory audits, Analytical consultation: SMTS 0.5 FTE

Data review and validation coordination: Tech 0.2 FTE

Shipping and Packaging supplies: \$ 10 K

Contract Laboratory Auditing Support: \$ 15 K

#### Data Validation

Data collected for regulatory compliance will be subject to data validation. Based on past experience data validation is approximately 30% of the total analytical costs.

### PERIODIC SITE MONITORING RE-EVALUATION

A 5 year review cycle will implemented to determine if the conditions and assumptions associated with the monitoring activities for each of the sites are still appropriate or can be modified based on the current risk associated with specific sites.

#### Controlled Land Use Sites

The chemical and physical processes of weathering will over time alter the nature of the contaminants at sites closed with a risk category that required site controls. Regulatory criteria may change over time. The site sampling data will be reviewed and if appropriate a risk analysis will be conducted to determine is the new risk values are consistent with the land use controls imposed on the sites or whether the NMED needs to reconsider imposed restrictions.

#### Engineered Sites

Analyze and evaluate the monitoring data to establish the performance of the engineered barriers in containing the waste and minimizing the risk to the public health and the environment. Determine if the stability (or variability) of the data warrants a revision of the frequency of data collection or change in the type of data being collected.

#### Groundwater Remediation Sites

Analyze and evaluate the monitoring data to determine the performance of the remedial processes, determine if the performance is consistent with the initial assumptions of the contaminant dissipation due to natural processes and demonstrates a reduction of risk to the public health and the environment.

Cost Basis: Every 5 yrs (starting with FY 2010)

SMTS SME : 0.1 FTE

Contractor Hydrogeologist: 0.3 FTE

Word Processing: 0.1 FTE

Msc. Cost : \$ 5K.

### REPORTING

Monitoring data summary and analysis reports will be required by the regulators and the DOE. Some of the data will be reported in the Site Annual Environmental Report.

Cost Basis: annual

SMTS SME : 200 hrs

STech: 400 hrs

Word Processing: 100 hrs

Technical Editing: 100 hrs

Materials: contract printing & binding : \$ 10,000

Assumptions:

- The engineered units, MWL, CAMU, and CWL will each require separate annual regulatory mandated reports
- The monitoring results for the groundwater units, TAG, TA-V and Canyons will be consolidated into a single annual report

A report to the DOE and the regulators will be provided for the 5 year LTES activities re-evaluation, the cost is under the 5 year re-evaluation

**General Assumptions for LTES Monitoring, Inspection and Maintenance:**

- Actual monitoring elements are dependent on approval of the regulatory documents such as CMI, PCCP, and Long Term Monitoring and Maintenance Plan.
- There will be no more CAMU leachate management after FY06.
- There will be no significant environmental changes or human intrusion, and therefore, no contingency actions will need to be taken. The only necessary actions will be related to routine maintenance.
- The Mixed Waste Landfill will not be excavated.
- SWMU 87 NFA will be approved following the FY03 housekeeping. Site 87 will be subject to institutional controls.
- Monitored natural attenuation will be re-justified every 5 years. The hydrogeologic and contaminant distribution conceptual models will not change significantly. Some computer modeling will be performed.
- Any technology upgrade costs will be equal to the tradeoff of ceasing the previous technology.

**RISKS TO PROJECT:**

- Expansion of oversight duties due to additional DOE or EPA requirements for site activities.
- Inadequate funding or staff to meet oversight objectives.
- Regulatory requirements changes
- Newly discovered contaminated sites
- ER schedule delays beyond FY06

**REFERENCES:**

CAMU Post-Closure Care Plan

LTES Implementation Plan (SNL/NM Sept 06)

Activity ID	DESCRIPTION	Duration	Baseline Start	Baseline Finish	Budgeted Cost	FY07				FY08				FY09				FY10				FY11			
						O1	O2	O3	O4	O1	O2	O3	O4	O1	O2	O3	O4	O1	O2	O3	O4	O1	O2	O3	O4
<b>LTEM LTES - EM</b>																									
<b>LTS2 MONITORING</b>																									
LTMON02000	START LONG TERM GROUNDWATER MONITORING	0	02OCT06*		0.00	START LONG TERM GROUNDWATER MONITORING																			
LTMON02020	FY07 Long Term Groundwater Monitoring	249	02OCT06	28SEP07	242,246.22	FY07 Long Term Groundwater Monitoring																			
LTMON02030	FY08 Long Term Groundwater Monitoring	251	01OCT07	30SEP08	236,947.29	FY08 Long Term Groundwater Monitoring																			
LTMON02040	FY09 Long Term Groundwater Monitoring	250	01OCT08	30SEP09	249,039.69	FY09 Long Term Groundwater Monitoring																			
LTMON02060	FY10 Long Term Groundwater Monitoring	250	01OCT09	30SEP10	249,039.69	FY10 Long Term Groundwater Monitoring																			
LTMON02070	FY11 Long Term Groundwater Monitoring	250	01OCT10	30SEP11	249,039.69	FY11 Long Term Groundwater Monitoring																			
LTMON03010	START LONG TERM COVER MONITORING	0	02OCT06*		0.00	START LONG TERM COVER MONITORING																			
LTMON03020	FY07 Long Term Cover Monitoring	249	02OCT06	28SEP07	44,834.65	FY07 Long Term Cover Monitoring																			
LTMON03030	FY08 Long Term Cover Monitoring	251	01OCT07	30SEP08	64,618.87	FY08 Long Term Cover Monitoring																			
LTMON03040	FY09 Long Term Cover Monitoring	250	01OCT08	30SEP09	52,855.20	FY09 Long Term Cover Monitoring																			
LTMON03050	FY10 Long Term Cover Monitoring	250	01OCT09	30SEP10	52,855.20	FY10 Long Term Cover Monitoring																			
LTMON03060	FY11 Long Term Cover Monitoring	250	01OCT10	30SEP11	52,855.20	FY11 Long Term Cover Monitoring																			
LTMON03660	FY07 SNL/CA Compliance Monitoring	249	02OCT06	28SEP07	25,830.38	FY07 SNL/CA Compliance Monitoring																			
LTMON03670	FY08 SNL/CA Compliance Monitoring	251	01OCT07	30SEP08	25,830.38	FY08 SNL/CA Compliance Monitoring																			
LTMON03680	FY09 SNL/CA Compliance Monitoring	250	01OCT08	30SEP09	25,830.38	FY09 SNL/CA Compliance Monitoring																			
LTMON03690	FY10 SNL/CA Compliance Monitoring	250	01OCT09	30SEP10	25,830.38	FY10 SNL/CA Compliance Monitoring																			
LTMON03700	FY11 SNL/CA Compliance Monitoring	250	01OCT10	30SEP11	25,830.38	FY11 SNL/CA Compliance Monitoring																			
LTMON04310	START LONG TERM STEWARDSHIP IMPLEMENTATION	0	02OCT06		0.00	START LONG TERM STEWARDSHIP IMPLEMENTATION																			
LTMON04960	FY07 Long Term Vadose Zone Monitoring	249	02OCT06*	28SEP07	243,661.53	FY07 Long Term Vadose Zone Monitoring																			
LTMON04970	FY08 Long Term Vadose Zone Monitoring	251	01OCT07	30SEP08	351,097.66	FY08 Long Term Vadose Zone Monitoring																			
LTMON04980	FY09 Long Term Vadose Zone Monitoring	250	01OCT08	30SEP09	351,097.66	FY09 Long Term Vadose Zone Monitoring																			

Start Date 01OCT03  
 Finish Date 07OCT69  
 Data Date 01OCT03  
 Run Date 07JUN05 10:05

Baseline  
 Progress Bar

**LONG TERM ENVIRONMENTAL STEWARDSHIP WITH LOADS**

LTES - EM

Sheet 1 of 2



Updates to Randy Lang 284-2482

Date	Revision	Checked	Approved

Activity ID	DESCRIPTION	Duration	Baseline Start	Baseline Finish	Budgeted Cost	FY07				FY08				FY09				FY10				FY11			
						Q1	Q2	Q3	Q4																
LTMON04990	FY10 Long Term Vadose Zone Monitoring	250	01OCT09	30SEP10	351,097.66																				
LTMON05000	FY11 Long Term Vadose Zone Monitoring	250	01OCT10	30SEP11	351,097.66																				
LTMON06000	FY07 Monitor Well Inspection and Maintenance	249	02OCT06*	28SEP07	280,109.78																				
LTMON06010	FY08 Monitor Well Inspection and Maintenance	251	01OCT07	30SEP08	280,109.78																				
LTMON06020	FY09 Monitor Well Inspection and Maintenance	250	01OCT08	30SEP09	280,109.78																				
LTMON06030	FY10 Monitor Well Inspection and Maintenance	250	01OCT09	30SEP10	280,109.78																				
LTMON06040	FY11 Monitor Well Inspection and Maintenance	250	01OCT10	30SEP11	280,109.78																				
LTMON07010	FY07 Sample Mgt Lab Contracts and Data Valid	249	02OCT06*	28SEP07	206,064.04																				
LTMON07020	FY08 Sample Mgt Lab Contracts and Data Valid	251	01OCT07	30SEP08	206,064.04																				
LTMON07030	FY09 Sample Mgt Lab Contracts and Data Valid	250	01OCT08	30SEP09	206,064.04																				
LTMON07040	FY10 Sample Mgt Lab Contracts and Data Valid	250	01OCT09	30SEP10	206,064.04																				
LTMON07050	FY11 Sample Mgt Lab Contracts and Data Valid	250	01OCT10	30SEP11	206,064.04																				
LTMON08000	FY10 Periodic Monitoring Site Re-Evaluation	250	01OCT09*	30SEP10	123,921.48																				
LTMON09000	FY07 Annual Monitoring Reporting	249	02OCT06*	28SEP07	52,468.00																				
LTMON09010	FY08 Annual Monitoring Reporting	251	01OCT07	30SEP08	52,468.00																				
LTMON09020	FY09 Annual Monitoring Reporting	250	01OCT08	30SEP09	52,468.00																				
LTMON09030	FY10 Annual Monitoring Reporting	250	01OCT09	30SEP10	52,468.00																				
LTMON09040	FY11 Annual Monitoring Reporting	250	01OCT10	30SEP11	52,468.00																				
LTMON10000	FY07 Controlled Land Use Sites	249	02OCT06*	28SEP07	18,915.52																				
LTMON10010	FY08 Controlled Land Use Sites	251	01OCT07	30SEP08	18,915.52																				
LTMON10020	FY09 Controlled Land Use Sites	250	01OCT08	30SEP09	18,915.52																				
LTMON10030	FY10 Controlled Land Use Sites	250	01OCT09	30SEP10	18,915.52																				
LTMON10040	FY11 Controlled Land Use Sites	250	01OCT10	30SEP11	18,915.52																				

Start Date 01OCT03  
 Finish Date 07OCT69  
 Data Date 01OCT03  
 Run Date 07JUN05 10:05

 Baseline  
 Progress Bar

**LONG TERM ENVIRONMENTAL STEWARDSHIP WITH LOADS**

LTES - EM

Sheet 2 of 2



Updates to Randy Lang 284-2482

Date	Revision	Checked	Approved

Cost Detail by Organization

ACT ID	DESC	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
<b>MONITORING</b>						
LTMON02020	FY07 Long Term Groundwater Monitoring	242246				
LTMON02030	FY08 Long Term Groundwater Monitoring		236947			
LTMON02040	FY09 Long Term Groundwater Monitoring			249040		
LTMON02060	FY10 Long Term Groundwater Monitoring				249040	
LTMON02070	FY11 Long Term Groundwater Monitoring					249040
LTMON03020	FY07 Long Term Cover Monitoring	44835				
LTMON03030	FY08 Long Term Cover Monitoring		64619			
LTMON03040	FY09 Long Term Cover Monitoring			52855		
LTMON03050	FY10 Long Term Cover Monitoring				52855	
LTMON03060	FY11 Long Term Cover Monitoring					52855
LTMON03660	FY07 SNL/CA Compliance Monitoring	25830				
LTMON03670	FY08 SNL/CA Compliance Monitoring		25830			
LTMON03680	FY09 SNL/CA Compliance Monitoring			25830		
LTMON03690	FY10 SNL/CA Compliance Monitoring				25830	
LTMON03700	FY11 SNL/CA Compliance Monitoring					25830
LTMON04960	FY07 Long Term Vadose Zone Monitoring	243662				
LTMON04970	FY08 Long Term Vadose Zone Monitoring		351098			
LTMON04980	FY09 Long Term Vadose Zone Monitoring			351098		
LTMON04990	FY10 Long Term Vadose Zone Monitoring				351098	
LTMON05000	FY11 Long Term Vadose Zone Monitoring					351098
LTMON06000	FY07 Monitor Well Inspection and Maintenance	280110				
LTMON06010	FY08 Monitor Well Inspection and Maintenance		280110			
LTMON06020	FY09 Monitor Well Inspection and Maintenance			280110		
LTMON06030	FY10 Monitor Well Inspection and Maintenance				280110	
LTMON06040	FY11 Monitor Well Inspection and Maintenance					280110
LTMON07010	FY07 Sample Mgt Lab Contracts and Data Valid	206064				
LTMON07020	FY08 Sample Mgt Lab Contracts and Data Valid		206064			
LTMON07030	FY09 Sample Mgt Lab Contracts and Data Valid			206064		
LTMON07040	FY10 Sample Mgt Lab Contracts and Data Valid				206064	
LTMON07050	FY11 Sample Mgt Lab Contracts and Data Valid					206064
LTMON08000	FY10 Periodic Monitoring Site Re-Evaluation				123921	
LTMON09000	FY07 Annual Monitoring Reporting	52468				
LTMON09010	FY08 Annual Monitoring Reporting		52468			
LTMON09020	FY09 Annual Monitoring Reporting			52468		
LTMON09030	FY10 Annual Monitoring Reporting				52468	
LTMON09040	FY11 Annual Monitoring Reporting					52468
LTMON10000	FY07 Controlled Land Use Sites	18916				
LTMON10010	FY08 Controlled Land Use Sites		18916			
LTMON10020	FY09 Controlled Land Use Sites			18916		
LTMON10030	FY10 Controlled Land Use Sites				18916	
LTMON10040	FY11 Controlled Land Use Sites					18916
<b>TOTAL</b>	<b>LTS2</b>	<b>1114130</b>	<b>1236052</b>	<b>1236380</b>	<b>1360302</b>	<b>1236380</b>
<b>REPORT TOTAL</b>		<b>1114130</b>	<b>1236052</b>	<b>1236380</b>	<b>1360302</b>	<b>1236380</b>

**APPENDIX H**  
**DOE Information Management Policies, Orders, and Guidelines**

## APPENDIX H

### DOE Information Management Policies, Orders, and Guidelines

July 2005

DOE Orders	
Name	Description
<a href="#">DOE Directives Homepage</a> 	Department of Energy Directives include Policies, Orders, Notices, Manuals, and Guides which are intended to direct, guide, inform, and instruct employees in the performance of their jobs, and enable them to work effectively within the Department and with agencies, contractors, and the public.
<a href="#">DOE Order 200.1, "Information Management Program"</a> 	Contains guidelines that eliminate the redundancy, and improve the quality and usability of the policies and requirements associated with the Department's various information management functions.
<a href="#">DOE Order 241.1A, "Scientific and Technical Information Management"</a> 	Establishes DOE requirements and responsibilities to ensure that scientific and technical information as identified, processed, disseminated, and preserved in a safe and accessible manner.
<a href="#">DOE Order HQ1324.1A, "Records Management"</a> 	Applies to all headquarters elements and headquarters management and operating contractors performing work for the Department
<a href="#">"DOE Records Schedule for Environmental Records"</a> 	This schedule provides for the disposition of U.S. Department of Energy (DOE) records created to comply with or needed to support compliance with Federal environmental laws and implementing regulations.
<a href="#">DOE Order 4300.1C, "Real Property Management"</a> 	Contains guidance on establishing Department-wide policies and procedures for the acquisition, use, inventory, and disposal of real property.
<a href="#">DOE Order 435.1, "Radioactive Waste Management"</a> 	Regulates how DOE manages radioactive waste.
<a href="#">DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities"</a> 	Contains the guidelines for the conduct of operations requirements at DOE facilities.
DOE Policies and Guidance	
Name	Description
<a href="#">Guide to the Management of Scientific and Technical Information</a> 	Department of Energy
<a href="#">Radioactive Waste Management Manual</a> 	Department of Energy Guidance
<a href="#">Draft Long-term Stewardship Implementation Plan Guidance</a> 	Department of Energy Guidance
<a href="#">Draft Interim Policy for the Department of Energy's Use of Institutional Controls</a> 	Department of Energy Policy
<a href="#">DOE Memorandum on Long-Term Stewardship Responsibility</a> 	Department of Energy Memorandum
<a href="#">Long-Term Stewardship Transition to Site Landlord</a> 	Department of Energy Memorandum

<a href="#">EPA Policy on Deletion and Deferral of Sites from the CERCLA National Priorities List (NPL)</a> 	<b>CERCLA Information Brief</b> (DOE/EH-413-0001)
<a href="#">Effects of Future Land Use Assumptions On Environmental Restoration Decision Making</a> 	<b>RCRA/CERCLA Information Brief</b> (DOE/EH-413/9810)
<a href="#">CERCLA Requirements Associated with Real Property Transfers</a> 	<b>CERCLA Information Brief</b> (EH-413-9808)
<a href="#">Deletions of Federal Facilities from the Federal Agency Hazardous Waste Compliance Docket and the National Priorities List</a> 	<b>CERCLA Information Brief</b> (EH-413-074/0597)
<a href="#">Use of Institutional Controls in a CERCLA Baseline Risk Assessment</a> 	<b>CERCLA Information Brief</b> (EH-231-014/1292)
<a href="#">Cross-Cut Guidance on Environmental Regulations for DOE Real Property Transfers</a> 	<b>United States Government Memorandum</b> (DOE/EH-413/9712)
<a href="#">EPA Draft Comprehensive Five-Year Review Guidance</a> 	<b>United States Government Memorandum</b>
<a href="#">EPA Guidance on Transfer of Federal Property Undergoing CERCLA Remedial Action</a> 	<b>United States Government Memorandum</b>
<a href="#">Final Directive On the Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites</a> 	<b>United States Government Memorandum</b>
<a href="#">Conditional Remedies Under RCRA Corrective Action</a> 	<b>RCRA Information Brief</b> (DOE/EH-413/064r)
<a href="#">Technical Impracticability Decisions for Ground Water at CERCLA Response Action and RCRA Corrective Action Sites</a> 	<b>RCRA/CERCLA Information Brief</b> (DOE/EH-413/9814)
<a href="#">Using Remedy Monitoring Plans To Ensure Remedy Effectiveness and Appropriate Modifications</a> 	<b>RCRA/CERCLA Information Brief</b> (DOE/EH-413 9809)
<a href="#">Standards Applicable to Owners and Operators of Closed and Closing Hazardous Waste Management Facilities: Post-Closure Permit Requirement and Closure Process (63 FR 56710)</a> 	<b>Environmental Guidance Regulatory Bulletin</b>
<a href="#">Environmental Response Design and Implementation Guidance</a> 	<b>National Environmental Training Office Document</b> (DOE/EH-413-9915)

[RCRA Ground Water Assessment Plans and Annual Ground Water Quality Assessment Reports at Interim](#)

**RCRA Information Brief**  
(EH-413-069/0396)

[Status Facilities](#)   

[RCRA Expanded Public Participation Final Rule](#)

**Environmental Guidance Regulatory Bulletin**

[Issued](#)   

[Guidance for UMTRA Project Surveillance and Maintenance](#) 

Describes the procedures that will be used to verify that UMTRA disposal sites continue to function as designated.

[Guidance for Implementing the Long-term Surveillance Program for UMTRA Project Title I Disposal Sites](#) 

Provides guidance for writing site-specific long-term surveillance plans and describes site surveillance, monitoring, and long-term care techniques for Title I UMTRA disposal sites.

[Guidance to DOE Sites Developing Project Baseline Summaries for Long-term Stewardship Costs](#)

An excerpt from EM's *Guidance for the Spring Update of the PBS Database: Life-Cycle Planning Data, FY 2001 Budget Formulation Information, and Paths to Closure* with respect to the long-term stewardship initiative.

[\(Excerpt\)](#) 

## Other Official DOE Language or Documents

Name	Description
<a href="#">FY 2002 Budget Narrative for LTS, which is included in the budget submission to Congress</a> 	For further information, please contact David Geiser at 202-586-9280.
<a href="#">Agreement in Principle (AIP) between EM and the NRC</a> 	On March 15, 2001, Assistant Secretary Huntoon authorized EM to sign an Agreement in Principle (AIP) with the Nuclear Regulatory Commission to allow work to begin on an Memorandum of Understanding MOU on Nuclear Waste Policy Act (NWPA) section 151(b) potential site transfers
<a href="#">"Institutional Controls in RCRA &amp; CERCLA Response Actions [DOE/EH-413-0004]"</a> 	U.S. Department of Energy Office of Environmental Policy and Guidance RCRA/CERCLA Division
<a href="#">"U.S. Department of Energy Strategic Plan"</a> 	"Strength Through Science, Powering the 21st Century"
<a href="#">"Integrated Planning, Accountability, and Budgeting System Handbook"</a>	U.S. Department of Energy, Office of Environmental Planning
<a href="#">"Budget Highlights"</a> 	U.S. Department of Energy, FY 2001 Budget Request to Congress
<a href="#">"Integrated Planning, Accountability, and Budgeting System Handbook"</a>	U.S. Department of Energy, Office of Environmental Management
<a href="#">DOE Congressional Testimony on Long-Term Stewardship</a>	Assistant Secretary for Environmental Management, Dr. Carolyn Huntoon, presented testimony supporting DOE's FY 2001 budget request that emphasized the importance of developing an effective long-term stewardship program.
<a href="#">Reassignment of the Grand Junction Office from Albuquerque to Idaho Operations Office</a> 	<b>Department of Energy Memorandum</b>
<a href="#">FY2000 Defense Authorization Act Conference Report (Excerpt)</a>	Language on the Long-term Stewardship Plan excerpted from the Congressional Record; page H7855.

[Memorandum of Understanding \(MOU\) Between the U.S. Department of Energy and the U.S. Army Corps of Engineers Regarding Program Administration and](#)

[Execution of the FUSRAP Program](#) 

A MOU between the U.S. Department of Energy (DOE) and the U.S. Army Corps of Engineers (USACE) for the purpose of delineating administration and execution responsibilities of each of the parties for the Formerly Utilized Sites Remedial Action Program (FUSRAP).

## Other Federal Policies and Guidance

**Name**

**Description**

[DOE Notification Memorandum on the EPA Five Year Review Guidance](#) 

The purpose of the memorandum is to make the field aware of the availability of the recently issued final version of EPA's "Comprehensive Five-Year Review Guidance."

[Reuse Assessments: A tool to Implement the Superfund Land Use Directive](#) 

This EPA directive presents information for developing future land-use assumptions when making remedy selection decisions for Superfund sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

[Comprehensive Five-Year Review Guidance](#) 

EPA's Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P, is intended to promote consistent implementation of the five-year review process. (EPA 540-R-01-007)

[Operation and Maintenance in the Superfund Program](#) 

EPA Fact Sheet (EPA 540-F-01-004)

["Handbook of Groundwater Policies for RCRA Corrective Action \(Draft\)"](#) 

For Facilities Subject to Corrective Action Under Subtitle C of the Resource Conservation and Recovery Act  
Issued by Office of Solid Waste Corrective Actions Programs Branch

[Close Out Procedures for National Priorities List Sites](#) 

EPA OSWER Directive 9320.2-09A-P  
(EPA 540-R-98-016)

[Direct Final Process for Deletions](#) 



EPA Memorandum transmitting the revised procedures for deleting sites from the NPL using a Streamlined Direct Final Notification Process (OSWER Directive 9320.2-12-FS-P)

[Institutional Controls and Transfer of Real Property Under CERCLA Section 120\(h\)\(3\)\(A\), \(B\), or \(C\) -- Draft Document](#) 

Institutional controls and transfer of real property.

[Institutional Controls and Transfer of Real Property Under CERCLA Section 120\(h\)\(3\)\(A\), \(B\), or \(C\) -- Draft Document](#) 

Institutional controls and transfer of real property.

["Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites." \(#9200.4-17P\)](#) 

This EPA Directive outlines EPA's policy with regard to the use of monitored natural attenuation for the remediation of contaminated soil and groundwater at sites regulated under all programs administered by EPA's Office of Solid Waste and Emergency Response (OSWER).

## Federal Regulations

### Name

### Description

[Atomic Energy Act \(42 U.S.C. Sect. 2011- Sect. 2259\)](#)

The Atomic Energy Act (AEA) assures the proper management of source, special nuclear, and by product material. The AEA delegates control of nuclear energy primarily to the Department of Energy, the Nuclear Regulatory Commission (NRC), and the Environmental Protection Agency (EPA).

[Resource Conservation and Recovery Act](#)

RCRA is the regulation EPA uses to manage from "cradle to grave" releases to the environment. This link provides an index to the full text of the act.

[Comprehensive Environmental Response, Compensation and Liability Act](#)

CERCLA is the regulation EPA uses to clean up abandoned or uncontrolled hazardous waste sites. This link provides an index to the full text of the act.

[Disposal of High-Level Radioactive Wastes in Geological Repositories](#)

10 CFR Part 60

[Licensing Requirements for Land Disposal of Radioactive Waste](#)

10 CFR Part 61

**APPENDIX I**  
**Planning Checklist for Institutional Controls**

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**(Source: DOE 2005)**

During the planning phase, DOE sites can develop and use a checklist for identifying, evaluating, and selecting appropriate institutional controls for use at their sites. A checklist example follows:

- Provide maps and figures showing boundaries of the planned institutional controls.
- Document risk exposure assumptions and reasonably anticipated land uses, as well as any known prohibited uses that might not be obvious on the basis of reasonably anticipated land uses.
- Describe the need for the institutional controls (e.g., security, public risk, site integrity, etc.).
- State performance objectives.
- Generally describe the institutional controls, the rationale for their selection and a consequence assessment if they are not used.
- Describe the necessary duration.
- Identify roles and responsibilities.
- Identify monitoring and reporting needs.
- Provide a list of institutional controls considered or evaluated for the purpose of selecting appropriate institutional control mechanisms to be implemented.
- If applicable, provide a comparison of institutional controls to be implemented at the site with requirements for institutional controls stipulated in the appropriate documentation.

Application of a Defense-in-Depth or Layering Approach

During the planning phase, DOE sites should consider the following:

- a. What levels and types of protective measures (e.g., physical, administrative, etc.) are appropriate for the associated risks?
- b. How much redundancy (layers of protection) does each situation warrant?
- c. How effectively will institutional controls address the specific conditions (e.g., exposure to contaminated ground water) for the necessary period?

d. How effectively will the institutional controls survive future changes that may occur in:

1. The status of property (e.g., change in property ownership),
2. Contamination (e.g., decay or migration),
3. Exposure pathways (e.g., cross media impacts), or
4. Receptors (e.g., change in site use)?

**APPENDIX J**  
**Examples of SNL/NM Site-Wide Institutional Controls**

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**Examples of SNL/NM Site-Wide Institutional Controls**

Category of Institutional Control	Types of Institutional Controls	Objective	Protects
Warning Notices	Signs, monuments	<ul style="list-style-type: none"> <li>• Provide visual identification and warning of hazardous or sensitive areas.</li> <li>• Provide information on restrictions, access information, contact information and emergency information.</li> <li>• Limit or restrict access to the site, or portions of the site.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Inadvertent intruders</li> <li>• Future generations</li> </ul>
Entry and Access Restrictions	Procedural and Security Requirements for Access	<ul style="list-style-type: none"> <li>• Control human access to hazardous or sensitive areas or property.</li> <li>• Ensure adequate training for those who enter hazardous or sensitive areas.</li> <li>• Avoid disturbance and exposure to hazardous waste.</li> <li>• Provide a basis for the enforcement of access restrictions.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Inadvertent intruders</li> </ul>
	Fencing	<ul style="list-style-type: none"> <li>• Restrict or prevent unauthorized access to hazardous or sensitive areas.</li> <li>• Provide protective barriers to standard industrial hazards.</li> <li>• Provide visual warnings.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Inadvertent intruders</li> </ul>
	Physical Barriers	<ul style="list-style-type: none"> <li>• Restrict or prevent unauthorized access to hazardous or sensitive areas.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Inadvertent intruders</li> </ul>
Resource- and Land-Use Management	Land-Use and Real Property Controls, Notifications and Restrictions	<ul style="list-style-type: none"> <li>• Ensure that use of the land is compatible with any hazards that exist.</li> <li>• Ensure that any changes in use of the land are adequately assessed before being allowed.</li> <li>• Ensure that the record of the property documents restrictions that will apply beyond change in ownership or management of the property.</li> <li>• Assure that any changes in property ownership or control, or oversight will be communicated to the appropriate parties and required notifications will be provided.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Future generations</li> <li>• Non-DOE entities using DOE land</li> <li>• Environmental receptors</li> </ul>
	Excavation Permits	<ul style="list-style-type: none"> <li>• Avoid unplanned disturbance or infiltration.</li> <li>• Inform and protect workers regarding potential exposure to hazardous waste.</li> <li>• Avoid the creation of potential pathways for the migration of hazardous waste.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Non-DOE entities using DOE land</li> </ul>
	Groundwater Controls	<ul style="list-style-type: none"> <li>• Ensure proper use of groundwater.</li> <li>• Ensure early detection of contaminant movement.</li> <li>• Detect leaks.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Future generations</li> <li>• Non-DOE entities using DOE land</li> </ul>
	Government Ownership	<ul style="list-style-type: none"> <li>• Limit or restrict access to the site, or portions of the site.</li> <li>• Restrict or prevent unauthorized access to hazardous or sensitive areas.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Future generations</li> <li>• Environmental receptors</li> </ul>
Site Information Management	Administrative Support, Archives, and Libraries	<ul style="list-style-type: none"> <li>• Maintain and provide access to information on the location and nature of contamination.</li> </ul>	<ul style="list-style-type: none"> <li>• DOE employees</li> <li>• DOE contractors</li> <li>• Site visitors</li> <li>• Future generations</li> </ul>